

JULES VERNE

Classic Science Fiction

TWENTY THOUSAND LEAGUES
UNDER THE SEA

FROM THE EARTH TO THE MOON

ROUND THE MOON





JULES VERNE
CLASSIC SCIENCE FICTION

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in the Nautilus
and
Rocket to the Moon
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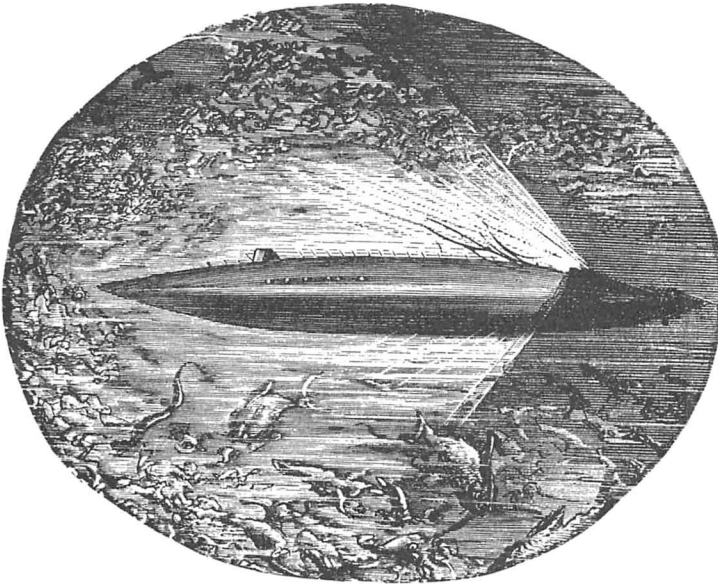
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**Twenty Thousand Leagues
Under the Sea
From the Earth to the Moon
Round the Moon**

These volumes present exciting adventure stories by an author with a remarkable imagination, who has been called “the father of science fiction.” These books created characters and ideas which have stimulated and entertained countless readers since they first appeared.

JULES VERNE

Classic Science Fiction



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The Gun Club, Baltimore.

JULES VERNE

Classic Science Fiction



Three Complete Illustrated Novels

FROM THE EARTH TO THE MOON

ROUND THE MOON

TWENTY THOUSAND LEAGUES
UNDER THE SEA

With Original Illustrations

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The World of Jules Verne

Here—in their full versions and comprising 185 illustrations—are three full-length books by the Father of Science Fiction. These thrilling stories, as exciting to read today as when they were originally published, represent a remarkable imaginative feat by a genius of both storytelling and scientific forecasting.

When these stories were written there were no thoughts of flying to the moon or living under the sea—rockets and submarines remained dreams of a few inventors. Jules Verne's astonishing imagination and inventive powers, however, and the study and research put into his writing, meant that he could forecast with remarkable detail and accuracy what would eventually transpire.

The adventurous appeal of these books is testified to by the fact that they, and so many other works by Jules Verne, have been made into films, thus thrilling new generations who have never read the original books. True, some of the film versions have served him poorly, and have not been faithful adaptations of his original stories and characters (a select listing of films based on the works of Jules Verne is provided), which is apparent from the books in this volume. *From the Earth to the Moon* was the basis for a poor film made in 1958, and might possibly have been the starting point for a 1967 comedy entitled *Jules Verne's Rocket to the Moon*. *Twenty Thousand Leagues Under the Sea*, however, has been filmed twice; the second time was the excellent version by Walt Disney in 1954, a classic, exciting and faithful adaptation which introduced Verne to a new generation.

From the Earth to the Moon is presented in this volume together with its companion *Round the Moon*, but originally they were published five years apart: some cliffhanger! Together they are an astonishing premonition of the shape of things to come. At a time when flight was possible only by balloon, and scientists considered powered flight an impracticable dream, Verne was thinking of the first flight from the earth. It is remarkable, and testimony to his scientific approach, that so much of what he forecast was either accurate or a reasonable speculation. There are a number of remarkable similarities

between his stories and what would take place a century later with the first circum-lunar flight of Apollo 8. Some of Verne's scenarios which closely resemble reality are:

- * launch from Florida
- * weightlessness in space
- * speed of Verne's astronauts was 24,545 mph (12,000 yards per second), Apollo 8 was 24,226 mph
- * December flight: for Verne 1 December and Apollo 8 21 December
- * Verne's giant telescope in the Rocky Mountains, so similar in power and location to that eventually located at Mount Palomar
- * 'Splashdown' into the Pacific Ocean
- * Mean distance of the moon in Verne is 234,347 miles; today it is calculated as 238,840 miles. Apollo 8 travelled 234,473 miles—a mere 74 miles more than Verne's forecast
- * Verne's spaceship was 9ft in diameter; the Apollo 8 command module was 11ft 5in high and 12ft 10in in diameter
- * Verne's spaceship carried 3 men and so did Apollo 8 (and even their names nearly compared—Arden and Anders, Barbicane and Bormann, Nicholl and Lovell)
- * Verne forecast a splashdown return to earth in the Pacific Ocean, as actually happened

Considering that Verne made his scientific forecasts a hundred years ago, when the marvels of science were as yet untapped, and he was accurate, is remarkable, but be this as it may, you can read *From the Earth to the Moon* and *Round the Moon* today as a great scientific adventure story.

These two stories did, however, act as inspiration for a film that was a milestone in the history of the cinema, when in 1902 Verne's *From the Earth to the Moon* and H. G. Wells's *The First Men in the Moon* were made into the first-ever science fiction film (precursor of *Close Encounters*, *Star Wars*, etc.) entitled 'A Trip to the Moon' by the famed French film-maker George Méliès. A lengthy film for its day, it ran for 16 minutes.

Verne's Captain Nemo, the megalomaniac genius and commander of the Nautilus, is one

of the great creations of fiction. The complete version of *Twenty Thousand Leagues Under the Sea* is presented in this volume, with all its detail. This adventure story has thrilled generations since it was first published in 1870. It has been presented in many media, and Captain Nemo has featured in 7 films (although only two of these have been of *Twenty Thousand Leagues Under the Sea*). Actors who have played the rôle are:

1916 Allan Holubar
1929 Lionel Barrymore
1954 James Mason
1962 Herbert Lom
1969 Robert Ryan
1973 Omar Shariff
1978 José Ferrer

It is the Walt Disney film which was perhaps the most faithful to Verne's writings, and a splendid epic with excellent effects.

In *Twenty Thousand Leagues Under the Sea* Verne's description of the sea and the undersea world, at times poetic, reflects his own personal love of the ocean. He had crossed the Atlantic in the *Great Eastern* but also delighted in his own yacht the *St. Michel*

and spent much of his time on her. "What a book it will be if I pull it off!" he said during the course of writing it; "what wonderful ideas I have had while sailing on the *St. Michel*." Indeed, he sailed his yacht up the Seine to Paris to see his publisher and discuss this, his latest novel. It is said that his publisher had him sit for the artist Edouard Riou as a model for the character of Professor Pierre Aronnax, although Verne was bearded.

The inspiration for Verne's *Nautilus* may well have been Robert Fulton's submarine *Nautilus* seventy years earlier, although Verne again expanded an idea to the limits of his imagination.

In *Best of Jules Verne 2* there are 500 pages of high adventure by a great storyteller. They are inevitably a reflection of their time in their method of story-telling and their detail, sometimes also in their characterisation, but their joie de vivre and imagination will sweep you along. Here are great classics of adventure presented in their unabridged versions, fully illustrated, for the first time in many years.

We hope that it may be possible to take you on more voyages with Jules Verne in another volume of *The Best of Jules Verne*.

Alan K. Russell

Verne and Films

Around the World in Eighty Days

United Artists/Michael Todd, 1956.

With David Niven, Cantinflas, Robert Newton, Shirley Maclaine, Charles Boyer and John Carradine.

Captain Grant's Children

Disney, 1962 (*In Search of the Castaways*).

With Maurice Chevalier, Hayley Mills, George Sanders and Wilfred Hyde White.

Five Weeks in a Balloon

Fox, 1962.

A Cinemascope film with Peter Lorre, Red Buttons, Fabian and Cedric Hardwicke.

For the Flag

Joseph E. Levine, 1961 (*The Fabulous World of Jules Verne*).

Lighthouse at the End of the World

MGM, 1972 (*The Light at the Edge of the World*).

With Kirk Douglas, Yul Brynner and Samantha Eggar.

From the Earth to the Moon

George Méliès, 1902.

RKO, 1958.

With Joseph Cotten, George Sanders and Debra Paget.

Master of the World

American International, 1961.

With Vincent Price and Charles Bronson. Screenplay by Richard Matheson, who wrote *The Shrinking Man*. The film based on *Robar the Conqueror*, also known as *Clipper of the Clouds* and *Master of the World*.

Michael Strogoff

RKO, 1937 (*The Soldier and the Lady*).

UFUS, 1956.

With Curt Jurgens, Genevieve Page and Jacques Dacqmine.

Mysterious Island

MGM, 1929.

Starring Lionel Barrymore.

Columbia, 1951, Serial.

Columbia, 1961 with Michael Craig, Herbert Lom and Joan Greenwood.

Special effects by Ray Harryhausen.

The Vanished Diamond

Columbia, 1968 (*The Southern Star*).

With George Segal, Ursula Andress, Orson Welles, Harry Andrews.

Twenty Thousand Leagues Under the Sea

George Méliès, 1907.

Universal, 1916.

Disney, 1954.

With Kirk Douglas, James Mason, Peter Lorre and Paul Lukas.

Journey to the Centre of the Earth

French film, 1909.

Twentieth Century Fox, 1959.

With James Mason, Pat Boone and Arlene Dahl.

Other Films

Jules Verne's Rocket to the Moon

American International, 1967.

With Burl Ives, Troy Donahue, Gert Frobe, Hermione Gingold and Terry-Thomas. A comedy which was claimed to have been based on *From the Earth to the Moon*.

Captain Nemo and the Underwater City

MGM, 1969.

With Robert Ryan, Chuck Connors and Nanette Newman.

The Amazing Captain Nemo

Warner, 1978.

José Ferrer.

From the Earth to the Moon

From the Earth to the Moon

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From the Earth to the Moon

CHAPTER I

THE GUN CLUB

DURING the Federal War in the United States, a new and influential club was established in the city of Baltimore in the State of Maryland. It is well known with what energy the taste for military matters became developed amongst that nation of shipowners, shopkeepers, and mechanics. Simple tradesmen jumped their counters to become extemporized captains, colonels, and generals, without having ever passed the School of Instruction at West Point: nevertheless, they quickly rivalled their compeers of the old continent, and, like them, carried off victories by dint of lavish expenditure in ammunition, money, and men.

But the point in which the Americans singularly distanced the Europeans was in the science of *gunnery*. Not, indeed, that their weapons retained a higher degree of perfection than theirs, but that they exhibited unheard-of dimensions, and consequently attained hitherto unheard-of ranges. In point of grazing, plunging, oblique, or enfilading, or point-blank firing, the English, French, and Prussians have nothing to learn; but their cannon, howitzers, and mortars are mere pocket-pistols compared with the formidable engines of the American artillery.

This fact need surprise no one. The Yankees, the first mechanics in the world, are engineers—just as the Italians are musicians and the Germans metaphysicians—by right of birth. Nothing is more natural, therefore, than to perceive them applying their audacious ingenuity to the science of gunnery. Witness the marvels of Parrott, Dahlgren, and Rodman. The Armstrong, Palliser, and Beaulieu guns were compelled to bow before their transatlantic rivals.

Now when an American has an idea, he directly seeks a second American to share it. If there be three, they elect a president and two secretaries. Given *four*, they name a keeper of records, and the office is ready for work; *five*, they convene a general meeting, and the club is fully constituted. So things were managed in Baltimore. The inventor of a new cannon associated himself with the caster and the borer. Thus formed the nucleus of the "Gun Club." In a single month after its formation it

numbered 1833 effective members and 30,565 corresponding members.

One condition was imposed as a *sine quâ non* upon every candidate for admission into the association, and that was the condition of having designed, or (more or less) perfected a cannon; or, in default of a cannon, at least a fire-arm of some description. It may, however, be mentioned that mere inventions of revolvers, five-shooting carbines, and similar small arms, met with but little consideration. Artillerists always commanded the chief place of favour.

The estimation in which these gentlemen were held, according to one of the most scientific exponents of the Gun Club, was "proportional to the masses of their guns, and in the direct ratio of the square of the distances attained by their projectiles."

The Gun Club once founded, it is easy to conceive the result of the inventive genius of the Americans. Their military weapons attained colossal proportions, and their projectiles, exceeding the prescribed limits, unfortunately occasionally cut in two some unoffending pedestrians. These inventions, in fact, left far in the rear the timid instruments of European artillery.

It is but fair to add that these Yankees, brave as they have ever proved themselves to be, did not confine themselves to theories and formulae, but that they paid heavily, *in propriâ personâ*, for their inventions. Amongst them were to be counted officers of all ranks, from lieutenants to generals; military men of every age, from those who were just making their *début* in the profession of arms up to those who had grown old on the gun-carriage. Many had found their rest on the field of battle whose names figured in the "Book of Honour" of the Gun Club; and of those who made good their return the greater proportion bore the marks of their indisputable valour. Crutches, wooden legs, artificial arms, steel hooks, caoutchouc jaws, silver craniums, platinum noses, were all to be found in the collection; and it was calculated by the great statistician Pitcairn that throughout the Gun Club there was not quite one arm between four persons, and exactly two legs between six.

Nevertheless, these valiant artillerists took

no particular account of these little facts, and felt justly proud when the despatches of a battle returned the number of victims at tenfold the quantity of the projectiles expended.

One day, however—sad and melancholy day!—peace was signed between the survivors of the war; the thunder of the guns gradually ceased, the mortars were silent, the howitzers were muzzled for an indefinite period, the cannon, with muzzles depressed, were returned into the arsenal, the shot were repiled, all bloody reminiscences were effaced; the cotton-plants grew luxuriantly in the well-manured fields, all mourning garments were laid aside, together with grief; and the Gun Club was relegated to profound inactivity.

Some few of the more advanced and inveterate theorists set themselves again to work upon calculations regarding the laws of projectiles. They reverted invariably to gigantic shells and howitzers of unparalleled calibre. Still, in default of practical experience, what was the value of mere theories? Consequently, the club-rooms became deserted, the servants dozed in the ante-chambers, the newspapers grew mouldy on the tables, sounds of snoring came from dark corners, and the members of the Gun Club, erstwhile so noisy in their séances, were reduced to silence by this disastrous peace and gave themselves up wholly to dreams of a Platonic kind of artillery.

"This is horrible!" said Tom Hunter one evening, while rapidly carbonizing his wooden legs in the fire-place of the smoking-room; "nothing to do! nothing to look forward to! what a loathsome existence! When again shall the guns arouse us in the morning with their delightful reports?"

"Those days are gone by," said jolly Bilsby, trying to extend his missing arms. "It was delightful once upon a time! One invented a gun, and hardly was it cast, when one hastened to try it in the face of the enemy! Then one returned to camp with a word of encouragement from Sherman or a friendly shake of the hand from McClellan. But now the generals are gone back to their counters; and in place of projectiles, they despatch bales of cotton. By Jove, the future of gunnery in America is lost!"

"Ay! and no war in prospect!" continued the famous James T. Maston, scratching with his steel hook his gutta-percha cranium. "Not a cloud in the horizon! and that too at such a critical period in the progress of the science of artillery! Yes, gentlemen! I who address you have myself this very morning perfected a model (plan, section, elevation, &c.) of a mortar destined to change all the conditions of

warfare!"

"No! is it possible?" replied Tom Hunter, his thoughts reverting involuntarily to a former invention of the Hon. J. T. Maston, by which, at its first trial, he had succeeded in killing three hundred and thirty-seven people.

"Fact!" replied he. "Still, what is the use of so many studies worked out, so many difficulties vanquished? It's mere waste of time! The New World seems to have made up its mind to live in peace; and our bellicose *Tribune* predicts some approaching catastrophes arising out of this scandalous increase of population."

"Nevertheless," replied Colonel Blomsberry, "they are always struggling in Europe to maintain the principle of nationalities."

"Well?"

"Well, there might be some field for enterprise down there; and if they would accept our services—"

"What are you dreaming of?" screamed Bilsby; "work at gunnery for the benefit of foreigners?"

"That would be better than doing nothing here," returned the colonel.

"Quite so," said J. T. Maston; "but still we need not dream of that expedient."

"And why not?" demanded the colonel.

"Because their ideas of progress in the Old World are contrary to our American habits of thought. Those fellows believe that one can't become a general without having served first as an ensign; which is as much as to say that one can't point a gun without having first cast it oneself!"

"Ridiculous!" replied Tom Hunter, whittling with his bowie-knife the arms of his easy-chair; "but if that be the case there, all that is left for us is to plant tobacco and distil whale-oil."

"What!" roared J. T. Maston, "shall we not employ these remaining years of our life in perfecting fire-arms? Shall there never be a fresh opportunity of trying the ranges of projectiles? Shall the air never again be lighted with the glare of our guns? No international difficulty ever arise to enable us to declare war against some transatlantic power? Shall not the French sink one of our steamers, or the English, in defiance of the rights of nations, hang a few of our countrymen?"

"No such luck," replied Colonel Blomsberry; "nothing of the kind is likely to happen; and even if it did, we should not profit by it. American susceptibility is fast declining and we are all going to the dogs."

"It is too true," replied J. T. Maston, with

fresh violence; "there are a thousand grounds for fighting, and yet we don't fight. We save up our arms and legs for the benefit of nations who don't know what to do with them! But stop—without going out of one's way to find a cause for war—did not North America once belong to the English?"

"Undoubtedly," replied Tom Hunter, stamping his crutch with fury.

"Well then," replied J. T. Maston, "why should not England in her turn belong to the Americans?"

"It would be but just and fair," returned Colonel Blomsberry.

"Go and propose it to the President of the United States," cried J. T. Maston, "and see how he will receive you."

"Bah!" growled Bilksby between the four teeth which the war had left him; "that will never do!"

"By Jove!" cried J. T. Maston, "he mustn't count on my vote at the next election!"

"Nor on ours," replied unanimously all the bellicose invalids.

"Meanwhile," replied J. T. M., "allow me

to say that, if I cannot get an opportunity to try my new mortars on a real field of battle, I shall say good-bye to the members of the Gun Club, and go and bury myself in the prairies of Arkansas!"

In that case we will accompany you," cried the others.

Matters were in this unfortunate condition, and the club was threatened with approaching dissolution, when an unexpected circumstance occurred to prevent so deplorable a catastrophe.

On the morrow after this conversation every member of the association received a sealed circular couched in the following terms:—

"BALTIMORE, Oct. 3.

"The President of the Gun Club has the honour to inform his colleagues that, at the meeting of the 5th instant, he will bring before them a communication of an extremely interesting nature. He requests, therefore, that they will make it convenient to attend in accordance with the present invitation.—Very cordially,

"IMPEY BARBICANE, P.G.C."



President Barbicane.

From the Earth to the Moon

CHAPTER II

PRESIDENT BARBICANE'S COMMUNICATION

ON the 5th of October, at 8 p.m., a dense crowd pressed towards the saloons of the Gun Club at No. 21, Union Square. All the members of the association resident in Baltimore attended the invitation of their president. As regards the corresponding members, notices were delivered by hundreds throughout the streets of the city, and, large as was the great hall, it was quite inadequate to accommodate the crowd of *savants*. They overflowed into the adjoining rooms, down the narrow passages, into the outer courtyards. There they ran against the vulgar herd who pressed up to the doors, each struggling to reach the front ranks, all eager to learn the nature of the important communication of President Barbicane; all pushing, squeezing, crushing with that perfect freedom of action which is peculiar to the masses when educated in ideas of "self-government."

On that evening a stranger who might have chanced to be in Baltimore could not have gained admission for love or money into the great hall. That was reserved exclusively for resident or corresponding members; no one else could possibly have obtained a place; and the city magnates, municipal councillors, and "select men" were compelled to mingle with the mere townspeople in order to catch stray bits of news from the interior.

Nevertheless the vast hall presented a curious spectacle. Its immense area was singularly adapted to the purpose. Lofty pillars formed of cannon, superposed upon huge mortars as a base, supported the fine ironwork of the arches, a perfect piece of cast-iron lacework. Trophies of blunderbuses, matchlocks, arquebuses, carbines, all kinds of fire-arms, ancient and modern, were picturesquely interlaced against the walls. The gas lit up in full glare myriads of revolvers grouped in the form of lustres, whilst groups of pistols, and candelabra formed of muskets bound together, completed this magnificent display of brilliance. Models of cannon, bronze castings, sights covered with dents, plates battered by the shots of the Gun Club, assortments of rammers and sponges, chaplets of shells, wreaths of projectiles, garlands of howitzers—in short, all the apparatus of the artillery, enchanted the eye by this wonderful arrangement and induced

a kind of belief that their real purpose was ornamental rather than deadly.

At the further end of the saloon the president, assisted by four secretaries, occupied a large platform. His chair, supported by a carved gun-carriage, was modelled upon the ponderous proportions of a 32-inch mortar. It was pointed at an angle of ninety degrees, and suspended upon trunnions, so that the president could balance himself upon it as upon a rocking-chair, a very agreeable fact in the very hot weather. Upon the table (a huge iron plate supported upon six carronnades) stood an inkstand of exquisite elegance, made of a beautifully chased Spanish piece, and a sonnette, which, when required, could give forth a report equal to that of a revolver. During violent debates this novel kind of bell scarcely sufficed to drown the clamour of these excitable artillerymen.

In front of the table benches arranged in zigzag form, like the circumvallations of a retrenchment, formed a succession of bastions and curtains set apart for the use of the members of the club; and on this especial evening one might say, "All the world was on the ramparts." The president was sufficiently well known, however, for all to be assured that he would not put his colleagues to discomfort without some very strong motive.

Impey Barbicane was a man of forty years of age, calm, cold, austere; of a singularly serious and self-contained demeanour, punctual as a chronometer, of imperturbable temper and immovable character; by no means chivalrous, yet adventurous withal, and always bringing practical ideas to bear upon the very rashest enterprises; an essentially New-Englander, a Northern colonist, a descendant of the old anti-Stuart Roundheads, and the implacable enemy of the gentlemen of the South, those ancient Cavaliers of the mother-country. In a word, he was a Yankee to the backbone.

Barbicane had made a large fortune as a timber-merchant. Being nominated Director of Artillery during the war, he proved himself fertile in invention. Bold in his conceptions, he contributed powerfully to the progress of that arm and gave an immense impetus to experimental researches.

He was a personage of the middle height, having, by a rare exception in the Gun Club, all his limbs complete. His strongly-marked features seemed drawn by square and rule; and if it be true that, in order to judge of a man's character one must look at his profile, Barbicane, so examined, exhibited the most certain indications of energy, audacity, and *song-froid*.

At this moment he was sitting in his armchair, silent, absorbed, lost in reflection, sheltered under his high-crowned hat—a kind of black silk cylinder which always seems firmly screwed upon the head of an American.

Just when the deep-toned clock in the great hall struck eight, Barbicane, as if he had been set in motion by a spring, raised himself up. A profound silence ensued, and the speaker, in a somewhat emphatic tone of voice, commenced as follows:—

“My brave colleagues, too long already a paralyzing peace has plunged the members of the Gun Club in deplorable inactivity. After a period of years full of incidents we have been compelled to abandon our labours, and to stop short on the road of progress. I do not hesitate to state, boldly, that any war which should recall us to arms would be welcome!” (*Cries of ‘Hear’ hear!’*) “But war, gentlemen, is impossible under existing circumstances; and, however we may desire it, many years may elapse before our cannon shall again thunder in the field of battle. We must make up our minds, then, to seek in another train of ideas some field for activity which we all pine for.”

The meeting felt that the president was now approaching the critical point, and redoubled their attention accordingly.

“For some months past, my brave colleagues,” continued Barbicane, “I have been asking myself whether, while confining ourselves to our own particular objects, we could not enter upon some grand experiment worthy of the nineteenth century; and whether the progress of artillery science would not enable us to carry it out to a successful issue. I have been considering, working, calculating; and the result of my studies is the conviction that we are safe to succeed in an enterprise which to any other country would appear wholly impracticable. This project, the result of long elaboration, is the object of my present communication. It is worthy of yourselves, worthy of the antecedents of the Gun Club; and it cannot fail to make some noise in the world.”

A thrill of excitement ran through the meeting.

Barbicane, having by a rapid movement

firmly fixed his hat upon his head, calmly continued his harangue:—

“There is no one among you, my brave colleagues, who has not seen *the Moon*, or, at least, heard speak of it. Don't be surprised if I am about to discourse to you regarding this Queen of the Night. It is perhaps reserved for us to become the Columbuses of this unknown world. Only enter into my plans, and second me with all your power, and I will lead you to its conquest, and its name shall be added to those of the thirty-six States which compose this Great Union.”

“Three cheers for the Moon!” roared the Gun Club, with one voice.

“The moon, gentlemen, has been carefully studied,” continued Barbicane; “her mass, density, and weight; her constitution, motions, distance, as well as her place in the solar system, have all been exactly determined. Selenographic charts have been constructed with a perfection which equals, if it does not even surpass, that of our terrestrial maps. Photography has given us proofs of the incomparable beauty of our satellite; in short, all is known regarding the moon which mathematical science, astronomy, geology, and optics can learn about her. But up to the present moment no direct communication has been established with her.”

A violent movement of interest and surprise here greeted this remark of the speaker.

“Permit me,” he continued, “to recount to you briefly how certain ardent spirits, starting on imaginary journeys, have penetrated the secrets of our satellite. In the seventeenth century a certain David Fabricius boasted of having seen with his own eyes the inhabitants of the moon. In 1649 a Frenchman, one Jean Baudoin, published a ‘Journey performed from the Earth to the Moon by Domingo Gonzalez,’ a Spanish Adventurer. At the same period Cyrano de Bergerac published that celebrated ‘Journeys in the Moon’ which met with such success in France. Somewhat later another Frenchman, named Fontenelle, wrote ‘The Plurality of Worlds,’ a *chef-d’oeuvre* of its time. About 1835 a small treatise, translated from the *New York American*, related how Sir John Herschell, having been despatched to the Cape of Good Hope for the purpose of making there some astronomical calculations, had, by means of a telescope brought to perfection by means of internal lighting, reduced the apparent distance of the moon to eighty yards! He then distinctly perceived caverns frequented by hippopotami, green mountains bordered by golden lace-work, sheep with horns of ivory, a



Meeting of the Gun-Club.

white species of deer, and inhabitants with membranous wings, like bats. This *brochure*, the work of an American named Locke, had a great sale. But, to bring this rapid sketch to a close, I will only add that a certain Hans Pfaal, of Rotterdam, launching himself in a balloon filled with a gas extracted from nitrogen, thirty-seven times lighter than hydrogen, reached the moon after a passage of nineteen hours. This journey, like all the previous ones, was purely imaginary; still, it was the work of a popular American author—I mean, Edgar Poe!”

“Cheers for Edgar Poe!” roared the assemblage, electrified by their president’s words.

“I have now enumerated,” said Barbicane, “the experiments which I call purely paper ones, and wholly insufficient to establish serious relations with the Queen of Night. Nevertheless, I am bound to add that some practical geniuses have attempted to establish actual communication with her. Thus, a few years ago, a German geometrician proposed to send a scientific expedition to the steppes of Siberia. There, on those vast plains, they were to describe enormous geometric figures, drawn in characters of reflecting luminosity, amongst which was the prop. regarding the ‘square of the hypotenuse,’ commonly called the ‘Ass’s bridge’ by the French. ‘Every intelligent being,’ said the geometrician, ‘must understand the scientific meaning of that figure. The Selenites, do they exist, will respond by a similar figure; and, a communication being thus once established, it will be easy to form an alphabet which shall enable us to converse with the inhabitants of the moon.’ So spoke the German geometrician; but his project was never put into practice, and up to the present day there is no bond in existence between the earth and her satellite. It is reserved for the practical genius of Americans to establish a communication with the sidereal world. The means of arriving thither are simple, easy, certain, infallible—

and that is the purpose of my present proposal.”

A storm of acclamations greeted these words. There was not a single person in the whole audience who was not overcome, carried away, lifted out of himself by the speaker’s words!

“Hear! hear! Silence!” resounded from all sides.

As soon as the excitement had partially subsided, Barbicane resumed his speech in a somewhat graver voice.

“You know,” said he, “what progress artillery science has made during the last few years, and what a degree of perfection fire-arms of every kind have reached. Moreover, you are well aware that, in general terms, the resisting power of cannon and the expansive force of gunpowder are practically unlimited. Well! starting from this principle, I ask myself whether, supposing sufficient apparatus could be obtained constructed upon the conditions of ascertained resistance, it might not be possible to project a shot up to the moon?”

At these words a murmur of amazement escaped from a thousand panting chests; then succeeded a moment of perfect silence, resembling that profound stillness which precedes the bursting of a thunderstorm. In point of fact, a thunderstorm did peal forth, but it was the thunder of applause, of cries, and of uproar which made the very hall tremble. The president attempted to speak, but could not. It was fully ten minutes before he could make himself heard.

“Suffer me to finish,” he calmly continued. “I have looked at the question in all its bearings, I have resolutely attacked it, and by incontrovertible calculations I find that a projectile endowed with an initial velocity of 12,000 yards per second, and aimed at the moon, must necessarily reach it. I have the honour, my brave colleagues, to propose a trial of this little experiment.”

From the Earth to the Moon

CHAPTER III

EFFECT OF THE PRESIDENT'S COMMUNICATION

It is impossible to describe the effect produced by the last words of the hon. president—the cries, the shouts, the succession of roars, hurrahs, and all the varied vociferations which the American language is capable of supplying. It was a scene of indescribable confusion and uproar. They shouted, they clapped, they stamped on the floor of the hall. All the weapons in the museum discharged at once could not have more violently set in motion the waves of sound. One need not be surprised at this. There are some cannoneers nearly as noisy as their own guns.

Barbicane remained calm in the midst of the enthusiastic clamour; perhaps he was desirous of addressing a few more words to his colleagues, for by his gestures he demanded silence, and his powerful alarum was worn out by its violent reports. No attention, however, was paid to his request. He was presently torn from his seat and passed from the hands of his faithful colleagues into the arms of a no less excited crowd.

Nothing can astound an American. It has often been asserted that the word "impossible" is not a French one. People have evidently been deceived by the dictionary. In America, all is easy, all is simple; and as for mechanical difficulties, they are overcome before they arise. Between Barbicane's proposition and its realization no true Yankee would have allowed even the semblance of a difficulty to be possible. A thing with them is no sooner said than done.

The triumphal progress of the president continued throughout the evening. It was a regular torchlight procession. Irish, Germans, French, Scotch, all the heterogeneous units which make up the population of Maryland shouted in their respective vernaculars; and the "vivas," "hurrahs," and "bravos" were intermingled in inexpressible enthusiasm.

Just at this crisis, as though she comprehended all this agitation regarding herself, the Moon shone forth with serene splendour, eclipsing by her intense illumination all the surrounding lights. The Yankees all turned their gaze towards her resplendent orb, kissed their hands, called her by all kinds of endearing names. Between eight o'clock and midnight one

optician in Jones'-Fall Street made his fortune by the sale of opera-glasses.

Midnight arrived, and the enthusiasm showed no signs of diminution. It spread equally among all classes of citizens—men of science, shopkeepers, merchants, porters, chair-men, as well as "greenhorns," were stirred in their innermost fibres. A national enterprise was at stake. The whole city, high and low, the quays bordering the Patapsco, the ships lying in the basins, disgorged a crowd drunk with joy, gin, and whisky. Every one chattered, argued, discussed, disputed, applauded, from the gentleman lounging upon the bar-room settee with his tumbler of sherry-cobbler before him down to the waterman who got drunk upon his "knock-me-down" in the dingy taverns of Fell Point.

About 2 a.m., however, the excitement began to subside. President Barbicane reached his house, bruised, crushed, and squeezed almost to a mummy. A Hercules could not have resisted a similar outbreak of enthusiasm. The crowd gradually deserted the squares and streets. The four railways from Ohio, Susquehanna, Philadelphia, and Washington, which converge at Baltimore, whirled away the heterogeneous population to the four corners of the United States, and the city subsided into comparative tranquillity.

On the following day, thanks to the telegraphic wires, five hundred newspapers and journals, daily, weekly, monthly, or bi-monthly, all took up the question. They examined it under all its different aspects, physical, meteorological, economical, or moral, up to its bearings on politics or civilization. They debated whether the moon was a finished world, or whether it was destined to undergo any further transformation. Did it resemble the earth at the period when the latter was destitute as yet of an atmosphere? What kind of spectacle would its hidden hemisphere present to our terrestrial spheroid? Granting that the question at present was simply that of sending a projectile up to the moon, every one must see that that involved the commencement of a series of experiments. All must hope that some day America would penetrate the deepest secrets of that mysterious orb; and some even



The Torchlight Procession

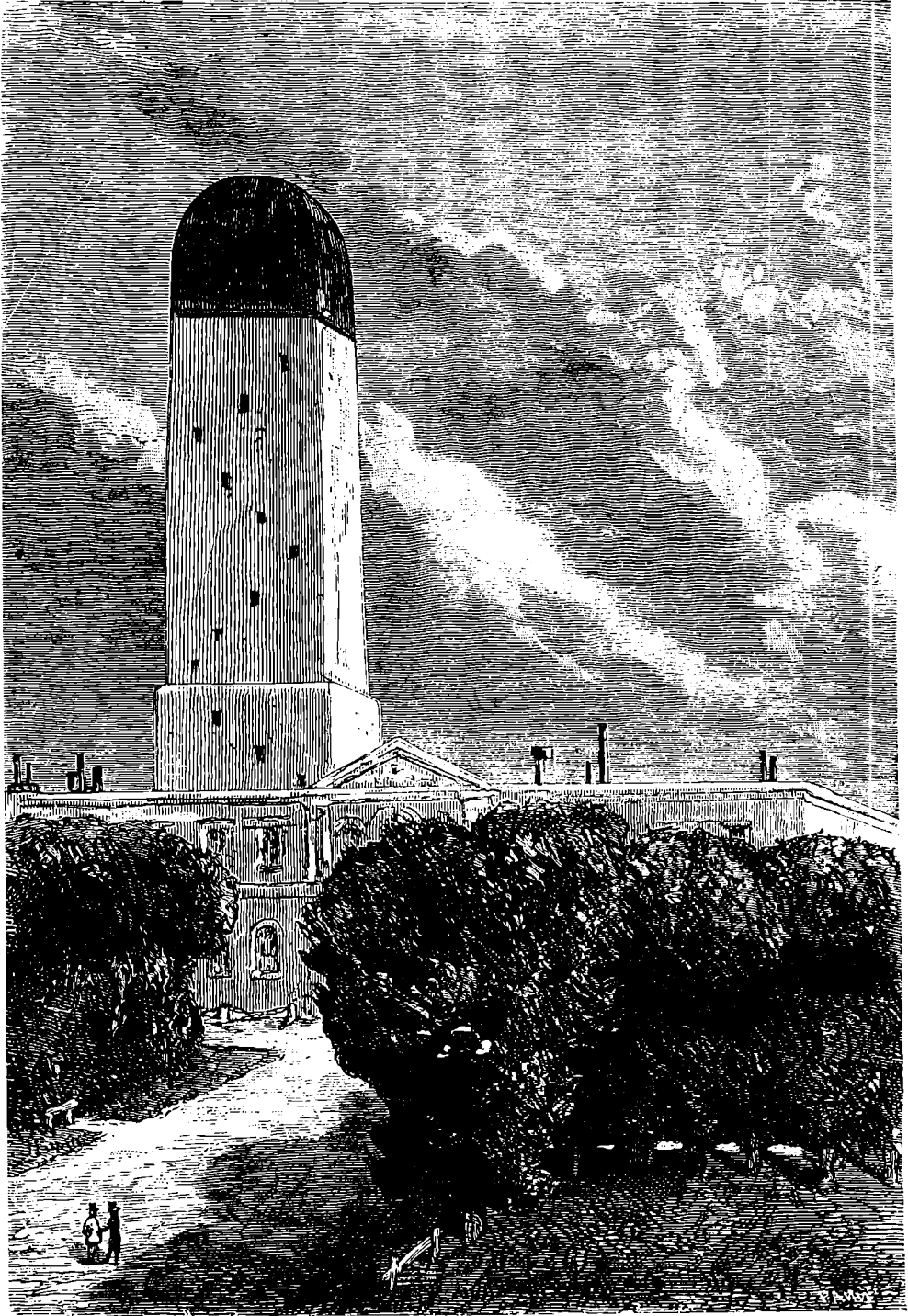
seemed to fear lest its conquest should not sensibly derange the equilibrium of Europe.

The project once under discussion, not a single paragraph suggested a doubt of its realization. All the papers, pamphlets, reports—all the journals published by the scientific, literary, and religious societies enlarged upon its advantages; and the Society of Natural History of Boston, the Society of Science and Art of Albany, the Geographical and Statistical Society of New York, the Philosophical Society of Philadelphia, and the Smithsonian of Washington sent innumerable letters of congratulation to the Gun Club, together with offers of immediate assistance and money.

From that day forward Impey Barbicane became one of the greatest citizens of the

United States, a kind of Washington of Science. A single trait of feeling, taken from many others, will serve to show the point which this homage of a whole people to a single individual attained.

Some few days after this memorable meeting of the Gun Club, the manager of an English company announced, at the Baltimore theatre, the production of "Much ado about Nothing." But the populace, seeing in that title an allusion damaging to Barbicane's project, broke into the auditorium, smashed the benches, and compelled the unlucky director to alter his playbill. Being a sensible man, he bowed to the public will and replaced the offending comedy by "As you like it;" and for many weeks he realized fabulous profits.



Cambridge Observatory.

From the Earth to the Moon

CHAPTER IV

REPLY FROM THE OBSERVATORY OF CAMBRIDGE

BARBICANE, however, lost not one moment amidst all the enthusiasm of which he had become the object. His first care was to reassemble his colleagues in the board-room of the Gun Club. There, after some discussion, it was agreed to consult the astronomers regarding the astronomical part of the enterprize. Their reply once ascertained, they could then discuss the mechanical means, and nothing should be wanting to ensure the success of this great experiment.

A note couched in precise terms, containing special interrogatories, was then drawn up and addressed to the Observatory of Cambridge in Massachusetts. This city, where the first University of the United States was founded, is justly celebrated for its astronomical staff. There are to found assembled all the most eminent men of science. Here is to be seen at work that powerful telescope which enabled Bond to resolve the nebula of Andromeda, and Clarke to discover the satellite of Sirius. This celebrated institution fully justified on all points the confidence reposed in it by the Gun Club.

So, after two days, the reply so impatiently awaited was placed in the hands of President Barbicane.

It was couched in the following terms:—

“The Director of the Cambridge Observatory to the President of the Gun Club at Baltimore.

CAMBRIDGE, Oct. 7.

“On the receipt of your favour of the 6th inst., addressed to the Observatory of Cambridge in the name of the Members of the Baltimore Gun Club, our staff was immediately called together, and it was judged expedient to reply as follows:—

“The questions which have been proposed to it are these,—

“1. Is it possible to transmit a projectile up to the moon?

“2. What is the exact distance which separates the earth from its satellite?

“3. What will be the period of transit of the projectile when endowed with sufficient initial velocity? and, consequently, at what moment ought it to be discharged in order that it may touch the moon at a particular point?

“4. At what precise moment will the moon present herself in the most favourable position to be reached by the projectile?

“5. What point in the heavens ought the cannon to be aimed at which is intended to discharge the projectile?

“6. What place will the moon occupy in the heavens at the moment of the projectile's departure?”

“Regarding the *first* question, ‘Is it possible to transmit a projectile up to the moon?’

Answer.—Yes; provided it possess an initial velocity of 12,000 yards per second; calculations prove that to be sufficient. In proportion as we recede from the earth the action of gravitation diminishes in the inverse ratio of the square of the distance; that is to say, *at three times a given distance the action is nine times less*. Consequently, the weight of a shot will decrease, and will become reduced to *zero* at the instant that the attraction of the moon exactly counterpoises that of the earth; that is to say, at 47/52 of its passage. At that instant the projectile will have no weight whatever; and, if it passes that point, it will fall into the moon by the sole effect of the lunar attraction. The *theoretical possibility* of the experiment is therefore absolutely demonstrated; its *success* must depend upon the power of the engine employed.

“As to the *second* question, ‘What is the exact distance which separates the earth from its satellite?’

Answer.—The moon does not describe a *circle* round the earth, but rather an *ellipse*, of which our earth occupies one of the *foci*; the consequence, therefore, is, that at certain times it approaches nearer to, and at others it recedes farther from, the earth; in astronomical language, it is at one time in *apogee*, at another in *perigee*. Now the difference between its greatest and its least distance is too considerable to be left out of consideration. In point of fact, in its apogee the moon is 247,552 miles, and in its perigee, 218,657 miles only distant; a fact which makes a difference of 28,895 miles, or more than one ninth of the entire distance. The perigee distance, therefore, is that which ought to serve as the basis of all calculations.

“To the *third* question:—

"*Answer.*—If the shot should preserve continuously its initial velocity of 12,000 yards per second, it would require little more than nine hours to reach its destination; but, inasmuch as that initial velocity will be continually decreasing, it results that, taking everything into consideration, it will occupy 300,000 seconds, that is 83hrs. 20m. in reaching the point where the attraction of the earth and moon will be *in equilibrio*. From this point it will fall into the moon in 50,000 seconds, or 13hrs. 53m. 20sec. It will be desirable, therefore, to discharge it 97hrs. 13m. 20sec. before the arrival of the moon at the point aimed at.

"Regarding question *four*, 'At what precise moment will the moon present herself in the most favourable position, &c.?' "

"*Answer.*—After what has been said above, it will be necessary, first of all, to choose the period when the moon will be in perigee, and *also* the moment when she will be crossing the zenith, which latter event will further diminish the entire distance by a length equal to the radius of the earth, i.e. 3919 miles; the result of which will be that the final passage remaining to be accomplished will be 214,976 miles. But although the moon passes her perigee every month, she does not reach the zenith always *at exactly the same moment*. She does not appear under these two conditions simultaneously, except at long intervals of time. It will be necessary, therefore, to wait for the moment when her passage in perigee shall coincide with that in the zenith. Now, by a fortunate circumstance, on the 4th December in the ensuing year the moon *will* present two conditions. At midnight she will be in perigee, that is, at her shortest distance from the earth, and at the same moment she will be crossing the zenith.

"On the *fifth* question, 'At what point in the heavens ought the cannon to be aimed?'

"*Answer.*—The preceding remarks being admitted, the cannon ought to be pointed to the zenith of the place. Its fire, therefore, will be perpendicular to the plane of the horizon; and the projectile will soonest pass beyond the range of the terrestrial attraction. But, in order that the moon should reach the zenith of a given place, it is necessary that the place should not exceed in latitude the declination of the luminary; in other words, it must be comprised within the degrees 0° and 28° of lat. N. or S. In every other spot the fire must necessarily be oblique, which would seriously militate against the success of the experiment.

"As to the *sixth* question, 'What place will the moon occupy in the heavens at the moment

of the projectile's departure?'

"*Answer.*—At the moment when the projectile shall be discharged into space, the moon, which travels daily forward 13° 10' 35", will be distant from the zenith point by four times that quantity, i.e. by 52° 42' 20", a space which corresponds to the path which she will describe during the entire journey of the projectile. But, inasmuch as it is equally necessary to take into account the deviation which the rotary motion of the earth will impart to the shot, and as the shot cannot reach the moon until after a deviation equal to 16 radii of the earth, which, calculated upon the moon's orbit, are equal to about eleven degrees, it becomes necessary to add these eleven degrees to those which express the retardation of the moon just mentioned: that is to say, in round numbers, about 64 degrees. Consequently, at the moment of firing the visual radius applied to the moon will describe, with the vertical line of the place, an angle of sixty-four degrees.

"These are our answers to the questions proposed to the Observatory of Cambridge by the members of the Gun Club:—

"To sum up,—

"1st. The cannon ought to be planted in a country situated between 0° and 28° of N. or S. lat.

"2ndly. It ought to be pointed directly towards the zenith of the place.

"3rdly. The projectile ought to be propelled with an initial velocity of 12,000 yards per second.

"4thly. It ought to be discharged at 10hrs. 46m. 40sec. of the 1st December of the ensuing year.

"5thly. It will meet the moon four days after its discharge, precisely at midnight on the 4th December, at the moment of its transit across the zenith.

"The members of the Gun Club ought, therefore, without delay, to commence the works necessary for such an experiment, and to be prepared to set to work at the moment determined upon; for, if they should suffer this 4th December to go by, they will not find the moon again under the same conditions of perigee and of zenith until eighteen years and eleven days afterwards.

"The Staff of the Cambridge Observatory place themselves entirely at their disposal in respect of all questions of theoretical astronomy; and herewith add their congratulations to those of all the rest of America.

"For the Astronomical Staff,

"J. M. BELFAST,

"*Director of the Observatory of Cambridge.*"

From the Earth to the Moon

CHAPTER V

THE ROMANCE OF THE MOON

AN observer endued with an infinite range of vision, and placed in that unknown centre around which the entire world revolves, might have beheld myriads of atoms filling all space during the chaotic epoch of the universe. Little by little, as ages went on, a change took place; a general law of attraction manifested itself, to which the hitherto errant atoms became obedient: these atoms combined together chemically according to their affinities, formed themselves into molecules, and composed those nebulous masses with which the depths of the heavens are strewed.

These masses became immediately endued with a rotary motion around their own central point. This centre, formed of indefinite molecules, began to revolve round its own axis during its gradual condensation; then, following the immutable laws of mechanics, in proportion as its bulk diminished by condensation, its rotary motion became accelerated, and these two effects continuing, the result was the formation of one principal star, the centre of the nebulous mass.

By attentively watching, the observer would then have perceived the other molecules of the mass, following the example of this central star, become likewise condensed by gradually accelerated rotation, and gravitating round it in the shape of innumerable stars. Thus was formed the *Nebuloe*, of which astronomers have reckoned up nearly 5000.

Amongst these 5000 nebulae there is one which has received the name of the Milky Way, and which contains eighteen millions of stars, each of which has become the centre of a solar world.

If the observer had then specially directed his attention to one of the more humble and less brilliant of these stellar bodies, a star of the fourth class, that which is arrogantly called the Sun, all the phenomena to which the formation of the Universe is to be ascribed would have been successively fulfilled before his eyes. In fact, he would have perceived this sun, as yet in the gaseous state, and composed of moving molecules, revolving round its axis in order to accomplish its work of concentration. This motion, faithful to the laws of mechanics, would have been accelerated with

the diminution of its volume; and a moment would have arrived when the centrifugal force would have overpowered the centripetal, which causes the molecules all to tend towards the centre.

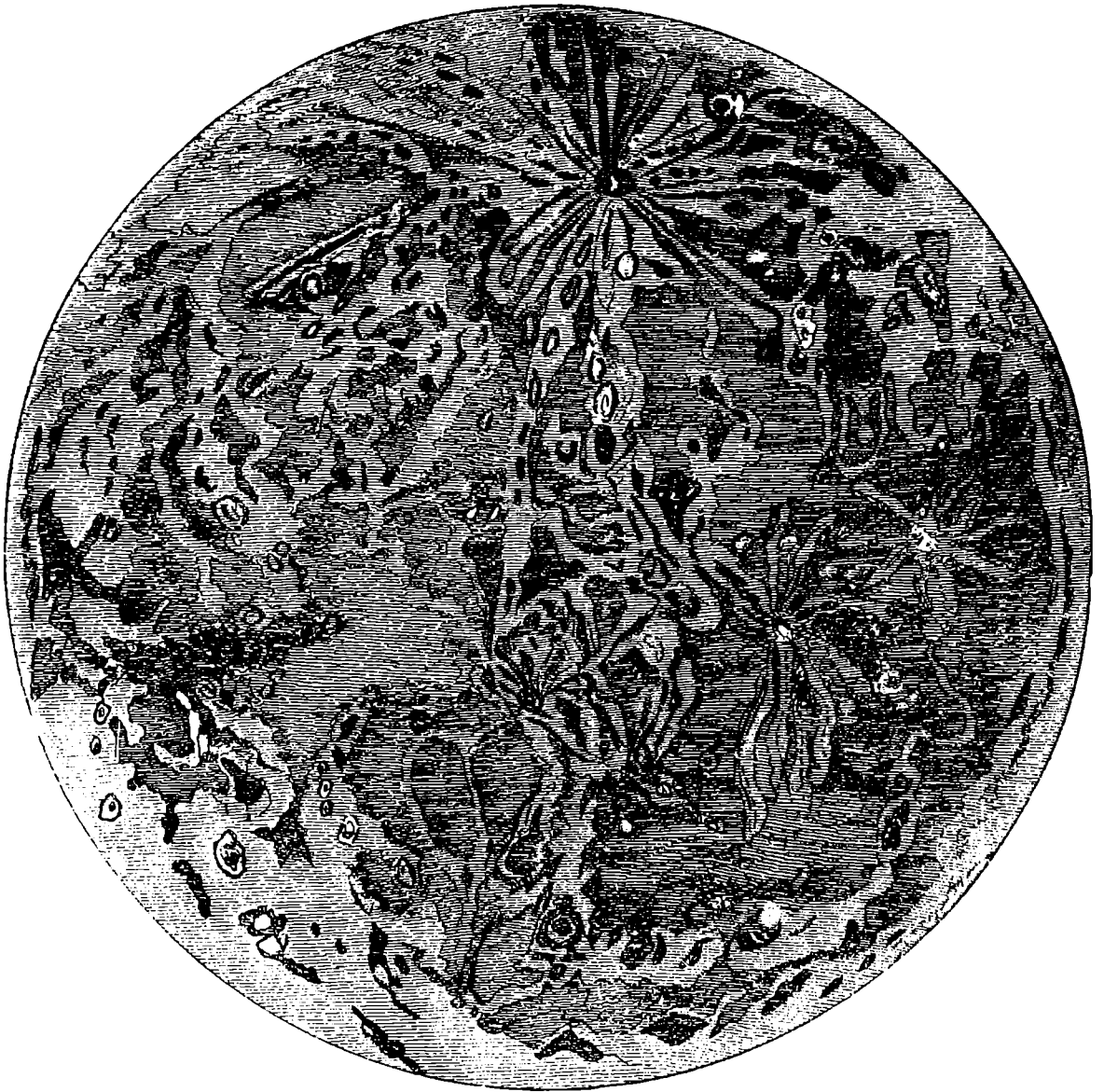
Another phenomenon would now have passed before the observer's eye, and the molecules situated on the plane of the equator escaping, like a stone from a sling of which the cord had suddenly snapped, would have formed around the sun sundry concentric rings resembling that of Saturn. In their turn, again, these rings of cosmical matter, excited by a rotary motion round the central mass, would have been broken up and decomposed into secondary nebulosities, that is to say, into planets. Similarly he would have observed these planets throw off one or more rings each, which became the origin of the secondary bodies which we call satellites.

Thus, then, advancing from atom to molecule, from molecule to nebulous mass, from that to a principal star, from star to sun, from sun to planet, and hence to satellite, we have the whole series of transformations undergone by the heavenly bodies during the first days of the world.

Now, of those attendant bodies which the sun maintains in their elliptical orbits by the great law of gravitation, some few in their turn possess satellites. Uranus has eight, Saturn eight, Jupiter four, Neptune possibly three, and the Earth *one*. This last, one of the least important of the entire solar system, we call *the Moon*; and it is she whom the daring genius of the Americans professed their intention of conquering.

The moon, by her comparative proximity, and the constantly varying appearances produced by her several phases, has always occupied a considerable share of the attention of the inhabitants of the earth.

From the time of Thales of Miletus, in the fifth century B.C., down to that of Copernicus in the fifteenth and Tycho Brahe in the sixteenth century A.D., observations have been from time to time carried on with more or less correctness, until in the present day the altitudes of the lunar mountains have been determined with exactitude. Galileo explained



The Moon's Disc.

the phenomena of the lunar light produced during certain of her phases by the existence of mountains, to which he assigned a mean altitude of 27,000 feet. After him Hévelius, an astronomer of Dantzic, reduced the highest elevations to 15,000 feet; but the calculations of Riccioli brought them up again to 21,000 feet.

At the close of the eighteenth century Herschell, armed with a powerful telescope, considerably reduced the preceding measurements. He assigned a height of 11,400 feet to the maximum elevations, and reduced the mean of the different altitudes to little more than 2,400 feet. But Herschell's calculations were in their turn corrected by the observations of Halley, Nasmyth, Bianchini, Gruithuysen, and others; but it was reserved for the labours of Boer and Maedler finally to solve the question. They succeeded in measuring 1905 different elevations, of which six exceed 15,000 feet, and twenty-two exceed 14,400 feet. The highest summit of all towers to a height of 22,606 feet above the surface of the lunar disc. At the same period the examination of the moon was completed. She appeared completely riddled with *craters*, and her essentially volcanic character was apparent at each observation. By the absence of refraction in the rays of the planets occulted by her we conclude that she is absolutely devoid of an atmosphere. The absence of air entails the absence of water. It became, therefore, manifest that the Selenites, to support life under such conditions, must possess a special organization of their own, must differ remarkably from the inhabitants of the earth.

At length, thanks to modern art, instruments of still higher perfection searched the moon without intermission, not leaving a single point of her surface unexplored; and notwithstanding that her diameter measures 2150 miles, her surface equals the 1-15th part of that of our globe, and her bulk the 1-49th part of that of the terrestrial spheroid—not one of her secrets was able to escape the eyes of the astronomers; and these skilful men of science

carried to even greater degree their prodigious observations.

Thus they remarked that, during full moon, the disc appeared scored in certain parts with *white* lines; and, during the phases, with *black*. On prosecuting the study of these with still greater precision, they succeeded in obtaining an exact account of the nature of these lines. They were long and narrow furrows sunk between parallel ridges, bordering generally upon the edges of the craters. Their length varied between ten and 100 miles, and their width was about 1600 yards. Astronomers called them chasms, but they could not get any farther. Whether these chasms were the dried-up beds of ancient rivers or not they were unable thoroughly to ascertain.

The Americans, amongst others, hoped one day or other to determine this geological question. They also undertook to examine the true nature of that system of parallel ramparts discovered on the moon's surface by Gruithuysen, a learned professor of Munich, who considered them to be "a system of fortifications thrown up by the Selenitic engineers." These two points, yet obscure, as well as others, no doubt, could not be definitively settled except by direct communication with the moon.

Regarding the degree of intensity of its light, there was nothing more to learn on this point. It was known that it is 300,000 times weaker than that of the sun, and that its heat has no appreciable effect upon the thermometer. As to the phenomenon known as the "ashy light," it is explained naturally by the effect of the transmission of the solar rays from the earth to the moon, which give the appearance of completeness to the lunar disc, while it presents itself under the crescent form during its first and last phases.

Such was the state of knowledge acquired regarding the earth's satellite, which the Gun Club undertook to perfect in all its aspects, cosmographic, geological, political, and moral.

From the Earth to the Moon

CHAPTER VI

THE PERMISSIVE LIMITS OF IGNORANCE AND BELIEF IN THE UNITED STATES

THE immediate result of Barbicane's proposition was to place upon the orders of the day all the astronomical facts relative to the Queen of Night. Everybody set to work to study assiduously. One would have thought that the moon had just appeared for the first time, and that no one had ever before caught a glimpse of her in the heavens. The papers revived all the old anecdotes in which the "sun of the wolves" played a part; they recalled the influences which the ignorance of past ages ascribed to her; in short, all America was seized with selenomania, or had become moon-mad.

The scientific journals, for their part, dealt more especially with the questions which touched upon the enterprise of the Gun Club. The letter of the Observatory of Cambridge was published by them, and commented upon with unreserved approval.

Until that time most people had been ignorant of the mode in which the distance which separates the moon from the earth is calculated. They took advantage of this fact to explain to them that this distance was obtained by measuring the parallax of the moon. The term parallax proving "caviare to the general," they further explained that it meant the angle formed by the inclination of two straight lines drawn from either extremity of the earth's radius to the moon. On doubts being expressed as to the correctness of this method, they immediately proved that not only was the mean distance 234,347 miles, but that astronomers could not possibly be in error in their estimate by more than 70 miles either way.

To those who were not familiar with the motions of the moon, they demonstrated that she possesses two distinct motions, the first being that of rotation upon her axis, the second that of revolution round the earth, accomplishing both together in an equal period of time, that is to say, in 27.1/3 days.

The motion of rotation is that which produces day and night on the surface of the moon; save that there is only one day and one night in the lunar month, each lasting 354.1/3 hours. But, happily for her, the face turned towards the terrestrial globe is illuminated by it with an intensity equal to the light of fourteen moons. As to the other face, always invisible to

us, it has of necessity 354 hours of absolute night, tempered only by that "pale glimmer which falls upon it from the stars."

Some well-intentioned but rather obstinate persons, could not at first comprehend how, if the moon displays invariably the same face to the earth during her revolution, she can describe one turn round herself. To such they answered, "Go into your dining-room, and walk round the table in such a way as always to keep your face turned towards the centre; by the time you will have achieved one complete round you will have completed one turn round yourself, since your eye will have traversed successively every point of the room. Well, then, the room is the heavens, the table is the earth, and the moon is yourself." And they would go away delighted.

So, then, the moon displays invariably the same face to the earth; nevertheless, to be quite exact, it is necessary to add that, in consequence of certain fluctuations of north and south, and of west and east, termed her libration, she permits rather more than the half, that is to say, five-sevenths, to be seen.

As soon as the ignoramuses came to understand as much as the Director of the Observatory himself knew, they began to worry themselves regarding her revolution round the earth, whereupon twenty scientific reviews immediately came to the rescue. They pointed out to them then that the firmament, with its infinitude of stars, may be considered as one vast dial-plate, upon which the moon travels, indicating the true time to all the inhabitants of the earth; that it is during this movement that the Queen of Night exhibits her different phases; that the moon is *full* when she is in *opposition* with the sun, that is, when the three bodies are on the same straight line, the earth occupying the centre; that she is *new* when she is in *conjunction* with the sun, that is, when she is between it and the earth; and lastly, that she is in her *first* or *last* quarter, when she makes with the sun and the earth an angle of which she herself occupies the apex.

Regarding the altitude which the moon attains above the horizon, the letter of the Cambridge Observatory had said all that was to be said in that respect. Every one knew that this

altitude varies according to the latitude of the observer. But the only zones of the globe in which the moon passes the zenith, that is, the point directly over the head of the spectator, are of necessity comprised between the twenty-eighth parallels and the equator. Hence the importance of the advice to try the experiment upon some point of that part of the globe, in order that the projectile might be discharged perpendicularly, and so the soonest escape the action of gravitation. This was an essential condition to the success of the enterprise, and continued actively to engage the public attention.

Regarding the path described by the moon in her revolution round the earth, the Cambridge Observatory had demonstrated that this path is a re-entering curve, not a perfect circle, but an ellipse, of which the earth occupies one of the *foci*. It was also well understood that it is farthest removed from the earth during its *apogee*, and approaches most nearly to it at its *perigee*.

Such then was the extent of knowledge possessed by every American on the subject, and of which no one could decently profess ignorance. Still, while these true principles were being rapidly disseminated many errors and illusory fears proved less easy to eradicate.

For instance, some worthy persons maintained that the moon was an ancient comet which, in describing its elongated orbit round the sun, happened to pass near the earth, and became confined within her circle of attraction. These drawing-room astronomers professed so to explain the charred aspect of the moon—a disaster which they attributed to the intensity of the solar heat; only, on being reminded that comets have an atmosphere, and that the moon has little or none, they were fairly at a loss for a reply.

Others again, belonging to the genus *funker*, expressed certain fears as to the position of the moon. They had heard it said that, according to

observations made in the time of the Caliphs, her revolution had become accelerated in a certain degree. Hence they concluded, logically enough, that an acceleration of motion ought to be accompanied by a corresponding diminution in the distance separating the two bodies; and that, supposing the double effect to be continued to infinity, the moon would end by one day falling into the earth. However, they became reassured as to the fate of future generations on being apprised that, according to the calculations of Laplace, this acceleration of motion is confined within very restricted limits, and that a proportional diminution of speed will be certain to succeed it. So, then, the stability of the solar system would not be deranged in ages to come.

Their remains but the third class, the superstitious. These worthies were not content merely to rest in ignorance; they must know all about things which had no existence whatever, and as to the moon, they had long known all about her. One set regarded her disc as a polished mirror, by means of which people could see each other from different points of the earth and interchange their thoughts. Another set pretended that out of one thousand new moons that had been observed, nine hundred and fifty had been attended with remarkable disturbances, such as cataclysms, revolutions, earthquakes, the deluge, &c. Then they believed in some mysterious influence exercised by her over human destinies—that every Selenite was attached to some inhabitant of the earth by a tie of sympathy; they maintained that the entire vital system is subject to her control, &c., &c. But in time the majority renounced these vulgar errors, and espoused the true side of the question. As for the Yankees, they had no other ambition than to take possession of this new continent of the sky, and to plant upon the summit of its highest elevation the star-spangled banner of the United States of America.



Barbicane holds forth.

From the Earth to the Moon

CHAPTER VII

THE HYMN OF THE CANNON-BALL

THE Observatory of Cambridge in its memorable letter had treated the question from a purely astronomical point of view. The mechanical part still remained.

President Barbicane had, without loss of time, nominated a Working Committee of the Gun Club. The duty of this Committee was to resolve the three grand questions of the cannon, the projectile, and the powder. It was composed of four members of great technical knowledge, Barbicane (with a casting vote in case of equality), General Morgan, Major Elphinstone, and J. T. Maston, to whom were confided the functions of secretary. On the 8th of October the Committee met at the house of President Barbicane, 3, Republican Street. The meeting was opened by the president himself.

"Gentlemen," said he, "we have to resolve one of the most important problems in the whole of the noble science of gunnery. It might appear, perhaps, the most logical course to devote our first meeting to the discussion of the engine to be employed. Nevertheless, after mature consideration, it has appeared to me that the question of the projectile must take precedence of that of the cannon, and that the dimensions of the latter must necessarily depend upon those of the former."

"Suffer me to say a word," here broke in J. T. Maston. Permission having been granted, "Gentlemen," said he, with an inspired accent, "our president is right in placing the question of the projectile above all others. The ball we are about to discharge at the moon is our ambassador to her, and I wish to consider it from a moral point of view. The cannon-ball, gentlemen, to my mind, is the most magnificent manifestation of human power. If Providence has created the stars and the planets, man has called the cannon-ball into existence. Let Providence claim the swiftness of electricity and of light, of the stars, the comets, and the planets, of wind and sound—we claim to have invented the swiftness of the cannon-ball, a hundred times superior to that of the swiftest horses or railway train. How glorious will be the moment when, infinitely exceeding all hitherto attained velocities, we shall launch our new projectile with the rapidity of seven miles a second! Shall it not, gentlemen—shall it not be

received up there with the honours due to terrestrial ambassador?"

Overcome with emotion the orator sat down and applied himself to a huge plate of sandwiches before him.

"And now," said Barbicane, "let us quit the domain of poetry and come direct to the question."

"By all means," replied the members, each with his mouth full of sandwich.

"The problem before us," continued the president, "is how to communicate to a projectile a velocity of 12,000 yards per second. Let us at present examine the velocities hitherto attained. General Morgan will be able to enlighten us on this point."

"And the more easily," replied the general, "that during the war I was a member of the Committee of experiments. I may say, then, that the 100-pounder Dahlgrens, which carried a distance of 5000 yards, impressed upon their projectile an initial velocity of 500 yards a second. The Rodman Columbiad threw a shot weighing half a ton a distance of six miles, with a velocity of 800 yards per second—a result which Armstrong and Palisser have never obtained in England."

"This," replied Barbicane, "is, I believe, the maximum velocity ever attained?"

"It is so," replied the general.

"Ah!" groaned J. T. Maston, "if my mortar had not burst—"

"Yes," quietly replied Barbicane, "but it did burst. We must take, then, for our starting-point this velocity of 800 yards. We must increase it twenty-fold. Now, reserving for another discussion the means of producing this velocity, I will call your attention to the dimensions which it will be proper to assign to the shot. You understand that we have nothing to do here with projectiles weighing at most but half a ton."

"Why not?" demanded the major.

"Because the shot," quickly replied J. T. Maston, "must be big enough to attract the attention of the inhabitants of the moon, if there are any?"

"Yes," replied Barbicane, "and for another reason more important still."

"What mean you?" asked the major.

"I mean that it is not enough to discharge a projectile, and then take no further notice of it; we must follow it throughout its course, up to the moment when it shall reach its goal."

"What?" shouted the general and the major in great surprise.

"Undoubtedly," replied Barbicane, composedly, "our experiment would produce no result."

"But then," replied the major, "you will have to give this projectile enormous dimensions."

"No! Be so good as to listen. You know that optical instruments have acquired great perfection; with certain telescopes we have succeeded in obtaining enlargements of 6000 times and reducing the moon to within forty miles' distance. Now, at this distance, any objects sixty feet square would be perfectly visible. If, then, the penetrative power of telescope has not been further increased, it is because that power detracts from their light; and the moon, which is but a reflecting mirror, does not give back sufficient light to enable us to perceive objects of lesser magnitude."

"Well, then, what do you propose to do?" asked the general. "Would you give your projectile a diameter of sixty feet?"

"Not so."

"Do you intend, then, to increase the luminous power of the moon?"

"Exactly so. If I can succeed in diminishing the density of the atmosphere through which the moon's light has to travel I shall have rendered her light more intense. To effect that object it will be enough to establish a telescope on some elevated mountain. That is what we will do."

"I give it up," answered the major. "You have such a way of simplifying things. And what enlargement do you expect to obtain in this way?"

"One of 48,000 times, which should bring the moon within an apparent distance of five miles; and, in order to be visible, objects need not have a diameter of more than nine feet."

"So, then," cried J. T. Maston, "our projectile need not be more than nine feet in diameter."

"Let me observe, however," interrupted Major Elphinstone, "this will involve a weight such as—"

"My dear major," replied Barbicane, "before discussing its weight, permit me to enumerate some of the marvels which our ancestors have achieved in this respect. I don't mean to pretend that the science of gunnery has not advanced, but it is as well to bear in mind

that during the middle ages they obtained results more surprising, I will venture to say, than ours. For instance, during the siege of Constantinople by Mahomet II., in 1453, stone shot of 1900lbs. weight were employed. At Malta, in the time of the knights, there was a gun of the fortress of St. Elmo which threw a projectile weighing 2500lbs. And, now, what is the extent of what we have seen ourselves? Armstrong guns discharging shot of 500lbs., and the Rodman guns projectiles of half a ton! It seems, then, that if projectiles have gained in range, they have lost far more in weight. Now, if we turn our efforts in that direction, we ought to arrive, with the progress of science, at ten times the weight of the shot of Mahomet II. and the Knights of Malta."

"Clearly," replied the major; "but what metal do you calculate upon employing?"

"Simply cast iron," said General Morgan.

"But," interrupted the major, "since the weight of a shot is proportionate to its volume, an iron ball of nine feet in diameter would be of tremendous weight."

"Yes, if it were solid, not if it were hollow."

"Hollow? then it would be a shell?"

"Yes, a shell," replied Barbicane; "decidedly it must be. A solid shot of 108 inches would weigh more than 200,000lbs., a weight evidently far too great. Still, as we must reserve a certain stability for our projectile, I propose to give it a weight of 20,000lbs."

"What, then, will be the thickness of the sides?" asked the major.

"If we follow the usual proportion," replied Morgan, "a diameter of 108 inches would require sides of two feet thickness, or less."

"That would be too much," replied Barbicane; "for you will observe that the question is not that of a shot intended to pierce an iron plate: it will suffice, therefore, to give it sides strong enough to resist the pressure of the gas. The problem, therefore, is this—What thickness ought a cast-iron shell to have in order not to weigh more than 20,000lbs.? Our clever secretary will soon enlighten us upon this point."

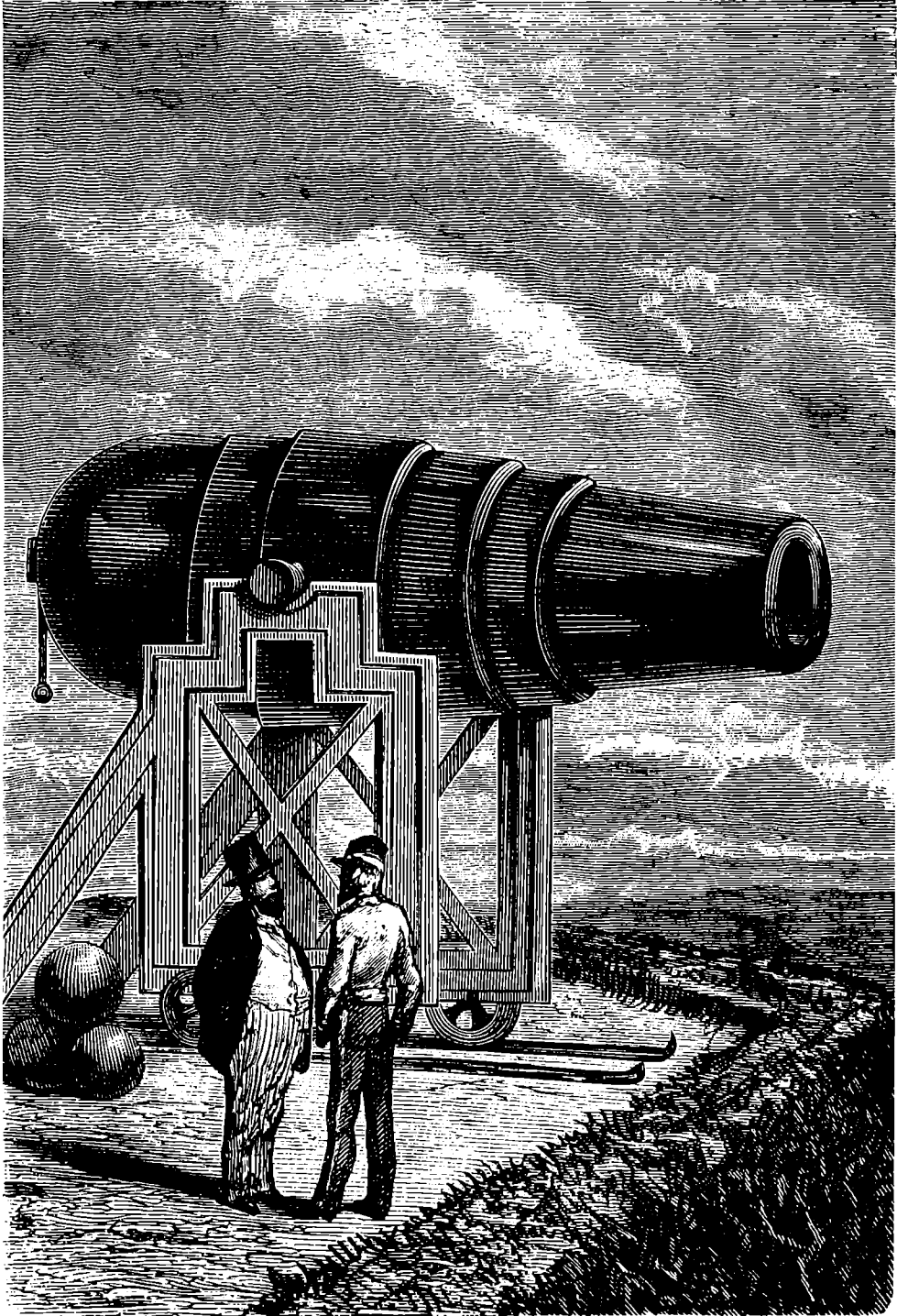
"Nothing easier," replied the worthy secretary of the Committee; and, rapidly tracing a few algebraical formulæ upon paper, among which n^2 and x^1 frequently appeared, he presently said,—

"The sides will require a thickness of less than two inches."

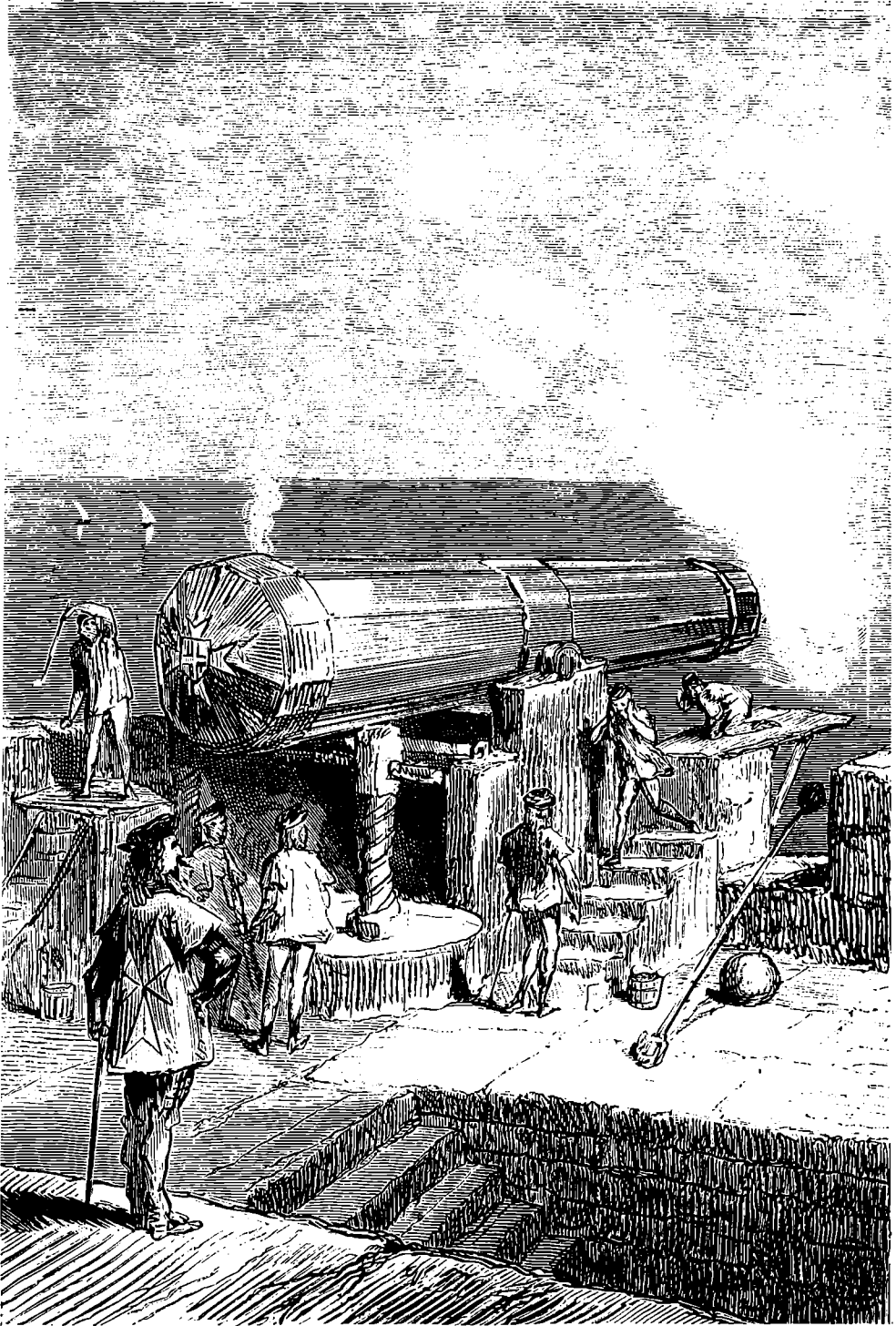
"Will that be enough?" asked the major doubtfully.

"Clearly not!" replied the president.

"What is to be done, then?" said Elphin-



The Rodman Columbiad.



Cannon at Malta in the times of the Knights.

stone, with a puzzled air.

“Employ another metal instead of iron.”

“Copper?” said Morgan.

“No; that would be too heavy. I have better than that to offer.”

“What then?” asked the major.

“Aluminium!” replied Barbicane.

“Aluminium?” cried his three colleagues in chorus.

“Unquestionably, my friends. This valuable metal possesses the whiteness of silver, the indestructibility of gold, the tenacity of iron, the fusibility of copper, the lightness of glass. It is easily wrought, is very widely distributed, forming the base of most of the rocks, is three times lighter than iron, and seems to have been created for the express purpose of furnishing us with the material for our projectile.”

“But, my dear president,” said the major, “is not the cost price of aluminium extremely high?”

“It was so at its first discovery, but it has fallen now to nine dollars the pound.”

“But still, nine dollars the pound!” replied the major, who was not willing readily to give

in; “even that is an enormous price.”

“Undoubtedly, my dear major; but not beyond our reach.”

“What will the projectile weigh then?” asked Morgan.

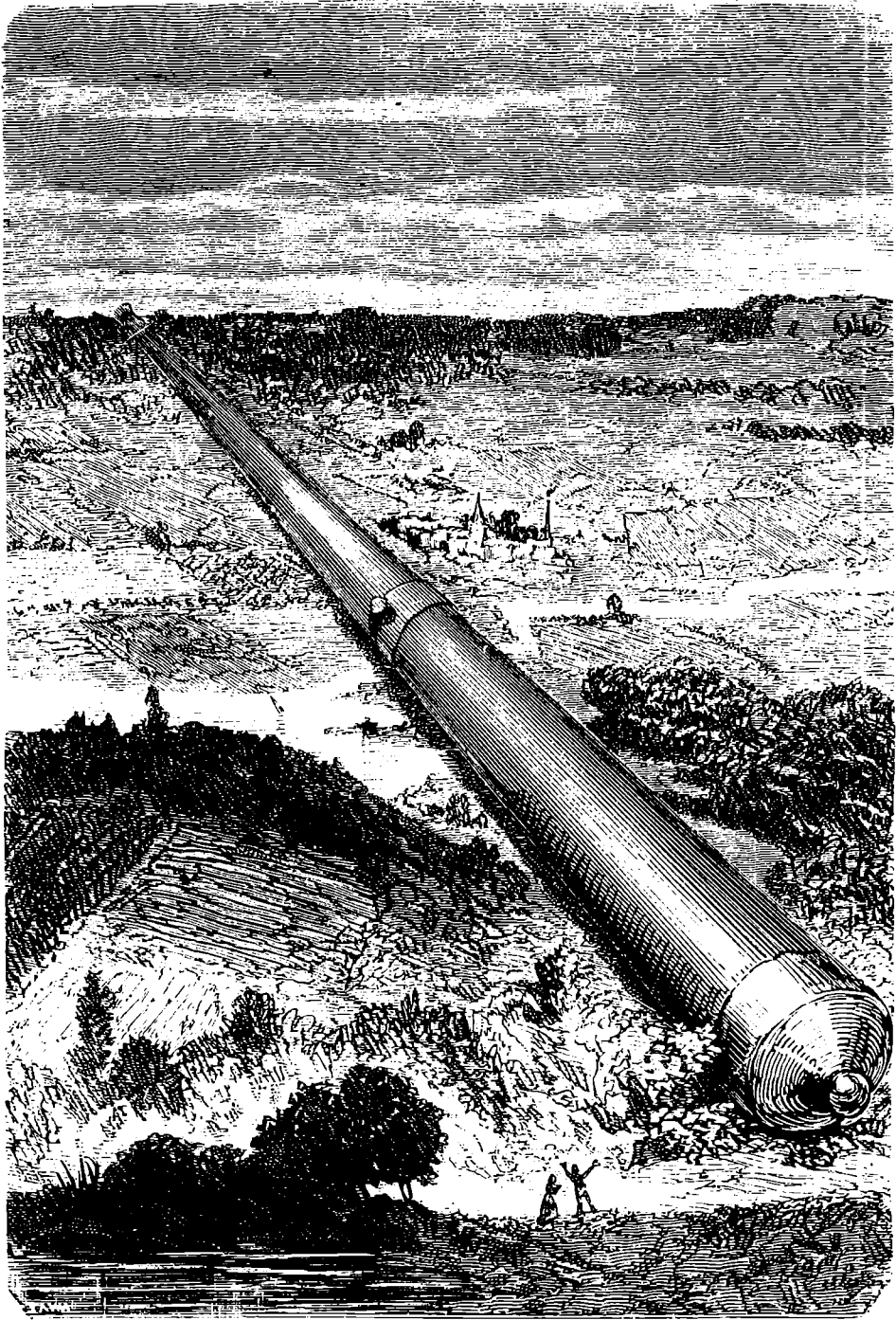
“Here is the result of my calculations,” replied Barbicane. “A shot of 108 inches in diameter, and 12 inches in thickness, would weigh, in cast-iron, 67,440lbs.; cast in aluminium, its weight will be reduced to 19,250lbs.”

“Capital!” cried the major; “but do you know that, at nine dollars the pound, this projectile will cost—”

“One hundred and seventy-three thousand and fifty dollars (\$173,050). I know it quite well. But fear not, my friends; the money will not be wanting for our enterprise, I will answer for it. Now what say you to aluminium, gentlemen?”

“Adopted!” replied the three members of the Committee.

So ended the first meeting. The question of the projectile was definitively settled.



Ideal sketch of J. T. Maston's gun.

From the Earth to the Moon

CHAPTER VIII

HISTORY OF THE CANNON

THE resolutions passed at the last meeting produced a great effect out of doors. Timid people took fright at the idea of a shot weighing 20,000lbs. being launched into space; they asked what cannon could ever transmit a sufficient velocity to such a mighty mass. The minutes of the second meeting were destined triumphantly to answer such questions. The following evening the discussion was renewed.

"My dear colleagues," said Barbicane, without further preamble, "the subject now before us is the construction of the engine, its length, its composition, and its weight. It is probable that we shall end by giving it gigantic dimensions; but however great may be the difficulties in the way, our mechanical genius will readily surmount them. Be good enough, then, to give me your attention, and do not hesitate to make objections at the close. I have no fear of them. The problem before us is how to communicate an initial force of 12,000 yards per second to a shell of 108 inches in diameter, weighing 20,000lbs. Now when a projectile is launched into space, what happens to it? It is acted upon by three independent forces, the resistance of the air, the attraction of the earth, and the force of impulsion with which it is endowed. Let us examine these three forces. The resistance of the air is of little importance. The atmosphere of the earth does not exceed forty miles. Now, with the given rapidity, the projectile will have traversed this in five seconds, and the period is too brief for the resistance of the medium to be regarded otherwise than as insignificant. Proceeding, then, to the attraction of the earth, that is, the weight of the shell, we know that this weight will diminish in the inverse ratio of the square of the distance. When a body left to itself falls to the surface of the earth, it falls five feet in the first second; and if the same body were removed 257,542 miles farther off, in other words, to the distance of the moon, its fall would be reduced to about half a line in the first second. That is almost equivalent to a state of perfect rest. Our business, then, is to overcome progressively this action of gravitation. The mode of accomplishing that is by the force of impulsion."

"There's the difficulty," broke in the major.

"True," replied the president; "but we will overcome that, for this force of impulsion will depend upon the length of the engine and the powder employed, the latter being limited only by the resisting power of the former. Our business, then, to-day is with the dimensions of the cannon."

"Now, up to the present time," said Barbicane, "our longest guns have not exceeded twenty-five feet in length. We shall therefore astonish the world by the dimensions we shall be obliged to adopt. It must evidently be, then, a gun of great range, since the length of the piece will increase the detention of the gas accumulated behind the projectile; but there is no advantage in passing certain limits."

"Quite so," said the major. "What is the rule in such a case?"

"Ordinarily the length of a gun is 20 to 25 times the diameter of the shot, and its weight 235 to 240 times that of the shot."

"That is not enough," cried J. T. Maston impetuously.

"I agree with you, my good friend; and, in fact, following this proportion for a projectile nine feet in diameter, weighing 30,000lbs., the gun would only have a length of 225 feet, and a weight of 7,200,000lbs."

"Ridiculous!" rejoined Maston. "As well take a pistol."

"I think so too," replied Barbicane; "that is why I propose to quadruple that length, and to construct a gun of 900 feet."

The general and the major offered some objections; nevertheless, the proposition, actively supported by the secretary, was definitively adopted.

"But," said Elphinstone, "what thickness must we give it?"

"A thickness of six feet," replied Barbicane.

"You surely don't think of mounting a mass like that upon a carriage?" asked the major.

"It would be a superb idea, though," said Maston.

"But impracticable," replied Barbicane. "No; I think of sinking this engine in the earth alone, binding it with hoops of wrought iron, and finally surrounding it with a thick mass of masonry of stone and cement. The piece once cast, it must be bored with great precision, so as

to preclude any possible windage. So there will be no loss whatever of gas, and all the expansive force of the powder will be employed in the propulsion."

"One simple question," said Elphinstone: "is our gun to be rifled?"

"No, certainly not," replied Barbicane; "we require an enormous initial velocity; and you are well aware that a shot quits a rifled gun less rapidly than it does a smooth-bore."

"True," rejoined the major.

The Committee here adjourned for a few minutes to tea and sandwiches.

On the discussion being renewed, "Gentlemen," said Barbicane, "we must now take into consideration the metal to be employed. Our cannon must be possessed of great tenacity, great hardness, be infusible by heat, indissoluble, and inoxydable by the corrosive action of acids."

"There is no doubt about that," replied the major; "and as we shall have to employ an immense quantity of metal, we shall not be at a loss for choice."

"Well, then," said Morgan, "I propose the best alloy hitherto known, which consists of 100 parts of copper, 12 of tin, and 6 of brass."

"I admit," replied the president, "that this composition has yielded excellent results, but in the present case it would be too expensive, and very difficult to work. I think, then, that we ought to adopt a material excellent in its way and of low price, such as cast iron. What is your

advice, major?"

"I quite agree with you," replied Elphinstone.

"In fact," continued Barbicane, "cast iron cost ten times less than bronze; it is easy to cast, it runs readily from the moulds of sand, it is easy of manipulation, it is at once economical of money and of time. In addition, it is excellent as a material, and I well remember that during the war, at the siege of Atlanta, some iron guns fired one thousand rounds at intervals of twenty minutes without injury."

"Cast iron is very brittle, though," replied Morgan.

"Yes, but it possesses great resistance. I will now ask our worthy secretary to calculate the weight of a cast-iron gun with a bore of nine feet and a thickness of six feet of metal."

"In a moment," replied Maston. Then, dashing off some algebraical formulæ with marvellous facility, in a minute or two he declared the following result:—

"The cannon will weigh 68,040 tons. And, at two cents a pound, it will cost—?"

"2,510,701 dollars."

Maston, the major, and the general regarded Barbicane with uneasy looks.

"Well, gentlemen," replied the president, "I repeat what I said yesterday. Make yourselves easy; the millions will not be wanting."

With this assurance of their president the Committee separated, after having fixed their third meeting for the following evening.

From the Earth to the Moon

CHAPTER IX

THE QUESTION OF THE POWDERS

THERE remained for consideration merely the question of powders. The public awaited with interest its final decision. The size of the projectile, the length of the cannon being settled, what would be the quantity of powder necessary to produce impulsion?

It is generally asserted that gunpowder was invented in the fourteenth century by the monk Schwartz, who paid for his grand discovery with his life. It is, however, pretty well proved that this story ought to be ranked amongst the legends of the middle ages. Gunpowder was not invented by any one; it was the lineal successor of the Greek fire, which, like itself, was composed of sulphur and saltpetre. Few persons are acquainted with the mechanical power of gunpowder. Now this is precisely what is necessary to be understood in order to comprehend the importance of the question submitted to the committee.

A litre of gunpowder weighs about 2lbs.; during combustion it produces 400 litres of gas. This gas, on being liberated and acted upon by a temperature raised to 2400 degrees, occupies a space of 4000 litres: consequently the volume of powder is to the volume of gas produced by its combustion as 1 to 4000. One may judge, therefore, of the tremendous pressure of this gas when compressed within a space 4000 times too confined. All this was, of course, well known to the members of the committee when they met on the following evening.

The first speaker on this occasion was Major Elphinstone, who had been the director of the gunpowder factories during the war.

"Gentlemen," said this distinguished chemist, "I begin with some figures which will serve as the basis of our calculation. The old 24-pounder shot required for its discharge 16lbs. of powder."

"You are certain of the amount?" broke in Barbicane.

"Quite certain," replied the major. "The Armstrong cannon employs only 75lbs. of powder for a projectile of 800lbs., and the Rodman Columbiad uses only 160lbs. of powder to send its half-ton shot a distance of six miles. These facts cannot be called in question, for I myself raised the point during the depositions taken before the Committee of

Artillery."

"Quite true," said the general.

"Well," replied the major, "these figures go to prove that the quantity of powder is not increased with the weight of the shot; that is to say, if a 24-pounder shot requires 16lbs. of powder;—in other words, if in ordinary guns we employ a quantity of powder equal to two-thirds of the weight of the projectile, this proportion is not constant. Calculate, and you will see that in place of 333lbs. of powder, the quantity is reduced to no more than 160lbs."

"What are you aiming at?" asked the president.

"If you push your theory to extremes, my dear major," said J. A. Maston, "you will get to this, that as soon as your shot becomes sufficiently heavy you will not require any powder at all."

"Our friend Maston is always at his jokes, even in serious matters," cried the major; "but let him make his mind easy, I am going presently to propose gunpowder enough to satisfy his artillerist's propensities. I only keep to statistical facts when I say that during the war, and for the very largest guns, the weight of powder was reduced, as the result of experience, to a tenth part of the weight of the shot."

"Perfectly correct," said Morgan; "but before deciding the quantity of powder necessary to give the impulse, I think it would be as well—"

"We shall have to employ a large-grained powder," continued the major, "its combustion is more rapid than that of the small."

"No doubt about that," replied Morgan, "but it is very destructive, and ends by enlarging the bore of the pieces."

"Granted; but that which is injurious to a gun destined to perform long service is not so to our Columbiad. We shall run no danger of an explosion; and it is necessary that our powder should take fire instantaneously in order that its mechanical effect may be complete."

"We must have," said Maston, "several touch-holes, so as to fire it at different points at the same time."

"Certainly," replied Elphinstone; "but that will render the working of the piece more



The invention of gunpowder by the monk Schwartz.

difficult. I return then to my large-grained powder, which removes those difficulties. In his Columbiad charges Rodman employed a powder as large as chestnuts, made of willow charcoal, simply dried in cast-iron pans. This powder was hard and glittering, left no trace upon the hand, contained hydrogen and oxygen in large proportion, took fire instantaneously, and though very destructive, did not sensibly injure the mouth-piece."

Up to this point Barbicane had kept aloof from the discussion; he left the others to speak while he himself listened; he had evidently got an idea. He now simply said, "Well, my friends, what quantity of powder do you propose?"

The three members look at one another.

"Two hundred thousand pounds," at last said Morgan.

"Five hundred thousand," added the major.

"Eight hundred thousand," screamed Maston.

A moment of silence followed this triple proposal; it was at last broken by the president.

"Gentlemen," he quietly said, "I start from this principle, that the resistance of a gun, constructed under the given conditions, is unlimited. I shall surprise our friend Maston, then, by stigmatizing his calculations as timid; and I propose to double his 800,000lbs. of powder."

"Sixteen hundred thousand pounds?" shouted Maston, leaping from his seat.

"Just so."

"We shall have to come then to my ideal of a cannon half a mile long; for you see 1,600,000lbs. will occupy a space of about 20,000 cubic feet; and since the contents of your cannon do not exceed 54,000 cubic feet, it would be half full; and the bore will not be more than long enough for the gas to communicate to the projectile sufficient impulse."

"Nevertheless," said the President, "I hold to that quantity of powder. Now, 1,600,000lbs. of powder will create 6,000,000,000 of litres of gas. Six thousand millions! You quite understand?"

"What is to be done then?" said the general.

"The thing is very simple; we must reduce this enormous quantity of powder, while preserving to it its mechanical power."

"Good; but by what means?"

"I am going to tell you," replied Barbicane quietly. "Nothing is more easy than to reduce this mass to one quarter of its bulk. You know that curious cellular matter which constitutes the elementary tissues of vegetables? This substance is found quite pure in many bodies,

especially in cotton, which is nothing more than the down of the seeds of the cotton plant. Now cotton, combined with cold nitric acid, becomes transformed into a substance eminently insoluble, combustible, and explosive. It was first discovered in 1832, by Braconnot, a French chemist, who called it xyloidine. In 1838 another Frenchman, Pelouze, investigated its different properties, and finally, in 1846, Schonbein, Professor of Chemistry at Bâle, proposed its employment for purposes of war. This powder, now called pyroxyle, or fulminating cotton, is prepared with great facility by simply plunging cotton for fifteen minutes in nitric acid, then washing it in water, then drying it, and it is ready for use."

"Nothing could be more simple," said Morgan.

"Moreover, pyroxyle is unaltered by moisture—a valuable property to us, inasmuch as it would take several days to charge the cannon. It ignites at 170 degrees in place of 240, and its combustion is so rapid that one may set light to it on the top of ordinary powder, without the latter having time to ignite."

"Perfect!" exclaimed the major.

"Only it is more expensive."

"What matter?" cried J. T. Maston.

"Finally, it imparts to projectiles a velocity four times superior to that of gunpowder. I will even add, that if we mix with it one-eighth of its own weight of nitrate of potass, its expansive force is again considerably augmented."

"Will that be necessary?" asked the major.

"I think not," replied Barbicane. "So, then, in place of 1,600,000lbs. of powder, we shall have but 400,000lbs. of fulminating cotton; and since we can, without danger, compress 500lbs. of cotton into 27 cubic feet, the whole quantity will not occupy a height of more than 180 feet within the bore of the Columbiad. In this way the shot will have more than 700 feet of bore to traverse under a force of 6,000,000,000 litres of gas before taking its flight towards the moon."

At this junction J. T. Maston could not repress his emotion; he flung himself into the arms of his friend with the violence of a projectile, and Barbicane would have been stove in if he had not been bomb-proof.

This incident terminated the third meeting of the Committee.

Barbicane and his bold colleagues, to whom nothing seemed impossible, had succeeded in solving the complex problems of projectile, cannon, and powder. Their plan was drawn up, and it only remained to put it in execution.

"A mere matter of detail, a bagatelle," said J. T. Maston.



Captain Nicholl.

From the Earth to the Moon

CHAPTER X

ONE ENEMY v. TWENTY-FIVE MILLIONS OF FRIENDS

THE American public took a lively interest in the smallest details of the enterprise of the Gun Club. It followed day by day the discussions of the committee. The most simple preparation for the great experiment, the questions of figures which it involved, the mechanical difficulties to be resolved—in one word, the entire plan of work—roused the popular excitement to the highest pitch.

The purely scientific attraction was suddenly intensified by the following incident:—

We have seen what legions of admirers and friends Barbicane's project had rallied round its author. There was, however, one single individual alone in all the States of the Union who protested against the attempt of the Gun Club. He attacked it furiously on every opportunity, and human nature is such that Barbicane felt more keenly the opposition of that one man than he did the applause of all the others. He was well aware of the motive of this antipathy, the origin of this solitary enmity, the cause of its personality and old standing, and in what rivalry of self-love it had its rise.

This persevering enemy the President of the Gun Club had never seen. Fortunate that it was so, for a meeting between the two men would certainly have been attended with serious consequences. This rival was a man of science, like Barbicane himself, of a fiery, daring, and violent disposition; a pure Yankee. His name was Captain Nicholl; he lived at Philadelphia.

Most people are aware of the curious struggle which arose during the Federal war between the guns and the armour of iron-plated ships. The result was the entire reconstruction of the navy of both the continents; as the one grew heavier, the other became thicker in proportion. The "Merrimac," the "Monitor," the "Tennessee," the "Weckhausen" discharged enormous projectiles themselves, after having been armour-clad against the projectiles of others. In fact they did to others that which they would *not* they should do to them—that grand principle of immorality upon which rests the whole art of war.

Now if Barbicane was a great founder of shot, Nicholl was a great forger of plates; the one cast night and day at Baltimore, the other forged day and night at Philadelphia. As soon

as ever Barbicane invented a new shot, Nicholl invented a new plate, each followed a current of ideas essentially opposed to the other. Happily for these citizens, so useful to their country, a distance of from fifty to sixty miles separated them from one another, and they had never yet met. Which of these two inventors had the advantage over the other it was difficult to decide from the results obtained. By last accounts, however, it would seem that the armour-plate would in the end have to give way to the shot; nevertheless, there were competent judges who had their doubts on the point.

At the last experiment the cylindro-conical projectiles of Barbicane stuck like so many pins in the Nicholl plates. On that day the Philadelphia iron-forged then believed himself victorious, and could not evince contempt enough for his rival; but when the other afterwards substituted for conical shot simple 600lb. shells, at very moderate velocity, the captain was obliged to give in. In fact, these projectiles knocked his best metal plate to shivers.

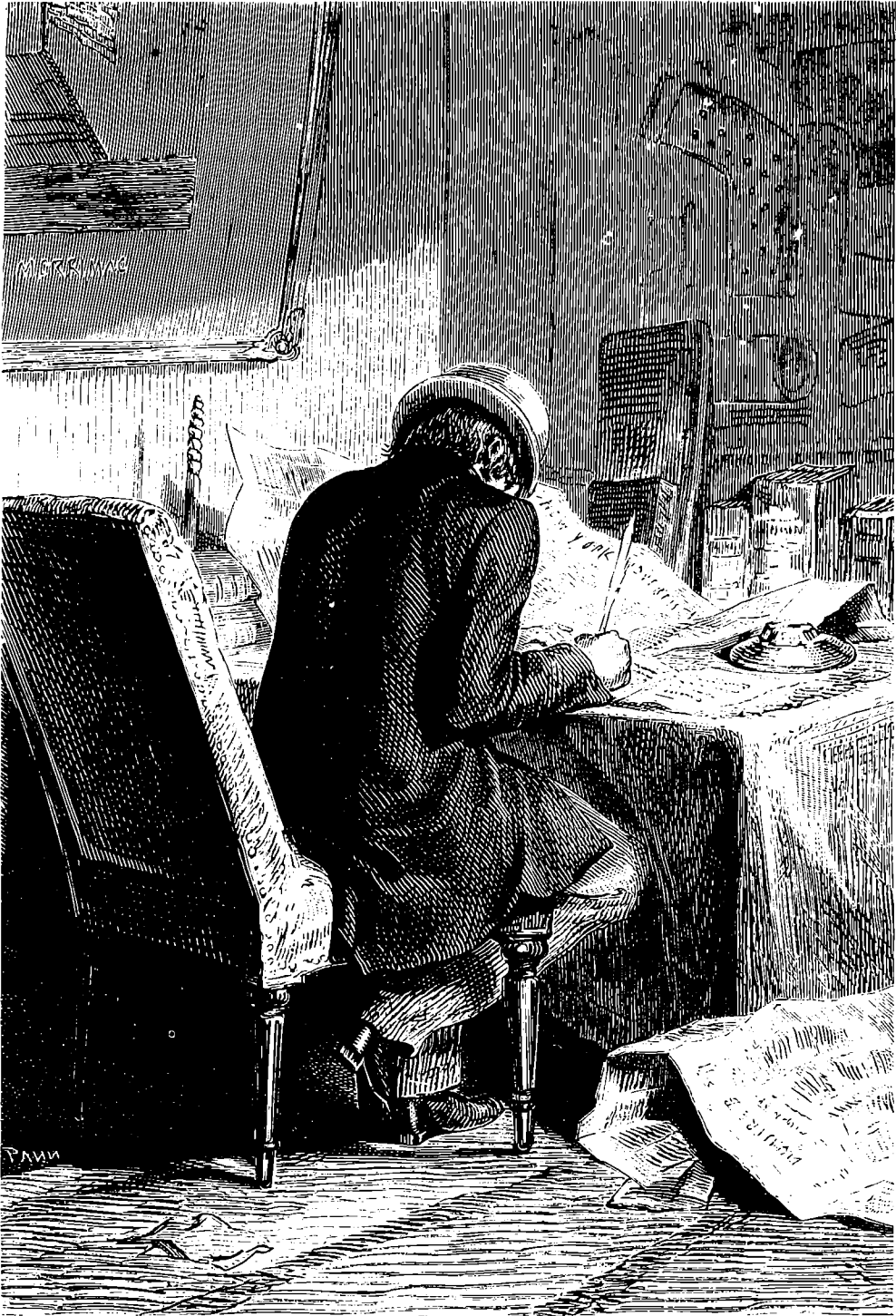
Matters were at this stage, and victory seemed to rest with the shot, when the war came to an end on the very day when Nicholl had completed a new armour-plate of wrought steel. It was a masterpiece of its kind, and bid defiance to all the projectiles in the world. The captain had it conveyed to the Polygon at Washington, challenging the President of the Gun Club to break it. Barbicane, peace having been declared, declined to try the experiment.

Nicholl, now furious, offered to expose his plate to the shock of any shot, solid, hollow, round, or conical. Refused by the president, who did not choose to compromise his last success.

Nicholl, disgusted by this obstinacy, tried to tempt Barbicane by offering him every chance. He proposed to fix the plate within two hundred yards of the gun. Barbicane still obstinate in refusal. A hundred yards? Not-even *seventy-five!*

"At fifty then!" roared the captain through the newspapers. "At twenty-five yards!! and I'll stand behind!!!"

Barbicane returned for answer that, even if Captain Nicholl would be so good as to stand in



Nicholl published a number of letters in the newspapers.

front, he would not fire any more.

Nicholl could not contain himself at this reply; threw out hints of cowardice; that a man who refused to fire a cannon-shot was pretty near being afraid of it; that artillerists who fight at six miles' distance are substituting mathematical formulæ for individual courage.

To these insinuations Barbicane returned no answer; perhaps he never heard of them, so absorbed was he in the calculations for his great enterprise.

When his famous communication was made to the Gun Club, the captain's wrath passed all bounds; with his intense jealousy was mingled a feeling of absolute impotence. How was he to invent anything to beat this 900-foot Columbiad? What armour-plate could ever resist a projectile of 30,000lbs. weight? Overwhelmed at first under this violent shock, he by and by recovered himself, and resolved to crush the proposal by the weight of his arguments.

He then violently attacked the labours of the Gun Club, published a number of letters in the newspapers, endeavoured to prove Barbicane ignorant of the first principles of gunnery. He maintained that it was absolutely impossible to impress upon any body whatever a velocity of 12,000 yards per second; that even with such a velocity a projectile of such a weight could not transcend the limits of the earth's atmosphere. Further still, even regarding the velocity to be acquired, and granting it to be sufficient, the shell could not resist the pressure of the gas developed by the ignition of 1,600,000lbs. of powder; and supposing it to resist that pressure, it would be the less able to support that temperature; it would melt on quitting the Columbiad, and fall back in a red-hot shower upon the heads of the imprudent spectators.

Barbicane continued his work without regarding these attacks.

Nicholl then took up the question in its other aspects. Without touching upon its uselessness in all points of view, he regarded the experiment as fraught with extreme danger, both to the citizens, who might sanction by their presence so reprehensible a spectacle, and also to the towns in the neighbourhood of this deplorable cannon. He also observed that if the projectile

did not succeed in reaching its destination (a result absolutely impossible), it must inevitably fall back upon the earth, and that the shock of such a mass, multiplied by the square of its velocity, would seriously endanger every point of the globe. Under the circumstances, therefore, and without interfering with the rights of free citizens, it was a case for the intervention of Government, which ought not to endanger the safety of all for the pleasure of one individual.

Spite of all his arguments, however, Captain Nicholl remained alone in his opinion. Nobody listened to him, and he did not succeed in alienating a single admirer from the President of the Gun Club. The latter did not even take the pains to refute the arguments of his rival.

Nicholl, driven into his last entrenchments, and not able to fight personally in the cause, resolved to fight with money. He published, therefore, in the *Richmond Inquirer* a series of wagers, conceived in these terms, and on an increasing scale:—

- No. 1 (1000 dols.).—That the necessary funds for the experiment of the Gun Club will not be forthcoming.
- No. 2 (2000 dols.).—That the operation of casting a cannon of 900 feet is impracticable, and cannot possibly succeed.
- No. 3 (3000 dols.).—That it is impossible to load the Columbiad, and that the pyroxyle will take fire spontaneously under the pressure of the projectile.
- No. 4 (4000 dols.).—That the Columbiad will burst at the first fire.
- No. 5 (5000 dols.).—That the shot will not travel farther than six miles, and that it will fall back again a few seconds after its discharge.

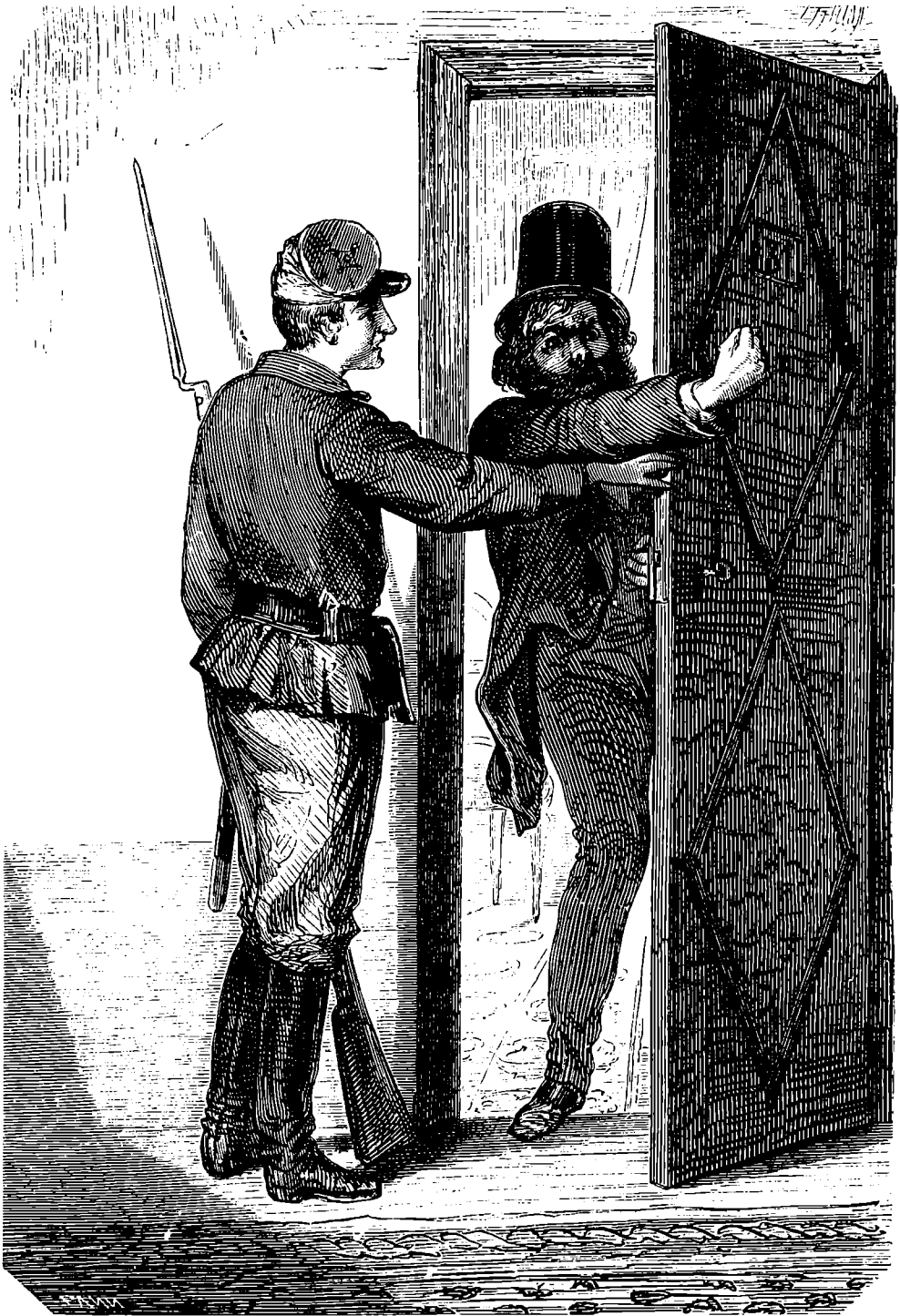
It was an important sum, therefore, which the captain risked in his invincible obstinacy. He had no less than 15,000 dollars at stake.

Notwithstanding the importance of the challenge, on the 19th of May he received a sealed packet containing the following superbly laconic reply:—

“BALTIMORE; Oct. 19.

“Done.

“BARBICANE.”



It became necessary to keep an eye upon the deputies.

From the Earth to the Moon

CHAPTER XI

FLORIDA AND TEXAS

ONE question yet remained to be decided: it was necessary to choose a favourable spot for the experiment. According to the advice of the Observatory of Cambridge, the gun must be fired perpendicularly to the plane of the horizon, that is to say, towards the zenith. Now the moon does not traverse the zenith, except in places situated between 0° and 28° of latitude. It became, then, necessary to determine exactly that spot on the globe where the immense Columbiad should be cast.

On the 20th of October, at a general meeting of the Gun Club, Barbicane produced a magnificent map of the United States. "Gentlemen," said he, in opening the discussion, "I presume that we are all agreed that this experiment cannot and ought not to be tried anywhere but within the limits of the soil of the Union. Now, by good fortune, certain frontiers of the United States extend downwards as far as the 28th parallel of the north latitude. If you will cast your eye over this map, you will see that we have at our disposal the whole of the southern portion of Texas and Florida."

It was finally agreed, then, that the Columbiad must be cast on the soil of either Texas or Florida. The result, however, of this decision was to create a rivalry entirely without precedent between the different towns of these two states.

The 28th parallel, on reaching the American coast, traverses the peninsula of Florida, dividing it into two nearly equal portions. Then, plunging into the Gulf of Mexico, it subtends the arc formed by the coast of Alabama, Mississippi, and Louisiana; then skirting Texas, off which it cuts an angle, it continues its course over Mexico, crosses the Sonora, Old California, and loses itself in the Pacific Ocean. It was, therefore, only those portions of Texas and Florida which were situated below this parallel which came within the prescribed conditions of latitude.

Florida, in its southern part, reckons no cities of importance; it is simply studded with forts raised against the roving Indians. One solitary town, Tampa Town, was able to put in a claim in favour of its situation.

In Texas, on the contrary, the towns are

much more numerous and important. Corpus Christi, in the country of Nuaces, and all the cities situated on the Rio Bravo, Laredo, Comalites, San Ignacio on the Web, Rio Grande city on the Starr, Edinburgh in the Hidalgo, Santa Rita, Elpanda, Brownsville in the Cameron, formed an imposing league against the pretensions of Florida. So, scarcely was the decision known, when the Texian and Floridan deputies arrived at Baltimore in an incredibly short space of time. From that very moment President Barbicane and the influential members of the Gun Club were besieged day and night by formidable claims. If seven cities of Greece contended for the honour of having given birth to Homer, here were two entire states threatening to come to blows about the question of a cannon.

The rival parties promenaded the streets with arms in their hands; and at every occasion of their meeting a collision was to be apprehended which might have been attended with disastrous results. Happily the prudence and address of President Barbicane averted the danger. These personal demonstrations found a division in the newspapers of the different states. The *New York Herald* and the *Tribune* supported Texas, while the *Times* and the *American Review* espoused the cause of the Floridan Deputies. The members of the Gun Club could not decide to which to give the preference.

Texas produced its array of twenty-six counties: Florida replied that twelve counties were better than twenty-six in a country only one-sixth part of the size.

Texas plumed itself upon its 330,000 natives; Florida with a far smaller territory, boasted of being much more densely populated with 56,000.

The Texians, through the columns of the *Herald*, claimed that some regard should be had to a state which grew the best cotton in all America, produced the best green oak for the service of the navy, and contained the finest oil, besides iron mines, in which the yield was 50 per cent. of pure metal.

To this the *American Review* replied that the soil of Florida, although not equally rich, afforded the best conditions for the moulding and casting of the Columbiad, consisting as it

did of sand and argillaceous earth.

"That may be all very well," replied the Texians; "but you must first get to this country. Now the communications with Florida are difficult, while the coast of Texas offers the bay of Galveston, which possesses a circumference of fourteen leagues, and is capable of containing the navies of the entire world!"

"A pretty notion truly," replied the papers in the interest of Florida, "that of Galveston Bay, *below the 29th parallel!* Have we not got the bay of Espiritu Santo, opening precisely upon *the 28th degree*, and by which ships can reach Tampa Town by direct route?"

"A fine bay! half choked with sand!" "Choked yourselves!" returned the others.

Thus the war went on for several days, when Florida endeavoured to draw her adversary away on to fresh ground; and one morning the *Times* hinted that, the enterprise being essentially American, it ought not to be attempted upon other than purely American territory.

To these words Texas retorted, "American! are we not as much so as you? Were not Texas and Florida both incorporated into the Union in 1845?"

"Undoubtedly," replied the *Times*; "but we have belonged to the Americans ever since 1820."

"Yes!" returned the *Tribune*; "after having been Spaniards or English for 200 years, you were sold to the United States for five million dollars!"

"Well! and why need we blush for that? Was not Louisiana bought from Napoleon in 1803 at the price of sixteen million dollars?"

"Scandalous!" roared the Texian deputies. "A wretched little strip of country like Florida to dare to compare itself to Texas, who, in place of selling herself, asserted her own independence, drove out the Mexicans in March 2, 1836, and declared herself a federal republic after the victory gained by Samuel Houston, on the banks of the San Jacinto, over the troops of Santa Anna!—a country, in fine, which voluntarily annexed itself to the United States of America!"

"Yes; because it was afraid of the Mexicans!" replied Florida.

"Afraid!" From this moment the state of things became intolerable. A sanguinary encounter seemed daily imminent between the two parties in the streets of Baltimore. It became necessary to keep an eye upon the deputies.

President Barbicane knew not which way to look. Notes, documents, letters full of menaces showered down upon his house. Which side ought he to take? As regarded the appropriation of the soil, the facility of communication, the rapidity of transport, the claims of both states were evenly balanced. As for political prepossessions, they had nothing to do with the question.

This dead block had existed for some little time, when Barbicane resolved to get rid of it at once. He called a meeting of his colleagues, and laid before them a proposition which, it will be seen, was profoundly sagacious.

"On carefully considering," he said, "what is going on now between Florida and Texas, it is clear that the same difficulties will recur with the towns of the favoured state. The rivalry will descend from state to city, and so on downwards. Now Texas possesses *eleven* towns within the prescribed conditions, which will further dispute the honour and create us new enemies, while Florida has only *one*. I go in, therefore, for Florida and Tampa Town."

This decision, on being made known, utterly crushed the Texian deputies. Seized with an indescribable fury, they addressed threatening letters to the different members of the Gun Club by name. The magistrates had but one course to take, and they took it. They chartered a special train, forced the Texians into it whether they would or no; and they quitted the city with a speed of thirty miles an hour.

Quickly, however, as they were despatched, they found time to hurl one last and bitter sarcasm at their adversaries.

Alluding to the extent of Florida, a mere peninsula confined between two seas, they pretended that it could never sustain the shock of the discharge, and that it would "bust up" at the very first shot.

"Very well, let it bust up!" replied the Floridans, with a brevity worthy of the days of ancient Sparta.

From the Earth to the Moon

CHAPTER XII

URBI ET ORBI

THE astronomical, mechanical, and topographical difficulties resolved, finally came the question of finance. The sum required was far too great for any individual, or even any single state, to provide the requisite millions.

President Barbicane undertook, despite of the matter being a purely American affair, to render it one of universal interest, and to request the financial co-operation of all peoples. It was, he maintained, the right and the duty of the whole earth to interfere in the affairs of its satellite. The subscription opened at Baltimore extended properly to the whole world—*Urbi et orbi*.

This subscription was successful beyond all expectation; notwithstanding that it was a question not of *lending* but of *giving* the money. It was a purely disinterested operation in the strictest sense of the term, and offered not the slightest chance of profit.

The effect, however, of Barbicane's communication was not confined to the frontiers of the United States; it crossed the Atlantic and Pacific, invading simultaneously Asia and Europe, Africa and Oceania. The observatories of the Union placed themselves in immediate communication with those of foreign countries. Some, such as those of Paris, Petersburg, Berlin, Stockholm, Hamburg, Malta, Lisbon, Benares, Madras, and others, transmitted their good wishes; the rest maintained a prudent silence, quietly awaiting the result. As for the observatory at Greenwich, seconded as it was by the twenty-two astronomical establishments of Great Britain, it spoke plainly enough. It boldly denied the possibility of success, and pronounced in favour of the theories of Captain Nicholl. But this was nothing more than mere English jealousy.

On the 8th of October President Barbicane published a manifesto full of enthusiasm, in which he made an appeal to "all persons of good will upon the face of the earth." This document, translated into all languages, met with immense success.

Subscription lists were opened in all the principal cities of the Union, with a central office at the Baltimore Bank, 9, Baltimore Street.

In addition, subscriptions were received at the following banks in the different states of the two continents:—

- At Vienna, with S. M. de Rothschild.
- „ Petersburg, Stieglitz and Co.
- „ Paris, The Crédit Mobilier.
- „ Stockholm, Tottie and Arfuredson.
- „ London, N. M. Rothschild and Son.
- „ Turin, Ardouin and Co.
- „ Berlin, Mendelssohn.
- „ Geneva, Lombard, Odier, and Co.
- „ Constantinople, The Ottoman Bank.
- „ Brussels, J. Lambert.
- „ Madrid, Daniel Weisweller.
- „ Amsterdam, Netherlands Credit Co.
- „ Rome, Torlonia and Co.
- „ Lisbon, Lecesne.
- „ Copenhagen, Private Bank.
- „ Rio Janeiro, do.
- „ Monte Video, do.
- „ Valparaiso and Lima, Thomas la
Chambre and Co.
- „ Mexico, Martin Daran and Co.

Three days after the manifesto of President Barbicane 4,000,000 of dollars were paid into the different towns of the Union. With such a balance the Gun Club might begin operations at once. But some days later advices were received to the effect that the foreign subscriptions were being eagerly taken up. Certain countries distinguished themselves by their liberality; others untied their purse-strings with less facility—matter of temperament. Figures are, however, more eloquent than words, and here is the official statement of the sums which were paid in to the credit of the Gun Club at the close of the subscription.

Russia paid in as her contingent the enormous sum of 368,733 roubles. No one need be surprised at this, who bears in mind the scientific taste of the Russians, and the impetus which they have given to astronomical studies—thanks to their numerous observatories.

France began by deriding the pretensions of the Americans. The moon served as a pretext for a thousand stale puns and a score of ballads, in which bad taste contested the palm with ignorance. But as formerly the French paid before singing, so now they paid after



The subscription was opened.

having had their laugh, and they subscribed for a sum of 1,253,930 francs. At that price they had a right to enjoy themselves a little.

Austria showed herself generous in the midst of her financial crisis. Her public contributions amounted to the sum of 216,000 florins—a perfect godsend.

52,000 rix-dollars were the remittance of Sweden and Norway; the amount is large for the country, but it would undoubtedly have been considerably increased had the subscription been opened in Christiania simultaneously with that at Stockholm. For some reason or other the Norwegians do not like to send their money to Sweden.

Prussia, by a remittance of 250,000 thalers, testified her high approval of the enterprise.

Turkey behaved generously; but she had a personal interest in the matter. The moon, in fact, regulates the cycle of her years and her fast of Ramadan. She could not do less than give 1,372,640 piastres; and she gave them with an eagerness which denoted, however, some pressure on the part of the Government.

Belgium distinguished herself among the second-rate states by a grant of 513,000 francs—about two centimes per head of her population.

Holland and her colonies interested themselves to the extent of 110,000 florins, only demanding an allowance of five per cent discount for paying ready money.

Denmark, a little contracted in territory, gave nevertheless 9000 ducats, proving her love for scientific experiments.

The Germanic Confederation pledged itself to 34,285 florins. It was impossible to ask for more; besides, they would not have given it.

Though very much crippled, Italy found 200,000 lire in the pockets of her people. If she had had Venetia she would have done better; but she had *not*.

The States of the Church thought that they could not send less than 7040 Roman crowns; and Portugal carried her devotion to science as far as 30,000 cruzados. It was the widow's mite—eighty-six piastres; but self-constituted empires are always rather short of money.

257 francs, this was the modest contribution of Switzerland to the American work. One must freely admit that she did not see the practical side of the matter. It did not seem to her that the mere despatch of a shot to the moon could possibly establish any relation of affairs with her; and it did not seem prudent to her to embark her capital in so hazardous an enterprise. After all, perhaps she was right.

As to Spain, she could not scrape together

more than 110 reals. She gave as an excuse that she had her railways to finish. The truth is, that science is not favourably regarded in that country, it is still in a backward state; and, moreover, certain Spaniards, not by any means the least educated, did not form a correct estimate of the bulk of the projectile compared with that of the moon. They feared that it would disturb the established order of things. In that case it were better to keep aloof; which they did to the tune of some reals.

There remained but England; and we know the contemptuous antipathy with which she received Barbicane's proposition. The English have but one soul for the whole twenty-six millions of inhabitants which Great Britain contains. They hinted that the enterprise of the Gun Club was contrary to the "principle of non-intervention." And they did not subscribe a single farthing.

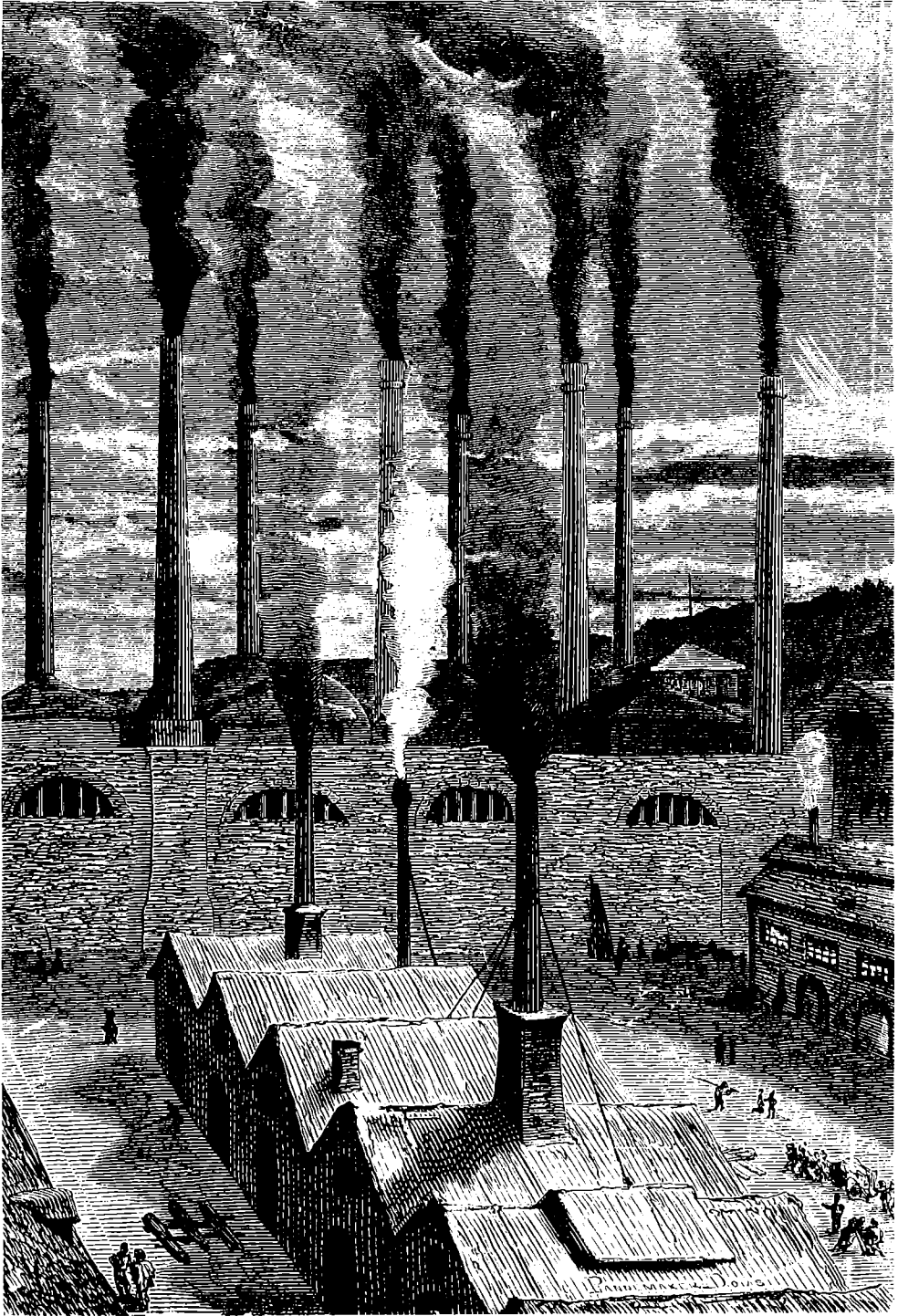
At this intimation the Gun Club merely shrugged its shoulders and returned to its great work. When South America, that is to say, Peru, Chili, Brazil, the provinces of La Plata and Columbia had poured forth their quota into their hands, the sum of 300,000 dollars, it found itself in possession of a considerable capital, of which the following is a statement:—

United States subscriptions	4,000,000	dollars
Foreign subscriptions	1,446,675	„
Total	5,446,675	„

Such was the sum which the public poured into the treasury of the Gun Club.

Let no one be surprised at the vastness of the amount. The work of casting, boring, masonry, the transport of workmen, their establishment in an almost uninhabited country, the construction of furnaces and workshops, the plant, the powder, the projectile, and incidental expenses, would, according to the estimates, absorb nearly the whole. Certain cannon shots in the Federal war cost 1000 dollars a-piece. This one of President Barbicane, unique in the annals of gunnery, might well cost five thousand times more.

On the 20th of October a contract was entered into with the manufactory of Goldspring, near New York, which during the war had furnished Parratt with the best cast-iron guns. It was stipulated between the contracting parties that the manufactory of Goldspring should engage to transport to Tampa Town, in southern Florida, the



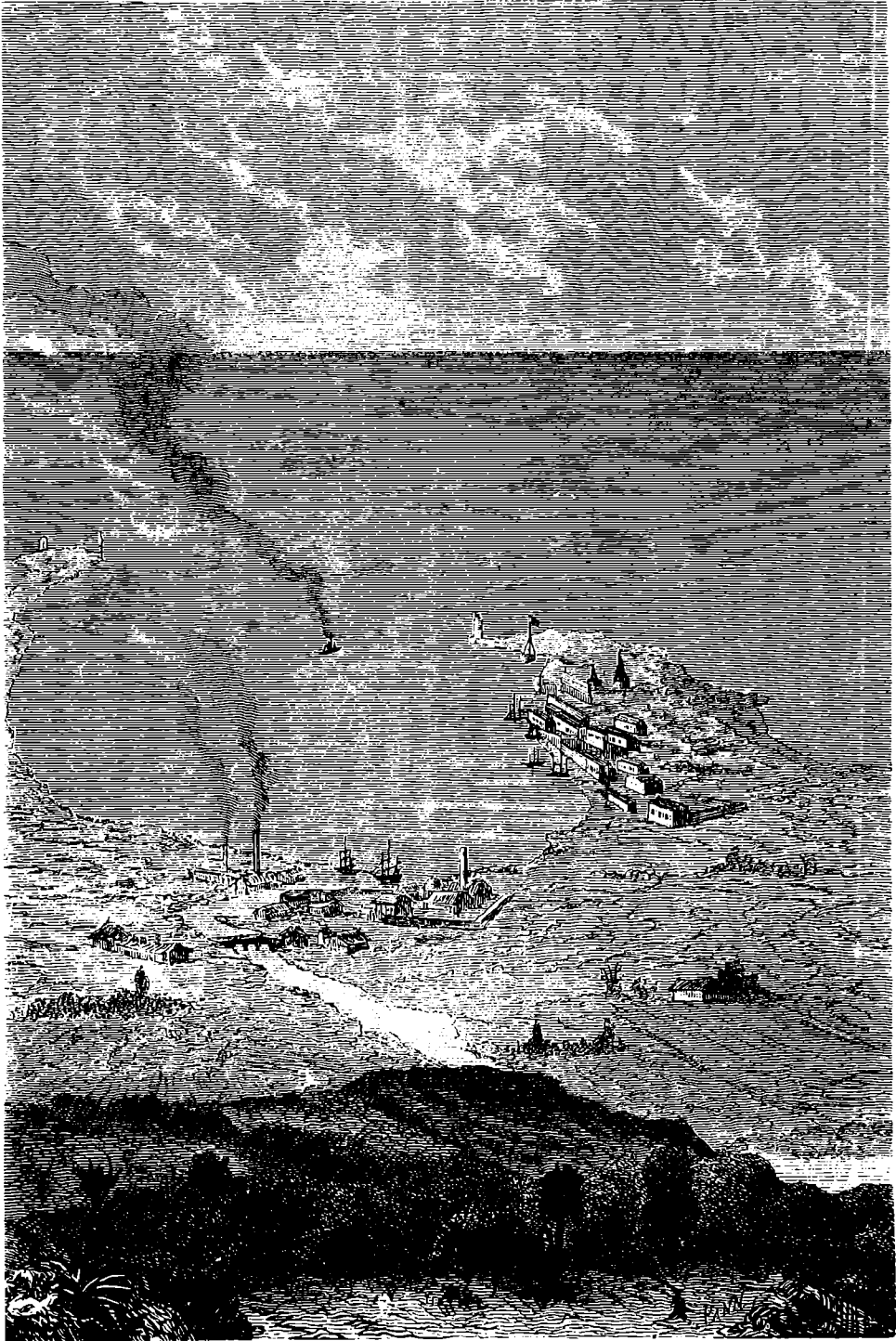
The manufactory of Goldspring, near New York.

necessary materials for casting the Columbiad. The work was bound to be completed at latest by the 15th of October following, and the cannon delivered in good condition under penalty of a forfeit of 100 dollars a day to the moment when the moon should again present herself under the same conditions—that is to say, in eighteen years and eleven days.

The engagement of the workmen, their pay,

and all the necessary details of the work, devolved upon the Goldspring Company.

This contract, executed in duplicate, was signed by Barbicane, President of the Gun Club, of the one part, and T. Murphison, director of the Goldspring manufactory, of the other, who thus executed the deed on behalf of their respective principals.



Tampa Town, previous to the undertaking.

From the Earth to the Moon

CHAPTER XIII

STONES HILL

WHEN the decision was arrived at by the Gun Club, to the disparagement of Texas, every one in America, where reading is an universal acquirement, set to work to study the geography of Florida. Never before had there been such a sale for works like *Bertram's Travels in Florida*, *Roman's Natural History of East and West Florida*, *William's Territory of Florida*, and *Cleland on the Cultivation of the Sugar-Cane in Florida*. It became necessary to issue fresh editions of these works.

Barbican had something better to do than to read. He desired to see things with his own eyes, and to mark the exact position of the proposed gun. So, without a moment's loss of time, he placed at the disposal of the Cambridge Observatory the funds necessary for the construction of a telescope, and entered into negotiations with the house of Breadwill and Co., of Albany, for the construction of an aluminium projectile of the required size. He then quitted Baltimore, accompanied by J. T. Maston, Major Elphinstone, and the manager of the Goldspring Factory.

On the following day, the four fellow-travellers arrived at New Orleans. There they immediately embarked on board the "Tampico," a despatch-boat belonging to the Federal navy, which the Government had placed at their disposal; and, getting up steam, the banks of the Louisiana speedily disappeared from sight.

The passage was not long. Two days after starting, the "Tampico," having made four hundred and eighty miles, came in sight of the coast of Florida. On a nearer approach Barbican found himself in view of a low, flat country of somewhat barren aspect. After coasting along a series of creeks abounding in lobsters and oysters, the "Tampico" entered the bay of Espiritu Santo, where she finally anchored in a small natural harbour, formed by the *embouchure* of the River Hillisborough, at seven p.m., on the 22nd October.

Our four passengers disembarked at once. "Gentlemen," said Barbican, "we have no time to lose; to-morrow we must obtain horses, and proceed to reconnoitre the country."

Barbican had scarcely set his foot on shore when three thousand of the inhabitants of Tampa Town came forth to meet him, an honour due to the president who had signalized their country by his choice.

Declining, however, every kind of ovation, Barbican ensconced himself in a room of the Franklin Hotel.

On the morrow some of those small horses of the Spanish breed, full of vigour and of fire, stood snorting under his windows; but instead of *four* steeds, here were *fifty*, together with their riders. Barbican descended with his three fellow-travellers; and much astonished were they all to find themselves in the midst of such a cavalcade. He remarked that every horseman carried a carbine slung across his shoulders and pistols in his holsters.

On expressing his surprise at these preparations, he was speedily enlightened by a young Floridan, who quietly said,—

"Sir, there are Seminoles there."

"What do you mean by Seminoles?"

"Savages who scour the prairies. We thought it best, therefore, to escort you on your road."

"Pooh!" cried J. T. Maston, mounting his steed.

"All right," said the Floridan; "but it is true enough, nevertheless."

"Gentlemen," answered Barbican, "I thank you for your kind attention; but it is time to be off."

It was five a.m. when Barbican and his party, quitting Tampa Town, made their way along the coast in the direction of Alifia Creek. This little river falls into Hillisborough Bay twelve miles above Tampa Town. Barbican and his escort coasted along its right bank to the eastward. Soon the waves of the bay disappeared behind a bend of rising ground, and the Floridan "champagne" alone offered itself to view.

Florida, discovered on Palm Sunday, in 1512, by Juan Ponce de Leon, was originally named *Pascha Florida*. It little deserved that designation with its dry and parched coasts. But after some few miles of tract the nature of the soil gradually changes and the country shows itself worthy of the name. Cultivated plains soon appear, where are united all the

productions of the northern and tropical floras, terminating in prairies abounding with pineapples and yams, tobacco, rice, cotton-plants, and sugar-canes, which extend beyond reach of sight, flinging their riches broadcast with careless prodigality.

Barbican appeared highly pleased on observing the progressive elevation of the land; and in answer to a question of J. T. Maston, replied,—

“My worthy friend, we cannot do better than sink our Columbiad in these high grounds.”

“To get nearer to the moon, perhaps?” said the secretary of the Gun Club.

“Not exactly,” replied Barbican, smiling; “do you not see that amongst these elevated plateaus we shall have a much easier work of it? No struggles with the water-springs, which will save us long and expensive tubings; and we shall be working in daylight instead of down a deep and narrow well. Our business, then, is to open our trenches upon ground some hundreds of yards above the level of the sea.”

“You are right, sir,” struck in Murchison, the engineer; “and, if I mistake not, we shall ere long find a suitable spot for our purpose.”

“I wish we were at the first stroke of the pickaxe,” said the president.

“And I wish we were at the *last*,” cried J. T. Maston.

About ten a.m. the little band had crossed a dozen miles. To fertile plains succeeded a region of forests. There perfumes of the most varied kinds mingled together in tropical profusion. These almost impenetrable forests were composed of pomegranates, orange-trees, citrons, figs, olives, apricots, bananas, huge vines, whose blossoms and fruits rivalled each other in colour and perfume. Beneath the odorous shade of these magnificent trees fluttered and warbled a little world of brilliantly plumaged birds.

J. T. Maston and the major could not repress their admiration on finding themselves in presence of the glorious beauties of this wealth of nature. President Barbican, however, less sensitive to these wonders, was in haste to press forward; the very luxuriance of the country was displeasing to him. They hastened onwards, therefore, and were compelled to ford several rivers, not without danger, for they were infested with huge alligators from fifteen to eighteen feet long.

Maston courageously menaced them with his steel hook, but he only succeeded in frightening some pelicans and teal, while tall flamingos stared stupidly at the party.

At length these denizens of the swamps disappeared in their turn; smaller trees became thinly scattered among less dense thickets—a few isolated groups detached the in midst of endless plains over which ranged herds of startled deer.

“At last,” cried Barbican, rising in his stirrups, “here we are at the region of pines!”

“Yes! and of savages too,” replied the major.

In fact, some Seminoles had just come in sight upon the horizon, they rode violently backwards and forwards on their fleet horses, brandishing their spears or discharging their guns with a dull report. These hostile demonstrations, however, had no effect upon Barbican and his companions.

They were then occupying the centre of a rocky plain, which the sun scorched with its parching rays. This was formed by a considerable elevation of the soil, which seemed to offer to the members of the Gun Club all the conditions requisite for the construction of their Columbiad.

“Halt!” said Barbican, reining up. “Has this place any local appellation?”

“It is called Stones Hill,” replied one of the Floridans.

Barbican, without saying a word, dismounted, seized his instruments, and began to note his position with extreme exactness. The little band, drawn up in rear, watched his proceedings in profound silence.

At this moment the sun passed the meridian. Barbican, after a few moments, rapidly wrote down the result of his observations, and said,—

“This spot is situated 1800 feet above the level of the sea, in 27° 7' N. lat. and 5° 7' W. long. of the meridian of Washington. It appears to me by its rocky and barren character to offer all the conditions requisite for our experiment. On that plain will be raised our magazines, workshops, furnaces, and workmen’s huts; and here, from this very spot,” said he, stamping his foot on the summit of Stones Hill, “hence shall our projectile take its flight into the regions of the Solar World.”

From the Earth to the Moon

CHAPTER XIV

PICKAXE AND TROWEL

THE same evening Barbicane and his companions returned to Tampa Town; and Murchison, the engineer, re-embarked on board the "Tampico" for New Orleans. His object was to enlist an army of workmen, and to collect together the greater part of the materials. The members of the Gun Club remained at Tampa Town, for the purpose of setting on foot the preliminary works by the aid of the people of the country.

Eight days after its departure, the "Tampico" returned into the bay of Espiritu Santo, with a whole flotilla of steamboats. Murchison had succeeded in assembling together fifteen hundred artisans. Attracted by the high pay and considerable bounties offered by the Gun Club, he had enlisted a choice legion of stokers, iron-founders, lime-burners, miners, brickmakers, and artisans of every trade, without distinction of colour. As many of these people brought their families with them, their departure resembled a perfect emigration.

On the 31st October, at ten o'clock in the morning, the troop disembarked on the quays of Tampa Town; and one may imagine the activity which pervaded that little town, whose population was thus doubled in a single day.

During the first few days they were busy discharging the cargo brought by the flotilla, the machines, and the rations, as well as a large number of huts constructed of iron plates, separately pieced and numbered. At the same period Barbicane laid the first sleepers of a railway fifteen miles in length, intended to unite Stones Hill with Tampa Town. On the first of November Barbicane quitted Tampa Town with a detachment of workmen; and on the following day the whole town of huts was erected round Stones Hill. This they enclosed with palisades; and in respect of energy and activity, it might have shortly been mistaken for one of the great cities of the Union. Everything was placed under a complete system of discipline, and the works were commenced in most perfect order.

The nature of the soil having been carefully examined, by means of repeated borings, the work of excavation was fixed for the 4th of November.

On that day Barbicane called together his foremen and addressed them as follows:—"You are well aware, my friends, of the object with which I have assembled you together in this wild part of Florida. Our business is to construct a cannon measuring nine feet in its interior diameter, six feet thick, and with a stone revetment of nineteen and a half feet in thickness. We have, therefore, a well of sixty feet in diameter to dig down to a depth of nine hundred feet. This great work must be completed *within eight months*, so that you have 2,543,400 cubic feet of earth to excavate in 255 days; that is to say, in round numbers, 2000 cubic feet per day. That which would present no difficulty to a thousand navvies working in open country will be of course more troublesome in a comparatively confined space. However, the thing must be done, and I reckon for its accomplishment upon your courage as much as upon your skill.

At eight o'clock in the morning the first stroke of the pickaxe was struck upon the soil of Florida; and from that moment that prince of tools was never inactive for one moment in the hands of the excavators. The gangs relieved each other every three hours.

On the 4th of November fifty workmen commenced digging, in the very centre of the enclosed space on the summit of Stones Hill, a circular hole sixty feet in diameter. The pickaxe first struck upon a kind of black earth, six inches in thickness, which was speedily disposed of. To this earth succeeded two feet of fine sand, which was carefully laid aside as being valuable for serving for the casting of the inner mould. After the sand appeared some compact white clay, resembling the chalk of Great Britain, which extended down to a depth of four feet. Then the iron of the picks struck upon the hard bed of the soil; a kind of rock formed of petrified shells, very dry, very solid, and which the picks could with difficulty penetrate. At this point the excavation exhibited a depth of six feet and a half, and the work of the masonry was begun.

At the bottom of this excavation they constructed a wheel of oak, a kind of circle strongly bolted together, and of immense strength. The centre of this wooden disc was

hollowed out to a diameter equal to the exterior diameter of the Columbiad. Upon this wheel rested the first layers of the masonry, the stones of which were bound together by hydraulic cement, with irresistible tenacity. The workmen, after laying the stones from the circumference to the centre, were thus enclosed within a kind of well twenty-one feet in diameter. When this work was accomplished, the miners resumed their picks and cut away the rock from underneath the *wheel* itself, taking care to support it as they advanced upon blocks of great thickness. At every two feet which the hole gained in depth they successively withdrew the blocks. The *wheel* then sank little by little, and with it the massive ring of masonry, on the upper bed of which the masons laboured incessantly, always reserving some vent holes to permit the escape of gas during the operation of casting.

This kind of work required on the part of the workmen extreme nicety and minute attention. More than one, in digging underneath the wheel, was dangerously injured by the splinters of stone. But their ardour never relaxed, night or day. By day they worked under the rays of the scorching sun; by night, under the gleam of the electric light. The sounds of the picks against the rock, the bursting of mines, the grinding of the machines, the wreaths of smoke scattered through the air, traced around Stones Hill a circle of terror which the herds of buffaloes and the war parties of the Seminoles never ventured to pass. Nevertheless, the works advanced regularly, as the steam-cranes actively removed the rubbish. Of unexpected obstacles there was little account; and with regard to foreseen difficulties, they were speedily disposed of.

At the expiration of the first month the well had attained the depth assigned for that lapse of time, viz. 112 feet. This depth was doubled in December, and trebled in January.

During the month of February the workmen had to contend with a sheet of water which made its way right across the outer soil. It became necessary to employ very powerful pumps and compressed air-engines to drain it off, so as to close up the orifice from whence it

issued; just as one stops a leak on board ship. they at last succeeded in getting the upper hand of these untoward streams; only, in consequence of the loosening of the soil, the wheel partly gave way, and a slight partial settlement ensued. This accident cost the life of several workmen.

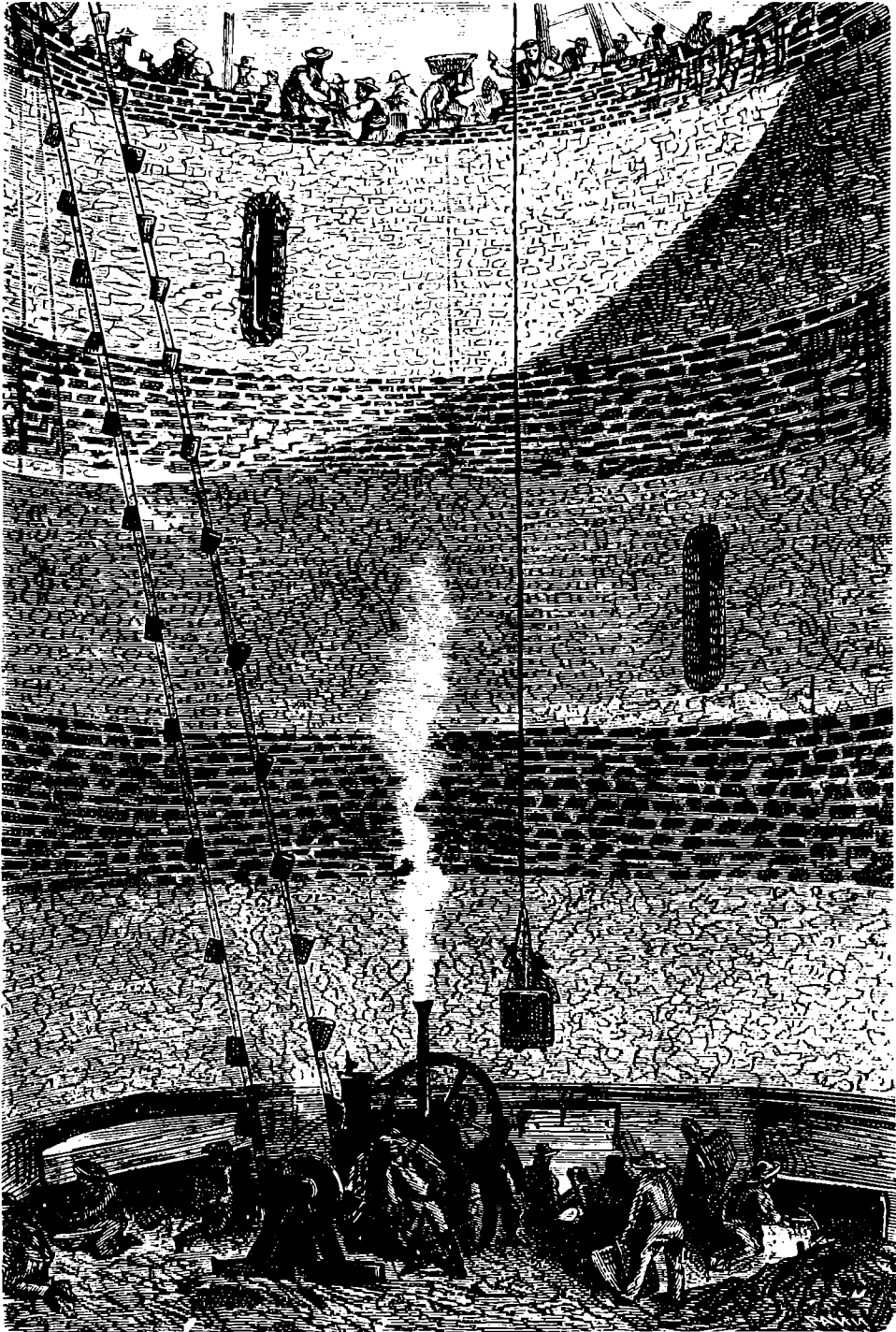
No fresh occurrence thenceforward arrested the progress of the operation; and on the 10th of June, twenty days before the expiration of the period fixed by Barbicane, the well, lined throughout with its facing of stone, had attained the depth of 900 feet. At the bottom the masonry rested upon a massive block measuring thirty feet in thickness, whilst on the upper portion it was level with the surrounding soil.

President Barbicane and the members of the Gun Club warmly congratulated their engineer Murchison: the cyclopean work had been accomplished with extraordinary rapidity.

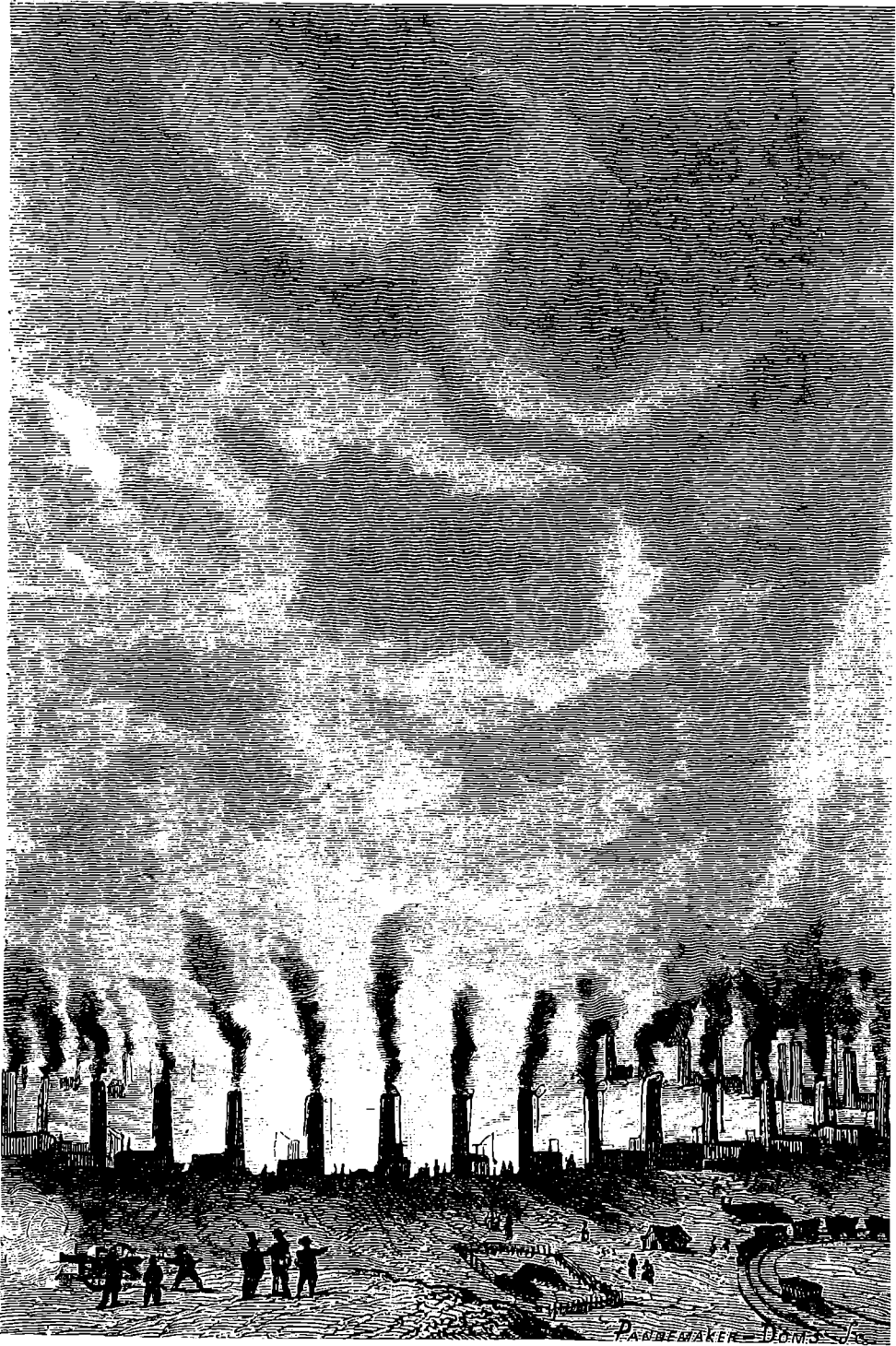
During these eight months Barbicane never quitted Stones Hill for a single instant. Keeping ever close by the work of excavation, he busied himself incessantly with the welfare and health of his workpeople, and was singularly fortunate in warding off the epidemics common to large communities of men, and so disastrous in those regions of the globe which are exposed to the influences of tropical climates.

Many workmen, it is true, paid with their lives for the rashness inherent in these dangerous labours; but these mishaps are impossible to be avoided, and they are classed amongst details with which the Americans trouble themselves but little. They have in fact more regard for human nature in general than for the individual in particular.

Nevertheless, Barbicane professed opposite principles to these, and put them in force at every opportunity. So, thanks to his care, his intelligence, his useful intervention in all difficulties, his prodigious and humane sagacity, the average of accidents did not exceed that of transatlantic countries, noted for their excessive precautions, France, for instance, among others, where they reckon about one accident for every two hundred thousand francs of work.



The work progressed regularly.



The casting.

From the Earth to the Moon

CHAPTER XV

THE FÊTE OF THE CASTING

DURING the eight months which were employed in the work of excavation the preparatory works of the casting had been carried on simultaneously with extreme rapidity. A stranger arriving at Stones Hill would have been surprised at the spectacle offered to his view.

At 600 yards from the well, and circularly arranged around it as a central point, rose 1200 reverberating ovens, each six feet in diameter, and separated from each other by an interval of three feet. The circumference occupied by these 1200 ovens presented a length of two miles. Being all constructed on the same plan, each with its high quadrangular chimney, they produced a most singular effect.

It will be remembered that on their third meeting the Committee had decided to use cast-iron for the Columbiad, and in particular the *white* description. This metal in fact is the most tenacious, the most ductile, and the most malleable, and consequently suitable for all moulding operations; and when smelted with pit coal, is of superior quality for all engineering works requiring great resisting power, such as cannon, steam-boilers, hydraulic presses, and the like.

Cast-iron, however, if subjected to only one single fusion, is rarely sufficiently homogeneous; and it requires a second fusion completely to refine it by dispossessing it of its last earthly deposits. So before being forwarded to Tampa Town, the iron ore, molten in the great furnaces of Goldspring, and brought into contact with coal and silicium heated to a high temperature, was carburized and transformed into cast-iron. After this first operation, the metal was sent on to Stones Hill. They had, however, to deal with 136,000,000lbs. of iron, a quantity far too costly to send by railway. The cost of transport would have been double that of material. It appeared preferable to freight vessels at New York, and to load them with the iron in bars. This, however, required not less than sixty-eight vessels of 1000 tons, a veritable fleet, which, quitting New York on the 3rd of May, on the 10th of the same month ascended the Bay of Espiritu Santo, and discharged their cargoes, without dues, in the port at Tampa

Town. Thence the iron was transported by rail to Stones Hill, and about the middle of January this enormous mass of metal was delivered at its destination.

It will be easily understood that 1200 furnaces were not too many to melt simultaneously these 60,000 tons of iron. Each of these furnaces contained nearly 140,000lbs. weight of metal. They were all built after the model of those which served for the casting of the Rodman gun, they were trapezoidal in shape, with a high elliptical arch. These furnaces, constructed of fireproof brick, were especially adapted for burning pit coal, with a flat bottom upon which the iron bars were laid. This bottom, inclined at an angle of 25°, allowed the metal to flow into the receiving troughs; and the 1200 converging trenches carried the molten metal down to the central well.

The day following that on which the works of the masonry and boring had been completed, Barbicane set to work upon the central mould. His object now was to raise within the centre of the well, and with a coincident axis, a cylinder 900 feet high, and 9 feet in diameter, which should exactly fill up the space reserved for the bore of the Columbiad. This cylinder was composed of a mixture of clay and sand, with the addition of a little hay and straw. The space left between the mould and the masonry was intended to be filled up by the molten metal, which would thus form the walls six feet in thickness. This cylinder, in order to maintain its equilibrium, had to be bound by iron bands, and firmly fixed at certain intervals by cross-clamps fastened into the stone lining; after the castings these would be buried in the block of metal, leaving no external projection.

This operation was completed on the 8th of July, and the run of the metal was fixed for the following day.

"This fête of the casting will be a grand ceremony," said J. T. Maston to his friend Barbicane.

"Undoubtedly," said Barbicane; "but it will not be a public fête."

"What! will you not open the gates of the enclosure to all comers?"

"I must be very careful, Maston. The casting of the Columbiad is an extremely delicate, not to say a dangerous, operation, and I should prefer its being done privately. At the discharge of the projectile, a fête if you like—till then, no!"

The president was right. The operation involved unforeseen dangers, which a great influx of spectators would have hindered him from averting. It was necessary to preserve complete freedom of movement. No one was admitted within the enclosure except a delegation of members of the Gun Club, who had made the voyage to Tampa Town. Among these was the brisk Bilsby, Tom Hunter, Colonel Blomsberry, Major Elphinstone, General Morgan, and the rest of the lot to whom the casting of the Columbiad was a matter of personal interest. J. T. Maston became their cicerone. He omitted no point of detail; he conducted them throughout the magazines, workshops, through the midst of the engines, and compelled them to visit the whole 1200 furnaces one after the other. At the end of the twelve-hundredth visit they were pretty well knocked up.

The casting was to take place at 12 o'clock precisely. The previous evening each furnace had been charged with 114,000lbs. weight of metal in bars disposed cross-ways to each other, so as to allow the hot air to circulate freely between them. At daybreak the 1200 chimneys vomited their torrents of flame into the air, and the ground was agitated with dull tremblings. As many pounds of metal as there were to *cast*, so many pounds of coal were there to *burn*. Thus there were 68,000 tons of coal which projected in the face of the sun a thick curtain of smoke. The heat soon became insupportable within the circle of furnaces, the rumbling of which resembled the rolling of thunder. The powerful ventilators added their continuous blasts and saturated with oxygen the glowing plates. The operation, to be successful, required to be conducted with great rapidity. On a signal given by a cannon-shot each furnace was to give vent to the molten iron and completely to empty itself. These

arrangements made, foremen and workmen waited the preconcerted moment with an impatience mingled with a certain amount of emotion. Not a soul remained within the enclosure. Each superintendent took his post by the aperture of the run.

Barbican and his colleagues, perched on a neighbouring eminence, assisted at the operation. In front of them was a piece of artillery ready to give fire on the signal from the engineer. Some minutes before midday the first driblets of metal began to flow; the reservoirs filled little by little; and, by the time that the whole melting was completely accomplished, it was kept in abeyance for a few minutes in order to facilitate the separation of foreign substances.

Twelve o'clock struck! A gun-shot suddenly pealed forth and shot its flame into the air. Twelve hundred melting-troughs were simultaneously opened and twelve hundred fiery serpents crept towards the central well, unrolling their incandescent curves. There, down they plunged with a terrific noise into a depth of 900 feet. It was an exciting and a magnificent spectacle. The ground trembled, while these molten waves, launching into the sky their wreaths of smoke, evaporated the moisture of the mould and hurled it upwards through the vent-holes of the stone lining in the form of dense vapour-clouds. These artificial clouds unrolled their thick spirals to a height of 1000 yards into the air. A savage, wandering somewhere beyond the limits of the horizon, might have believed that some new crater was forming in the bosom of Florida, although there was neither any eruption, nor typhoon, nor storm, nor struggle of the elements, nor any of those terrible phenomena which nature is capable of producing. No, it was man alone who had produced these reddish vapours, these gigantic flames worthy of a volcano itself, these tremendous vibrations resembling the shock of an earthquake, these reverberations rivalling those of hurricanes and storms; and it was his hand which precipitated into an abyss, dug by himself, a whole Niagara of molten metal!

From the Earth to the Moon

CHAPTER XVI

THE COLUMBIAD

HAD the casting succeeded? They were reduced to mere conjecture. There was indeed every reason to expect success, since the mould had absorbed the entire mass of the molten metal; still some considerable time must elapse before they could arrive at any certainty upon the matter.

The patience of the members of the Gun Club was sorely tried during this period of time. But they could do nothing. J. T. Maston escaped roasting by a miracle. Fifteen days after the casting an immense column of smoke was still rising in the open sky, and the ground burnt the soles of the feet within a radius of 200 feet round the summit of Stones Hill. It was impossible to approach nearer. All they could do was to wait with what patience they might.

"Here we are at the 10th August," exclaimed J. T. Maston one morning, "only four months to the 1st of December! We shall never be ready in time!" Barbicane said nothing, but his silence covered serious irritation.

However, daily observations revealed a certain change going on in the state of the ground. About the 15th August the vapours ejected had sensibly diminished in intensity and thickness. Some days afterwards the earth exhaled only a slight puff of smoke, the last breath of the monster enclosed within its circle of stone. Little by little the belt of heat contracted, until on the 22nd August Barbicane, his colleagues, and the engineer were enabled to set foot on the iron sheet which lay level upon the summit of Stones Hill.

"At last!" exclaimed the President of the Gun Club, with an immense sigh of relief.

The work was resumed the same day. They proceeded at once to extract the interior mould, for the purpose of clearing out the boring of the piece. Pickaxes and boring irons were set to work without intermission. The clayey and sandy soils had acquired extreme hardness under the action of the heat; but by the aid of the machines, the rubbish on being dug out was rapidly carted away on railway waggons; and such was the ardour of the work, so persuasive the arguments of

Barbicane's dollars, that by the 3rd of September all traces of the mould had entirely disappeared.

Immediately the operation of boring was commenced; and by the aid of powerful machines, a few weeks later, the inner surface of the immense tube had been rendered perfectly cylindrical, and the bore of the piece had acquired a thorough polish.

At length, on the 22nd of September, less than a twelvemonth after Barbicane's original proposition, the enormous weapon, accurately bored, and exactly vertically pointed, was ready for work. There was only the moon now to wait for; and they were pretty sure that she would not fail in the rendezvous.

The ecstasy of J. T. Maston knew no bounds, and he narrowly escaped a frightful fall while staring down the tube. But for the strong hand of Colonel Blonsberry, the worthy secretary, like a modern Erostratus, would have found his death in the depths of the Columbiad.

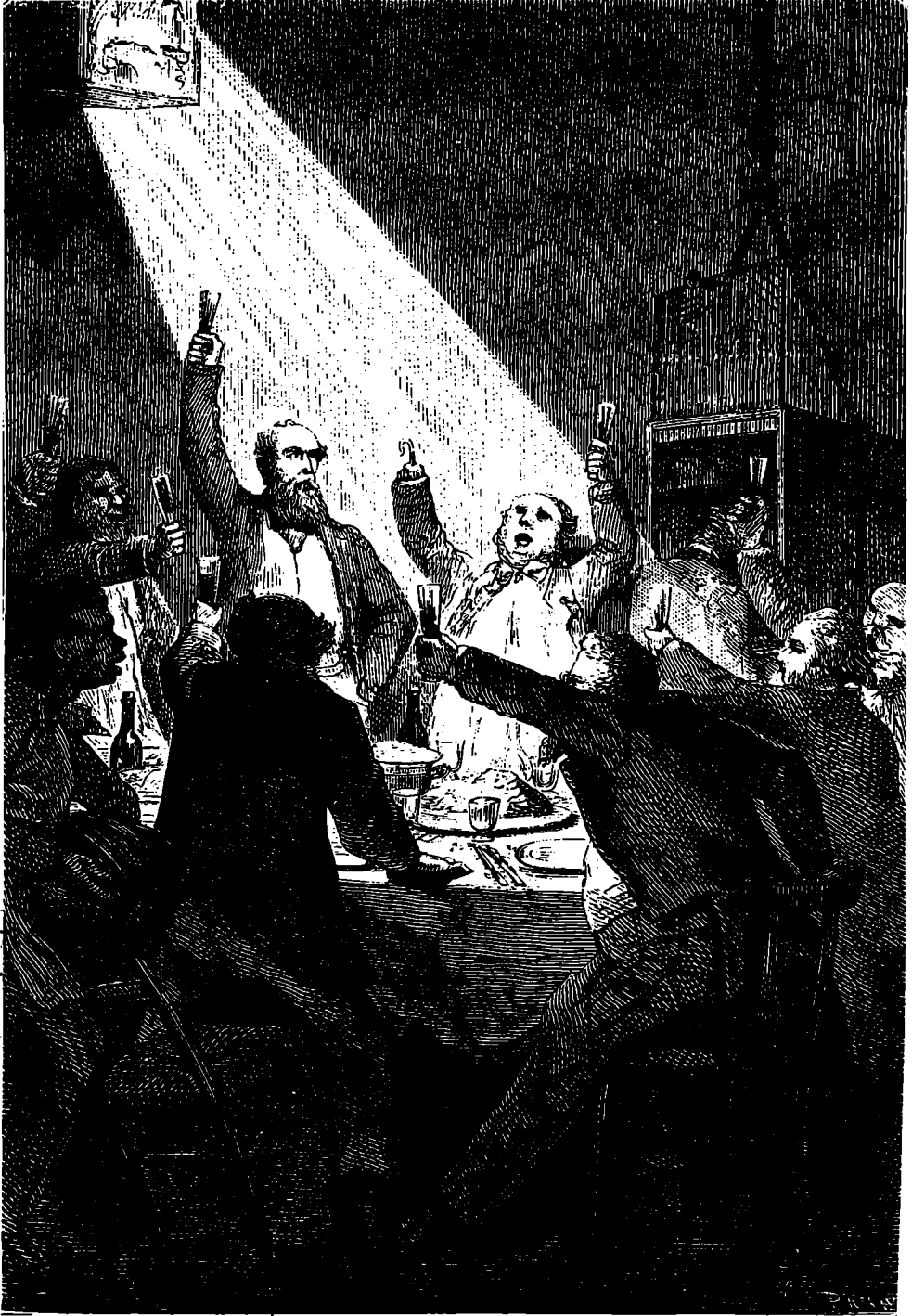
The cannon was then finished; there was no possible doubt as to its perfect completion. So, on the 6th of October, Captain Nicholl opened an account between himself and President Barbicane, in which he debited himself to the latter in the sum of 2000 dollars. One may believe that the Captain's wrath was increased to its highest point, and must have made him seriously ill. However, he had still three bets of three, four, and five thousand dollars, respectively; and if he gained two out of these, his position would not be very bad. But the money question did not enter into his calculations; it was the success of his rival in casting a cannon against which iron plates sixty feet thick would have been ineffectual, that dealt him a terrible blow.

After the 23rd of September the enclosure of Stones Hill was thrown open to the public; and it will be easily imagined what was the concourse of visitors to this spot! There was an incessant flow of people to and from Tampa Town and the place, which resembled a procession, or rather, in fact, a pilgrimage.

It was already clear to be seen that, on the day of the experiment itself, the aggregate of spectators would be counted by millions; for



Tampa Town, after the undertaking.



The banquet in the Columbiad.

they were already arriving from all parts of the earth upon this narrow strip of promontory. Europe was emigrating to America.

Up to that time, however, it must be confessed, the curiosity of the numerous comers was but scantily gratified. Most had counted upon witnessing the spectacle of the casting, and they were treated to nothing but smoke. This was sorry food for hungry eyes; but Barbicane would admit no one to that operation. Then ensued grumbling, discontent, murmurs; they blamed the President, taxed him with dictatorial conduct. His proceedings were declared "un-American." There was very nearly a riot round Stones Hill; but Barbicane remained inflexible. When, however, the Columbiad was entirely finished, this state of closed doors could no longer be maintained; besides it would have been bad taste, and even imprudence, to affront the public feeling. Barbicane, therefore, opened the enclosure to all comers; but, true to his practical disposition, he determined to coin money out of the public curiosity.

It was something, indeed, to be enabled to contemplate this immense Columbiad; but to descend into its depths, this seemed to the Americans the *ne plus ultra* of earthly felicity. Consequently, there was not one curious spectator who was not willing to give himself the treat of visiting the interior of this metallic abyss. Baskets suspended from steam-cranes permitted them to satisfy their curiosity. There was a perfect mania. Women, children, old men, all made it a point of duty to penetrate the mysteries of the colossal gun. The fare for the descent was fixed at five dollars per head; and, despite this high charge, during the two months which preceded the experiment, the influx of visitors enabled the Gun Club to pocket nearly 500,000 dollars!

It is needless to say that the first visitors of

the Columbiad were the members of the Gun Club. This privilege was justly reserved for that illustrious body. The ceremony took place on the 25th September. A basket of honour took down the President, J. T. Maston, Major Elphinstone, General Morgan, Colonel Blomsberry, and other members of the club, to the number of ten in all. How hot it was at the bottom of that long tube of metal! They were half suffocated. But what delight! What ecstasy! A table had been laid with six covers on the massive stone which formed the bottom of the Columbiad, and lighted by a jet of electric light resembling that of day itself. Numerous exquisite dishes, which seemed to descend from heaven, were placed successively before the guests, and the richest wines of France flowed in profusion during this splendid repast, served nine hundred feet beneath the surface of the earth!

The festival was animated, not to say somewhat noisy. Toasts flew backwards and forwards. They drank to the earth and to her satellite, to the Gun Club, the Union, the moon, Diana, Phoebe, Selene, the "peaceful courier of the night"! All the hurrahs, carried upwards upon the sonorous waves of the immense acoustic tube, arrived with the sound of thunder at its mouth; and the multitude ranged round Stones Hill heartily united their shouts with those of the ten revellers hidden from view at the bottom of the gigantic Columbiad.

J. T. Maston was no longer master of himself. Whether he shouted or gesticulated, ate or drank most, would be a difficult matter to determine. At all events, he would not have given his place up for an empire, "not even if the cannon—loaded, primed, and fired at that very moment—were to blow him in pieces into the planetary world."

From the Earth to the Moon

CHAPTER XVII

A TELEGRAPHIC DESPATCH

THE great works undertaken by the Gun Club had now virtually come to an end; and two months still remained before the day for the discharge of the shot to the moon. To the general impatience these two months appeared as long as years! Hitherto the smallest details of the operation had been daily chronicled by the journals, which the public devoured with eager eyes.

Just at this moment a circumstance, the most unexpected, the most extraordinary and incredible, occurred to rouse afresh their panting spirits, and to throw every mind into a state of the most violent excitement.

One day, the 30th September, at 3.47 p.m., a telegram, transmitted by cable from Valentia (Ireland) to Newfoundland and the American mainland, arrived at the address of President Barbicane.

The President tore open the envelope, read the despatch, and, despite his remarkable powers of self-control, his lips turned pale and his eyes grew dim, on reading the twenty words of this telegram.

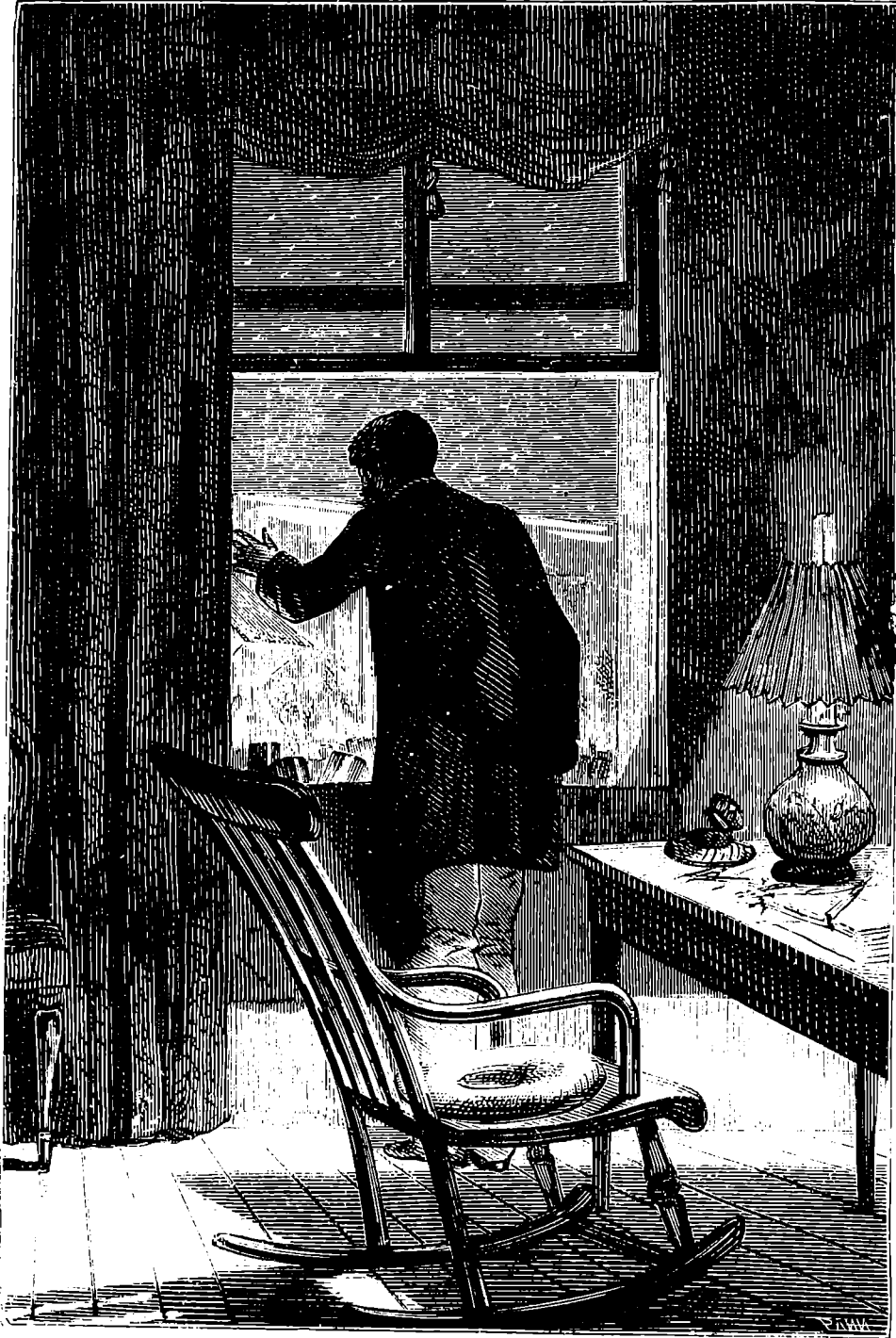
Here is the text of the despatch, which figures now in the archives of the Gun Club:—

“FRANCE, PARIS,
‘30 *September*, 4 a.m.

“Barbicane, Tampa Town, Florida,
United States.

“Substitute for your spherical shell a cylindro-conical projectile. I shall go inside. Shall arrive by steamer ‘Atlanta.’

“MICHEL ARDAN.”



President Barbicane at his window.

From the Earth to the Moon

CHAPTER XVIII

THE PASSENGER OF THE "ATLANTA"

IF this astounding news, instead of flying through the electric wires, had simply arrived by post in the ordinary sealed envelope, Barbicane would not have hesitated a moment. He would have held his tongue about it, both as a measure of prudence, and in order not to have to reconsider his plans. This telegram might be a cover for some jest, especially as it came from a Frenchman. What human being would ever have conceived the idea of such a journey! and, if such a person really existed, he must be an idiot, whom one would shut up in a lunatic ward, rather than within the walls of the projectile.

The contents of the despatch, however, speedily became known; for the telegraphic officials possessed but little discretion, and Michel Ardan's proposition ran at once throughout the several States of the Union. Barbicane had, therefore, no further motive for keeping silence. Consequently, he called together such of his colleagues as were at the moment in Tampa Town, and without any expression of his own opinions simply read to them the laconic text itself. It was received with every possible variety of expressions of doubt, incredulity, and derision from every one, with the exception of J. T. Maston, who exclaimed, "It is a grand idea, however!"

When Barbicane originally proposed to send a shot to the moon every one looked upon the enterprise as simple and practicable enough—a mere question of gunnery; but when a person, professing to be a reasonable being, offered to take passage within the projectile, the whole thing became a farce, or, in plainer language, a *humbug*.

One question, however, remained. Did such a being exist? This telegram flashed across the depths of the Atlantic, the designation of the vessel on board which he was to take his passage, the date assigned for his speedy arrival, all combined to impart a certain character of reality to the proposal. They must get some clearer notion of the matter. Scattered groups of inquirers at length condensed themselves into a compact crowd, which made straight for the residence of President Barbicane. That worthy individual was keeping quiet with the intention of

watching events as they arose. But he had forgotten to take into account the public impatience; and it was with no pleasant countenance that he watched the population of Tampa Town gathering under his windows. The murmurs and vociferations below presently obliged him to appear. He came forward, therefore, and on silence being procured, a citizen put point-blank to him the following question:—"Is the person mentioned in the telegram, under the name of Michel Ardan, on his way here? Yes or no."

"Gentlemen," replied Barbicane, "I know no more than you do."

"We must know," roared the impatient voices.

"Time will show," calmly replied the President.

"Time has no business to keep a whole country in suspense," replied the orator. "Have you altered the plans of the projectile according to the request of the telegram?"

"Not yet, gentlemen; but you are right! we must have better information to go by. The telegraph must complete its information."

"To the telegraph!" roared the crowd.

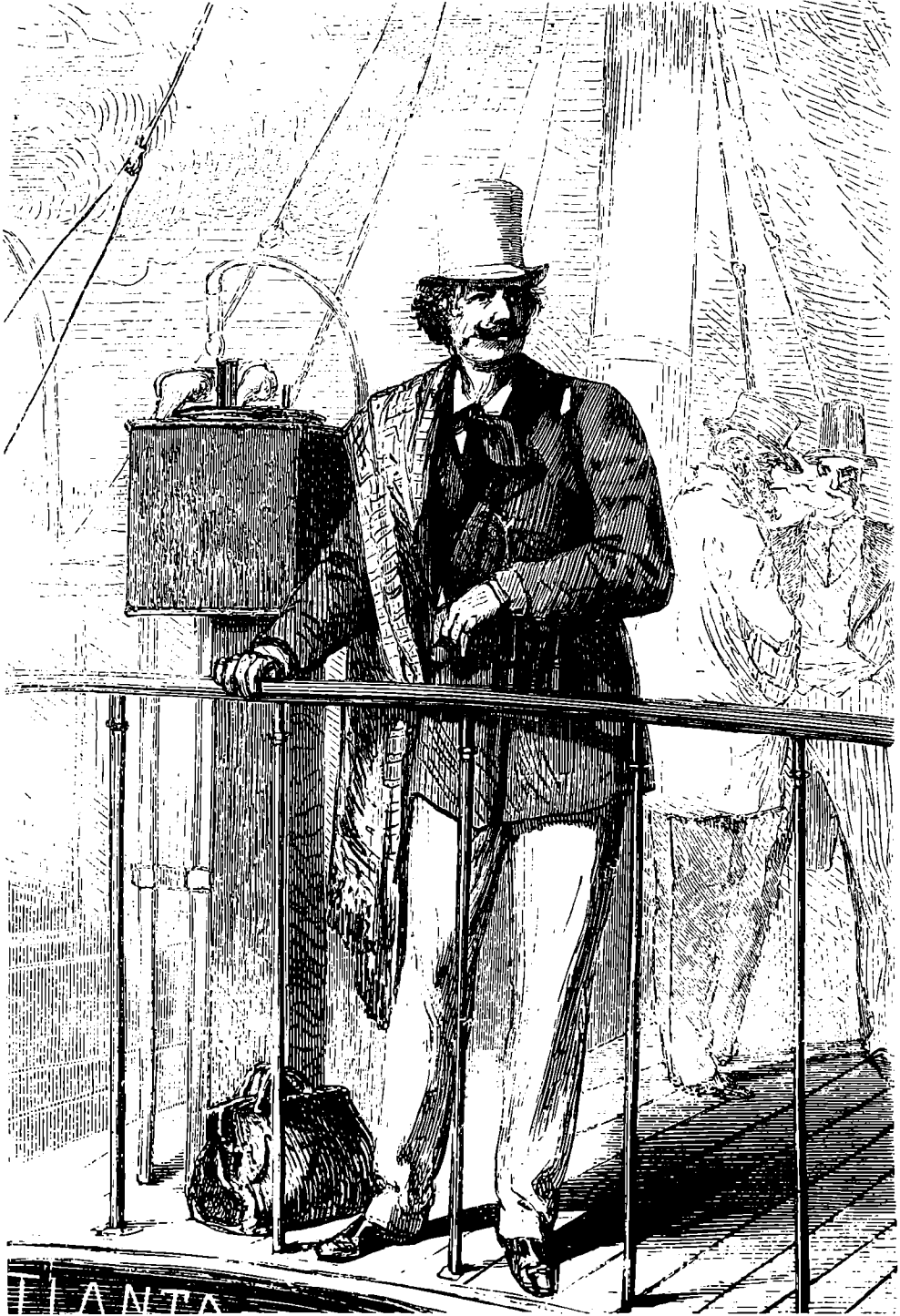
Barbicane descended; and heading the immense assemblage, led the way to the telegraph office. A few minutes later a telegram was despatched to the secretary of the underwriters at Liverpool, requesting answers to the following queries:—

"About the ship 'Atlanta'—when did she leave Europe? Had she on board a Frenchman named Michel Ardan?"

Two hours afterwards Barbicane received information too exact to leave room for the smallest remaining doubt.

"The steamer 'Atlanta' from Liverpool put to sea on the 2nd October, bound for Tampa Town, having on board a Frenchman borne on the list of passengers by the name of Michel Ardan."

That very evening he wrote to the house of Breadwill and Co., requesting them to suspend the casting of the projectile until the receipt of further orders. On the 20th October, at 9 a.m., the semaphores of the Bahama Canal signalled a thick smoke on the horizon. Two hours later a large steamer exchanged signals with them.



Michel Ardan.

The name of the "Atlanta" flew at once over Tampa Town. At four o'clock the English vessel entered the Bay of Espiritu Santo. At five it crossed the passage of Hillisborough Bay at full steam. At six she cast anchor at Port Tampa. The anchor had scarcely caught the sandy bottom when 500 boats surrounded the "Atlanta," and the steamer was taken by assault. Barbicane was the first to set foot on deck, and in a voice of which he vainly tried to conceal the emotion, called "Michel Ardan."

"Here!" replied an individual perched on the poop.

Barbicane, with arms crossed, looked fixedly at the passenger of the "Atlanta."

He was a man of about 42 years of age, of large build, but slightly round-shouldered. His massive head momentarily shook a shock of reddish hair, which resembled a lion's mane. His face was short with a broad forehead, and furnished with a moustache as bristly as a cat's, and little patches of yellowish whisker upon full cheeks. Round, wildish eyes, slightly near-sighted, completed a physiognomy essentially *feline*. His nose was firmly shaped, his mouth particularly sweet in expression, high forehead, intelligent and furrowed with wrinkles like a newly-ploughed field. The body was powerfully developed and firmly fixed upon long legs. Muscular arms, and a general air of decision gave him the appearance of a hardy, jolly companion. He was dressed in a suit of ample dimensions, loose neckerchief, open shirt-collar, disclosing a robust neck; his cuffs were invariably unbuttoned, through which appeared a pair of red hands.

On the bridge of the steamer, in the midst of the crowd, he bustled to and fro, never still for a moment, "dragging his anchors," as the sailors say, gesticulating, making free with everybody, biting his nails with nervous avidity. He was one of those originals which nature sometimes invents in the freak of a moment, and of which she then breaks the mould.

Amongst other peculiarities, this curiosity gave himself out for a sublime ignoramus, "like Shakespeare," and professed supreme contempt for all scientific men. Those "fellows," as he called them, "are only fit to mark the points, while we play the game." He was, in fact, a thorough Bohemian, adventurous, but not an adventurer; a hair-brained fellow, a kind of Icarus, only possessing relays of wings. For the rest, he was ever in scrapes, ending invariably by falling on his feet, like those little pith figures which they sell for children's toys. In two words, his motto was

"I have my opinions," and the love of the impossible constituted his ruling passion.

Such was the passenger of the "Atlanta," always excitable, as if boiling under the action of some internal fire by the character of his physical organization. If ever two individuals offered a striking contrast to each other, these were certainly Michel Ardan and the Yankee Barbicane; both, moreover, being equally enterprising and daring, each in his own way.

The scrutiny which the President of the Gun Club had instituted regarding this new rival was quickly interrupted by the shouts and hurrahs of the crowd. The cries became at last so uproarious, and the popular enthusiasm assumed so personal a form, that Michel Ardan, after having shaken hands some thousands of times, at the imminent risk of leaving his fingers behind him, was fain at last to make a bolt for his cabin.

Barbicane followed him without uttering a word.

"You are Barbicane, I suppose?" said Michel Ardan in a tone of voice in which he would have addressed a friend of twenty years' standing.

"Yes," replied the President of the G.C.

"All right! how d'ye do, Barbicane? how are you getting on—pretty well? that's right."

"So," said Barbicane, without further preliminary, "you are quite determined to go."

"Quite decided."

"Nothing will stop you?"

"Nothing. Have you modified your projectile according to my telegram?"

"I waited for your arrival. But," asked Barbicane again, "have you carefully reflected?"

"Reflected? have I any time to spare? I find an opportunity of making a tour in the moon, and I mean to profit by it. There is the whole gist of the matter."

Barbicane looked hard at this man who spoke so lightly of his project with such complete absence of anxiety. "But, at least," said he, "you have some plans, some means of carrying your project into execution?"

"Excellent, my dear Barbicane; only permit me to offer one remark:—My wish is to tell my story once for all, to everybody, and then to have done with it; then there will be no need for recapitulation. So, if you have no objection, assemble your friends, colleagues, the whole town, all Florida, all America if you like, and to-morrow I shall be ready to explain my plans and answer any objections whatever that may be advanced. You may rest assured I

shall wait without stirring. Will that suit you?"

"All right," replied Barbicane.

So saying, the President left the cabin and informed the crowd of the proposal of Michel Ardan. His words were received with clappings of hands and shouts of joy. They had removed all difficulties. To-morrow every one would contemplate at his ease this European hero. However, some of the spectators, more infatuated than the rest, would not leave the deck of the "Atlanta." They passed the night on board. Amongst others, J. T. Maston got his hook fixed in the combing of the poop, and

it pretty nearly required the capstan to get it out again.

"He is a hero! a hero!" he cried, a theme of which he was never tired of ringing the changes; "and we are only like weak, silly women, compared with this European!"

As to the president, after having suggested to the visitors it was time to retire, he re-entered the passenger's cabin, and remained there till the bell of the steamer made it midnight.

But then the two rivals in popularity shook hands heartily, and parted on terms of intimate friendship.

From the Earth to the Moon

CHAPTER XIX

A MONSTER MEETING

ON the following day Barbicane, fearing that indiscreet questions might be put to Michel Ardan, was desirous of reducing the number of the audience to a few of the initiated, his own colleagues for instance. He might as well have tried to check the Falls of Niagara! He was compelled, therefore, to give up the idea, and to let his new friend run the chances of a public conference. The place chosen for this monster meeting was a vast plain situated in the rear of the town. In a few hours, thanks to the help of the shipping in port, an immense roofing of canvas was stretched over the parched prairie, and protected it from the burning rays of the sun. There 300,000 people braved for many hours the stifling heat while awaiting the arrival of the Frenchman. Of this crowd of spectators a first set could both see and hear; a second set saw badly and heard nothing at all; and as for the third, it could neither see nor hear anything at all. At three o'clock Michel Ardan made his appearance, accompanied by the principal members of the Gun Club. He was supported on his right by President Barbicane, and on his left by J. T. Maston, more radiant than the midday sun and nearly as ruddy. Ardan mounted a platform, from the top of which his view extended over a sea of black hats. He exhibited not the slightest embarrassment; he was just as gay, familiar, and pleasant as if he were at home. To the hurrahs which greeted him he replied by a graceful bow; then, waving his hand to request silence, he spoke in perfectly correct English as follows:—

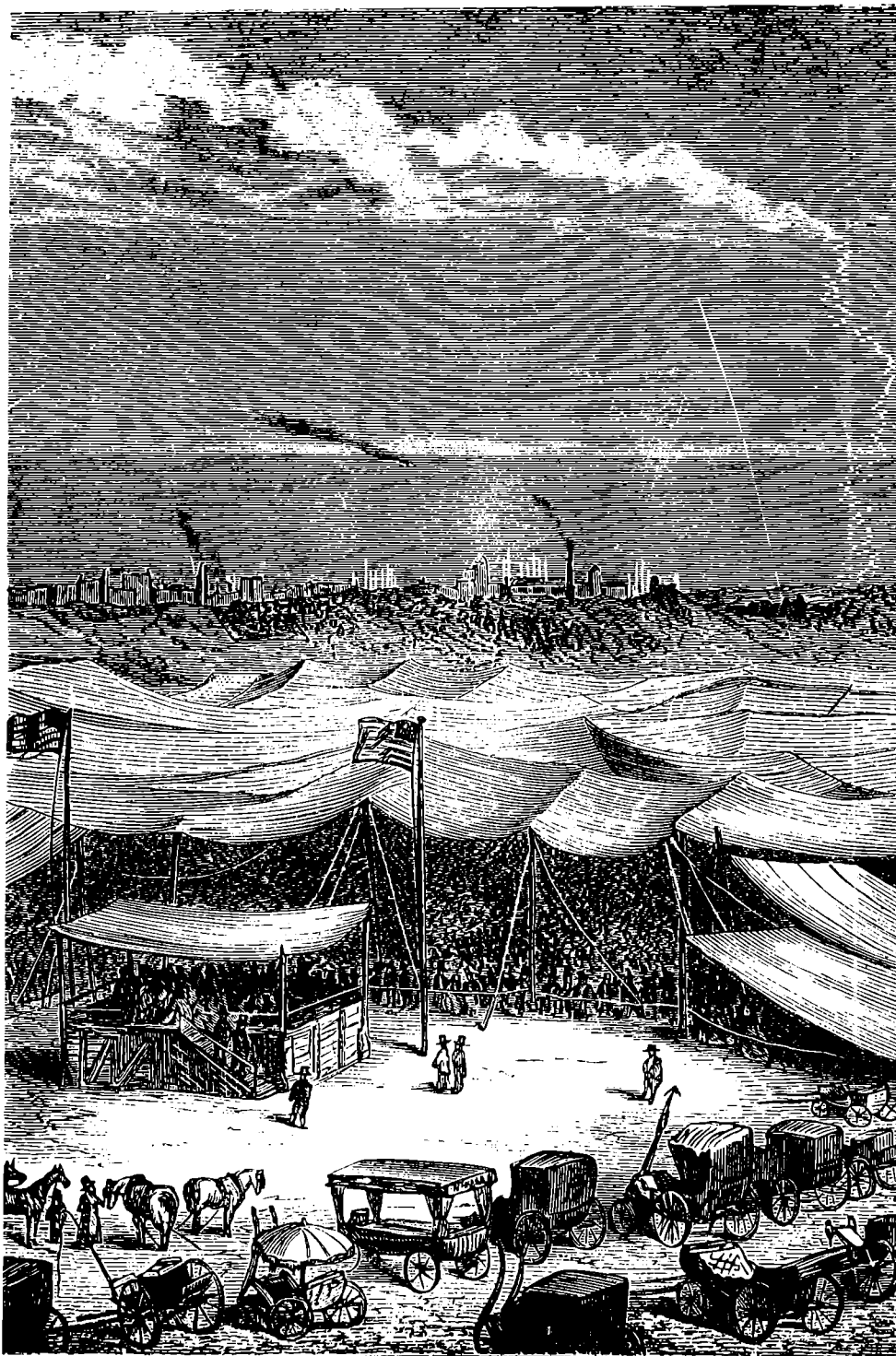
“Gentlemen, despite the very hot weather I request your patience for a short time while I offer some explanations regarding the projects which seem to have so interested you. I am neither an orator nor a man of science, and I had no idea of addressing you in public; but my friend Barbicane has told me that you would like to hear me, and I am quite at your service. Listen to me, therefore, with your 600,000 ears, and please to excuse the faults of the speaker. Now pray do not forget that you see before you a perfect ignoramus, whose ignorance goes so far that he cannot even understand the difficulties! It seemed to him that it was a matter quite simple, natural, and

easy to take one's place in a projectile and start for the moon! That journey must be undertaken sooner or later; and, as for the mode of locomotion adopted, it follows simply the law of progress. Man began by walking on all-fours; then, one fine day, on two feet; then in a carriage; then in a stage-coach; and lastly by railway. Well, the projectile is the vehicle of the future, and the planets themselves are nothing else! Now some of you, gentlemen, may imagine that the velocity we propose to impart to it is extravagant. It is nothing of the kind. All the stars exceed it in rapidity, and the earth herself is at this moment carrying us round the sun at three times as rapid a rate, and yet she is a mere loungeur on the way compared with many others of the planets! And her velocity is constantly *decreasing*. Is it not evident, then, I ask you, that there will some day appear velocities far greater than these, of which light or electricity will probably be the mechanical agent?

“Yes, gentlemen,” continued the orator, “in spite of the opinions of certain narrow-minded people, who would shut up the human race upon this globe, as within some magic circle which it must never outstep, we shall one day travel to the moon, the planets, and the stars, with the same facility, rapidity, and certainty as we now make the voyage from Liverpool to New York! Distance is but a relative expression, and must end by being reduced to zero.”

The assembly, strongly predisposed as they were in favour of the French hero, were slightly staggered at this bold theory. Michel Ardan perceived the fact.

“Gentleman,” he continued with a pleasant smile, “you do not seem quite convinced. Very good! Let us reason the matter out. Do you know how long it would take for an *express train* to reach the moon? Three hundred days; no more! And what is that? The distance is no more than nine times the circumference of the earth; and there are no sailors or travellers, of even moderate activity, who have not made longer journeys than that in their lifetime. And now consider that I shall be only ninety-seven hours on my journey. Ah! I see you are reckoning that the moon is a long way off



The meeting.

from the earth, and that one must think twice before making the experiment. What would you say, then, if we were talking of going to Neptune, which revolves at a distance of more than two thousand seven hundred and twenty millions of miles from the sun! And yet what is that compared with the distance of the fixed stars, some of which, such as Areturus, are at billions of miles distant from us? And then you talk of the *distance* which separates the planets from the sun! And there are people who affirm that such a thing as distance exists. Absurdity, folly, idiotic nonsense! Would you know what *I* think of our own solar universe? Shall I tell you my theory? It is very simple! In my opinion the solar system is a solid, homogeneous body; the planets which compose it are in *actual contact* with each other; and whatever space exists between them is nothing more than the space which separates the molecules of the densest metal, such as silver, iron, or platinum! I have the right, therefore, to affirm, and I repeat, with the conviction which must penetrate all your minds, 'Distance is but an empty name; distance does not really exist!'"

"Hurrah!" cried one voice (need it be said it was that of J. T. Maston?). "Distance does not exist!" And overcome by the energy of his movements, he nearly fell from the platform to the ground. He just escaped a severe fall, which would have proved to him that distance was by no means *an empty name*.

"Gentlemen," resumed the orator, "I repeat that the distance between the earth and her satellite is a mere trifle, and undeserving of serious consideration. I am convinced that before twenty years are over one half of our earth will have paid a visit to the moon. Now, my worthy friends, if you have any question to put to me, you will, I fear, sadly embarrass a poor man like myself; still I will do my best to answer you."

Up to this point the President of the Gun Club had been satisfied with the turn which the discussion had assumed. It became now, however, desirable to divert Ardan from questions of a practical nature, with which he was doubtless far less conversant. Barbicane, therefore, hastened to get in a word, and began by asking his new friend whether he thought that the moon and the planets were inhabited.

"You put before me a great problem, my worthy President," replied the orator, smiling. "Still, men of great intelligence, such as Plutarch, Swedenborg, Bernardin de St. Pierre, and others have, if I mistake not, pro-

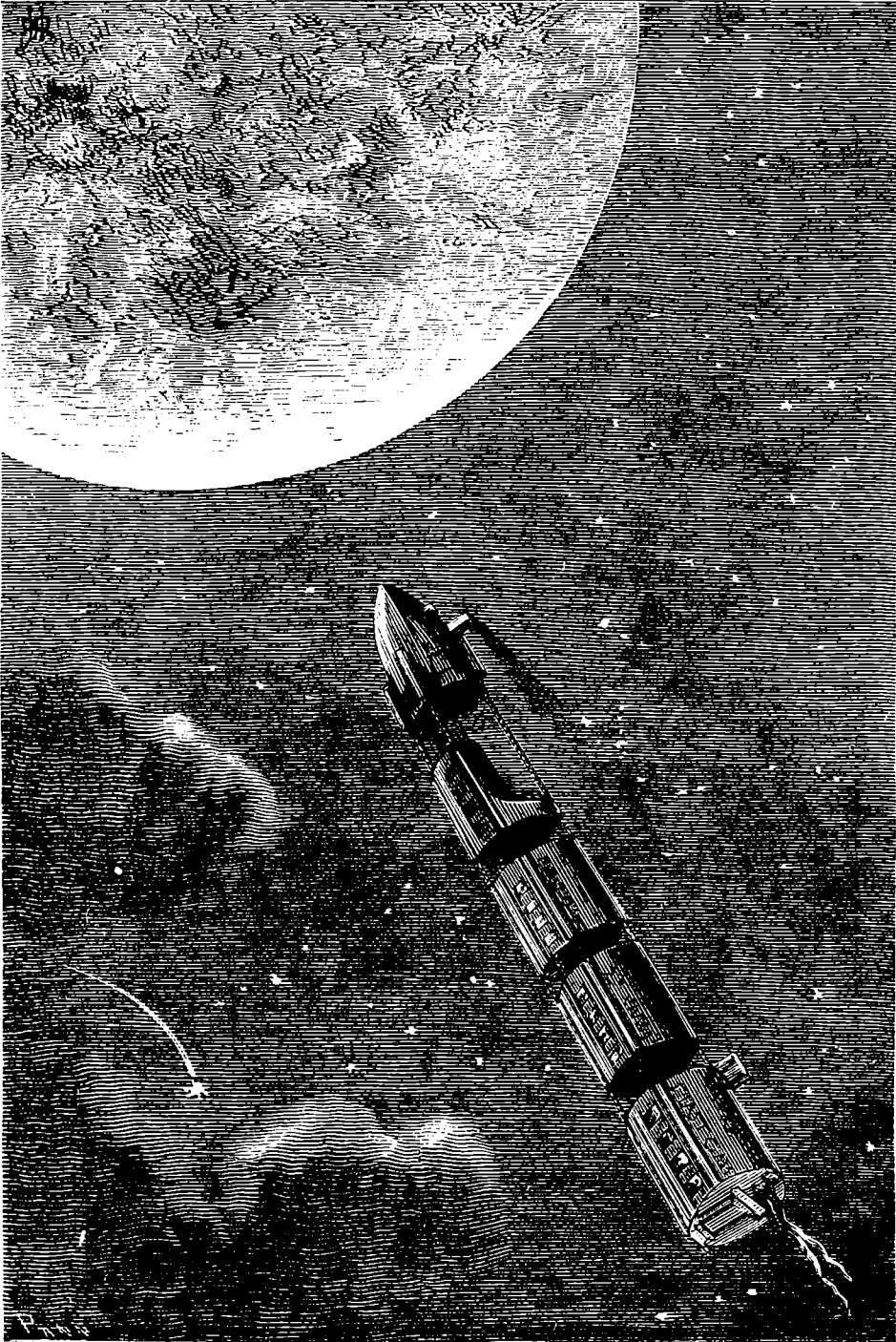
nounced in the affirmative. Looking at the question from the natural philosopher's point of view, I should say that *nothing useless* existed in the world; and, replying to your question by another, I should venture to assert, that if these worlds are *habitable*, they either are, have been, or will be inhabited."

"No one could answer more logically or fairly," replied the president. "The question then reverts to this: *Are* these worlds habitable? For my own part I believe they are."

"For myself, I feel certain of it," said Michel Ardan.

"Nevertheless," retorted one of the audience, "there are many arguments *against* the habitability of the worlds. The conditions of life must evidently be greatly modified upon the majority of them. To mention only the planets, we should be either broiled alive in some, or frozen to death in others, according as they are more or less removed from the sun."

"I regret," replied Michel Ardan, "that I have not the honour of personally knowing my contradictor, for I would have attempted to answer him. His objection has its merits, I admit; but I think we may successfully combat it, as well as all others which affect the habitability of the other worlds. If I were a *natural philosopher*, I would tell him that if less of caloric were *set in motion* upon the planets which are nearest to the sun, and more, on the contrary, upon those which are farthest removed from it, this simple fact would alone suffice to equalize the heat, and to render the temperature of those worlds supportable by beings organized like ourselves. If I were a *naturalist*, I would tell him that, according to some illustrious men of science, nature has furnished us with instances upon the earth of animals existing under very varying conditions of life; that fish respire in a medium fatal to other animals; that amphibious creatures possess a double existence very difficult of explanation; that certain denizens of the seas maintain life at enormous depths, and there support a pressure equal to that of fifty or sixty atmospheres without being crushed; that several aquatic insects, insensible to temperature, are met with equally among boiling springs and in the frozen plains of the Polar Sea; in fine, that we cannot help recognizing in nature a diversity of means of operation oftentimes incomprehensible, but not the less real. If I were a *chemist*, I would tell him that the aerolites, bodies evidently formed exteriorly of our terrestrial globe, have, upon analysis,



Projectile trains for the moon.

revealed indisputable traces of carbon, a substance which owes its origin solely to organized beings, and which, according to the experiments of Reichenbach, must necessarily itself have been *endued with animation*. And lastly, were I a theologian, I would tell him that the scheme of the Divine Redemption, according to St. Paul, seems to be applicable, not merely to the earth, but to all the celestial worlds. But, unfortunately I am neither theologian, nor chemist, nor naturalist, nor philosopher; therefore, in my absolute ignorance of the great laws which govern the universe, I confine myself to saying in reply, 'I do not know whether the worlds are inhabited or not; and since I do not know, *I am going to see!*'"

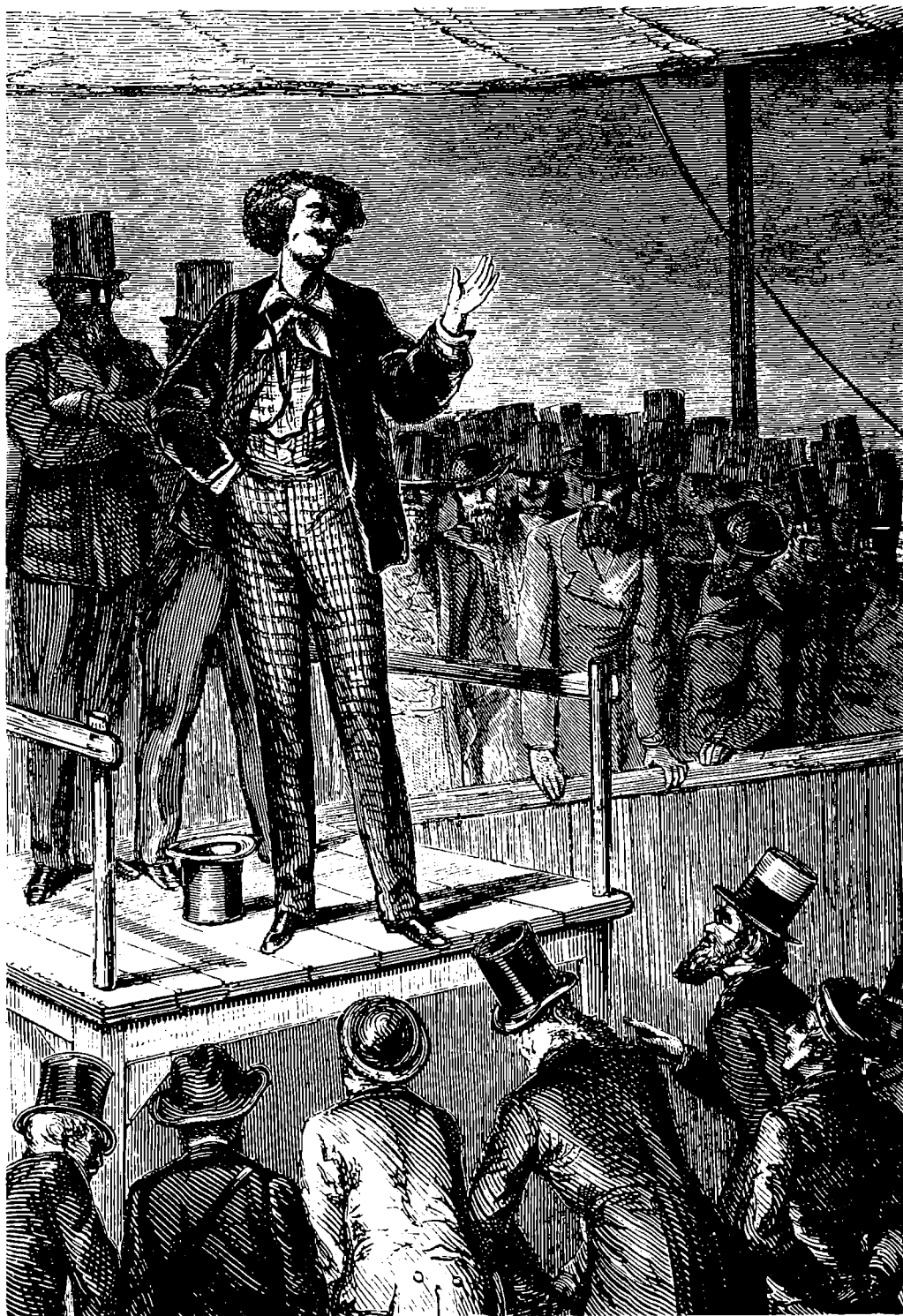
Whether Michel Ardan's antagonist hazarded any further arguments or not it is impossible to say, for the uproarious shouts of the crowd would not allow any expression of opinion to gain a hearing. On silence being restored, the triumphant orator contented himself with adding the following remarks:—

"Gentlemen, you will observe that I have but slightly touched upon this great question. There is another altogether different line of arguments in favour of the habitability of the stars, which I omit for the present. I only desire to call attention to one point. To those who maintain that the planets are *not* inhabited one may reply:—You might be perfectly in the right, if you could only show that the earth is the *best possible world*, spite of what Voltaire has said. She has but *one* satellite, while Jupiter, Uranus, Saturn, Neptune have each several, an advantage by no means to be despised. But that which renders our own globe so uncomfortable is the

inclination of its axis to the plane of its orbit. Hence the inequality of days and nights; hence the disagreeable diversity of the seasons. On the surface of our unhappy spheroid we are always either too hot or too cold; we are frozen in winter, broiled in summer; it is the planet of rheumatism, coughs, bronchitis; while on the surface of Jupiter, for example, where the axis is but slightly inclined, the inhabitants may enjoy uniform temperatures. It possesses zones of perpetual springs, summers, autumns, and winters; every Jovian may choose for himself what climate he likes, and there spend the whole of his life in security from all variations of temperature. You will, I am sure, readily admit this superiority of Jupiter over our own planet, to say nothing of his years, which each equal twelve of ours! Under such auspices, and such marvellous conditions of existence, it appears to me that the inhabitants of so fortunate a world must be in every respect superior to ourselves. All we require, in order to attain to such perfection, is the mere trifle of having an axis of rotation less inclined to the plane of its orbit!"

"Hurrah!" roared an energetic voice, "let us unite our efforts, invent the necessary machines, and rectify the earth's axis!"

A thunder of applause followed this proposal, the author of which was, of course, no other than J. T. Maston. And, in all probability, if the truth must be told, if the Yankees could only have found a point of application for it, they would have constructed a lever capable of raising the earth and rectifying its axis. It was just this deficiency which baffled these daring mechanicians.



Attack and riposte.

From the Earth to the Moon

CHAPTER XX

ATTACK AND RIPOSTE

AS soon as the excitement had subsided, the following words were heard uttered in a strong and determined voice:—

“Now that the speaker has favoured us with so much imagination, would he be so good as to return to his subject, and give us a little practical view of the question?”

All eyes were directed towards the person who spoke. He was a little dried-up man, of an active figure, with an American “goatee” beard. Profiting by the different movements in the crowd, he had managed by degrees to gain the front row of spectators. There, with arms crossed and stern gaze, he watched the hero of the meeting. After having put his question he remained silent, and appeared to take no notice of the thousands of looks directed towards himself, nor of the murmur of disapprobation excited by his words. Meeting at first with no reply, he repeated his question with marked emphasis, adding, “We are here to talk about the *moon* and not about the *earth*.”

“You are right, sir,” replied Michel Ardan; “the discussion has become irregular. We will return to the moon.”

“Sir,” said the unknown, “you pretend that our satellite is inhabited. Very good; but if Selenites do exist, that race of beings assuredly must live without breathing, for—I warn you for your own sake—there is not the smallest particle of air on the surface of the moon.”

At this remark Ardan pushed up his shock of red hair; he saw that he was on the point of being involved in a struggle with this person upon the very gist of the whole question. He looked sternly at him in his turn and said,—

“Oh! so there is no air in the moon? And pray, if you are so good, who ventures to affirm that?”

“The men of science.”

“Really?”

“Really.”

“Sir,” replied Michel, “pleasantry apart, I have a profound respect for men of science who do possess science, but a profound contempt for men of science who do not.”

“Do you know any who belong to the latter category?”

“Decidedly. In France there are some who

maintain that, mathematically, a bird cannot possibly fly; and others who demonstrate theoretically that fishes were never made to live in water.”

“I have nothing to do with persons of that description, and I can quote, in support of my statement, names which you cannot refuse deference to.”

“Then, sir, you will sadly embarrass a poor ignorant, who, besides, asks nothing better than to learn.”

“Why, then, do you introduce scientific questions if you have never studied them?” asked the unknown somewhat coarsely.

“For the reason that ‘he is always brave who never suspects danger.’ I know nothing, it is true; but it is precisely my very weakness which constitutes my strength.”

“Your weakness amounts to folly,” retorted the unknown in a passion.

“All the better,” replied our Frenchman, “if it carries me up to the *moon*.”

Barbicane and his colleagues devoured with their eyes the intruder who had so boldly placed himself in antagonism to their enterprise. Nobody knew him, and the president, uneasy as to the result of so free a discussion, watched his new friend with some anxiety. The meeting began to be somewhat fidgety also, for the contest directed their attention to the dangers, if not the actual impossibilities, of the proposed expedition.

“Sir,” replied Ardan’s antagonist, “there are many and incontrovertible reasons which prove the absence of an atmosphere in the moon. I might say that, *à priori*, if one ever did exist, it must have been absorbed by the earth; but I prefer to bring forward indisputable facts.”

“Bring them forward then, sir, as many as you please.”

“You know,” said the stranger, “that when any luminous rays cross a medium such as the air, they are deflected out of the straight line; in other words, they undergo *refraction*. Well! When stars are occulted by the moon, their rays, on grazing the edge of her disc, exhibit not the least deviation, nor offer the slightest indication of refraction. It follows, therefore, that the moon cannot be surrounded by an

atmosphere.”

“In point of fact,” replied Ardan, “this is your chief, if not your *only* argument; and a really scientific man might be puzzled to answer it. For myself, I will simply say that it is defective, because it assumes that the angular diameter of the moon has been completely determined, which is not the case. But let us proceed. Tell me, my dear sir, do you admit the existence of volcanoes on the moon’s surface?”

“*Extinct*, yes! In activity, no!”

“These volcanoes, however, were at one time in a state of activity?”

“True! but, as they furnished themselves the oxygen necessary for combustion, the mere fact of their eruption does not prove the presence of an atmosphere.”

“Proceed again, then; and let us set aside this class of arguments in order to come to direct observations. In 1715 the astronomers Louville and Halley, watching the eclipse of the 3rd May, remarked some very extraordinary scintillations. These jets of light, rapid in nature, and of frequent recurrence, they attributed to thunderstorms generated in the lunar atmosphere.”

“In 1715,” replied the unknown, “the astronomers Louville and Halley mistook for lunar phenomena some which were purely terrestrial, such as meteoric or other bodies which are generated in our own atmosphere. This was the scientific explanation at the time of the facts; and that is my answer now.”

“On again, then,” replied Ardan; “Herschel, in 1787, observed a great number of luminous points on the moon’s surface, did he not?”

“Yes! but without offering any solution of them. Herschel himself never inferred from them the necessity of a lunar atmosphere. And I may add that Baer and Maedler, the two great authorities upon the moon, are quite agreed as to the entire absence of air on its surface.”

A movement was here manifest among the assemblage, who appeared to be growing excited by the arguments of this singular personage.

“Let us proceed,” replied Ardan, with perfect coolness, “and come to one important fact. A skilful French astronomer, M. Laussedat, in watching the eclipse of July 18, 1860, proved that the horns of the solar crescent were *rounded and truncated*. Now, this appearance could only have been produced by a deviation of the solar rays in traversing the atmosphere of the moon. There

is no other possible explanation of the fact.”

“But is this established as a fact?”

“Absolutely certain!”

A counter-movement here took place in favour of the hero of the meeting, whose opponent was now reduced to silence. Ardan resumed the conversation; and, without exhibiting any exultation at the advantage he had gained, simply said,—

“You see then, my dear sir, we must not pronounce with absolute positiveness against the existence of an atmosphere in the moon. That atmosphere is, probably, of extreme rarity; nevertheless at the present day science generally admits that it exists.”

“Not in the mountains, at all events,” returned the unknown, unwilling to give in.

“No! but at the bottom of the valleys, and not exceeding a few hundred feet in height.”

“In any case you will do well to take every precaution, for the air will be terribly rarified.”

“My good sir, there will always be enough for a solitary individual; besides, once arrived up there, I shall do my best to economize, and not to breathe except on grand occasions!”

A tremendous roar of laughter rang in the ears of the mysterious interlocutor, who glared fiercely round upon the assembly.

“Then,” continued Ardan, with a careless air, “since we are in accord regarding the presence of a certain atmosphere, we are forced to admit the presence of a certain quantity of water. This is a happy consequence for me. Moreover, my amiable contradictor, permit me to submit to you one further observation. We only know *one* side of the moon’s disc; and if there is but little air on the face presented to us, it is possible that there is plenty on the one turned away from us.”

“And for what reason?”

“Because the moon, under the action of the earth’s attraction, has assumed the form of an egg, which we look at from the smaller end. Hence it follows, by Hausen’s calculations, that its centre of gravity is situated in the other hemisphere. Hence it results that the great mass of air and water must have been drawn away to the other face of our satellite during the first days of its creation.”

“Pure fancies!” cried the unknown.

“No! Pure theories! which are based upon the laws of mechanics, and it seems difficult to me to refute them. I appeal then to this meeting, and I put it to them whether life, such as exists upon the earth, is possible on the surface of the moon?”

Three hundred thousand auditors at once

applauded the proposition. Ardan's opponent tried to get in another word, but he could not obtain a hearing. Cries and menaces fell upon him like hail.

"Enough! enough!" cried some.

"Drive the intruder off!" shouted others.

"Turn him out!" roared the exasperated crowd.

But he, holding firmly on to the platform, did not budge an inch, and let the storm pass on, which would soon have assumed formidable proportions, if Michel Ardan had not quieted it by a gesture. He was too chivalrous to abandon his opponent in an apparent extremity.

"You wished to say a few more words?" he asked, in a pleasant voice.

"Yes, a thousand; or rather, no, only one! If you persevere in your enterprise, you must be a—"

"Very rash person! How can you treat me as such? me, who have demanded a cylindrical conical projectile, in order to prevent turning round and round on my way like a squirrel?"

"But, unhappy man, the dreadful recoil will smash you to pieces at your starting."

"My dear contradictor, you have just put your finger upon the true and the only difficulty; nevertheless, I have too good an opinion of the industrial genius of the Americans not to believe that they will succeed in overcoming it."

"But the heat developed by the rapidity of the projectile in crossing the strata of air?"

"Oh! the walls are thick, and I shall soon have crossed the atmosphere."

"But victuals and water?"

"I have calculated for a twelvemonth's supply, and I shall be only four days on the journey."

"But for air to breathe on the road?"

"I shall make it by chemical process."

"But your fall on the moon, supposing you ever reach it?"

"It will be six times less dangerous than a sudden fall upon the earth, because the weight will be only one-sixth as great on the surface of the moon."

"Still it will be enough to smash you like glass!"

"What is to prevent my retarding the shock by means of rockets conveniently placed, and lighted at the right moment?"

"But after all, supposing all difficulties surmounted, all obstacles removed, supposing everything combined to favour you, and granting that you may arrive safe and sound in the moon, how will you come back?"

"I am not coming back!"

At this reply, almost sublime in its very simplicity, the assembly became silent. But its silence was more eloquent than could have been its cries of enthusiasm. The unknown profited by the opportunity and once more protested,—

"You will inevitably kill yourself!" he cried; "and your death will be that of a madman, useless even to science!"

"Go on, my dear unknown, for truly your prophecies are most agreeable!"

"It really is too much!" cried Michel Ardan's adversary. "I do not know why I should continue so frivolous a discussion! Please yourself about this insane expedition! We need not trouble ourselves about *you!*"

"Pray don't stand upon ceremony!"

"No! another person is responsible for your act."

"Who, may I ask?" demanded Michel Ardan in an imperious tone.

"The ignoramus who organized this equally absurd and impossible experiment!"

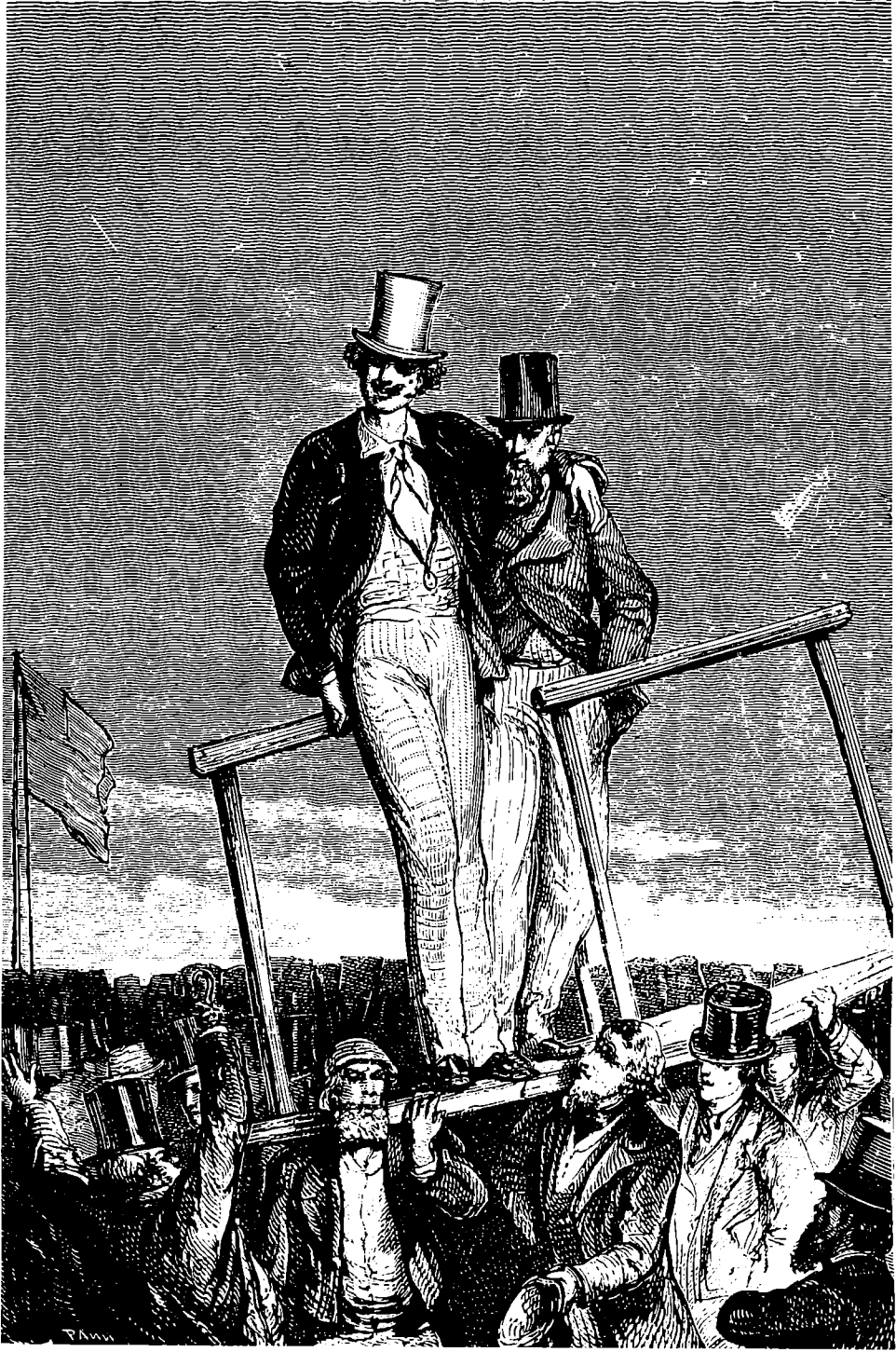
The attack was direct. Barbicane, ever since the interference of the unknown, had been making fearful efforts of self-control; now, however, seeing himself directly attacked, he could restrain himself no longer. He rose suddenly, and was rushing upon the enemy who thus braved him to the face, when all at once he found himself separated from him.

The platform was lifted by a hundred strong arms, and the President of the Gun Club shared with Michel Ardan triumphal honours. The shield was heavy, but the bearers came in continuous relays, disputing, struggling, even fighting among themselves in their eagerness to lend their shoulders to this demonstration.

However, the unknown had not profited by the tumult to quit his post. Besides, he could not have done it in the midst of that compact crowd. There he held on in the front row, with crossed arms, glaring at President Barbicane.

The shouts of the immense crowd continued at their highest pitch throughout this triumphant march. Michel Ardan took it all with evident pleasure. His face gleamed with delight. Several times the platform seemed seized with pitching and rolling like a weather-beaten ship. But the two heroes of the meeting had good sea-legs. They never stumbled; and their vessel arrived without dues at the port of Tampa Town.

Michel Ardan managed fortunately to escape from the last embraces of his vigorous admirers. He made for the Hotel Franklin, quickly gained his chamber, and slid under the



The platform was suddenly carried away.

bed-clothes, while an army of a hundred thousand men kept watch under his windows.

During this time a scene, short, grave, and decisive, took place between the mysterious personage and the President of the Gun Club.

Barbicane, free at last, had gone straight at his adversary.

"Come!" he said shortly.

The other followed him on to the quay; and the two presently found themselves alone at the entrance of an open wharf on Jones' Fall.

The two enemies, still mutually unknown, gazed at each other.

"Who are you?" asked Barbicane.

"Captain Nicholl!"

"So I suspected. Hitherto chance has never thrown you in my way."

"I am come for that purpose."

"You have insulted me!"

"Publicly!"

"And you will answer to me for this insult?"

"At this very moment."

"No! I desire that all that passes between us shall be secret. There is a wood situated three miles from Tampa, the wood of Skersnaw. Do you know it?"

"I know it."

"Will you be so good as to enter it to-morrow morning at five o'clock, on one side?"

"Yes! if you will enter at the other side at the same hour."

"And you will not forget your rifle?" said Barbicane.

"No more than you will forget yours," replied Nicholl.

These words having been coldly spoken, the President of the Gun Club and the Captain parted. Barbicane returned to his lodging; but, instead of snatching a few hours of repose, he passed the night in endeavouring to discover a means of evading the recoil of the projectile, and resolving the difficult problem proposed by Michel Ardan during the discussion at the meeting.



Maston burst into the room.

From the Earth to the Moon

CHAPTER XXI

HOW A FRENCHMAN MANAGES AN AFFAIR

WHILE the contract of this duel was being discussed by the president and the captain—this dreadful, savage duel, in which each adversary became a man-hunter—Michel Ardan was resting from the fatigues of his triumph. *Resting* is hardly an appropriate expression, for American beds rival marble or granite tables for hardness.

Ardan was sleeping, then, badly enough, tossing about between the cloths which served him for sheets, and he was dreaming of making a more comfortable couch in his projectile when a frightful noise disturbed his dreams. Thundering blows shook his door. They seemed to be caused by some iron instrument. A great deal of loud talking was distinguishable in this racket, which was rather too early in the morning. "Open the door," some one shrieked, "for Heaven's sake!" Ardan saw no reason for complying with a demand so roughly expressed. However, he got up and opened the door just as it was giving way before the blows of this determined visitor. The secretary of the Gun Club burst into the room. A bomb could not have made more noise or have entered the room with less ceremony.

"Last night," cried J. T. Maston, *ex abrupto*, "our president was publicly insulted during the meeting. He provoked his adversary, who is none other than Captain Nicholl! They are fighting this morning in the wood of Skersnaw. I heard all particulars from the mouth of Barbicane himself. If he is killed, then our scheme is at end. We must prevent this duel; and one man alone has enough influence over Barbicane to stop him, and that man is Michel Ardan."

While J. T. Maston was speaking, Michel Ardan, without interrupting him, had hastily put on his clothes; and, in less than two minutes, the two friends were making for the suburbs of Tampa Town with rapid strides.

It was during this walk that Maston told Ardan the state of the case. He told him the real causes of the hostility between Barbicane and Nicholl; how it was of old date, and why, thanks to unknown friends, the president and the captain had, as yet, never met face to face. He added that it arose simply from a rivalry

between iron plates and shot, and, finally, that the scene at the meeting was only the long-wished-for opportunity for Nicholl to pay off an old grudge.

Nothing is more dreadful than private duels in America. The two adversaries attack each other like wild beasts. Then it is that they might well covet those wonderful properties of the Indians of the prairies—their quick intelligence, their ingenious cunning, their scent of the enemy. A single mistake, a moment's hesitation, a single false step may cause death. On these occasions Yankees are often accompanied by their dogs, and keep up the struggle for hours.

"What demons you are!" cried Michel Ardan, when his companion had depicted this scene to him with much energy.

"Yes we are," replied J. T. modestly; "but we had better make haste."

Though Michel Ardan and he had crossed the plain still wet with dew, and had taken the shortest route over creeks and rice-fields, they could not reach Skersnaw under five hours and a half.

Barbicane must have passed the border half an hour ago.

There was an old bushman working there, occupied in selling faggots from trees that had been levelled by his axe.

Maston ran towards him, saying, "Have you seen a man go into the wood armed with a rifle? Barbicane, the president, my best friend?"

The worthy secretary of the Gun Club thought that his president must be known by all the world. But the bushman did not seem to understand him.

"A hunter?" said Ardan.

"A hunter? Yes," replied the bushman.

"Long ago?"

"About an hour."

"Too late!" cried Maston.

"Have you heard any gun-shots?" asked Ardan.

"No!"

"Not one?"

"Not one! that hunter did not look as if he knew how to hunt!"

"What is to be done?" said Maston.

"We must go into the wood, at the risk of getting a ball which is not intended for us."

"Ah!" cried Maston, in a tone which could not be mistaken, "I would rather have twenty balls in my own head than one in Barbicane's."

"Forward, then," said Ardan, pressing his companion's hand.

A few moments later the two friends had disappeared in the copse. It was a dense thicket, in which rose huge cypresses, sycamores, tulip-trees, olives, tamarinds, oaks, and magnolias. These different trees had interwoven their branches into an inextricable maze, through which the eye could not penetrate. Michel Ardan and Maston walked side by side in silence through the tall grass, cutting themselves a path through the strong creepers, casting curious glances on the bushes, and momentarily expecting to hear the sound of rifles. As for the traces which Barbicane ought to have left of his passage through the wood, there was not a vestige of them visible: so they followed the barely perceptible paths along which Indians had tracked some enemy, and which the dense foliage darkly overshadowed.

After an hour spent in vain pursuit the two stopped, in intensified anxiety.

"It must be all over," said Maston, discouraged. "A man like Barbicane would not dodge with his enemy, or ensnare him, would not even manoeuvre! He is too open, too brave. He has gone straight ahead, right into the danger, and doubtless far enough from the bushman for the wind to prevent his hearing the report of the rifles."

"But surely," replied Michel Ardan, "since we entered the wood we should have heard!"

"And what if we came too late?" cried Maston in tones of despair.

For once Ardan had no reply to make, he and Maston resuming their walk in silence. From time to time, indeed, they raised great shouts, calling alternately Barbicane and Nicholl, neither of whom, however, answered their cries. Only the birds, awakened by the sound, flew past them and disappeared among the branches, while some frightened deer fled precipitately before them.

For another hour their search was continued. The greater part of the wood had been explored. There was nothing to reveal the presence of the combatants. The information of the bushman was after all doubtful, and Ardan was about to propose their abandoning this useless pursuit, when all at once Maston stopped.

"Hush!" said he, "there is some one down there!"

"Some one?" repeated Michel Ardan.

"Yes; a man! He seems motionless. His rifle is not in his hands. What can he be doing?"

"But can you recognize him?" asked Ardan, whose short sight was of little use to him in such circumstances.

"Yes! yes! He is turning towards us," answered Maston.

"And it is?"

"Captain Nicholl!"

"Nicholl?" cried Michel Ardan, feeling a terrible pang of grief.

"Nicholl unarmed! He has, then, no longer any fear of his adversary!"

"Let us go to him," said Michel Ardan, "and find out the truth."

But he and his companions had barely taken fifty steps when they paused to examine the captain more attentively. They expected to find a bloodthirsty man, happy in his revenge!

On seeing him, they remained stupefied.

A net, composed of very fine meshes, hung between two enormous tulip-trees, and in the midst of this snare, with its wings entangled, was a poor little bird, uttering pitiful cries, while it vainly struggled to escape. The bird-catcher who had laid this snare was no human being, but a venomous spider, peculiar to that country, as large as a pigeon's egg, and armed with enormous claws. The hideous creature, instead of rushing on its prey, had beaten a sudden retreat and taken refuge in the upper branches of the tulip-tree, for a formidable enemy menaced its stronghold.

Here, then, was Nicholl, his gun on the ground, forgetful of danger, trying if possible to save the victim from its cobweb prison. At last it was accomplished, and the little bird flew joyfully away and disappeared.

Nicholl lovingly watched its flight, when he heard these words pronounced by a voice full of emotion,—

"You are indeed a brave man!"

He turned. Michel Ardan was before him, repeating in a different tone,—

"And a kindhearted one!"

"Michel Ardan!" cried the captain. "Why are you here?"

"To press your hand, Nicholl, and to prevent you from either killing Barbicane or being killed by him."

"Barbicane!" returned the captain. I have been looking for him for the last two hours in vain. Where is he hiding?"

"Nicholl!" said Michel Ardan, "this is not courteous! we ought always to treat an



In the midst of this snare was a poor little bird.

adversary with respect; rest assured if Barbicane is still alive we shall find him all the more easily; because if he has not, like you, been amusing himself with freeing oppressed birds, he must be looking for *you*. When we have found him, Michel Ardan tells you this, there will be no duel between you."

"Between President Barbicane and myself," gravely replied Nicholl, "there is a rivalry which the death of one of us—"

"Pooh, pooh!" said Ardan. "Brave fellows like you indeed! you shall not fight!"

"I will fight, sir!"

"No!"

"Captain," said J. T. Maston, with much feeling, "I am a friend of the president's, his *alter ego*, his second self; if you really must kill some one, *shoot me!* it will do just as well!"

"Sir," Nicholl replied, seizing his rifle convulsively, "these jokes—"

"Our friend Maston is not joking," replied Ardan. "I fully understand his idea of being killed himself in order to save his friend. But neither he nor Barbicane will fall before the balls of Captain Nicholl. Indeed I have so attractive a proposal to make to the two rivals, that both will be eager to accept it."

"What is it?" asked Nicholl with manifest incredulity.

"Patience!" exclaimed Ardan. "I can only reveal it in the presence of Barbicane."

"Let us go in search of him then!" cried the captain.

The three men started off at once; the captain having discharged his rifle threw it over his shoulder, and advanced in silence.

Another half-hour passed, and the pursuit was still fruitless. Maston was oppressed by sinister forebodings. He looked fiercely at Nicholl, asking himself whether the captain's vengeance had been already satisfied, and the unfortunate Barbicane, shot, was perhaps lying dead on some bloody track. The same thought seemed to occur to Ardan; and both were casting inquiring glances on Nicholl, when suddenly Maston paused.

The motionless figure of a man leaning against a gigantic catalpa twenty feet off appeared, half-veiled by the foliage.

"It is he!" said Maston.

Barbicane never moved. Ardan looked at the captain, but he did not wince. Ardan went forward crying,—

"Barbicane, Barbicane!"

No answer! Ardan rushed towards his friend; but in the act of seizing his arms, he stopped short and uttered a cry of surprise.

Barbicane, pencil in hand, was tracing geo-

metrical figures in a memorandum book, whilst his unloaded rifle lay beside him on the ground.

Absorbed in his studies, Barbicane, in his turn forgetful of the duel, had seen and heard nothing.

When Ardan took his hand, he looked up and stared at his visitor in astonishment.

"Ah, it is you!" he cried at last. "I have found it, my friend, I have found it!"

"What?"

"My plan!"

"What plan?"

"The plan for counteracting the effect of the shock at the departure of the projectile!"

"Indeed?" said Michel Ardan, looking at the captain out of the corner of his eye.

"Yes! water! simply water, which will act as a spring—ah! Maston," cried Barbicane, "you here also?"

"Himself," replied Ardan; and permit me to introduce to you at the same time the worthy Captain Nicholl!"

"Nicholl!" cried Barbicane, who jumped up at once. "Pardon me, captain, I had quite forgotten—I am ready!"

Michel Ardan interfered, without giving the two enemies time to say anything more.

"Thank Heaven!" said he. "It is a happy thing that brave men like you two did not meet sooner! we should now have been mourning for one or other of you. But, thanks to Providence, which has interfered, there is now no further cause for alarm. When one forgets one's anger in mechanics or in cobwebs, it is a sign that the anger is not dangerous."

Michel Ardan then told the president how the captain had been found occupied.

"I put it to you now," said he in conclusion, "are two such good fellows as you are made on purpose to smash each other's skulls with shot?"

There was in "the situation" somewhat of the ridiculous, something quite unexpected; Michel Ardan saw this, and determined to effect a reconciliation.

"My good friends," said he, with his most bewitching smile, "this is nothing but a misunderstanding. Nothing more! well! to prove that it is all over between you, accept frankly the proposal I am going to make to you."

"Make it," said Nicholl.

"Our friend Barbicane believes that his projectile will go straight to the moon?"

"Yes, certainly," replied the president.

"And our friend Nicholl is persuaded it will fall back upon the earth?"

"I am certain of it," cried the captain.



“Go with me, and see whether we are stopped on our journey.”

“Good!” said Ardan. “I cannot pretend to make you agree; but I suggest this:—Go with me, and so see whether we are stopped on our journey.”

“What?” exclaimed J. T. Maston, stupefied.

The two rivals, on this sudden proposal, looked steadily at each other. Barbicane waited for the captain’s answer. Nicholl watched for the decision of the president.

“Well?” said Michel. “There is now no fear of the shock!”

“Done!” cried Barbicane.

But quickly as he pronounced the word, he was not before Nicholl.

“Hurrah! bravo! hip! hip! hurrah!” cried Michel, giving a hand to each of the late adversaries. “Now that it is all settled, my friends, allow me to treat you after French fashion. Let us be off to breakfast!”

From the Earth to the Moon

CHAPTER XXII

THE NEW CITIZEN OF THE UNITED STATES

THAT same day all America heard of the affair of Captain Nicholl and President Barbicane, as well as its singular *dénouement*. From that day forth, Michel Ardan had not one moment's rest. Deputations from all corners of the Union harassed him without cessation or intermission. He was compelled to receive them all, whether he would or no. How many hands he shook, how many people he was "hail-fellow-well-met" with, it is impossible to guess! Such a triumphal result would have intoxicated any other man; but he managed to keep himself in a state of delightful *semi-tipsiness*.

Among the deputations of all kinds which assailed him, that of "The Lunatics" were careful not to forget what they owed to the future conqueror of the moon. One day, certain of these poor people, so numerous in America, came to call upon him, and requested permission to return with him to their native country.

"Singular hallucination!" said he to Barbicane, after having dismissed the deputation with promises to convey numbers of messages to friends in the moon. "Do you believe in the influence of the moon upon distempers?"

"Scarcely!"

"No more do I, despite some remarkable recorded facts of history. For instance, during an epidemic in 1693, a large number of persons died at the very moment of an eclipse. The celebrated Bacon always fainted during an eclipse. Charles VI. relapsed six times into madness during the year 1399, sometimes during the new, sometimes during the full moon. Gall observed that insane persons underwent an accession of their disorder twice in every month, at the epochs of new and full moon. In fact, numerous observations made upon fevers, somnambulisms, and other human maladies, seem to prove that the moon does exercise some mysterious influence upon man."

"But the how and the wherefore?" asked Barbicane.

"Well, I can only give you the answer which Arago borrowed from Plutarch, which is nineteen centuries old. 'Perhaps the stories are

not true!'"

In the height of his triumph, Michel Ardan had to encounter all the annoyances incidental to a man of celebrity. Managers of entertainments wanted to exhibit him. Barnum offered him a million dollars to make the tour of the United States in his show. As for his photographs, they were sold of all sizes, and his portrait taken in every imaginable posture. More than half a million copies were disposed of in an incredibly short space of time.

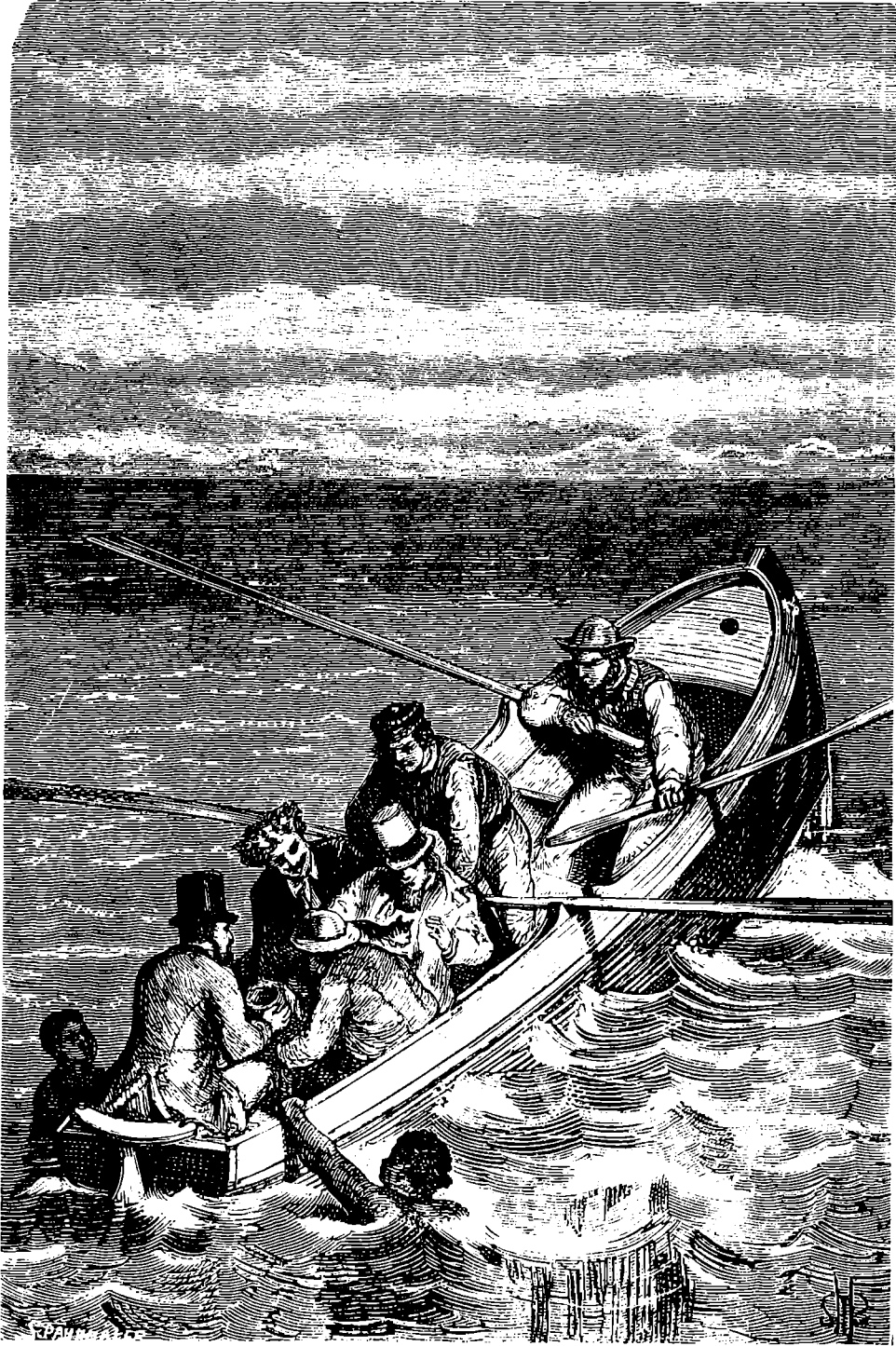
But it was not only the men who paid him homage, but the women also. He might have married well a hundred times over, if he had been willing to settle in life. The old maids, in particular, of forty years and upwards, and dry in proportion, devoured his photographs day and night. They would have married him by hundreds, even if he had imposed upon them the condition of accompanying him into space. He had, however, no intention of transplanting a race of Franco-Americans upon the surface of the moon.

He therefore declined all offers.

As soon as he could withdraw from these somewhat embarrassing demonstrations, he went, accompanied by his friends, to pay a visit to the Columbiad. He was highly gratified by his inspection, and made the descent to the bottom of the tube of this gigantic machine which was presently to launch him to the regions of the moon.

It is necessary here to mention a proposal of J. T. Maston's. When the secretary of the Gun Club found that Barbicane and Nicholl accepted the proposal of Michel Ardan, he determined to join them, and make one of a snug party of four. So one day he determined to be admitted as one of the travellers. Barbicane, pained at having to refuse him, gave him clearly to understand that the projectile could not possibly contain so many passengers. Maston, in despair, went in search of Michel Ardan, who counselled him to resign himself to the situation, adding one or two arguments *ad hominem*.

"You see, old fellow," he said, "you must not take what I say in bad part; but really, between ourselves, you are in too incomplete a condition to appear in the moon!"



The cat taken out of the shell.

"Incomplete?" shrieked the valiant invalid. voyage.

"Yes, my dear fellow! imagine our meeting some of the inhabitants up there! Would you like to give them such a melancholy notion of what goes on down here? to teach them what war is, to inform them that we employ our time chiefly in devouring each other, in smashing arms and legs, and that too on a globe which is capable of supporting a hundred billions of inhabitants, and which actually does contain nearly two hundred millions? Why, my worthy friend, we should have to turn you out of doors!"

"But still, if you arrive there in pieces, you will be as *incomplete* as I am."

"Unquestionably," replied Michel Ardan; "but we shall not."

In fact, a preparatory experiment, tried on the 18th October, had yielded the best results and caused the most well-grounded hopes of success. Barbicane, desirous of obtaining some notion of the effect of the shock at the moment of the projectile's departure, had procured a 38-inch mortar from the arsenal of Pensacola. He had this placed on the bank of Hillisborough Roads, in order that the shell might fall back into the sea, and the shock be thereby destroyed. His object was to ascertain the extent of the shock of departure, and not that of the return.

A hollow projectile had been prepared for this curious experiment. A thick padding fastened upon a kind of elastic network, made of the best steel, lined the inside of the walls. It was a veritable *nest* most carefully wadded.

"What a pity I can't find room in there," said J. T. Maston, regretting that his height did not allow of his trying the adventure.

Within this shell were shut up a large cat, and a squirrel belonging to J. T. Maston, and of which he was particularly fond. They were desirous, however, of ascertaining how this little animal, least of all others subject to giddiness, would endure this experimental

The mortar was charged with 160lbs. of powder, and the shell placed in the chamber. On being fired, the projectile rose with great velocity, described a majestic parabola, attained a height of about a thousand feet, and with a graceful curve descended in the midst of the vessels that lay there at anchor.

Without a moment's loss of time a small boat put off in the direction of its fall; some active divers plunged into the water and attached ropes to the handles of the shell, which was quickly dragged on board. Five minutes did not elapse between the moment of enclosing the animals and that of unscrewing the coverlid of their prison.

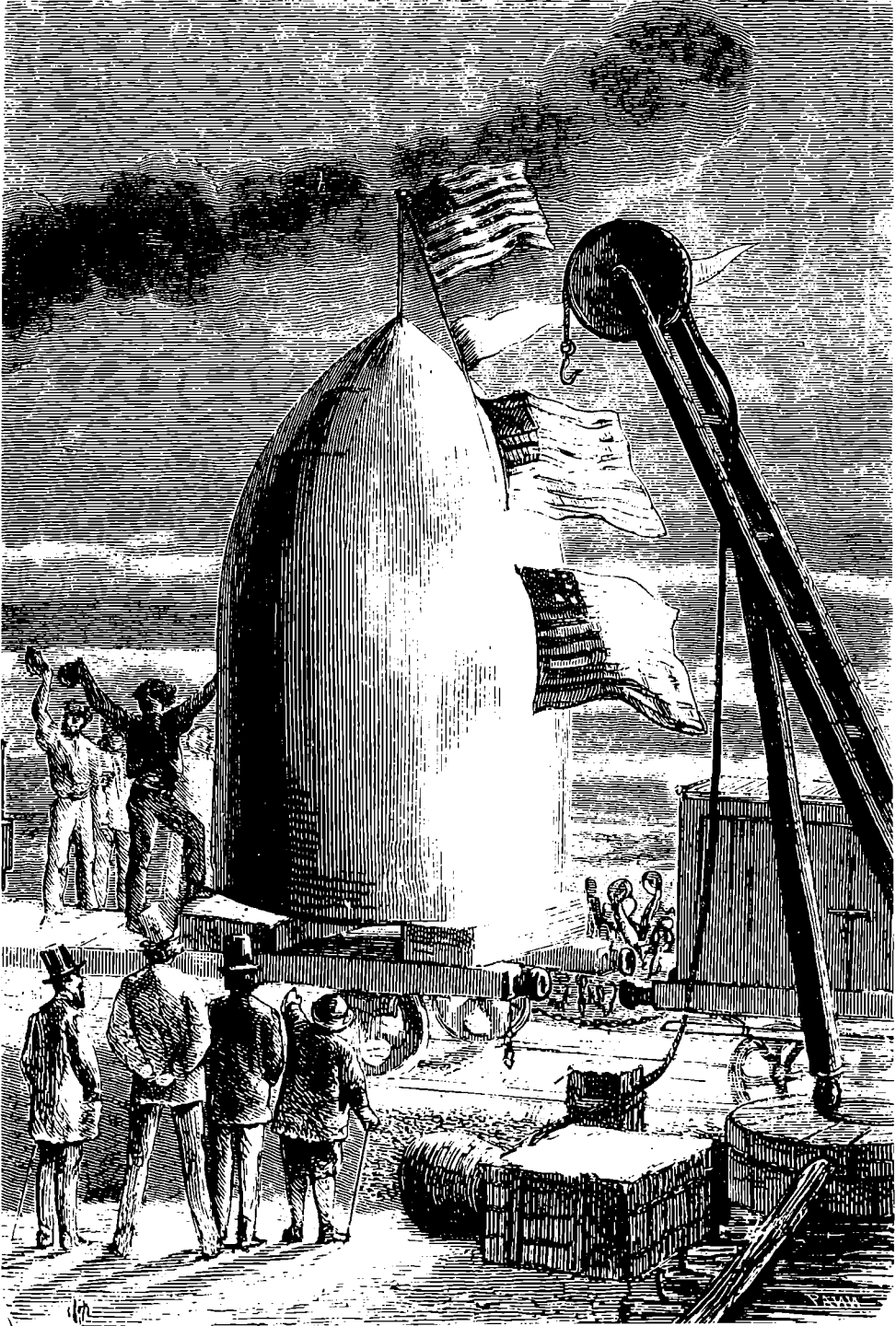
Ardan, Barbicane, Maston, and Nicholl were present on board the boat, and assisted at the operation with an interest which may readily be comprehended. Hardly had the shell been opened when the cat leaped out, slightly bruised, but full of life, and exhibiting no signs whatever of having made an aerial expedition. No trace, however, of the squirrel could be discovered. The truth at last became apparent; —the cat had eaten its fellow-traveller!

J. T. Maston grieved much for the loss of his poor squirrel, and proposed to add its case to that of other martyrs to science.

After this experiment all hesitation, all fear disappeared. Besides, Barbicane's plans would ensure greater perfection for his projectile, and go far to annihilate altogether the effects of the shock. Nothing now remained but to go!

Two days later Michel Ardan received a message from the President of the United States, an honour of which he showed himself especially sensible.

After the example of his illustrious fellow-countryman, the Marquis de la Fayette, the Government had decreed to him the title of "Citizen of the United States of America."



The arrival of the projectile at Stones Hill.

From the Earth to the Moon

CHAPTER XXIII

THE PROJECTILE VEHICLE

ON the completion of the Columbiad the public interest centred in the projectile itself, the vehicle which was destined to carry the three hardy adventurers into space.

The new plans had been sent to Breadwill and Co., of Albany, with the request for their speedy execution. The projectile was consequently cast on the 2nd November, and immediately forwarded by the Eastern Railway to Stones Hill, which it reached without accident on the 10th of that month, where Michel Ardan, Barbicane, and Nicholl were waiting impatiently for it.

The projectile had now to be filled to the depth of three feet with a bed of water, intended to support a watertight wooden disc, which worked easily within the walls of the projectile. It was upon this kind of raft that the travellers were to take their place. This body of water was divided by horizontal partitions, which the shock of the departure would have to break in succession. Then each sheet of the water, from the lowest to the highest, running off into escape tubes towards the top of the projectile, constituted a kind of spring; and the wooden disc, supplied with extremely powerful plugs, could not strike the lowest plate except after breaking successively the different partitions. Undoubtedly the travellers would still have to encounter a violent *recoil* after the complete escapement of the water; but the first shock would be almost entirely destroyed by this powerful spring. The upper part of the walls were lined with a thick padding of leather, fastened upon springs of the best steel, behind which the escape tubes were completely concealed; thus all imaginable precautions had been taken for averting the first shock; and if they *did* get crushed, they must, as Michel Ardan said, be made of very bad materials.

The entrance into this metallic tower was by a narrow aperture contrived in the wall of the cone. This was hermetically closed by a plate of aluminium, fastened internally by powerful screw-pressure. The travellers could therefore quit their prison at pleasure, as soon as they should reach the moon.

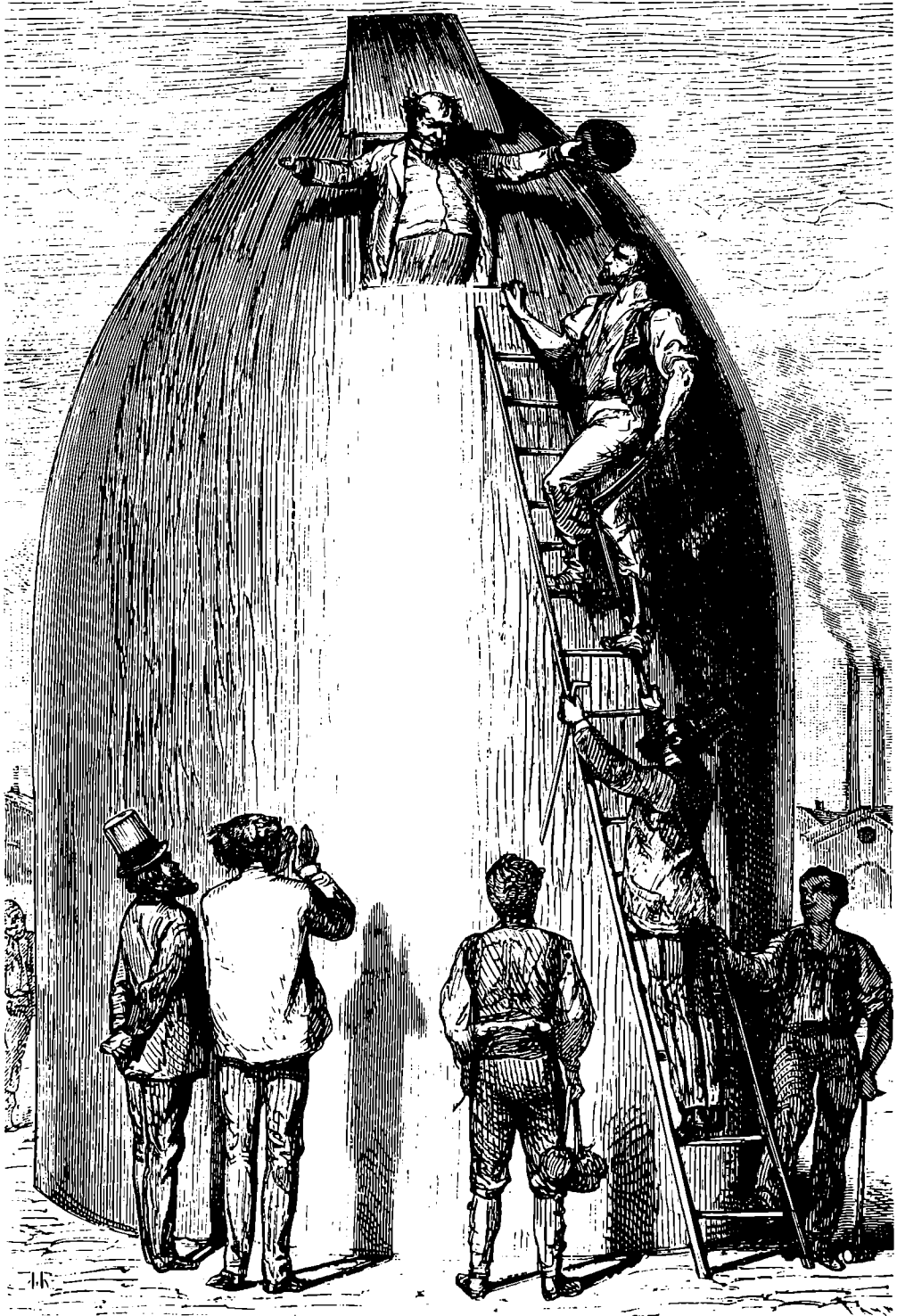
Light and view were given by means of four thick lenticular glass scuttles, two pierced in

the circular wall itself, the third in the bottom, the fourth in the top. These scuttles then were protected against the shock of departure by plates let into solid grooves, which could easily be opened outwards by unscrewing them from the inside. Reservoirs firmly fixed contained water and the necessary provisions; and fire and light were procurable by means of gas, contained in a special reservoir under a pressure of several atmospheres. They had only to turn a tap, and for six hours the gas would light and warm this comfortable vehicle.

There now remained only the question of air; for allowing for the consumption of air by Barbicane, his two companions, and two dogs which he purposed taking with him, it was necessary to renew the air of the projectile. Now air consists principally of twenty-one parts of oxygen and seventy-nine of nitrogen. The lungs absorb the oxygen, which is indispensable for the support of life, and reject the nitrogen. The air expired loses nearly five per cent. of the former and contains nearly an equal volume of carbonic acid, produced by the combustion of the elements of the blood. In an air-tight enclosure, then, after a certain time, all the oxygen of the air will be replaced by the carbonic acid—a gas fatal to life. There were two things to be done then—first, to replace the absorbed oxygen; secondly, to destroy the expired carbonic acid; both easy enough to do, by means of chlorate of potash and caustic potash. The former is a salt which appears under the form of white crystals; when raised to a temperature of 400° it is transformed into chlorure of potassium, and the oxygen which it contains is entirely liberated. Now twenty-eight pounds of chlorate of potash produce seven pounds of oxygen, or 2400 *litres*—the quantity necessary for the travellers during twenty-four hours.

Caustic potash has a great affinity for carbonic acid; and it is sufficient to shake it in order for it to seize upon the acid and form bicarbonate of potash. By these two means they would be enabled to restore to the vitiated air its life-supporting properties.

It is necessary, however, to add that the experiments had hitherto been made *in anima*



J. T. Maston had grown fat.

vili. Whatever its scientific accuracy was, they were at present ignorant how it would answer with human beings. The honour of putting it to the proof was energetically claimed by J. T. Maston.

“Since I am not to go,” said the brave artillerist, “I may at least live for a week in the projectile.”

It would have been hard to refuse him; so they consented to his wish. A sufficient quantity of chlorate of potass and of caustic potash was placed at his disposal, together with provisions for eight days. And having shaken hands with his friends, on the 12th November, at six o'clock a.m., after strictly informing them not to open his prison before

the 20th, at six o'clock p.m., he slid down the projectile, the plate of which was at once hermetically sealed. What did he do with himself during that week? They could get no information. The thickness of the walls of the projectile prevented any sound reaching from the inside to the outside. On the 20th of November, at six p.m. exactly, the plate was opened. The friends of J. T. Maston had been all along in a state of much anxiety; but they were promptly reassured on hearing a jolly voice shouting a boisterous hurrah.

Presently afterwards the secretary of the Gun Club appeared at the top of the cone in a triumphant attitude. He had grown fat!



The telescope of the Rocky Mountains.

From the Earth to the Moon

CHAPTER XXIV

THE TELESCOPE OF THE ROCKY MOUNTAINS

ON the 20th October in the preceding year, after the close of the subscription, the president of the Gun Club had credited the Observatory of Cambridge with the necessary sums for the construction of a gigantic optical instrument. This instrument was designed for the purpose of rendering visible on the surface of the moon any object exceeding nine feet in diameter.

At the period when the Gun Club essayed their great experiment, such instruments had reached a high degree of perfection, and produced some magnificent results. Two telescopes in particular, at this time, were possessed of remarkable power and of gigantic dimensions. The first, constructed by Herschel, was thirty-six feet in length, and had an object-glass of four feet six inches; it possessed a magnifying power of 6000. The second was raised in Ireland, in Parsonstown Park, and belongs to Lord Rosse. The length of this tube is forty-eight feet, and the diameter of its object-glass six feet; it magnifies 6400 times, and required an immense erection of brickwork and masonry for the purpose of working it, its weight being twelve tons and a half.

Still, despite these colossal dimensions, the actual enlargements scarcely exceeded 6000 times in round numbers; consequently, the moon was brought within no nearer an apparent distance than thirty-nine miles; and objects of less than sixty feet in diameter, unless they were of very considerable length, were still imperceptible.

In the present case, dealing with a projectile nine feet in diameter and fifteen feet long, it became necessary to bring the moon within an apparent distance of five miles at most; and, for that purpose, to establish a magnifying power of 48,000 times.

Such was the question proposed to the Observatory of Cambridge. There was no lack of funds; the difficulty was purely one of construction.

After considerable discussion as to the best form and principle of the proposed instrument the work was finally commenced. According to the calculations of the Observatory of Cambridge, the tube of the new reflector

would require to be 280 feet in length, and the object-glass sixteen feet in diameter. Colossal as these dimensions may appear, they were diminutive in comparison with the 10,000 foot telescope proposed by the astronomer Hooke only a few years ago!

Regarding the choice of locality, that matter was promptly determined. The object was to select some lofty mountain, and there are not many of these in the United States. In fact there are but two chains of moderate elevation, between which runs the magnificent Mississippi, the "king of rivers," as these Republican Yankees delight to call it.

Eastwards rise the Apalachians, the very highest point of which, in New Hampshire, does not exceed the very moderate altitude of 5600 feet.

On the west, however, rise the Rocky Mountains, that immense range which, commencing at the Straits of Magellan, follows the western coast of Southern America under the name of the Andes or the Cordilleras, until it crosses the Isthmus of Panama, and runs up the whole of North America to the very borders of the Polar Sea. The highest elevation of this range still does not exceed 10,700 feet. With this elevation, nevertheless, the Gun Club were compelled to be content, inasmuch as they had determined that both telescope and Columbiad should be erected within the limits of the Union. All the necessary apparatus was consequently sent on to the summit of Long's Peak, in the territory of Missouri.

Neither pen nor language can describe the difficulties of all kinds which the American engineers had to surmount, or the prodigies of daring and skill which they accomplished. They had to raise enormous stones, massive pieces of wrought iron, heavy corner-clamps and huge portions of cylinder, with an object-glass weighing nearly 30,000lbs., above the line of perpetual snow for more than 10,000 feet in height, after crossing desert prairies, impenetrable forests, fearful rapids, far from all centres of population, and in the midst of savage regions, in which every detail of life becomes an almost insoluble problem. And yet, notwithstanding these innumerable obstacles, American genius triumphed. In less

than a year after the commencement of the works, towards the close of September, the gigantic reflector rose into the air to a height of 280 feet. It was raised by means of an enormous iron crane; an ingenious mechanism allowed it to be easily worked towards all the points of the heavens, and to follow the stars from the one horizon to the other during their journey through the heavens.

It had cost 400,000 dollars. The first time it was directed towards the moon, the observers evinced both curiosity and anxiety. What were they about to discover in the field of this telescope which magnified objects 48,000 times? Would they perceive peoples, herds of lunar animals, towns, lakes, seas? No! there

was nothing which science had not already discovered! and on all the points of its disc the volcanic nature of the moon became determinable with the utmost precision.

But the telescope of the Rocky Mountains, before doing its duty to the Gun Club, rendered immense services to astronomy. Thanks to its penetrative power, the depths of the heavens were sounded to the utmost extent; the apparent diameter of a great number of stars was accurately measured; and Mr. Clark, of the Cambridge staff, resolved the Crab nebula in Taurus, which the reflector of Lord Rosse had never been able to decompose.

From the Earth to the Moon

CHAPTER XXV

FINAL DETAILS

IT was the 22nd of November; the departure was to take place in ten days. One operation alone remained to be accomplished to bring all to a happy termination; an operation delicate and perilous, requiring infinite precautions, and against the success of which Captain Nicholl had laid his third bet. It was, in fact, nothing less than the loading of the Columbiad, and the introduction into it of 400,000 pounds of gun-cotton. Nicholl had thought, not perhaps without reason, that the handling of such formidable quantities of pyroxyle would, in all probability, involve a grave catastrophe; and at any rate, that this immense mass of eminently inflammable matter would inevitably ignite when submitted to the pressure of the projectile.

There were indeed dangers accruing as before from the carelessness of the Americans, but Barbicane had set his heart on success, and took all possible precautions. In the first place, he was very careful as to the transportation of the gun-cotton to Stones Hill. He had it conveyed in small quantities, carefully packed in sealed cases. These were brought by rail from Tampa Town to the camp, and from thence were taken to the Columbiad by bare-footed workmen, who deposited them in their places by means of cranes placed at the orifice of the cannon. No steam-engine was permitted to work, and every fire was extinguished within two miles of the works.

Even in November they feared to work by day, lest the sun's rays acting on the gun-cotton might lead to unhappy results. This led to their working at night, by light produced in a vacuum by means of Rühmkorff's apparatus, which threw an artificial brightness into the depths of the Columbiad. There the cartridges were arranged with the utmost regularity, connected by a metallic thread, destined to communicate to them all simultaneously the electric spark, by which means this mass of gun-cotton was eventually to be ignited.

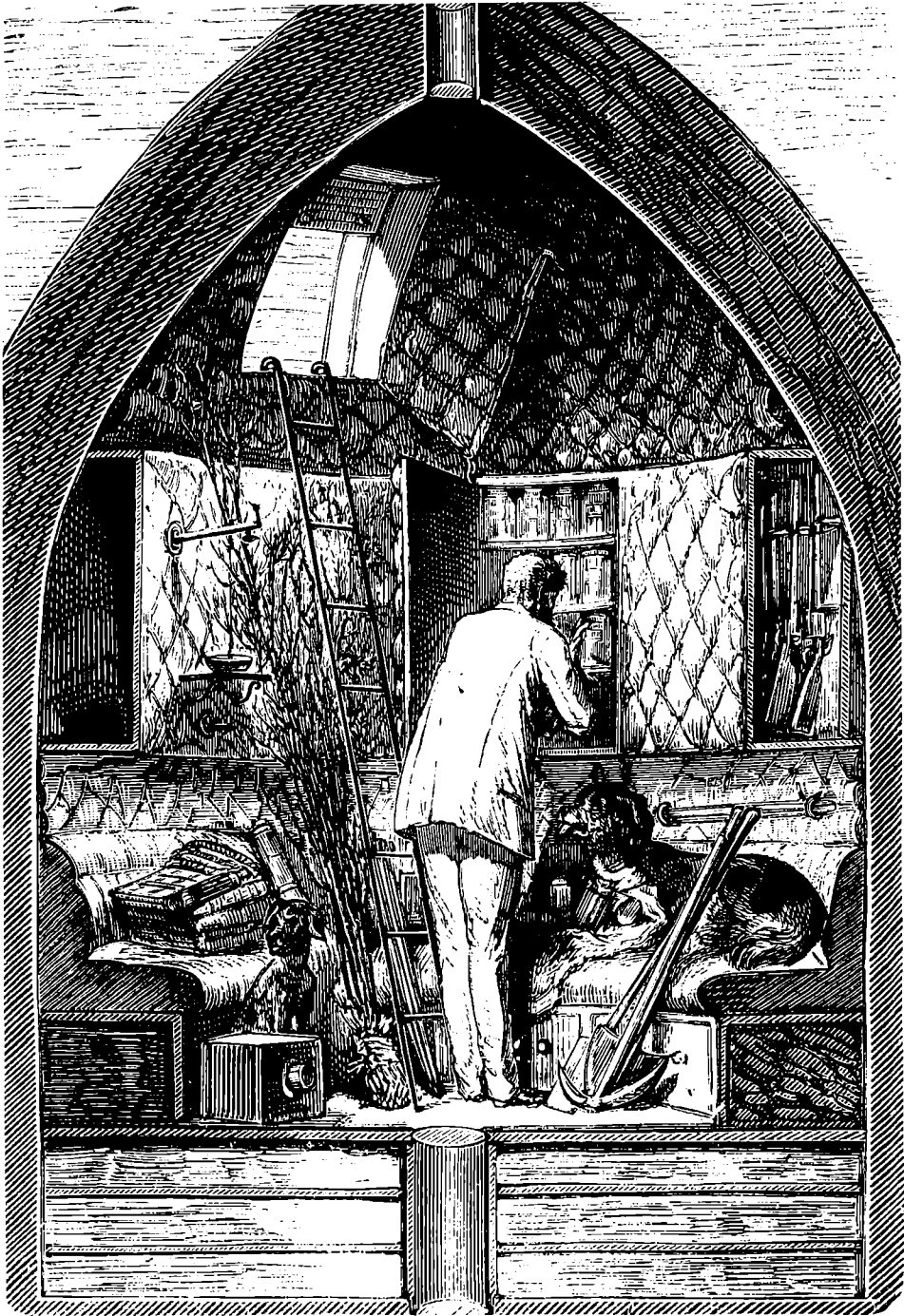
By the 28th of November, 800 cartridges had been placed in the bottom of the Columbiad. So far the operation had been successful! But what confusion, what anxieties, what struggles were undergone by

President Barbicane! In vain had he refused admission to Stones Hill; every day the inquisitive neighbours scaled the palisades, some even carrying their imprudence to the point of smoking, while surrounded by bales of gun-cotton. Barbicane was in a perpetual state of alarm. J. T. Maston seconded him to the best of his ability, by giving vigorous chase to the intruders, and carefully picking up the still lighted cigar ends which the Yankees threw about. A somewhat difficult task! seeing that more than 300,000 persons were gathered round the enclosure. Michel Ardan had volunteered to superintend the transport of the cartridges to the mouth of the Columbiad; but the president, having surprised him with an enormous cigar in his mouth, while he was hunting out the rash spectators to whom he himself offered so dangerous an example, saw that he could not trust this fearless smoker, and was therefore obliged to mount a special guard over him.

At last, Providence being propitious, this wonderful loading came to a happy termination, Captain Nicholl's third bet being thus lost. It remained now to introduce the projectile into the Columbiad, and to place it on its soft bed of gun-cotton.

But before doing this, all those things necessary for the journey had to be carefully arranged in the projectile-vehicle. These necessaries were numerous; and had Ardan been allowed to follow his own wishes, there would have been no space remaining for the travellers. It is impossible to conceive of half the things this charming Frenchman wished to convey to the moon. A veritable stock of useless trifles! But Barbicane interfered and refused admission to anything not absolutely needed. Several thermometers, barometers, and telescopes were packed in the instrument case.

The travellers being desirous of examining the moon carefully during their voyage, in order to facilitate their studies, they took with them Boer and Moëller's excellent *Mappa Selenographica*, a masterpiece of patience and observation, which they hoped would enable them to identify those physical features in the moon, with which they were acquainted. This



The interior of the projectile.

map reproduced with scrupulous fidelity the smallest details of the lunar surface which faces the earth; the mountains, valleys, craters, peaks, and ridges were all represented, with their exact dimensions, relative positions, and names; from the mountains Doërfel and Leibnitz on the eastern side of the disc, to the *Mare frigoris* of the North Pole.

They took also three rifles and three fowling-pieces, and a large quantity of balls, shot, and powder.

"We cannot tell whom we shall have to deal with," said Michel Ardan. "Men or beasts may possibly object to our visit. It is only wise to take all precautions."

These defensive weapons were accompanied by pickaxes, crowbars, saws, and other useful implements, not to mention clothing adapted to every temperature, from that of the polar regions to that of the torrid zone.

Ardan wished to convey a number of animals of different sorts (not indeed a pair of every known species), as he could not see the necessity of acclimatizing serpents, tigers, alligators, or any other noxious beasts in the moon. "Nevertheless," he said to Barbicane, "some valuable and useful beasts, bullocks, cows, horses, and donkeys, would bear the journey very well, and would also be very useful to us."

"I dare say, my dear Ardan," replied the president, "but our projectile-vehicle is no Noah's ark, from which it differs both in dimensions and object. Let us confine ourselves to possibilities."

After a prolonged discussion, it was agreed that the travellers should restrict themselves to a sporting-dog belonging to Nicholl, and to a large Newfoundland. Several packets of seeds were also included among the necessaries. Michel Ardan, indeed, was anxious to add some sacks full of earth to sow them in; as it was, he took a dozen shrubs carefully wrapped up in straw to plant in the moon.

The important question of provisions still remained; it being necessary to provide against the possibility of their finding the moon absolutely barren. Barbicane managed so successfully, that he supplied them with sufficient rations for a year. These consisted of preserved meats and vegetables, reduced by strong hydraulic pressure to the smallest possible dimensions. They were also supplied with brandy, and took water enough for two months, being confident, from astronomical observations, that there was no lack of water on the moon's surface. As to provisions, doubtless the inhabitants of the *earth* would

find nourishment somewhere in the *moon*. Ardan never questioned this; indeed, had he done so, he would never have undertaken the journey.

"Besides," he said one day to his friends, "we shall not be completely abandoned by our terrestrial friends; they will take care not to forget us."

"No, indeed!" replied J. T. Maston.

"What do you mean?" asked Nicholl.

"Nothing would be simpler," replied Ardan; "the Columbiad will be always there. Well! whenever the moon is in a favourable condition as to the zenith, if not to the perigee, that is to say about once a year, could you not send us a shell packed with provisions, which we might expect on some appointed day?"

"Hurrah! hurrah!" cried J. T. Maston; "what an ingenious fellow! what a splendid idea! Indeed, my good friends, we shall not forget you!"

"I shall reckon upon you! Then, you see, we shall receive news regularly from the earth, and we shall indeed be stupid if we hit upon no plan for communicating with our good friends here!"

These words inspired such confidence, that Michel Ardan carried all the Gun Club with him in this enthusiasm. What he said seemed so simple and so easy, so sure of success, that none could be so sordidly attached to this earth, as to hesitate to follow the three travellers on their lunar expedition.

All being ready at last, it remained to place the projectile in the Columbiad, an operation abundantly accompanied by dangers and difficulties.

The enormous shell was conveyed to the summit of Stones Hill. There, powerful cranes raised it, and held it suspended over the mouth of the cylinder.

It was a fearful moment! What if the chains should break under its enormous weight? The sudden fall of such a body would inevitably cause the gun-cotton to explode!

Fortunately this did not happen; and some hours later the projectile-vehicle descended gently into the heart of the cannon and rested on its couch of pyroxylyte, a vertiable bed of explosive eider-down. Its pressure had no result, other than the more effectual ramming down of the charge of the Columbiad.

"I have lost," said the Captain, who forthwith paid President Barbicane the sum of 3000 dollars.

Barbicane did not wish to accept the money from one of his fellow-travellers, but gave way at last before the determination of Nicholl,

who wished before leaving the earth to fulfil all his engagements.

“Now,” said Michel Ardan, “I have only one thing more to wish for you, my brave Captain.”

“What is that?” asked Nicholl.

“It is that you may lose your two other bets! Then we shall be sure not to be stopped on our journey!”

From the Earth to the Moon

CHAPTER XXVI

FIRE!

THE first of December had arrived! the fatal day! for, if the projectile were not discharged that very night at 10h. 46m. 40s. p.m., more than eighteen years must roll by before the moon would again present herself under the same conditions of zenith and perigee.

The weather was magnificent. Despite the approach of winter, the sun shone brightly, and bathed in its radiant light that earth which three of its denizens were about to abandon for a new world.

How many persons lost their rest on the night which preceded this long-expected day! All hearts beat with disquietude, save only the heart of Michel Ardan. That imperturbable personage came and went with his habitual business-like air, while nothing whatever denoted that any unusual matter preoccupied his mind.

After dawn, an innumerable multitude covered the prairie which extends, as far as the eye can reach, round Stones Hill. Every quarter of an hour the railway brought fresh accessions of sightseers; and, according to the statement of the *Tampa Town Observer*, not less than five millions of spectators thronged the soil of Florida.

For a whole month previously, the mass of these persons had bivouacked round the enclosure, and laid the foundations for a town which was afterwards called "Ardan's Town." The whole plain was covered with huts, cottages, and tents. Every nation under the sun was represented there; and every language might be heard spoken at the same time. It was a perfect Babel re-enacted. All the various classes of American society were mingled together in terms of absolute equality. Bankers, farmers, sailors, cotton-planters, brokers, merchants, watermen, magistrates, elbowed each other in the most free-and-easy way. Louisiana Creoles fraternised with farmers from Indiana; Kentucky and Tennessee gentlemen and haughty Virginians conversed with trappers and the half-savages of the lakes and butchers from Cincinnati. Broad-brimmed white hats and Panamas, blue cotton trowsers, light coloured stockings, cambric frills, were all here displayed; while upon shirt-fronts, wristbands, and neckties,

upon every finger, even upon the very *ears*, they wore an assortment of rings, shirt-pins, brooches, and trinkets, of which the value only equalled the execrable taste. Women, children and servants, in equally expensive dress, surrounded their husbands, fathers, or masters, who resembled the patriarchs of tribes in the midst of their immense households.

At meal-times, all fell to work upon the dishes peculiar to the Southern States, and consumed with an appetite that threatened speedy exhaustion of the victualling powers of Florida, fricasseed frogs, stuffed monkey, fish chowder, underdone 'possum, and racoon steaks. And as for the liquors which accompanied this indigestible repast! The shouts, the vociferations that resounded through the bars and taverns decorated with glasses, tankards, and bottles of marvellous shape, mortars for pounding sugar, and bundles of straws! "Mint-julep!" roars one of the barmen; "Claret sangaree!" shouts another; "Cocktail!" "Brandy-smash!" "Real mint-jelup in the new style!" All these cries intermingled produced a bewildering and deafening hubbub.

But on this day, 1st December, such sounds were rare. No one thought of eating or drinking, and at four p.m. there were vast numbers of spectators who had not even taken their customary lunch! And, a still more significant fact, even the national passion for play seemed quelled for the time under the general excitement of the hour.

Up till nightfall, a dull, noiseless agitation, such as precedes great catastrophes, ran through the anxious multitude. An indescribable uneasiness pervaded all minds, an indefinable sensation which oppressed the heart. Every one wished it was over.

However, about seven o'clock, the heavy silence was dissipated. The moon rose above the horizon. Millions of hurrahs hailed her appearance. She was punctual to the rendezvous, and shouts of welcome greeted her on all sides, as her pale beams shone gracefully in the clear heavens. At this moment the three intrepid travellers appeared. This was the signal for renewed cries of still greater



An innumerable multitude covered the prairie round Stones Hill.



Fire.

intensity. Instantly the vast assemblage, as with one accord, struck up the national hymn of the United States, and "Yankee Doodle," sung by five millions of hearty throats, rose like a roaring tempest to the farthest limits of the atmosphere. Then a profound silence reigned throughout the crowd.

The Frenchman and the two Americans had by this time entered the enclosure reserved in the centre of the multitude. They were accompanied by the members of the Gun Club, and by deputations sent from all the European Observatories. Barbicane, cool and collected, was giving his final directions. Nicholl, with compressed lips, his arms crossed behind his back, walked with a firm and measured step. Michel Ardan, always easy, dressed in thorough traveller's costume, leathern gaiters on his legs, pouch by his side, in loose velvet suit, cigar in mouth, was full of inexhaustible gaiety, laughing, joking, playing pranks with J. T. Maston. In one word, he was the thorough "Frenchman" (and worse, a "Parisian") to the last moment.

Ten o'clock struck! The moment had arrived for taking their places in the projectile! The necessary operations for the descent, and the subsequent removal of the cranes and scaffolding that inclined over the mouth of the Columbiad, required a certain period of time.

Barbicane had regulated his chronometer to the tenth part of a second by that of Murchison the engineer, who was charged with the duty of firing the gun by means of an electric spark. Thus the travellers enclosed within the projectile, were enabled to follow with their eyes the impassive needle which marked the precise moment of their departure.

The moment had arrived for saying "Good-bye!" The scene was a touching one. Despite his feverish gaiety, even Michel Ardan was touched. J. T. Maston had found in his own dry eyes one ancient tear, which he had doubtless reserved for the occasion. He dropped it on the forehead of his dear president.

"Can I not go?" he said, "there is still time!"

"Impossible, old fellow!" replied Barbicane. A few moments later, the three fellow-travellers had ensconced themselves in the projectile, and screwed down the plate which covered the entrance-aperture. The mouth of the Columbiad, now completely disencumbered, was open entirely to the sky.

The moon advanced upwards in a heaven of the purest clearness, outshining in her passage the twinkling light of the stars. She passed over the constellation of the Twins, and was now nearing the half-way point between the horizon and the zenith. A terrible silence weighed upon the entire scene! Not a breath of wind upon the earth! not a sound of breathing from the countless chests of the spectators! Their hearts seemed afraid to beat! All eyes were fixed upon the yawning mouth of the Columbiad.

Murchison followed with his eye the hand of his chronometer. It wanted scarce forty seconds to the moment of departure, but each second seemed to last an age! At the twentieth there was a general shudder, as it occurred to the minds of that vast assemblage that the bold travellers shut up within the projectile were also counting those terrible seconds. Some few cries here and there escaped the crowd.

"Thirty-five! — thirty-six! — thirty-seven! — thirty-eight! — thirty-nine! — forty! FIRE!!!"

Instantly Murchison pressed with his finger the key of the electric battery, restored the current of the fluid, and discharged the spark into the breach of the Columbiad.

An appalling, unearthly report followed instantly, such as can be compared to nothing whatever known, not even to the roar of thunder, or the blast of volcanic explosions! No words can convey the slightest idea of the terrific sound! An immense spout of fire shot up from the bowels of the earth as from a crater. The earth heaved up, and with great difficulty some few spectators obtained a momentary glimpse of the projectile victoriously cleaving the air in the midst of the fiery vapours!

From the Earth to the Moon

CHAPTER XXVII

FOUL WEATHER

AT the moment when that pyramid of fire rose to a prodigious height into the air, the glare of the flame lit up the whole of Florida; and for a moment day superseded night over a considerable extent of the country. This immense canopy of fire was perceived at a distance of 100 miles out at sea, and more than one ship's captain entered in his log the appearance of this gigantic meteor.

The discharge of the Columbiad was accompanied by a perfect earthquake. Florida was shaken to its very depths. The gases of the powder, expanded by heat, forced back the atmospheric strata with tremendous violence, and this artificial hurricane rushed like a waterspout through the air.

Not a single spectator remained on his feet! Men, women, children, all lay prostrate like ears of corn under a tempest. There ensued a terrible tumult; a large number of persons were seriously injured. J. T. Maston, who, despite of all dictates of prudence had kept in advance of the mass, was pitched back 120 feet, shooting like a projectile over the heads of his fellow-citizens. Three hundred thousand persons remained deaf for a time, and as though struck stupefied.

As soon as the first effects were over, the injured, the deaf, and lastly, the crowd in general, woke up with frenzied cries. "Hurrah for Ardan! Hurrah for Barbicane! Hurrah for Nicholl!" rose to the skies. Thousands of persons, noses in air, armed with telescopes and race-glasses, were questioning space, forgetting all contusions and emotions in the one idea of watching for the projectile. They looked in vain! It was no longer to be seen, and they were obliged to wait for telegrams from Long's Peak. The Director of the Cambridge Observatory was at his post on the Rocky Mountains; and to him, as a skilful and persevering astronomer, all observations had been confided.

But an unforeseen phenomenon came in to subject the public impatience to a severe trial.

The weather, hitherto so fine, suddenly changed; the sky became heavy with clouds. It could not have been otherwise after the terrible derangement of the atmospheric strata, and the dispersion of the enormous quantity of

vapour arising from the combustion of 200,000lbs. of pyroxylye!

On the morrow the horizon was covered with clouds—a thick and impenetrable curtain between earth and sky, which unhappily extended as far as the Rocky Mountains. It was a fatality! But since man had chosen so to disturb the atmosphere, he was bound to accept the consequences of his experiment.

Supposing, now, that the experiment had succeeded, the travellers having started on the 1st of December, at 10h. 46m. 40s. p.m., were due on the 4th at 0h. p.m. at their destination. So that up to that time it would have been very difficult after all to have observed, under such conditions, a body so small as the shell. Therefore they waited with what patience they might.

From the 4th to the 6th of December inclusive, the weather remaining much the same in America, the great European instruments of Herschel, Rosse, and Foucault, were constantly directed towards the moon, for the weather was then magnificent; but the comparative weakness of their glasses prevented any trustworthy observations being made.

On the 7th the sky seemed to lighten. They were in hopes now, but their hope was of but short duration, and at night again thick clouds hid the starry vault from all eyes.

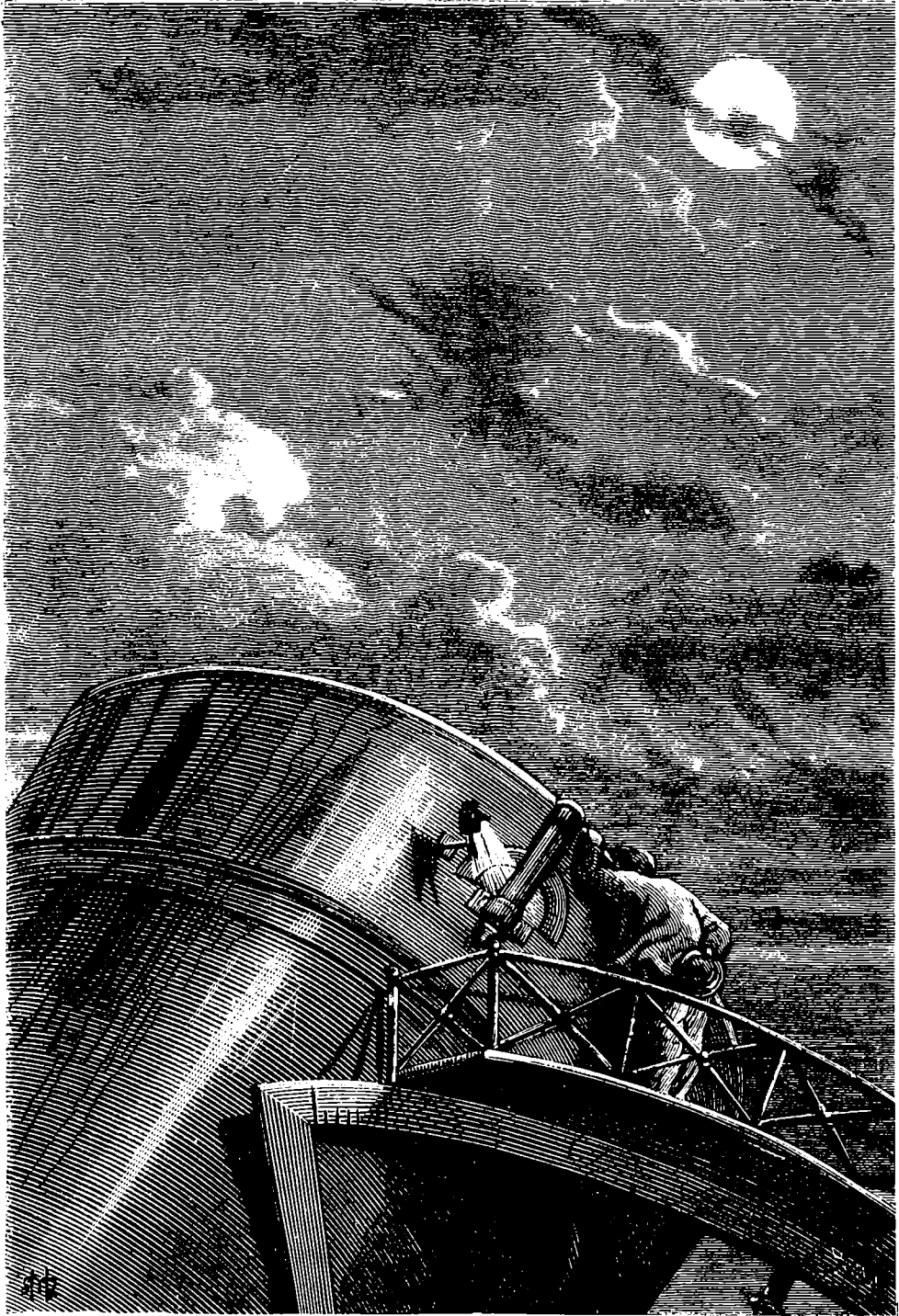
Matters were now becoming serious, when on the 9th, the sun reappeared for an instant, as if for the purpose of teasing the Americans. It was received with hisses; and wounded, no doubt, by such a reception, showed itself very sparing of its rays.

On the 10th, no change! J. T. Maston went nearly mad, and great fears were entertained regarding the brain of this worthy individual, which had hitherto been so well preserved within his gutta-percha cranium.

But on the 11th one of those inexplicable tempests peculiar to those intertropical regions, was let loose in the atmosphere. A terrific east wind swept away the groups of clouds which had been so long gathering, and at night the semi-disc of the orb of night rode majestically amidst the soft constellations of the sky.



Effect of the explosion.



The Director at his post.

From the Earth to the Moon

CHAPTER XXVIII

A NEW STAR

THAT very night, the startling news so impatiently awaited, burst like a thunderbolt over the United States of the Union, and thence, darting across the ocean, ran through all the telegraphic wires of the globe. The projectile had been detected, thanks to the gigantic reflector of Long's Peak! Here is the note received by the Director of the Observatory of Cambridge. It contains the scientific conclusion regarding this great experiment of the Gun Club.

"LONG'S PEAK, *December 12.*

"To the Officers of the Observatory of Cambridge.

"The projectile discharged by the Columbiad at Stones Hill has been detected by Messrs. Belfast and J. T. Maston, 12th December, at 8.47 p.m., the moon having entered her last quarter. This projectile has not arrived at its destination. It has passed by the side; but sufficiently near to be retained by the lunar attraction.

"The rectilinear movement has thus become changed into a circular motion of extreme velocity, and it is now pursuing an elliptical orbit round the moon, of which it has become a true satellite.

"The elements of this new star we have as yet been unable to determine; we do not yet know the velocity of its passage. The distance which separates it from the surface of the moon may be estimated at about 2833 miles.

"However, two hypothesis come here into our consideration.

"1. Either the attraction of the moon will end by drawing them into itself, and the travellers will attain their destination; or,—

"2. The projectile, following an immutable law, will continue to gravitate round the moon till the end of time.

"At some future time, our observations will be able to determine this point, but till then the experiment of the Gun Club can have no other result than to have provided our solar system with a new star.

"J. BELFAST."

To how many questions did this unexpected denouement give rise? What mysterious results was the future reserving for the investigations of science? At all events, the names of Nicholl, Barbicane, and Michel Ardan were certain to be immortalized in the annals of astronomy!

When the despatch from Long's Peak had once become known, there was but one universal feeling of surprise and alarm. Was it possible to go to the aid of these bold travellers? No! for they had placed themselves beyond the pale of humanity, by crossing the limits imposed by the Creator on his earthly creatures. They had air enough for *two* months; they had victuals enough for *twelve*;—*but after that?* There was only one man who would not admit that the situation was desperate,—he alone had confidence; and that was their devoted friend J. T. Maston.

Besides, he never let them get out of sight. His home was henceforth the post at Long's Peak; his horizon, the mirror of that immense reflector. As soon as the moon rose above the horizon, he immediately caught her in the field of the telescope; he never let her go for an instant out of his sight, and followed her assiduously in her course through the stellar spaces. He watched with untiring patience the passage of the projectile across her silvery disc, and really the worthy man remained in perpetual communication with his three friends, whom he did not despair of seeing again some day.

"Those three men," said he, "have carried into space all the resources of art, science, and industry. With that, one can do anything; and you will see that, some day, they will come out all right."

Round the Moon

Round the Moon

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Round the Moon

PRELIMINARY CHAPTER

RECAPITULATING THE FIRST PART OF THIS WORK, AND SERVING AS A PREFACE TO THE SECOND

DURING the year 186-, the whole world was greatly excited by a scientific experiment unprecedented in the annals of science. The members of the Gun Club, a circle of artillerymen formed at Baltimore after the American war, conceived the idea of putting themselves in communication with the moon!—yes, with the moon,—by sending to her a projectile. Their president, Barbicane, the promoter of the enterprise, having consulted the astronomers of the Cambridge Observatory upon the subject, took all necessary means to ensure the success of this extraordinary enterprise, which had been declared practicable by the majority of competent judges. After setting on foot a public subscription, which realized nearly 5,446,675 dollars, they began the gigantic work.

According to the advice forwarded from the members of the Observatory, the gun destined to launch the projectile had to be fixed in a country situated between the 0 and 28th degrees of north or south latitude, in order to aim at the moon when at the zenith; and its initiatory velocity was fixed at twelve thousand yards to the second. Launched on the 1st of December, at 10hrs. 46m. 40s. p.m., it ought to reach the moon four days after its departure, that is on the 5th of December, at midnight precisely, at the moment of her attaining her *perigee*, that is her nearest distance from the earth, which is exactly 86,410 leagues (French), or 238,833 miles *mean distance* (English).

The principal members of the Gun Club, President Barbicane, Major Elphinstone, the secretary Joseph T. Maston, and other learned men, held several meetings, at which the shape and composition of the projectile were discussed, also the position and nature of the gun, and the quality and quantity of the powder to be used. It was decided: 1st, that the projectile should be a shell made of aluminium with a diameter of 108 inches and a thickness of twelve inches to its walls; and should weigh 19,250lbs. 2ndly, that the gun should be a Columbiad cast in iron, 900 feet long, and run perpendicularly into the earth. 3rdly, that the charge should contain 400,000 pounds of gun-cotton, which, giving out six billions of litres

of gas in rear of the projectile, would easily carry it towards the orb of night.

These questions determined President Barbicane, assisted by Murchison the engineer, to choose a spot situated in Florida, in 27° 7' North latitude, and 77° 3' W. (Greenwich) longitude. It was on this spot, after stupendous labour, that the Columbiad was cast with full success. Things stood thus, when an incident took place which increased the interest attached to this great enterprise a hundred-fold.

A Frenchman, an enthusiastic Parisian, as witty as he was bold, asked to be enclosed in the projectile, in order that he might reach the moon, and reconnoitre this terrestrial satellite. The name of this intrepid adventurer was Michel Ardan. He landed in America, was received with enthusiasm, held meetings, saw himself carried in triumph, reconciled President Barbicane to his mortal enemy, Captain Nicholl, and, as a token of reconciliation, persuaded them both to start with him in the projectile. The proposition being accepted, the shape of the projectile was slightly altered. It was made of a cylindro-conical form. This species of aerial car was lined with strong springs and partitions to deaden the shock of departure. It was provided with food for a year, water for some months, and gas for some days. A self-acting apparatus supplied the three travellers with air to breathe. At the same time, on one of the highest points of the Rocky Mountains, the Gun Club had a gigantic telescope erected, in order that they might be able to follow the course of the projectile through space. All was then ready.

On the 30th November, at the hour fixed upon, from the midst of an extraordinary crowd of spectators, the departure took place; and for the first time, three human beings quitted the terrestrial globe, and launched into interplanetary space with almost a certainty of reaching their destination. These bold travellers, Michel Ardan, President Barbicane, and Captain Nicholl, ought to make the passage in ninety-seven hours, thirteen minutes, and twenty seconds. Consequently, their arrival on the lunar disc could not take place until the 5th December at twelve at night, at the exact moment when the moon should be

full, and not on the 4th, as some badly-informed journals had announced.

But an unforeseen circumstance, viz., the detonation produced by the Columbiad, had the immediate effect of troubling the terrestrial atmosphere, by accumulating a large quantity of vapour, a phenomenon which excited universal indignation, for the moon was hidden from the eyes of the watchers for several nights.

The worthy Joseph T. Maston, the staunchest friend of the three travellers, started for the Rocky Mountains, accompanied by Hon. J. Belfast, director of the Cambridge Observatory, and reached the station of Long's Peak, where the telescope was erected which brought the moon within an apparent distance of two leagues. The hon. secretary of the Gun Club wished himself to observe the vehicle of his daring friends.

The accumulation of clouds in the atmosphere prevented all observations on the 5th, 6th, 7th, 8th, 9th, and 10th of December. Indeed it was thought that all observations would have to be put off to the 3rd of January in the following year; for the moon entering its last quarter on the 11th, would then only present an ever-decreasing portion of her disc, insufficient to allow of their following the course of the projectile.

At length, to the general satisfaction, a heavy storm cleared the atmosphere on the night of the 11th and 12th December, and the moon, with half illuminated disc, was plainly to be seen upon the black sky.

That very night, a telegram was sent from the station of Long's Peak by Joseph T. Maston and Belfast to the gentlemen of the Cambridge Observatory, announcing that, on the 11th of December at 8h. 47m. p.m., the projectile launched by the Columbiad of Stones Hill had been detected by Messrs. Belfast and Maston,—that it had deviated from its course from some unknown cause, and had not reached its destination; but that it has passed near enough to be retained by the lunar attraction; that its rectilinear movement had been changed to a circular one, and that following an elliptical orbit round the star of night it had become *its satellite*. The telegram added that the elements of this new star had not yet been calculated; and indeed three observations made upon a star in three different positions, are necessary to determine these elements. Then it showed that the distance separating the projectile from the lunar surface "might" be reckoned at about 2833 miles.

It ended with this double hypothesis; either the attraction of the moon would draw it to

herself, and the travellers thus attain their end; or that the projectile, held in one immutable orbit, would gravitate around the lunar disc to all eternity.

With such alternatives, what would be the fate of the travellers? Certainly they had food for some time. But supposing they did succeed in their rash enterprise, how would they return? *Could* they ever return? Should they hear from them? These questions, debated by the most learned pens of the day, strongly engrossed the public attention.

It is advisable here to make a remark which ought to be well considered by hasty observers. When a purely speculative discovery is announced to the public, it cannot be done with too much prudence. No one is obliged to discover either a planet, a comet, or a satellite; and whoever makes a mistake in such a case exposes himself justly to the derision of the mass. Far better is it to wait; and that is what the impatient Joseph T. Maston should have done before sending this telegram forth to the world, which, according to his idea, told the whole result of the enterprise. Indeed this telegram contained two sorts of errors, as was proved eventually. 1st, errors of observation, concerning the distance of the projectile from the surface of the moon, for on the 11th December it was impossible to see it; and what Joseph T. Maston had seen, or thought he saw, could not have been the projectile of the Columbiad. 2ndly, errors of theory on the fate in store for the said projectile; for in making it a satellite of the moon, it was putting it in direct contradiction to all mechanical laws.

One single hypothesis of the observers of Long's Peak could ever be realized, that which foresaw the case of the travellers (if still alive) uniting their efforts with the lunar attraction to attain the surface of the disc.

Now these men, as clever as they were daring, *had* survived the terrible shock consequent on their departure, and it is their journey in the projectile car which is here related in its most dramatic as well as in its most singular details. This recital will destroy many illusions and surmises; but it will give a true idea of the singular changes in store for such an enterprise; it will bring out the scientific instincts of Barbicane, the industrious resources of Nicholl, and the audacious humour of Michel Ardan.

Besides this, it will prove that their worthy friend, Joseph T. Maston, was wasting his time, while leaning over the gigantic telescope he watched the course of the moon through the starry space.

Round the Moon

CHAPTER I

FROM TWENTY MINUTES PAST TEN TO FORTY-SEVEN MINUTES PAST TEN P.M.

AS ten o'clock struck, Michel Ardan, Barbicane, and Nicholl, took leave of the numerous friends they were leaving on the earth. The two dogs, destined to propagate the canine race on the lunar continents, were already shut up in the projectile.

The three travellers approached the orifice of the enormous cast-iron tube, and a crane let them down to the conical top of the projectile. There, an opening made for the purpose gave them access to the aluminium car. The tackle belonging to the crane being hauled from outside, the mouth of the Columbiad was instantly disencumbered of its last supports.

Nicholl, once introduced with his companions inside the projectile, began to close the opening by means of a strong plate, held in position by powerful screws. Other plates, closely fitted, covered the lenticular glasses, and the travellers, hermetically enclosed in their metal prison, were plunged in profound darkness.

"And now, my dear companions," said Michel Ardan, "let us make ourselves at home; I am a domesticated man and strong in housekeeping. We are bound to make the best of our new lodgings, and make ourselves comfortable. And first let us try and see a little. Gas was not invented for moles."

So saying, the thoughtless fellow lit a match by striking it on the sole of his boot; and approached the burner fixed to the receptacle, in which the carbonized hydrogen, stored at high pressure, sufficed for the lighting and warming of the projectile for a hundred and forty-four hours, or six days and six night. The gas caught fire, and thus lighted the projectile looked like a comfortable room with thickly padded walls, furnished with a circular divan, and a roof rounded in the shape of a dome.

The objects it contained, arms, instruments, and utensils securely fastened against the rounds of wadding, could bear the shock of departure with impunity. Humanly speaking, every possible precaution had been taken to bring this rash experiment to a successful termination.

Michel Ardan examined everything, and declared himself satisfied with his installation.

"It is a prison," said he, "but a travelling

prison; and, with the right of putting my nose to the window, I could well stand a lease of a hundred years. You smile, Barbicane. Have you any *arrière-pensée*? Do you say to yourself, 'This prison may be our tomb'? Tomb, perhaps; still I would not change it for Mahomet's, which floats in space, but never advances an inch!"

Whilst Michel Ardan was speaking, Barbicane and Nicholl were making their last preparations.

Nicholl's chronometer marked twenty minutes past ten p.m. when the three travellers were finally enclosed in their projectile. This chronometer was set within the tenth of a second by that of Murchison the engineer. Barbicane consulted it.

"My friends," said he, "it is twenty minutes past ten. At forty-seven minutes past ten Murchison will launch the electric spark on the wire which communicates with the charge of the Columbiad. At that precise moment we shall leave our spheroid. Thus we have still twenty-seven minutes to remain on the earth."

"Twenty-six minutes thirteen seconds," replied the methodical Nicholl.

"Well!" exclaimed Michel Ardan, in a good-humoured tone, "much may be done in twenty-six minutes. The gravest questions of morals and politics may be discussed, and even solved. Twenty-six minutes well employed are worth more than twenty-six years in which nothing is done. Some *seconds* of a Pascal or a Newton are more precious than the whole existence of a crowd of raw simpletons—"

"And you conclude, then, you everlasting talker?" asked Barbicane.

"I conclude that we have twenty-six minutes left," replied Ardan.

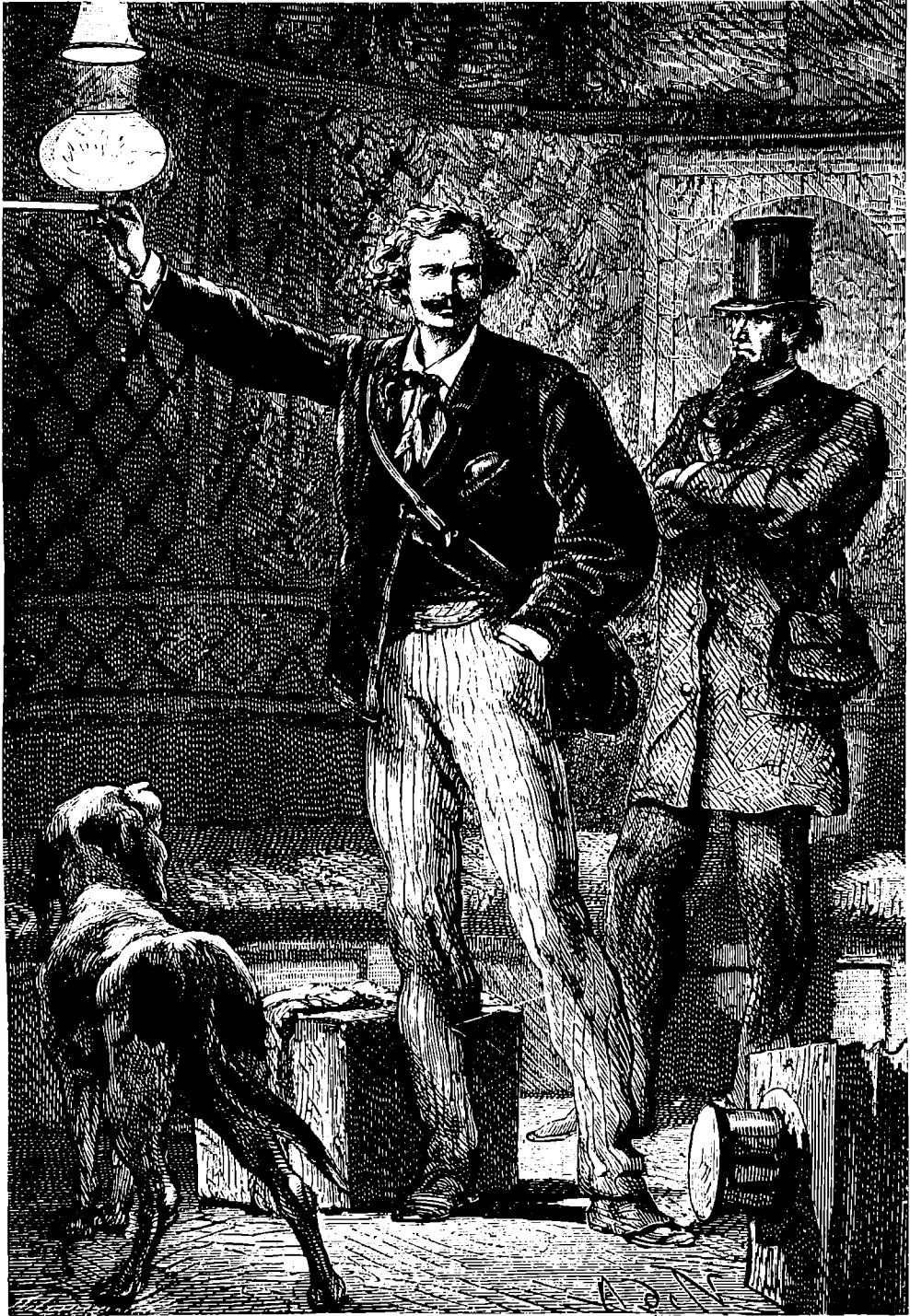
"Twenty-four only," said Nicholl.

"Well, twenty-four, if you like, my noble captain," said Ardan; "twenty-four minutes in which to investigate—"

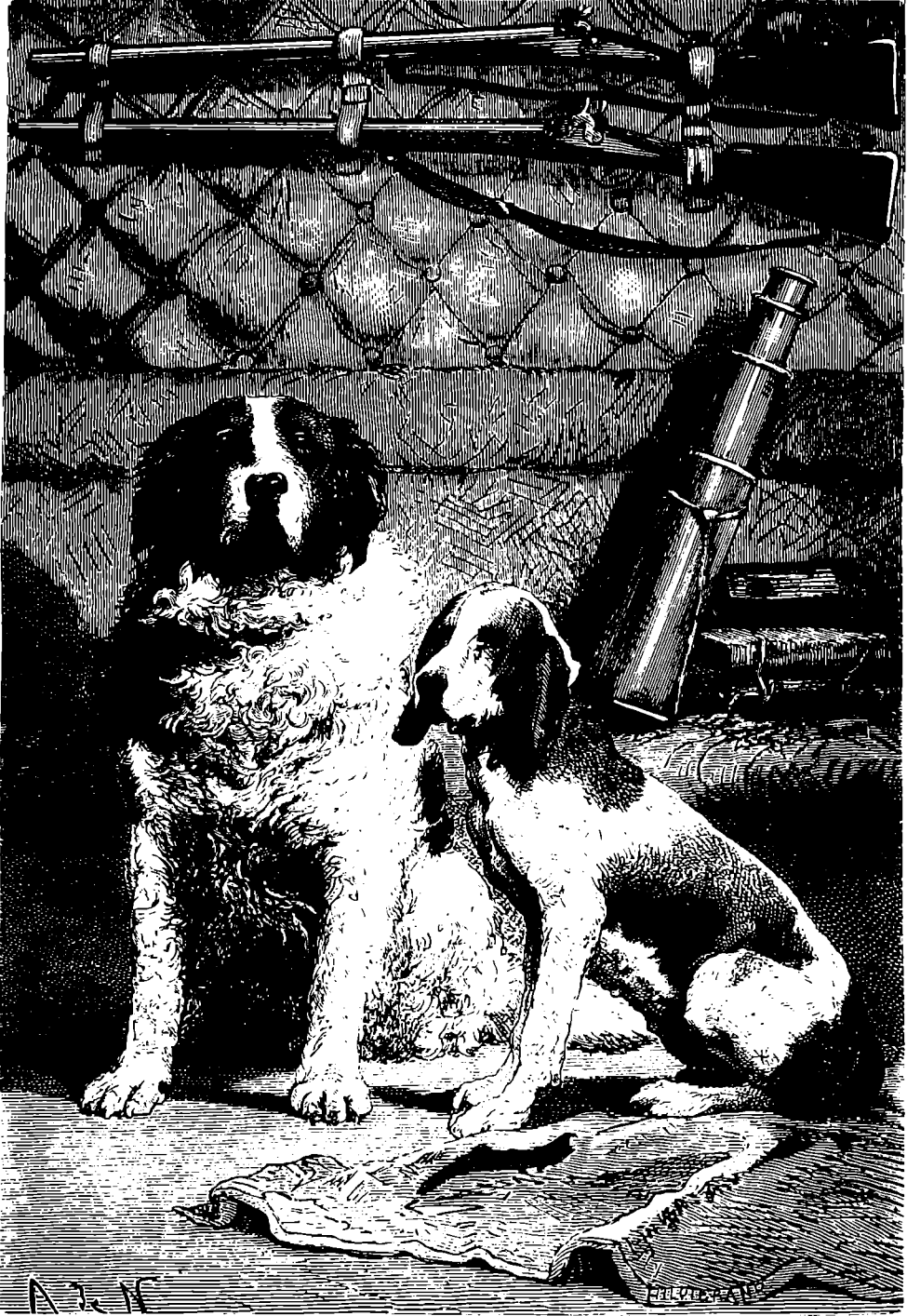
"Michel," said Barbicane, "during the passage we shall have plenty of time to investigate the most difficult questions. For the present we must occupy ourselves with our departure."

"Are we not ready?"

"Doubtless; but there are still some precau-



The gas caught fire.



Diana and Satellite.

tions to be taken, to deaden as much as possible the first shock."

"Have we not the water-cushions placed between the partition-breaks, whose elasticity will sufficiently protect us?"

"I *hope* so, Michel," replied Barbicane gently, "but I am not sure."

"Ah, the joker!" exclaimed Michel Ardan. "He hopes!—He is not sure!—and he waits for the moment when we are encased to make this deplorable admission! I beg to be allowed to get out!"

"And how?" asked Barbicane.

"Humph!" said Michel Ardan, "it is not easy; we are in the train, and the guard's whistle will sound before twenty-four minutes are over."

"*Twenty*," said Nicholl.

For some moments the three travellers looked at each other. Then they began to examine the objects imprisoned with them.

"Everything is in its place," said Barbicane. "We have now to decide how we can best place ourselves to resist the shock. Position cannot be an indifferent matter; and we must, as much as possible, prevent the rush of blood to the head."

"Just so," replied Nicholl.

"Then," replied Michel Ardan, ready to suit the action to the word, "let us put our heads down and our feet in the air, like the clowns in the grand circus."

"No," said Barbicane, "let us stretch ourselves on our sides; we shall resist the shock better that way. Remember that, when the projectile starts, it matters little whether we are in it or before it; it amounts to much the same thing."

"If it is only 'much the same thing,' I may cheer up," said Michel Ardan.

"Do you approve of my idea, Nicholl?" asked Barbicane.

"Entirely," replied the captain. "We've still thirteen minutes and a half."

"That Nicholl is not a man," exclaimed Michel; "he is a chronometer with seconds, an escape, and eight holes."

But his companions were not listening; they were taking up their last positions with the most perfect coolness. They were like two methodical travellers in a car, seeking to place themselves as comfortably as possible.

We might well ask ourselves of what materials are the hearts of these Americans made, to whom the approach of the most frightful danger added no pulsation.

Three thick and solidly-made couches had been placed in the projectile. Nicholl and

Barbicane placed them in the centre of the disc forming the floor. There the three travellers were to stretch themselves some moments before their departure.

During this time, Ardan, not being able to keep still, turned in his narrow prison like a wild beast in a cage, chatting with his friends, speaking to the dogs Diana and Satellite, to whom, as may be seen, he had given significant names.

"Ah, Diana! Ah, Satellite!" he exclaimed, teasing them; "so you are going to show the moon-dogs the good habits of the dogs of the earth! That will do honour to the canine race! If ever we do come down again, I will bring a cross type of 'moon-dogs,' which will make a stir!"

"If there *are* dogs in the moon," said Barbicane.

"There are," said Michel Ardan, "just as there are horses, cows, donkeys, and chickens. I bet that we shall find chickens."

"A hundred dollars we shall find none!" said Nicholl.

"Done, my captain!" replied Ardan, clasping Nicholl's hand. "But, by the bye, you have already lost three bets with our president, as the necessary funds for the enterprise have been found, as the operation of casting has been successful, and lastly, as the Columbiad has been loaded without accident, six thousand dollars."

"Yes," replied Nicholl. "Thirty-seven minutes six seconds past ten."

"It is understood, captain. Well, before another quarter of an hour you will have to count 9000 dollars to the president; 4000 because the Columbiad will not burst, and 5000 because the projectile will rise more than six miles in the air."

"I have the dollars," replied Nicholl, slapping the pocket of his coat. I only ask to be allowed to pay."

"Come, Nicholl, I see that you are a man of method, which I could never be; but indeed you have made a series of bets of very little advantage to yourself, allow me to tell you."

"And why?" asked Nicholl.

"Because, if you gain the first, the Columbiad will have burst, and the projectile with it; and Barbicane will no longer be there to reimburse your dollars."

"My stake is deposited at the bank in Baltimore," replied Barbicane simply; "and if Nicholl is not there, it will go to his heirs."

"Ah, you practical men!" exclaimed Michel Ardan; "I admire you the more for not being able to understand you."

"Forty-two minutes past ten!" said Nicholl.
"Only five minutes more!" answered Barbicane.

"Yes, five little minutes!" replied Michel Ardan; "and we are enclosed in a projectile, at the bottom of a gun 900 feet long! And under this projectile are rammed 400,000 lbs. of gun-cotton, which is equal to 1,600,000 lbs. of ordinary powder! And friend Murchison, with his chronometer in hand, his eye fixed on the needle, his finger on the electric apparatus, is counting the seconds preparatory to launching us into interplanetary space."

"Enough, Michel, enough!" said Barbicane, in a serious voice; "let us prepare. A few instants alone separate us from an eventful moment. One clasp of the hand, my friends."

"Yes," exclaimed Michel Ardan, more moved than he wished to appear; and the three

bold companions were united in a last embrace.

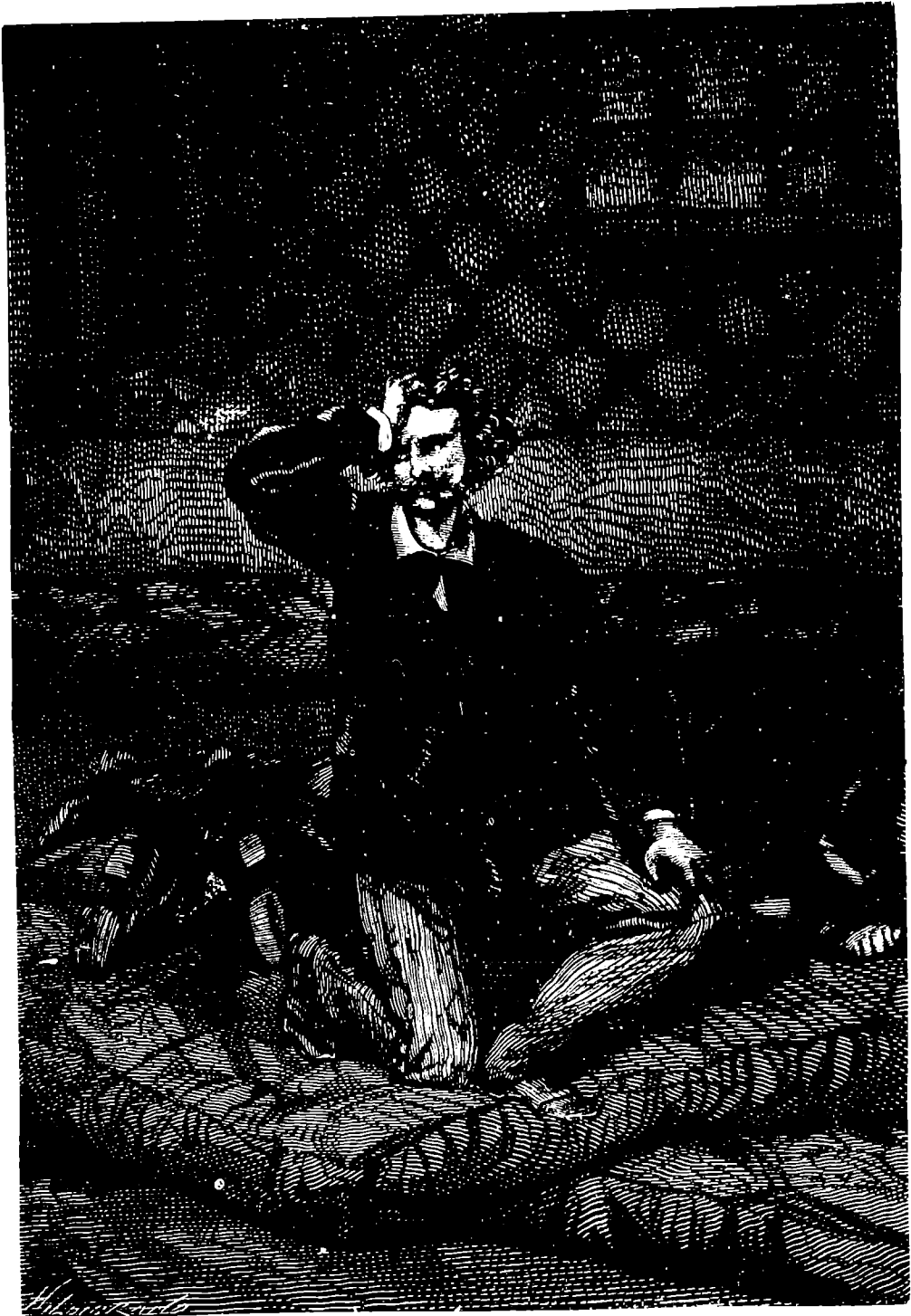
"God preserve us!" said the religious Barbicane.

Michel Ardan and Nicholl stretched themselves on the couches placed in the centre of the disc.

"Forty seven minutes past ten!" murmured the captain.

"Twenty seconds more!" Barbicane quickly put out the gas and lay down by his companions, and the profound silence was only broken by the ticking of the chronometer marking the seconds.

Suddenly a dreadful shock was felt, and the projectile, under the force of six billions of litres of gas, developed by the combustion of the pyroxyle, mounted into space.



The courageous Frenchman.

Round the Moon

CHAPTER II

THE FIRST HALF-HOUR

WHAT had happened? What effect has this frightful shock produced? Had the ingenuity of the constructors of the projectile obtained any happy result? Had the shock been deadened, thanks to the springs, the four plugs, the water-cushions, and the partition-breaks? Had they been able to subdue the frightful pressure of the initiatory speed of more than 11,000 yards, which was enough to traverse Paris or New York in a second? This was evidently the question suggested to the thousand spectators of this moving scene. They forgot the aim of the journey, and thought only of the travellers. And if one amongst them—Joseph T. Maston for example—could have cast one glimpse into the projectile, what would he have seen?

Nothing then. The darkness was profound. But its cylindroconical partitions had resisted wonderfully. Not a rent or a dent anywhere! The wonderful projectile was not even heated under the intense deflagration of the powder, nor liquefied, as they seemed to fear, in a shower of aluminium.

The interior showed but little disorder; indeed, only a few objects had been violently thrown towards the roof; but the most important seemed not to have suffered from the shock at all; their fixtures were intact.

On the movable disc, sunk down to the bottom by the smashing of the partition-breaks and the escape of the water, three bodies lay apparently lifeless. Barbicane, Nicholl, and Michel Ardan—did they still breathe? or was the projectile nothing now but a metal coffin, bearing three corpses into space?

Some minutes after the departure of the projectile, one of the bodies moved, shook its arms, lifted its head, and finally succeeded in getting on its knees. It was Michel Ardan. He felt himself all over, gave a sonorous "Hem!" and then said,—

"Michel Ardan is whole. How about the others?"

The courageous Frenchman tried to rise, but could not stand. His head swam, from the rush of blood; he was blind; he was like a drunken man.

"Bur-r!" said he. "It produces the same

effect as two bottles of Corton, though perhaps less agreeable to swallow." Then, passing his hand several times across his forehead and rubbing his temples, he called in a firm voice,—

"Nicholl! Barbicane!"

He waited anxiously. No answer; not even a sigh to show that the hearts of his companions were still beating. He called again. The same silence.

"The devil!" he exclaimed. They look as if they had fallen from a fifth story on their heads. Bah!" he added, with that imperturbable confidence which nothing could check, "if a Frenchman can get on his knees, two Americans ought to be able to get on their feet. But first let us light up."

Ardan felt the tide of life return by degrees. His blood became calm, and returned to its accustomed circulation. Another effort restored his equilibrium. He succeeded in rising, drew a match from his pocket, and approaching the burner lighted it. The receiver had not suffered at all. The gas had not escaped. Besides, the smell would have betrayed it; and in that case Michel Ardan could not have carried a lighted match with impunity through the space filled with hydrogen. The gas mixing with the air would have produced a detonating mixture, and the explosion would have finished what the shock had perhaps begun. When the burner was lit, Ardan leaned over the bodies of his companions: they were lying one on the other, an inert mass, Nicholl above, Barbicane underneath.

Ardan lifted the captain, propped him up against the divan, and began to rub vigorously. This means, used with judgment, restored Nicholl, who opened his eyes, and instantly recovering his presence of mind, seized Ardan's hand and looked around him.

"And Barbicane?" said he.

"Each in turn," replied Michel Ardan. "I began with you, Nicholl, because you were on the top. Now let us look to Barbicane." Saying which, Ardan and Nicholl raised the president of the Gun Club and laid him on the divan. He seemed to have suffered more than either of his companions; he was bleeding, but Nicholl



They raised Barbicane.

was reassured by finding that the hæmorrhage came from a slight wound on the shoulder, a mere graze, which he bound up carefully.

Still, Barbicane was a long time coming to himself, which frightened his friends, who did not spare friction.

"He breathes though," said Nicholl, putting his ear to the chest of the wounded man.

"Yes," replied Ardan, "he breathes like a man who has some notion of that daily operation. Rub, Nicholl; let us rub harder." And the two improvised practitioners worked so hard and so well that Barbicane recovered his senses. He opened his eyes, sat up, took his two friends by the hands, and his first words were—

"Nicholl, are we moving?"

Nicholl and Barbicane looked at each other; they had not yet troubled themselves about the projectile; their first thought has been for the traveller, not for the car.

"Well, are we really moving?" repeated Michel Ardan.

"Or quietly resting on the soil of Florida?" asked Nicholl.

"Or at the bottom of the Gulf of Mexico?" added Michel Ardan.

"What an idea!" exclaimed the president.

And this double hypothesis suggested by his companions had the effect of recalling him to his senses. In any case they could not yet decide on the position of the projectile. Its apparent immovability, and the want of communication with the outside, prevented them from solving the question. Perhaps the projectile was unwinding its course through space. Perhaps after a short rise it had fallen upon the earth, or even in the Gulf of Mexico—a fall which the narrowness of the peninsula of Florida would render not impossible.

The case was serious, the problem interesting, and one that must be solved as soon as possible. Thus, highly excited, Barbicane's moral energy triumphed over physical weakness, and he rose to his feet. He listened. Outside was perfect silence; but the thick padding was enough to intercept all sounds coming from the earth. But one circumstance struck Barbicane, viz., that the temperature inside the projectile was singularly high. The president drew a thermometer from its case, and consulted it. The instrument showed 81° Fahr.

"Yes," he exclaimed, "yes, we are moving! This stifling heat, penetrating through the partitions of the projectile, is produced by its friction on the atmospheric strata. It will soon diminish, because we are already floating in

space, and after having been nearly stifled, we shall have to suffer intense cold.

"What!" said Michel Ardan. "According to your showing, Barbicane, we are already beyond the limits of the terrestrial atmosphere?"

"Without a doubt, Michel. Listen to me. It is fifty-five minutes past ten; we have been gone about eight minutes; and if our initiatory speed has not been checked by the friction, six seconds would be enough for us to pass through the forty miles of atmosphere which surrounds the globe."

"Just so," replied Nicholl; "but in what proportion do you estimate the diminution of speed by friction?"

"In the proportion of one-third, Nicholl. This diminution is considerable, but according to my calculations it is nothing less. If, then, we had an initiatory speed of 12,000 yards, on leaving the atmosphere this speed would be reduced to 9165 yards. In any case we have already passed through this interval, and—"

"And then," said Michel Ardan, "friend Nicholl has lost his two bets: four thousand dollars because the Columbiad did not burst; five thousand dollars because the projectile has risen more than six miles. Now, Nicholl, pay up."

"Let us prove it first," said the captain, "and we will pay afterwards. It is quite possible that Barbicane's reasoning is correct, and that I have lost my nine thousand dollars. But a new hypothesis presents itself to my mind, and it annuls the wager."

"What is that?" asked Barbicane quickly.

"The hypothesis that, for some reason or other, fire was never set to the powder, we have not started at all."

"My goodness, captain," exclaimed Michel Ardan, "that hypothesis is worthy of my brain! It cannot be a serious one. For have we not been half annihilated by the shock? Did I not recall you to life? Is not the president's shoulder still bleeding from the blow it has received?"

"Granted," replied Nicholl; "but one question."

"Well, captain?"

"Did you hear the detonation, which certainly ought to be loud?"

"No," replied Ardan, much surprised; "certainly I did not hear the detonation."

"And you, Barbicane?"

"Nor I, either."

"Very well," said Nicholl.

"Well now," murmured the president, "why did we not hear the detonation?"



It was an enormous disc.

The three friends looked at each other with a disconcerted air. It was quite an inexplicable phenomenon. The projectile had started, and consequently there must have been a detonation.

"Let us first find out where we are," said Barbicane, "and let down the panel."

This very simple operation was soon accomplished.

The nuts which held the bolts to the outer plates of the right-hand scuttle gave way under the pressure of the English wrench. These bolts were pushed outside, and buffers covered with india-rubber stopped up the holes which let them through. Immediately the outer plate fell back upon its hinges like a porthole, and the lenticular glass which closed the scuttle appeared. A similar one was let into the thick partition on the opposite side of the projectile, another in the top of the dome, and finally, a fourth in the middle of the base. They could, therefore, make observations in four different directions: the firmament by the side and most direct windows, the earth or the moon by the upper and under openings in the projectile.

Barbicane and his two companions immediately rushed to the uncovered window. But it was lit by no ray of light. Profound darkness surrounded them, which, however, did not prevent the president from exclaiming,—

"No, my friends, we have not fallen back upon the earth; no, nor are we submerged in the Gulf of Mexico. Yes! we are mounting into space. See those stars shining in the night, and that impenetrable darkness heaped up between the earth and us!"

"Hurrah! hurrah!" exclaimed Michel Ardan and Nicholl in one voice.

Indeed, this thick darkness proved that the projectile had left the earth, for the soil, brilliantly lit by the moonbeams, would have been visible to the travellers, if they had been lying on its surface. This darkness also showed that the projectile had passed the atmospheric strata, for the diffused light spread in the air would have been reflected on the metal walls, which reflection was wanting. This light would have lit the window, and the window was dark. Doubt was no longer possible; the travellers had left the earth.

"I have lost," said Nicholl.

"I congratulate you," replied Ardan.

"Here are the nine thousand dollars," said the captain, drawing a roll of paper dollars from his pocket.

"Will you have a receipt for it?" asked Barbicane, taking the sum.

"If you do not mind," answered Nicholl; "it is more businesslike."

And coolly and seriously, as if he had been at his strong-box, the president drew forth his note-book, tore out a blank leaf, wrote a proper receipt in pencil, dated and signed it with the usual flourish,* and gave it to the captain, who carefully placed it in his pocket-book. Michel Ardan, taking off his hat, bowed to his two companions without speaking. So much formality under such circumstances left him speechless. He had never before seen anything so "American."

This affair settled, Barbicane and Nicholl had returned to the window, and were watching the constellations. The stars looked like bright points on the black sky. But from that side they could not see the orb of night, which, travelling from east to west, would rise by degrees towards the zenith. Its absence drew the following remark from Ardan.

"And the moon; will she perchance fail at our rendezvous?"

"Do not alarm yourself," said Barbicane; "our future globe is at its post, but we cannot see her from this side; let us open the other."

As Barbicane was about leaving the window to open the opposite scuttle, his attention was attracted by the approach of a brilliant object. It was an enormous disc, whose colossal dimension could not be estimated. Its face, which was turned to the earth, was very bright. One might have thought it a small moon reflecting the light of the larger one. She advanced with great speed, and seemed to describe an orbit round the earth, which would intersect the passage of the projectile. This body revolved upon its axis, and exhibited the phenomena of all celestial bodies abandoned in space.

"Ah!" exclaimed Michel Ardan, "what is that? another projectile?"

Barbicane did not answer. The appearance of this enormous body surprised and troubled him. A collision was possible, and might be attended with deplorable results; either the projectile would deviate from its path, or a shock, breaking its impetus, might precipitate it to the earth; or, lastly, it might be irresistibly drawn away by the powerful asteroid. The president caught at a glance the consequences of these three hypotheses, either of which would, one way or the other, bring their experiment to an unsuccessful and fatal

*This is a purely French habit. (Ed.)

termination. His companions stood silently looking into space. The object grew rapidly as it approached them, and by an optical illusion the projectile seemed to be throwing itself before it.

"By Jove!" exclaimed Michel Ardan, "we shall run into one another!"

Instinctively the travellers drew back. Their dread was great, but it did not last many seconds. The asteroid passed several hundred yards from the projectile and disappeared, not so much from the rapidity of its course, as that its face being opposite the moon, it was suddenly merged into the perfect darkness of space.

"A happy journey to you," exclaimed Michel Ardan, with a sigh of relief. "Surely infinity of space is large enough for a poor little projectile to walk through without fear. Now, what is this portentous globe which nearly struck us?"

"I know," replied Barbicane.

"Oh, indeed! you know everything."

"It is," said Barbicane, "a simple meteorite, but an enormous one, which the attraction of the earth has retained as a satellite."

"Is it possible!" exclaimed Michel Ardan; "the earth then has two moons like Neptune?"

"Yes, my friend, two moons, though it passes generally for having only one; but this second moon is so small, and its speed so great, that the inhabitants of the earth cannot see it. It was by noticing disturbances that a French astronomer, M. Petit, was able to determine the existence of this second satellite and calculate its elements. According to his observations, this meteorite will accomplish its revolution round the earth in three hours and twenty minutes, which implies a wonderful rate of speed."

"Do all astronomers admit the existence of this satellite?" asked Nicholl.

"No," replied Barbicane; "but if, like us, they had met it, they could no longer doubt it. Indeed, I think that this meteorite, which, had it struck the projectile, would have much embarrassed us, will give us the means of deciding what our position in space is."

"How?" said Ardan.

"Because its distance is known, and when we met it, we were exactly 4650 miles from the surface of the terrestrial globe.

"More than 2000 French leagues," exclaimed Michel Ardan. "That beats the express trains of the pitiful globe called the earth."

"I should think so," replied Nicholl, consulting his chronometer; "it is eleven

o'clock, and it is only thirteen minutes since we left the American Continent."

"Only thirteen minutes?" said Barbicane.

"Yes," said Nicholl; "and if our initiatory speed of 12,000 yards has been kept up, we shall have made about 20,000 miles in the hour."

"That is all very well, my friends," said the president, "but the insoluble question still remains. Why did we not hear the detonation of the Columbiad?"

For want of an answer the conversation dropped, and Barbicane began thoughtfully to let down the shutter of the second side. He succeeded; and through the uncovered glass the moon filled the projectile with a brilliant light. Nicholl, as an economical man, put out the gas, now useless, and whose brilliancy prevented any observation of the interplanetary space.

The lunar disc shone with wonderful purity. Her rays, no longer filtered through the vapoury atmosphere of the terrestrial globe, shone through the glass, filling the air in the interior of the projectile with silvery reflections. The black curtain of the firmament in reality heightened the moon's brilliancy, which in this void of ether unfavourable to diffusion did not eclipse the neighbouring stars. The heavens, thus seen, presented quite a new aspect, and one which the human eye could never dream of. One may conceive the interest with which these bold men watched the orb of night, the great aim of their journey.

In its motion the earth's satellite was insensibly nearing the zenith, the mathematical point which it ought to attain ninety-six hours later. Her mountains, her plains, every projection was as clearly discernible to their eyes as if they were observing it from some spot upon the earth; but its light was developed through space with wonderful intensity. The disc shone like a platinum mirror. Of the earth flying from under their feet, the travellers lost all recollection.

It was Captain Nicholl who first recalled their attention to the vanishing globe.

"Yes," said Michel Ardan, "do not let us be ungrateful to it. Since we are leaving our country, let our last looks be directed to it. I wish to see the earth once more before it is quite hidden from my eyes."

To satisfy his companions, Barbicane began to uncover the window at the bottom of the projectile, which would allow them to observe the earth direct. The disc, which the force of the projection had beaten down to the base, was removed, not without difficulty. Its frag-

ments, placed carefully against the wall, might serve again upon occasion. Then a circular gap appeared, nineteen inches in diameter, hollowed out of the lower part of the projectile. A glass cover, six inches thick and strengthened with upper fastenings, closed it tightly. Beneath was fixed an aluminium plate, held in place by bolts. The screws being undone, and the bolts let go, the plate fell down, and visible communication was established between the interior and the exterior.

Michel Ardan knelt by the glass. It was cloudy, seemingly opaque.

"Well!" he exclaimed, "and the earth?"

"The earth?" said Barbicane. "There it is."

"What! that little thread; that silver crescent?"

"Doubtless, Michel. In four days, when the moon will be full, at the very time we shall reach it, the earth will be new, and will only appear to us as a slender crescent which will soon disappear, and for some days will be enveloped in utter darkness."

"That the earth?" repeated Michel Ardan, looking with all his eyes at the thin slip of his native planet.

The explanation given by President Barbicane was correct. The earth, with respect to the projectile, was entering its last phase. It was in its octant, and showed a crescent finely traced on the dark background of the sky. Its light, rendered bluish by the thick strata of the atmosphere, was less intense than that of the crescent moon, but it was of considerable dimensions, and looked like an enormous arch stretched across the firmament. Some parts brilliantly lighted, especially on its concave part, showed the presence of high mountains, often disappearing behind thick spots, which are never seen on the lunar disc. They were rings of clouds placed concentrically round the terrestrial globe.

Whilst the travellers were trying to pierce the profound darkness, a brilliant cluster of

shooting stars burst upon their eyes. Hundreds of meteorites, ignited by the friction of the atmosphere, irradiated the shadow of the luminous train, and lined the cloudy parts of the disc with their fire. At this period the earth was in its perihelium, and the month of December is so propitious to these shooting stars, that astronomers have counted as many as twenty-four thousand in an hour. But Michel Ardan, disdainful of scientific reasonings, preferred thinking that the earth was thus saluting the departure of her three children with her most brilliant fireworks.

Indeed this was all they saw of the globe lost in the shadow, an inferior orb of the solar world, rising and setting to the great planets like a simple morning or evening star! This globe, where they had left all their affections, was nothing more than a fugitive crescent!

Long did the three friends look without speaking, though united in heart, whilst the projectile sped onward with an ever-decreasing speed. Then an irresistible drowsiness crept over their brain. Was it weariness both of body and mind? No doubt; for after the over-excitement of those last hours passed upon earth, reaction was inevitable.

"Well," said Nicholl, "since we must sleep, let us sleep."

And stretching themselves on their couches, they were all three soon in a profound slumber.

But they had not forgotten themselves more than a quarter of an hour, when Barbicane sat up suddenly, and rousing his companions with a loud voice, exclaimed,—

"I have found it!"

"What have you found?" asked Michel Ardan, jumping from his bed.

"The reason why we did not hear the detonation of the Columbiad."

"And it is—?" said Nicholl.

"Because our projectile travelled *faster than the sound!*"

Round the Moon

CHAPTER III

THEIR PLACE OF SHELTER

THIS curious but certainly correct explanation once given, the three friends returned to their slumbers. Could they have found a calmer or more peaceful spot to sleep in? On the earth, houses, towns, cottages, and country feel every shock given to the exterior of the globe. On sea, the vessels rocked by the waves are still in motion; in the air, the balloon oscillates incessantly on the fluid strata of divers densities. This projectile alone, floating in perfect space, in the midst of perfect silence, offered perfect repose.

Thus the sleep of our adventurous travellers might have been indefinitely prolonged, if an unexpected noise had not awakened them at about seven o'clock in the morning of the 2nd of December, eight hours after their departure.

This noise was a very natural barking.

"The dogs! it is the dogs!" exclaimed Michel Ardan, rising at once.

"They are hungry," said Nicholl.

"By Jove!" replied Michel, "we have forgotten them."

"Where are they?" asked Barbicane.

They looked, and found one of the animals crouched under the divan. Terrified and shaken by the initiatory shock, it had remained in the corner till its voice returned with the pangs of hunger. It was the amiable Diana, still very confused, who crept out of her retreat, though not without much persuasion, Michel Ardan encouraging her with most gracious words.

"Come, Diana," said he; "come, my girl! thou whose destiny will be marked in the cynegetic annals; thou whom the pagans would have given as companion to the god Anubis, and Christians as friend to St. Roch; thou who art rushing into interplanetary space, and wilt perhaps be the Eve of all Selenite dogs! come, Diana, come here."

Diana, flattered or not, advanced by degrees, uttering plaintive cries.

"Good," said Barbicane; "I see Eve, but where is Adam?"

"Adam?" replied Michel; "Adam cannot be far off; he is there somewhere; we must call him. Satellite! here, Satellite!"

But Satellite did not appear. Diana would not leave off howling. They found, however, that she was not bruised, and they gave her a pie, which silenced her complaints. As to Satellite, he seemed quite lost. They had to hunt a long time before finding him in one of the upper compartments of the projectile, whither some unaccountable shock must have violently hurled him. The poor beast, much hurt, was in a piteous state.

"The devil!" said Michel.

They brought the unfortunate dog down with great care. Its skull had been broken against the roof, and it seemed unlikely that he could recover from such a shock. Meanwhile, he was stretched comfortably on a cushion. Once there, he heaved a sigh.

"We will take care of you," said Michel; "we are responsible for your existence. I would rather lose an arm than a paw of my poor Satellite."

Saying which, he offered some water to the wounded dog, who swallowed it with avidity.

This attention paid, the travellers watched the earth and the moon attentively. The earth was now only discernible by a cloudy disc ending in a crescent, rather more contracted than that of the previous evening; but its expanse was still enormous, compared with that of the moon, which was approaching nearer and nearer to a perfect circle.

"By Jove!" said Michel Ardan, "I am really sorry that we did not start when the earth was full, that is to say, when our globe was in opposition to the sun."

"Why?" asked Nicholl.

"Because we should have seen our continents and seas in a new light,—the first resplendent under the solar rays, the latter cloudy as represented on some maps of the world. I should like to have seen those poles of the earth on which the eye of man has never yet rested.

"I dare say," replied Barbicane; "but if the earth had been *full*, the moon would have been *new*; that is to say, invisible, because of the rays of the sun. It is better for us to see the destination we wish to reach, than the point of departure."



The sun chose to be of the party.

"You are right, Barbicane," replied Captain Nicholl; "and, besides, when we have reached the moon, we shall have time during the long lunar nights to consider at our leisure the globe on which our likenesses swarm."

"Our likenesses!" exclaimed Michel Ardan; "they are no more our likenesses than the Selenites are! We inhabit a new world, peopled by ourselves—the projectile! I am Barbicane's likeness, and Barbicane is Nicholl's. Beyond us, around us, human nature is at an end, and we are the only population of this microcosm until we become pure Selenites."

"In about eighty-eight hours," replied the captain.

"Which means to say?" asked Michel Ardan.

"That it is half-past eight," replied Nicholl.

"Very well," retorted Michel; "then it is impossible for me to find even the shadow of a reason why we should not go to breakfast."

Indeed the inhabitants of the new star could not live without eating, and their stomachs were suffering from the imperious laws of hunger. Michel Ardan, as a Frenchman, was declared chief cook, an important function, which raised no rival. The gas gave sufficient heat for the culinary apparatus, and the provision-box furnished the elements of this first feast.

The breakfast began with three bowls of excellent soup, thanks to the liquefaction in hot water of those precious cakes of Liebig, prepared from the best parts of the ruminants of the Pampas. To the soup succeeded some beefsteaks, compressed by an hydraulic press, as tender and succulent as if brought straight from the kitchen of an English eating-house. Michel, who was imaginative, maintained that they were even "red."

Preserved vegetables ("fresher than nature," said the amiable Michel) succeeded the dish of meat; and was followed by some cups of tea with bread and butter, after the American fashion.

The beverage was declared exquisite, and was due to the infusion of the choicest leaves, of which the Emperor of Russia had given some chests for the benefit of the travellers.

And lastly, to crown the repast, Ardan brought out a fine bottle of Nuits, which was found "by chance" in the provision-box. The three friends drank to the union of the earth and her satellite.

And, as if he had not already done enough for the generous wine which he had distilled on the slopes of Burgundy, the sun chose to be of the party. At this moment the projectile

emerged from the conical shadow cast by the terrestrial globe, and the rays of the radiant orb struck the lower disc of the projectile direct, occasioned by the angle which the moon's orbit makes with that of the earth.

"The sun!" exclaimed Michel Ardan.

"No doubt," replied Barbicane; "I expected it."

"But," said Michel, "the conical shadow which the earth leaves in space extends beyond the moon?"

"Far beyond it, if the atmospheric refraction is not taken into consideration," said Barbicane. "But when the moon is enveloped in this shadow, it is because the centres of the three stars, the sun, the earth, and the moon, are all in one and the same straight line. Then the *nodes* coincide with the *phases* of the moon, and there is an eclipse. If we had started when there was an eclipse of the moon, all our passage would have been in the shadow, which would have been a pity."

"Why?"

"Because, though we are floating in space, our projectile, bathed in the solar rays, will receive their light and heat. It economizes the gas, which is in every respect a good economy."

Indeed, under these rays which no atmosphere can temper, either in temperature or brilliancy, the projectile grew warm and bright as if it had passed suddenly from winter to summer. The moon above, the sun beneath, were inundating it with their fire.

"It is pleasant here," said Nichol.

"I should think so," said Michel Ardan. "With a little earth spread on our aluminium planet we should have green peas in twenty-four hours. I have but one fear, which is that the walls of the projectile might melt."

"Calm yourself, my worthy friend," replied Barbicane; "the projectile withstood a very much higher temperature than this as it slid through the strata of the atmosphere. I should not be surprised if it did not look like a meteor on fire to the eyes of the spectators in Florida."

"But then Joseph T. Maston will think we are roasted!"

"What astonishes me," said Barbicane, "is that we have not been. That was a danger we had not provided for."

"I feared it," said Nicholl simply.

"And you never mentioned it, my sublime captain," exclaimed Michel Ardan, clasping his friend's hand.

Barbicane now began to settle himself in the projectile as if he was never to leave it. One

must remember that this aerial car had a base with a superficies of fifty-four square feet. Its height to the roof was twelve feet. Carefully laid out in the inside, and little encumbered by instruments and travelling utensils which each had their particular place, it left the three travellers a certain freedom of movement. The thick window inserted in the bottom could bear any amount of weight, and Barbicane and his companions walked upon it as if it were solid plank; but the sun striking it directly with its rays lit the interior of the projectile from beneath, thus producing singular effects of light.

They began by investigating the state of their store of water and provisions, neither of which had suffered, thanks to the care taken to deaden the shock. Their provisions were abundant, and plentiful enough to last the three travellers for more than a year. Barbicane wished to be cautious, in case the projectile should land on a part of the moon which was utterly barren. As to water and the reserve of brandy, which consisted of fifty gallons, there was only enough for two months; but according to the last observations of astronomers, the moon had a low, dense, and thick atmosphere, at least in the deep valleys, and there springs and streams could not fail. Thus, during their passage, and for the first year of their settlement on the lunar continent, these adventurous explorers would suffer neither hunger nor thirst.

Now about the air in the projectile. There, too, they were secure. Reiset and Regnaut's apparatus, intended for the production of oxygen, was supplied with chlorate of potass for two months. They necessarily consumed a certain quantity of gas, for they were obliged to keep the producing substance at a temperature of above 400°. But there again they were all safe. The apparatus only wanted a little care. But it was not enough to renew the oxygen; they must absorb the carbonic acid produced by expiration. During the last twelve hours the atmosphere of the projectile had become charged with this deleterious gas. Nicholl discovered the state of the air by observing Diana panting painfully. The carbonic acid, by a phenomenon similar to that produced in the famous Grotto del Cane, had collected at the bottom of the projectile owing to its weight. Poor Diana, with her head low, would suffer before her masters from the presence of this gas. But Captain Nicholl hastened to remedy this state of things, by placing on the floor several receivers containing caustic potash which he shook about for a

time, and this substance, greedy of carbonic acid, soon completely absorbed it, thus purifying the air.

An inventory of instruments was then begun. The thermometers and barometers had resisted, all but one minimum thermometer, the glass of which was broken. An excellent aneroid was drawn from the wadded box which contained it and hung on the wall. Of course it was only affected by and marked the pressure of the air inside the projectile, but it also showed the quantity of moisture which it contained. At that moment its needle oscillated between 25.24 and 25.08.

It was fine weather.

Barbicane had also brought several compasses, which he found intact. One must understand that under present conditions their needles were acting *wildly*, that is without any *constant* direction. Indeed, at the distance they were from the earth, the magnetic pole could have no perceptible action upon the apparatus; but the box placed on the lunar disc might perhaps exhibit some strange phenomena. In any case it would be interesting to see whether the earth's satellite submitted like herself to its magnetic influence.

A hypsometer to measure the height of the lunar mountains, a sextant to take the height of the sun, glasses which would be useful as they neared the moon, all these instruments were carefully looked over, and pronounced good in spite of the violent shock.

As to the pickaxes and different tools which were Nicholl's especial choice; as to the sacks of different kinds of grain and shrubs which Michel Ardan hoped to transplant into Selenite ground, they were stowed away in the upper part of the projectile. There was a sort of granary there, loaded with things which the extravagant Frenchman had heaped up. What they were no one knew, and the good-tempered fellow did not explain. Now and then he climbed up by cramp-irons rivetted to the walls, but kept the inspection to himself. He arranged and rearranged, he plunged his hand rapidly into certain mysterious boxes, singing in one of the falsest of voices an old French refrain to enliven the situation.

Barbicane observed with some interest that his guns and other arms had not been damaged. These were important, because, heavily loaded, they were to help to lessen the fall of the projectile, when drawn by the lunar attraction (after having passed the point of neutral attraction) on to the moon's surface; a fall which ought to be six times less rapid than it would have been on the earth's surface,



Ardan plunged his hand rapidly into certain mysterious boxes.

thanks to the difference of bulk. The inspection ended with general satisfaction, when each returned to watch space through the side windows and the lower glass coverlid.

There was the same view. The whole extent of the celestial sphere swarmed with stars and constellations of wonderful purity, enough to drive an astronomer out of his mind! On one side the sun, like the mouth of a lighted oven, a dazzling disc without a halo, standing out on the dark background of the sky! On the other, the moon returning its fire by reflection, and apparently motionless in the midst of the starry world. Then, a large spot seemingly nailed to the firmament, bordered by a silvery cord: it was the earth! Here and there nebulous masses like large flakes of starry snow; and from the zenith to the nadir, an immense ring formed by an impalpable dust of stars, the "Milky Way," in the midst of which the sun ranks only as a star of the fourth magnitude. The observers could not take their eyes from this novel spectacle, of which no description could give an adequate idea. What reflections it suggested! What emotions hitherto unknown awoke in their souls! Barbicane wished to begin the relation of his journey while under its impressions, and hour after hour took notes

of all facts happening in the beginning of the enterprise. He wrote quietly, with his large square writing, in a business-like style.

During this time Nicholl, the calculator, looked over the minutes of their passage, and worked out figures with unparalleled dexterity. Michel Ardan chatted first with Barbicane, who did not answer him, and then with Nicholl, who did not hear him, with Diana, who understood none of his theories, and lastly with himself, questioning and answering, going and coming, busy with a thousand details; at one time bent over the lower glass, at another roosting in the heights of the projectile, and always singing. In this microcosm he represented French loquacity and excitability, and we beg you to believe that they were well represented. The day, or rather (for the expression is not correct) the lapse of twelve hours, which forms a day upon earth, closed with a plentiful supper carefully prepared. No accident of any nature had yet happened to shake the travellers' confidence; so, full of hope, already sure of success, they slept peacefully, whilst the projectile under an uniformly decreasing speed was crossing the sky.

Round the Moon

CHAPTER IV

A LITTLE ALGEBRA

THE night passed without incident. The word "night," however, is scarcely applicable.

The position of the projectile with regard to the sun did not change. Astronomically, it was daylight on the lower part, and night on the upper; so when during this narrative these words are used, they represent the lapse of time between the rising and setting of the sun upon the earth.

The travellers' sleep was rendered more peaceful by the projectile's excessive speed, for it seemed absolutely motionless. Not a motion betrayed its onward course through space. The rate of progress, however rapid it might be, cannot produce any sensible effect on the human frame when it takes place in a vacuum, or when the mass of air circulates with the body which is carried with it. What inhabitant of the earth perceives its speed, which, however, is at the rate of 68,000 miles per hour? Motion under such conditions is "felt" no more than repose; and when a body is in repose it will remain so as long as no strange force displaces it; if moving, it will not stop unless an obstacle comes in its way. This indifference to motion or repose is called inertia.

Barbicane and his companions might have believed themselves perfectly stationary, being shut up in the projectile; indeed, the effect would have been the same if they had been on the outside of it. Had it not been for the moon, which was increasing above them, they might have sworn that they were floating in complete stagnation.

That morning, the 3rd of December, the travellers were awakened by a joyous but unexpected noise; it was the crowing of a cock which sounded through the ear. Michel Ardan, who was the first on his feet, climbed to the top of the projectile, and shutting a box, the lid of which was partly open, said in a low voice, "Will you hold your tongue? That creature will spoil my design!"

But Nicholl and Barbicane were awake.

"A cock!" said Nicholl.

"Why no, my friends," Michel answered quickly; "it was I who wished to awake you by this rural sound." So saying, he gave vent to a splendid cock-a-doodledoo, which would have done honour to the proudest of poultry-yards.

The two Americans could not help laughing.

"Fine talent that," said Nicholl, looking suspiciously at his companion.

"Yes," said Michel; "a joke in my country. It is very Gallic; they play the cock so in the best society."

Then turning the conversation,—

"Barbicane, do you know what I have been thinking of all night?"

"No," answered the president.

"Of our Cambridge friends. You have already remarked that I am an ignoramus in mathematical subjects; and it is impossible for me to find out how the servants of the Observatory were able to calculate what initiatory speed the projectile ought to have on leaving the Columbiad in order to attain the moon."

"You mean to say," replied Barbicane, "to attain that neutral point where the terrestrial and lunar attractions are equal; for, starting from that point, situated about nine-tenths of the distance travelled over, the projectile would simply fall upon the moon, on account of its weight."

"So be it," said Michel; "but, once more; how could they calculate the initiatory speed?"

"Nothing can be easier," replied Barbicane.

"And you knew how to make that calculation?" asked Michel Ardan.

"Perfectly. Nicholl and I would have made it, if the Observatory had not saved us the trouble."

"Very well, old Barbicane," replied Michel; "they might have cut off my head, beginning at my feet, before they could have made me solve that problem."

"Because you do not know algebra," answered Barbicane quietly.

"Ah, there you are, you eaters of x^2 ; you think you have said all when you have said 'Algebra.'"

"Michel," said Barbicane, "can you use a forge without a hammer, or plough without a ploughshare?"

"Hardly."

"Well, algebra is a tool, like the plough or the hammer, and a good tool to those who know how to use it."

"Seriously?"

"Quite seriously."

"And can you use that tool in my presence?"

"If it will interest you."

"And show me how they calculated the initiatory speed of our car?"

"Yes, my worthy friend; taking into consideration all the elements of the problem, the distance from the centre of the earth to the centre of the moon, of the radius of the earth, of its bulk, and of the bulk of the moon, I can tell exactly what ought to be the initiatory speed of the projectile, and that by a simple formula."

"Let us see."

"You shall see it; only I shall not give you the real course drawn by the projectile between the moon and the earth in considering their motion round the sun. No, I shall consider these two orbs as perfectly motionless, which will answer all our purpose."

"And why?"

"Because it will be trying to solve the problem called 'the problem of the three bodies,' for which the integral calculus is not yet far enough advanced."

"Then," said Michel Ardan, in his sly tone, "mathematics have not said their last word?"

"Certainly not," replied Barbicane.

"Well, perhaps the Selenites have carried the integral calculus farther than you have; and, by the bye, what is this 'integral calculus?'"

"It is a calculation the converse of the differential," replied Barbicane seriously.

"Much obliged; it is all very clear, no doubt."

"And now," continued Barbicane, "a slip of paper and a bit of pencil, and before a half-hour is over I will have found the required formula."

Half an hour had not elapsed before Barbicane, raising his head, showed Michel Ardan a page covered with algebraical signs, in which the general formula for the solution was contained.

"Well, and does Nicholl understand what that means?"

"Of course, Michel," replied the captain. "All these signs, which seem cabalistic to you, form the plainest, the clearest, and the most logical language to those who know how to read it."

"And you pretend, Nicholl," asked Michel, "that by means of these hieroglyphics, more incomprehensible than the Egyptian Ibis, you can find what initiatory speed it was necessary to give to the projectile?"

"Incontestably," replied Nicholl; "and even by this same formula I can always tell you its speed at any point of its transit."

"On your word?"

"On my word."

"Then you are as cunning as our president."

"No, Michel; the difficult part is what Barbicane has done; that is, to get an equation which shall satisfy all the conditions of the problem. The remainder is only a question of arithmetic, requiring merely the knowledge of the four rules."

"That is something!" replied Michel Ardan, who for his life could not do addition right, and who defined the rule as a Chinese puzzle, which allowed one to obtain all sorts of totals.

"The expression v zero, which you see in that equation, is the speed which the projectile will have on leaving the atmosphere."

"Just so," said Nicholl; "it is from that point that we must calculate the velocity, since we know already that the velocity at departure was exactly one and a half times more than on leaving the atmosphere."

"I understand no more," said Michel.

"It is a very simple calculation," said Barbicane.

"Not as simple as I am," retorted Michel.

"That means, that when our projectile reached the limits of the terrestrial atmosphere it had already lost one-third of its initiatory speed."

"As much as that?"

"Yes, my friend; merely by friction against the atmospheric strata. You understand that the faster it goes the more resistance it meets with from the air."

"That I admit," answered Michel; "and I understand it, although your x 's and zero's, and algebraic formulae, are rattling in my head like nails in a bag."

"First effects of algebra," replied Barbicane; "and now, to finish, we are going to prove the given number of these different expressions, that is, work out their value."

"Finish me!" replied Michel.

Barbicane took the paper, and began again to make his calculations with great rapidity. Nicholl looked over and greedily read the work as it proceeded.

"That's it! that's it!" at last he cried.

"Is it clear?" asked Barbicane.

"It is written in letters of fire," said Nicholl.

"Wonderful fellows!" muttered Ardan.

"Do you understand it at last?" asked Barbicane.

"Do I understand it?" cried Ardan; "my head is splitting with it."



“Do I understand it?” cried Ardan; “My head is splitting with it.”

“And now,” said Nicholl, “to find out the speed of the projectile when it left the atmosphere, we have only to calculate that.”

The captain, as a practical man equal to all difficulties, began to write frightful rapidity. Divisions and multiplications grew under his fingers; the figures were like hail on the white page. Barbicane watched him, whilst Michel Ardan nursed a growing headache with both hands.

“Very well?” asked Barbicane, after some minutes’ silence.

“Well!” replied Nicholl; “every calculation made, v zero, that is to say, the speed necessary for the projectile on leaving the atmosphere, to enable it to reach the equal point of attraction, ought to be—”

“Yes?” said Barbicane.

“Twelve thousand yards.”

“What!” exclaimed Barbicane, starting; “you say—”

“Twelve thousand yards.”

“The devil!” cried the president, making a

gesture of despair.

“What is the matter?” asked Michel Ardan, much surprised.

“What is the matter! why, if at this moment our speed had already diminished one-third by friction, the initiatory speed ought to have been—”

“Seventeen thousand yards.”

“And the Cambridge Observatory declared that 12,000 yards was enough at starting; and our projectile, which only started with that speed—”

“Well?” asked Nicholl.

“Well, it will not be enough.”

“Good.”

“We shall not be able to reach the neutral point.”

“The deuce!”

“We shall not even get half way.”

“In the name of the projectile!” exclaimed Michel Ardan, jumping as if it was already on the point of striking the terrestrial globe.

“And we shall fall back upon the earth!”

Round the Moon

CHAPTER V

THE COLD OF SPACE

THIS revelation came like a thunderbolt. Who could have expected such an error in calculation? Barbicane would not believe it. Nicholl revised his figures: they were exact. As to the formula which had determined them, they could not suspect its truth; it was evident that an initiatory velocity of 17,000 yards in the first second was necessary to enable them to reach the neutral point.

The three friends looked at each other silently. There was no thought of breakfast. Barbicane, with clenched teeth, knitted brows, and hands clasped convulsively, was watching through the window. Nicholl had crossed his arms, and was examining his calculations. Michel Ardan was muttering,—

“That is just like those scientific men: they never do anything else. I would give twenty pistoles if we could fall upon the Cambridge Observatory and crush it, together with the whole lot of dabblers in figures which it contains.”

Suddenly a thought struck the captain, which he at once communicated to Barbicane.

“Ah!” said he; “it is seven o’clock in the morning; we have already been gone thirty-two hours; more than half our passage is over, and we are not falling that I am aware of.”

Barbicane did not answer, but, after a rapid glance at the captain, took a pair of compasses wherewith to measure the angular distance of the terrestrial globe; then from the lower window he took an exact observation, and noticed that the projectile was apparently stationary. Then rising and wiping his forehead, on which large drops of perspiration were standing, he put some figures on paper. Nicholl understood that the president was deducting from the terrestrial diameter the projectile’s distance from the earth. He watched him anxiously.

“No,” exclaimed Barbicane, after some moments, “no, we are not falling! no, we are already more than 50,000 leagues from the earth. We have passed the point at which the projectile would have stopped if its speed had only been 12,000 yards at starting. We are still going up.”

“That is evident,” replied Nicholl; “and we

must conclude that our initial speed, under the power of the 400,000 lbs. of gun-cotton, must have exceeded the required 12,000 yards. Now I can understand how, after thirteen minutes only, we met the second satellite, which gravitates round the earth at more than 2000 leagues’ distance.”

“And this explanation is the more probable,” added Barbicane, “because, in throwing off the water enclosed between its partition-breaks, the projectile found itself lightened of a considerable weight.”

“Just so,” said Nicholl.

“Ah, my brave Nicholl, we are saved!”

“Very well, then,” said Michel Ardan quietly; “as we are safe, let us have breakfast.”

Nicholl was not mistaken. The initial speed had been, very fortunately, much above that estimated by the Cambridge Observatory; but the Cambridge Observatory had nevertheless made a mistake.

The travellers, recovered from this false alarm, breakfasted merrily. If they ate a great deal, they talked more. Their confidence was greater after than before “the incident of the algebra.”

“Why should we not succeed?” said Michel Ardan; “why should we not arrive safely? We are launched; we have no obstacle before us, no stones in our way; the road is open, more so than that of a ship battling with the sea; more open than that of a balloon battling with the wind; and if a ship can reach its destination, a balloon go where it pleases, why cannot our projectile attain its end and aim?”

“It *will* attain it,” said Barbicane.

“If only to do honour to the Americans,” added Michel Ardan, “the only people who could bring such an enterprise to a happy termination, and the only one which could produce a President Barbicane. Ah, now we are no longer uneasy, I begin to think, What will become of us? We shall get right royally weary.”

Barbicane and Nicholl made a gesture of denial.

“But I have provided for the contingency, my friends,” replied Michel; “you have only

to speak, and I have chess, draughts, cards, and dominoes at your disposal; nothing is wanting but a billiard-table."

"What!" exclaimed Barbicane; "you brought away such trifles?"

"Certainly," replied Michel, "and not only to distract ourselves, but also with the laudable intention of endowing the Selenite smoking divans with them."

"My friend," said Barbicane, "if the moon is inhabited, its inhabitants must have appeared some thousands of years before those of the earth, for we cannot doubt that their star is much older than ours. If then these Selenites have existed their hundreds of thousands of years, and if their brain is of the same organization as the human brain, they have already invented all that we have invented, and even what we may invent in future ages. They have nothing to learn from us, and we have everything to learn from them."

"What!" said Michel; "you believe that they have artists like Phidias, Michael Angelo, or Raphael?"

"Yes."

"Poets like Homer, Virgil, Milton, Lamartine, and Hugo?"

"I am sure of it."

"Philosophers like Plato, Aristotle, Descartes, Kant?"

"I have no doubt of it."

"Scientific men like Archimedes, Euclid, Pascal, Newton?"

"I could swear it."

"Comic writers like Arnal, and photographers like—like Nadar?"

"Certain."

"Then, friend Barbicane, if they are as strong as we are, and even stronger—these Selenites—why have they not tried to communicate with the earth? why have they not launched a lunar projectile to our terrestrial regions?"

"Who told you that they have never done so?" said Barbicane, seriously.

"Indeed," added Nicholl, "it would be easier for them than for us, for two reasons; first, because the attraction on the moon's surface is six times less than on that of the earth, which would allow a projectile to rise more easily; secondly, because it would be enough to send such a projectile only at 8000 leagues instead of 80,000, which would require the force of projection to be ten times less strong."

"Then," continued Michel, "I repeat it, why have they not done it?"

"And I repeat," said Barbicane; "who told you that they have not done it?"

"When?"

"Thousands of years before man appeared on earth."

"And the projectile—where is the projectile? I demand to see the projectile."

"My friend," replied Barbicane, "the sea covers five-sixths of our globe. From that we may draw five good reasons for supposing that the lunar projectile, if ever launched, is now at the bottom of the Atlantic or the Pacific, unless it sped into some crevasse at that period when the crust of the earth was not yet hardened."

"Old Barbicane," said Michel, "you have an answer for everything, and I bow before your wisdom. But there is one hypothesis that would suit me better than all the others, which is, that the Selenites, being older than we, are wiser, and have not invented *gunpowder*."

At this moment Diana joined in the conversation by a sonorous barking. She was asking for her breakfast.

"Ah!" said Michel Ardan, "in our discussion we have forgotten Diana and Satellite."

Immediately a good-sized pie was given to the dog, which devoured it hungrily.

"Do you see, Barbicane," said Michel, "we should have made a second Noah's Ark of this projectile, and borne with us to the moon a couple of every kind of domestic animal."

"I dare say; but room would have failed us."

"Oh!" said Michel, "we might have squeezed a little."

"The fact is," replied Nicholl, "that cows, bulls, and horses, and all ruminants, would have been very useful on the lunar continent, but unfortunately the car could neither have been made a stable nor a shed."

"Well, we might at least have brought a donkey, only a little donkey; that courageous beast which old Silenus loved to mount. I love those old donkeys; they are the least favoured animals in creation; they are not only beaten while alive, but even after they are dead."

"How do you make that out?" asked Barbicane.

"Why," said Michel, "they make their skins into drums."

Barbicane and Nicholl could not help laughing at this ridiculous remark. But a cry from their merry companion stopped them. The latter was leaning over the spot where Satellite lay. He rose, saying,—

"My good Satellite is no longer ill."

"Ah!" said Nicholl.

"No," answered Michel, "he is dead! There," added he, in a piteous tone, "that is embarrassing. I much fear, my poor Diana, that you will leave no progeny in the lunar regions!"

Indeed the unfortunate Satellite had not survived its wound. It was quite dead. Michel Ardan looked at his friends with a rueful countenance.

"One question presents itself," said Barbicane. "We cannot keep the dead body of this dog with us for the next forty-eight hours."

"No! certainly not," replied Nicholl; "but our scuttles are fixed on hinges; they can be let down. We will open one, and throw the body out into space."

The president thought for some moments, and then said,—

"Yes, we must do so, but at the same time taking very great precautions."

"Why?" asked Michel.

"For two reasons which you will understand," answered Barbicane. "The first relates to the air shut up in the projectile, and of which we must lose as little as possible."

"But we manufacture the air?"

"Only in part. We make only the oxygen, my worthy Michel; and with regard to that, we must watch that the apparatus does not furnish the oxygen in too great a quantity; for an excess would bring us very serious physiological troubles. But if we make the oxygen, we do not make the azote, that medium which the lungs do not absorb, and which ought to remain intact; and that azote will escape rapidly through the open scuttles."

"Oh! the time for throwing out poor Satellite?" said Michel.

"Agreed; but we must act quickly."

"And the second reason?" asked Michel.

"The second reason is that we must not let the outer cold, which is excessive, penetrate the projectile, or we shall be frozen to death."

"But the sun?"

"The sun warms our projectile, which absorbs its rays; but it does not warm the vacuum in which we are floating at this moment. Where there is no air, there is no more heat than diffused light; and the same with darkness: it is cold where the sun's rays do not strike direct. This temperature is only the temperature produced by the radiation of the stars; that is to say, what the terrestrial globe would undergo if the sun disappeared one day."

"Which is not to be feared," replied Nicholl.

"Who knows?" said Michel Ardan. "But, in admitting that the sun does not go out, might it not happen that the earth might move away from it?"

"There!" said Barbicane, "there is Michel with his ideas."

"And," continued Michel, "do we not know that in 1861 the earth passed through the tail of a comet? Or let us suppose a comet whose power of attraction is greater than that of the sun. The terrestrial orbit will bend towards the wandering star, and the earth, becoming its satellite, will be drawn such a distance that the rays of the sun will have no action on its surface."

"That *might* happen, indeed," replied Barbicane, "but the consequences of such a displacement need not be so formidable as you suppose."

"And why not?"

"Because the heat and the cold would be equalized on our globe. It has been calculated that, had our earth been carried along in its course by the comet of 1861, at its perihelion, that is, its nearest approach to the sun, it would have undergone a heat 28,000 times greater than that of summer. But this heat, which is sufficient to evaporate the waters, would have formed a thick ring of cloud, which would have modified that excessive temperature; hence the compensation between the cold of the aphelion and the heat of the perihelion."

"And how many degrees," asked Nicholl, "is the temperature of the planetary spaces estimated?"

"Formerly," replied Barbicane, "it was greatly exaggerated; but now, after the calculations of Fourier, of the French Academy of Science, it is not supposed to exceed 60° Centigrade below zero."

"Pooh!" said Michel, "that's nothing!"

"It is very much," replied Barbicane; "the temperature which was observed in the polar regions, at Melville Island and Fort Reliance, that is 76° Fahrenheit below zero."

"If I mistake not," said Nicholl, "M. Pouillet, another savant, estimates the temperature of space at 250° Fahr. below zero. We shall, however, be able to verify these calculations for ourselves."

"Not at present; because the solar rays, beating directly upon our thermometer, would give, on the contrary, a very high temperature. But, when we arrive in the moon, during its fifteen days of night at either face, we shall have leisure to make the experiment, for our satellite lies in a vacuum."



Satellite was thrown out.

“What do you mean by a *vacuum*?” asked Michel. “Is it perfectly such?”

“It is absolutely void of air.”

“And is the air replaced by nothing whatever?”

“By the ether only,” replied Barbicane.

“And pray what is the ether?”

“The ether, my friend, is an agglomeration of imponderable atoms, which, relatively to their dimensions, are as far removed from each other as the celestial bodies are in space. It is these atoms which, by their vibratory motion, produce both light and heat in the universe.”

They now proceeded to the burial of Satellite. They had merely to drop him into space, in the same way that sailors drop a body

into the sea; but, as President Barbicane suggested, they must act quickly, so as to lose as little as possible of that air whose elasticity would rapidly have spread it into space. The bolts of the right scuttle, the opening of which measured about twelve inches across, were carefully drawn, whilst Michel, quite grieved, prepared to launch his dog into space. The glass, raised by a powerful lever, which enabled it to overcome the pressure of the inside air on the walls of the projectile, turned rapidly on its hinges, and Satellite was thrown out. Scarcely a particle of air could have escaped, and the operation was so successful, that later on Barbicane did not fear to dispose of the rubbish which encumbered the car.

Round the Moon

CHAPTER VI

QUESTION AND ANSWER

ON the 4th of December, when the travellers awoke after fifty-four hours' journey, the chronometer marked five o'clock of the terrestrial morning. In time it was just over five hours and forty minutes, half of that assigned to their sojourn in the projectile; but they had already accomplished nearly seven-tenths of the way. This peculiarity was due to their regularly decreasing speed.

Now when they observed the earth through the lower window, it looked like nothing more than a dark spot, drowned in the solar rays. No more crescent, no more cloudy light! The next day, at midnight, the earth would be *new*, at the very moment when the moon would be full. Above, the orb of night was nearing the line followed by the projectile, so as to meet it at the given hour. All around the black vault was studded with brilliant points, which seemed to move slowly; but, at the great distance they were from them, their relative size did not seem to change. The sun and stars appeared exactly as they do to us upon earth. As to the moon, she was considerably larger; but the travellers' glasses, not very powerful, did not allow them as yet to make any useful observations upon her surface, or reconnoitre her topographically or geologically.

Thus the time passed in never-ending conversations all about the moon. Each one brought forward his own contingent of particular facts; Barbicane and Nicholl always serious, Michel Ardan always enthusiastic. The projectile, its situation, its direction, incidents which might happen, the precautions necessitated by their fall on to the moon, were inexhaustible matters of conjecture.

As they were breakfasting, a question of Michel's, relating to the projectile, provoked rather a curious answer from Barbicane, which is worth repeating. Michel, supposing it to be roughly stopped, whilst still under its formidable initial speed, wished to know what the consequences of the stoppage would have been.

"But," said Barbicane, "I do not see how it could have been stopped."

"But let us suppose so," said Michel.

"It is an impossible supposition," said the practical Barbicane; "unless the impulsive

force had failed; but even then its speed would diminish by degrees, and it would not have stopped suddenly."

"Admit that it had struck a body in space."

"What body?"

"Why that enormous meteor which we met."

"Then," said Nicholl, "the projectile would have been broken into a thousand pieces, and we with it."

"More than that," replied Barbicane; "we should have been burnt to death."

"Burnt?" exclaimed Michel, "by Jove! I am sorry it did not happen, 'just to see.'"

"And you would have seen," replied Barbicane. "It is known now that heat is only a modification of motion. When water is warmed—that is to say, when heat is added to it—its particles are set in motion."

"Well," said Michel, "that is an ingenious theory!"

"And a true one, my worthy friend; for it explains every phenomenon of caloric. Heat is but the motion of atoms, a simple oscillation of the particles of a body. When they apply the break to a train, the train comes to a stop. but what becomes of the motion which it had previously possessed? It is transformed into heat, and the break becomes hot. Why do they grease the axles of the wheels? To prevent their heating, because this heat would be generated by the motion which is thus lost by transformation."

"Yes, I understand," replied Michel, "perfectly. For example, when I have run a long time, when I am swimming, when I am perspiring in large drops, why am I obliged to stop? Simply because my motion is changed into heat."

Barbicane could not help smiling at Michel's reply; then, returning to his theory, said,—

"Thus, in case of a shock, it would have been with our projectile as with a ball which falls in a burning state after having struck the metal plate; it is its motion which is turned into heat. Consequently I affirm that, if our projectile had struck the meteor, its speed thus suddenly checked would have raised a heat great enough to turn it into vapour instantaneously."

"Then," asked Nicholl, "what would happen if the earth's motion were to stop suddenly?"

"Her temperature would be raised to such a pitch," said Barbicane, "that she would be at once reduced to vapour."

"Well," said Michel, "that is a way of ending the earth which will greatly simplify things."

"And if the earth fell upon the sun?" asked Nicholl.

"According to calculation," replied Barbicane, "the fall would develop a heat equal to that produced by 16,000 globes of coal, each equal in bulk to our terrestrial globe."

"Good additional heat for the sun," replied Michel Ardan, "of which the inhabitants of Uranus or Neptune would doubtless not complain; they must be perished with cold on their planets."

"Thus, my friends," said Barbicane, "all motion suddenly stopped produces heat. And this theory allows us to infer that the heat of the solar disc is fed by a hail of meteors falling incessantly on its surface. They have even calculated—"

"Oh, dear!" murmured Michel, "the figures are coming."

"They have even calculated," continued the imperturbable Barbicane, "that the shock of each meteor on the sun ought to produce a heat equal to that of 4000 masses of coal of an equal bulk."

"And what is the solar heat?" asked Michel.

"It is equal to that produced by the combustion of a stratum of coal surrounding the sun to a depth of forty-seven miles."

"And that heat—"

"Would be able to boil two billions nine hundred millions of cubic myriametres* of water."

"And it does not roast us!" exclaimed Michel.

"No," replied Barbicane, "because the terrestrial atmosphere absorbs four-tenths of the solar heat; besides, the quantity of heat intercepted by the earth is but a billionth part of the entire radiation."

"I see that all is for the best," said Michel, "and that this atmosphere is a useful invention; for it not only allows us to breathe, but it prevents us from roasting."

"Yes!" said Nicholl, "unfortunately, it will

not be the same in the moon."

"Bah!" said Michel, always hopeful. "If there are inhabitants, they must breathe. If there are no longer any, they must have left enough oxygen for three people, if only at the bottom of ravines, where its own weight will cause it to accumulate, and we will not climb the mountains; that is all." And Michel, rising, went to look at the lunar disc, which shone with intolerable brilliancy.

"By Jove!" said he, "it must be hot up there!"

"Without considering," replied Nicholl, "that the day lasts 360 hours!"

"And to compensate that," said Barbicane, "the nights have the same length; and as heat is restored by radiation, their temperature can only be that of the planetary space."

"A pretty country, that!" exclaimed Michel. "Never mind! I wish I was there! Ah! my dear comrades, it will be rather curious to have the earth for our moon, to see it rise on the horizon, to recognize the shape of its continents, and to say to oneself, 'There is America, there is Europe'; then to follow it when it is about to lose itself in the sun's rays! By-the-bye, Barbicane, have the Selenites eclipses?"

"Yes, eclipses of the sun," replied Barbicane, "when the centres of the three orbs are on a line, the earth being in the middle. But they are only partial, during which the earth, cast like a screen upon the solar disc, allows the greater portion to be seen."

"And why," asked Nicholl, "is there no total eclipse? Does not the cone of the shadow cast by the earth extend beyond the moon?"

"Yes, if we do not take into consideration the refraction produced by the terrestrial atmosphere. No, if we take that refraction into consideration. Thus let b be the horizontal parallel, and p the apparent semidiameter—"

"Oh!" said Michel. "Do speak plainly, you man of algebra!"

"Very well;" replied Barbicane, "in popular language the mean distance from the moon to the earth being sixty terrestrial radii, the length of the cone of the shadow, on account of the refraction, is reduced to less than forty-two radii. The result is that when there are eclipses, the moon finds itself beyond the cone of pure shadow, and that the sun sends her its rays, not only from its edges, but also from its centre."

"Then," said Michel, in a merry tone, "why are there eclipses, when there ought not to be any?"

"Simply because the solar rays are

*The myriametre is equal to rather more than 10,936 cubic yards English.—(Ed.)

weakened by this refraction, and the atmosphere through which they pass extinguishes the greater part of them!"

"That reason satisfies me," replied Michel. "Besides we shall see when we get there. Now, tell me, Barbicane, do you believe that the moon is an old comet?"

"There's an idea!"

"Yes," replied Michel, with an amiable swagger, "I have a few ideas of that sort."

"But that idea does not spring from Michel," answered Nicholl.

"Well, then, I am a plagiarist."

"No doubt about it. According to the ancients, the Arcadians pretend that their ancestors inhabited the earth before the moon became her satellite. Starting from this fact, some scientific men have seen in the moon a comet whose orbit will one day bring it so near to the earth that it will be held there by its attraction."

"Is there any truth in this hypothesis?" asked Michel.

"None whatever," said Barbicane, "and the proof is, that the moon has preserved no trace of the gaseous envelope which always accompanies comets."

"But," continued Nicholl, "before becoming the earth's satellite, could not the moon, when in her perihelion, pass so near the sun as by evaporation to get rid of all those gaseous substances?"

"It is possible, friend Nicholl, but not probable."

"Why not?"

"Because—Faith I do not know."

"Ah!" exclaimed Michel, "what hundreds of volumes we might make of all that we do not know!"

"Ah! indeed. What time is it?" asked Barbicane.

"Three o'clock," answered Nicholl.

"How times goes," said Michel, "in the conversation of scientific men such as we are! Certainly, I feel I know too much! I feel that I am becoming a well!"

Saying which, Michel hoisted himself to the roof of the projectile, "to observe the moon better," he pretended. During this time his companions were watching through the lower glass. Nothing new to note!

When Michel Ardan came down, he went to the side scuttle; and suddenly they heard an exclamation of surprise!

"What is it?" asked Barbicane.

The president approached the window, and saw a sort of flattened sack floating some yards from the projectile. This object seemed

as motionless as the projectile, and was consequently animated with the same ascending movement.

"What is that machine?" continued Michel Ardan. "Is it one of the bodies of space which our projectile keeps within its attraction, and which will accompany it to the moon?"

"What astonishes me," said Nicholl, "is that the specific weight of the body, which is certainly less than that of the projectile, allows it to keep so perfectly on a level with it."

"Nicholl," replied Barbicane, after a moment's reflection, "I do not know what the object is, but I do know why it maintains our level."

"And why?"

"Because we are floating in space, my dear captain, and in space bodies fall or move (which is the same thing) with equal speed whatever be their weight or form; it is the air, which by its resistance creates these differences in weight. When you create a vacuum in a tube, the objects you send through it, grains of dust or grains of lead, fall with the same rapidity. Here in space is the same cause and the same effect."

"Just so," said Nicholl, "and everything we throw out of the projectile will accompany it until it reaches the moon."

"Ah! fools that we are!" exclaimed Michel.

"Why that expletive?" asked Barbicane.

"Because we might have filled the projectile with useful objects, books, instruments, tools, &c. We could have thrown them all out, and all would have followed in our train. But happy thought! Why cannot we walk outside like the meteor? Why cannot we launch into space through the scuttle? What enjoyment it would be to feel oneself thus suspended in ether, more favoured than the birds who must use their wings to keep themselves up!"

"Granted," said Barbicane, "but how to breathe?"

"Hang the air, to fail so inopportunistly!"

"But if it did not fail, Michel, your density being less than that of the projectile, you would soon be left behind."

"Then we must remain in our car?"

"We must!"

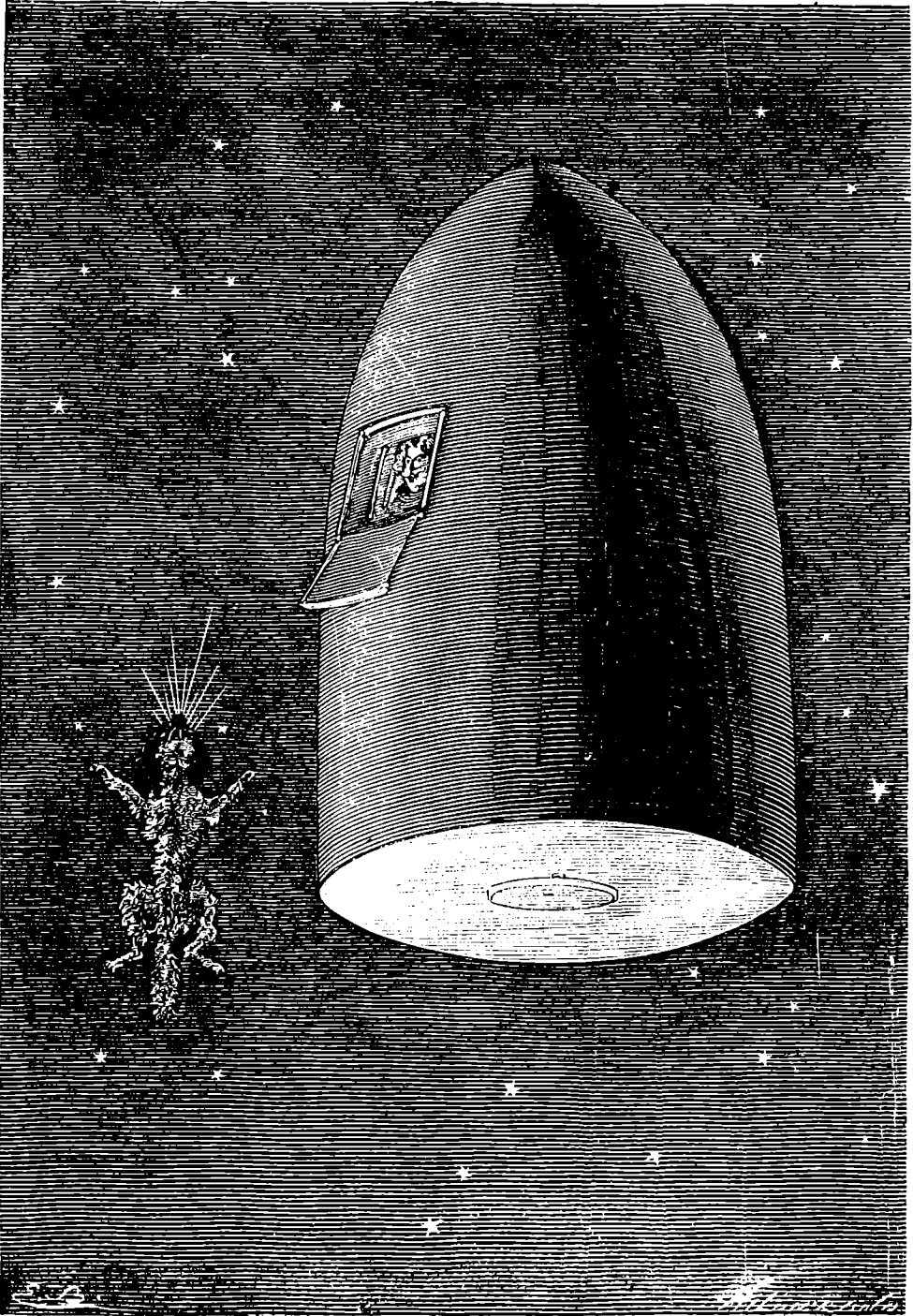
"Ah!" exclaimed Michel, in a loud voice.

"What is the matter," asked Nicholl.

"I know, I guess, what this pretended meteor is! It is no asteroid which is accompanying us! It is not a piece of a planet."

"What is it then?" asked Barbicane.

"It is our unfortunate dog! It is Diana's husband!"



It was the body of Satellite.

Indeed, this deformed, unrecognizable Satellite, flattened like a bagpipe without object, reduced to nothing, was the body of wind, and ever mounting, mounting!

Round the Moon

CHAPTER VII

A MOMENT OF INTOXICATION

THUS a phenomenon, curious but explicable, was happening under these strange conditions.

Every object thrown from the projectile would follow the same course and never stop until it did. There was a subject for conversation which the whole evening could not exhaust.

Besides, the excitement of the three travellers increased as they drew near the end of their journey. They expected unforeseen incidents, and new phenomena; and nothing would have astonished them in the frame of mind they then were in. Their over-excited imagination went faster than the projectile, whose speed was evidently diminishing, though insensibly to themselves. But the moon grew larger to their eyes, and they fancied if they stretched out their hands they could seize it.

The next day, the 5th of November, at five in the morning, all three were on foot. That day was to be the last of their journey, if all calculations were true. That very night, at twelve o'clock, in eighteen hours, exactly at the full moon, they would reach its brilliant disc. The next midnight would see that journey ended, the most extraordinary of ancient or modern times. Thus from the first of the morning, through the scuttles silvered by its rays, they saluted the orb of night with a confident and joyous hurrah.

The moon was advancing majestically along the starry firmament. A few more degrees, and she would reach the exact point where her meeting with the projectile was to take place.

According to his own observations, Barbicane reckoned that they would land on her northern hemisphere, where stretch immense planes, and where mountains are rare. A favourable circumstance if, as they thought, the lunar atmosphere was stored only in its depths.

"Besides," observed Michel Ardan, "a plain is easier to disembark upon than a mountain. A Selenite, deposited in Europe on the summit of Mont Blanc, or in Asia on the top of the Himalayas, would not be quite the right place."

"And," added Captain Nicholl, "on a flat ground, the projectile will remain motionless when it has once touched; whereas on a

declivity it would roll like an avalanche, and not being squirrels we should not come out safe and sound. So it is all for the best."

Indeed, the success of the audacious attempt no longer appeared doubtful. But Barbicane was preoccupied with one thought; but not wishing to make his companions uneasy, he kept silence on the subject.

The direction the projectile was taking towards the moon's northern hemisphere, showed that her course had been slightly altered. The discharge, mathematically calculated, would carry the projectile to the very centre of the lunar disc. If it did not land there, there must have been some deviation. What had caused it? Barbicane could neither imagine, nor determine the importance of the deviation, for there were no points to go by.

He hoped, however, that it would have no other result than that of bringing them near the upper border of the moon, a region more suitable for landing.

Without imparting his uneasiness to his companions, Barbicane contented himself with constantly observing the moon, in order to see whether the course of the projectile would not be altered; for the situation would have been terrible if it failed in its aim, and being carried beyond the disc should be launched into interplanetary space. At that moment, the moon, instead of appearing flat like a disc, showed its convexity. If the sun's rays had struck it obliquely, the shadow thrown would have brought out the high mountains, which would have been clearly detached. The eye might have gazed into the cater's gaping abysses, and followed the capricious fissures which wound through the immense plains. But all relief was as yet levelled in intense brilliancy. They could scarcely distinguish those large spots which give to the moon the appearance of a human face.

"Face, indeed!" said Michel Ardan; "but I am sorry for the amiable sister of Apollo. A very pitted face!"

But the travellers, now so near the end, were incessantly observing this new world. They imagined themselves walking through its unknown countries, climbing its highest peaks,

descending into its lowest depths. Here and there they fancied they saw vast seas, scarcely kept together under so rarefied an atmosphere, and watercourses emptying the mountain tributaries. Leaning over the abyss, they hoped to catch some sounds from that orb for ever mute in the solitude of space. That last day left them.

They took down the most trifling details. A vague uneasiness took possession of them as they neared the end. This uneasiness would have been doubled had they felt how their speed had decreased. It would have seemed to them quite insufficient to carry them to the end. It was because the projectile then "weighed" almost nothing. Its weight was ever decreasing, and would be entirely annihilated on that line where the lunar and terrestrial attractions would neutralize each other.

But in spite of his preoccupation, Michel Ardan did not forget to prepare the morning repast with his accustomed punctuality. They ate with a good appetite. Nothing was so excellent as the soup liquefied by the heat of the gas; nothing better than the preserved meat. Some glasses of good French wine crowned the repast, causing Michel Ardan to remark that the lunar vines, warmed by that ardent sun, ought to distil even more generous wines; that is, if they existed. In any case, the far-seeing Frenchman had taken care not to forget in his collection some precious cuttings of the Médoc and Côte d'Or, upon which he founded his hopes.

Reiset and Regnault's apparatus worked with great regularity. Not an atom of carbonic acid resisted the potash; and as to the oxygen, Captain Nicholl said "it was of the first quality." The little watery vapour enclosed in the projectile mixing with the air tempered the dryness; and many apartments in London, Paris, or New York, and many theatres, were certainly not in such a healthy condition.

But that it might act with regularity, the apparatus must be kept in perfect order; so each morning Michel visited the escape regulators, tried the taps, and regulated the heat of the gas by the pyrometer. Everything had gone well up to that time, and the travellers, imitating the worthy Joseph T. Maston, began to acquire a degree of embonpoint, which would have rendered them unrecognizable if their imprisonment had been prolonged to some months. In a word, they behaved like chickens in a coop; they were getting fat.

In looking through the scuttle Barbicane

saw the spectre of the dog, and other divers objects which had been thrown from the projectile obstinately following them. Diana howled lugubriously on seeing the remains of Satellite, which seemed as motionless as if they reposed on the solid earth.

"Do you know, my friends," said Michel Ardan, "that if one of us had succumbed to the shock consequent on departure, we should have had a great deal of trouble to bury him? What am I saying? to *etherize* him, as here ether takes the place of earth. You see the accusing body would have followed us into space like a remorse."

"That would have been sad," said Nicholl.

"Ah!" continued Michel, "what I regret is not being able to take a walk outside. What voluptuousness to flat amid this radiant ether, to bathe oneself in it, to wrap oneself in the sun's pure rays. If Barbicane had only thought of furnishing us with a diving apparatus and an air-pump, I could have ventured out and assumed fanciful attitudes of feigned monsters on the top of the projectile."

"Well, old Michel," replied Barbicane, "you would not have made a feigned monster long, for in spite of your diver's dress, swollen by the expansion of air within you, you would have burst like a shell, or rather like a balloon which has risen too high. So do not regret it, and do not forget this—as long as we float in space, all sentimental walks beyond the projectile are forbidden."

Michel Ardan allowed himself to be convinced to a certain extent. He admitted that the thing was difficult but not *impossible*, a word which he never uttered.

The conversation passed from this subject to another, not failing for an instant. It seemed to the three friends as though, under present conditions, ideas shot up in their brains as leaves shoot at the first warmth of spring. They felt bewildered. In the middle of the questions and answers which crossed each other, Nicholl put one question which did not find an immediate solution.

"Ah, indeed!" said he; "it is all very well to go to the moon, but how to get back again?"

His two interlocutors looked surprised. One would have thought that this possibility now occurred to them for the first time.

"What do you mean by that, Nicholl?" asked Barbicane gravely.

"To ask for means to leave a country," added Michel, "when we have not yet arrived there, seems to me rather inopportune."

"I do not say that, wishing to draw back," replied Nicholl; "but I repeat my question,



“I could have ventured out on the top of the projectile.”

and I ask, 'How shall we return?'"

"I know nothing about it," answered Barbicane.

"And I," said Michel, "if I had known how to return, I would never have started."

"There's an answer!" cried Nicholl.

"I quite approve of Michel's words," said Barbicane; "and add, that the question has no real interest. Later, when we think it advisable to return, we will take counsel together. If the Columbiad is not there, the projectile will be."

"That is a step certainly. A ball without a gun!"

"The gun," replied Barbicane, "can be manufactured. The powder can be made. Neither metals, saltpetre, nor coal can fail in the depths of the moon, and we need only go 8000 leagues in order to fall upon the terrestrial globe by virtue of the mere laws of weight."

"Enough," said Michel with animation. "Let it be no longer a question of returning; we have already entertained it too long. As to communicating with our former earthly colleagues, that will not be difficult."

"And how?"

"By means of meteors launched by lunar volcanos."

"Well thought of, Michel," said Barbicane in a convinced tone of voice. "Laplace has calculated that a force five times greater than that of our gun would suffice to send a meteor from the moon to the earth, and there is not one volcano which has not a greater power of propulsion than that."

"Hurrah!" exclaimed Michel; "these meteors are handy postmen, and cost nothing. And how we shall be able to laugh at the post-office administration. But now I think of it—"

"What do you think of?"

"A capital idea. Why did we not fasten a thread to our projectile, and we could have exchanged telegrams with the earth?"

"The deuce!" answered Nicholl. "Do you consider the weight of a thread 250,000 miles long nothing?"

"As nothing. They could have trebled the Columbiad's charge; they could have quadrupled or quintupled it!" exclaimed Michel, with whom the verb took a higher intonation each time.

"There is but one little objection to make to your proposition," replied Barbicane, "which is that, during the rotary motion of the globe, our thread would have wound itself round it like a chain on a capstan, and that it would inevitably had brought us to the ground."

"By the thirty-nine stars of the Union!"

said Michel, "I have nothing but impracticable ideas to-day; ideas worthy of J. T. Maston. But I have a notion that, if we do not return to earth, J. T. Maston will be able to come to us."

"Yes, he'll come," replied Barbicane; "he is a worthy and a courageous comrade. Besides, what is easier? Is not the Columbiad still buried in the soil of Florida? Is cotton and nitric acid wanted wherewith to manufacture the pyroxile? Will not the moon again pass to the zenith of Florida? In eighteen years' time will she not occupy exactly the same place as to-day?"

"Yes," continued Michel, "yes, Maston will come, and with him our friends Elphistone, Blomsberry, all the members of the Gun Club, and they will be well received. And by and by they will run trains of projectiles between the earth and the moon! Hurrah for J. T. Maston!"

It is probable that, if the Hon. J. T. Maston did not hear the hurrahs uttered in his honour, his ears at least tingled. What was he doing then? Doubtless posted in the Rocky Mountains, at the station of Long's Peak, he was trying to find the invisible projectile gravitating in space. If he was thinking of his dear companions, we must allow that they were not far behind him; and that, under the influence of a strange excitement, they were devoting to him their best thoughts.

But whence this excitement, which was evidently growing upon the tenants of the projectile? Their sobriety could not be doubted. This strange irritation of the brain, must it be attributed to the peculiar circumstances under which they found themselves, to their proximity to the orb of night, from which only a few hours separated them, to some secret influence of the moon acting upon their nervous system? Their faces were as rosy as if they had been exposed to the roaring flames of an oven; their voices resounded in loud accents; their words escaped like a champagne cork driven out by carbonic acid; their gestures became annoying, they wanted so much room to perform them; and, strange to say, they none of them noticed this great tension of the mind.

"Now," said Nicholl, in a short tone, "now that I do not know whether we shall ever return from the moon, I want to know what we are going to do there?"

"What we are going to do there?" replied Barbicane, stamping with his foot as if he was in a fencing saloon; "I do not know."

"You do not know!" exclaimed Michel,



They struck up a frantic dance.

with a bellow which provoked a sonorous echo in the projectile.

"No, I have not even thought about it," retorted Barbicane, in the same loud tone.

"Well, I know," replied Michel.

"Speak, then," cried Nicholl, who could no longer contain the growling of his voice.

"I shall speak if it suits me," exclaimed Michel, seizing his companions' arms with violence.

"*It must* suit you," said Barbicane, with an eye on fire and a threatening hand. "It was you who drew us into this frightful journey, and we want to know what for."

"Yes," said the captain, "now that I do not know *where* I am going, I want to know *why* I am going."

"Why?" exclaimed Michel, jumping a yard high, "why? To take possession of the moon in the name of the United States; to add a fortieth State to the Union; to colonize the lunar regions; to cultivate them, to people them, to transport thither all the prodigies of art, of science, and industry; to civilize the Selenites, unless they are more civilized than we are; and to constitute them a republic, if they are not already one!"

"And if there are no Selenites?" retorted Nicholl, who, under the influence of this unaccountable intoxication, was very contradictory.

"Who said that there were no Selenites?" exclaimed Michel in a threatening tone.

"I do," howled Nicholl.

"Captain," said Michel, "do not repeat that insolence, or I will knock your teeth down your throat!"

The two adversaries were going to fall upon each other, and the incoherent discussion threatened to merge into a fight, when Barbicane intervened with one bound.

"Stop, miserable men," said he, separating his two companions; "if there are no Selenites, we will do without them."

"Yes," exclaimed Michel, who was not particular; "yes, we will do without them. We have only to make Selenites. Down with the Selenites!"

"The empire of the moon belongs to us," said Nicholl. "Let us three constitute the republic."

"I will be the congress," cried Michel.

"And I the senate," retorted Nicholl.

"And Barbicane, the president," howled Michel.

"Not a president elected by the nation," replied Barbicane.

"Very well, a president elected by the congress," cried Michel; "and as I am the congress, you are unanimously elected!"

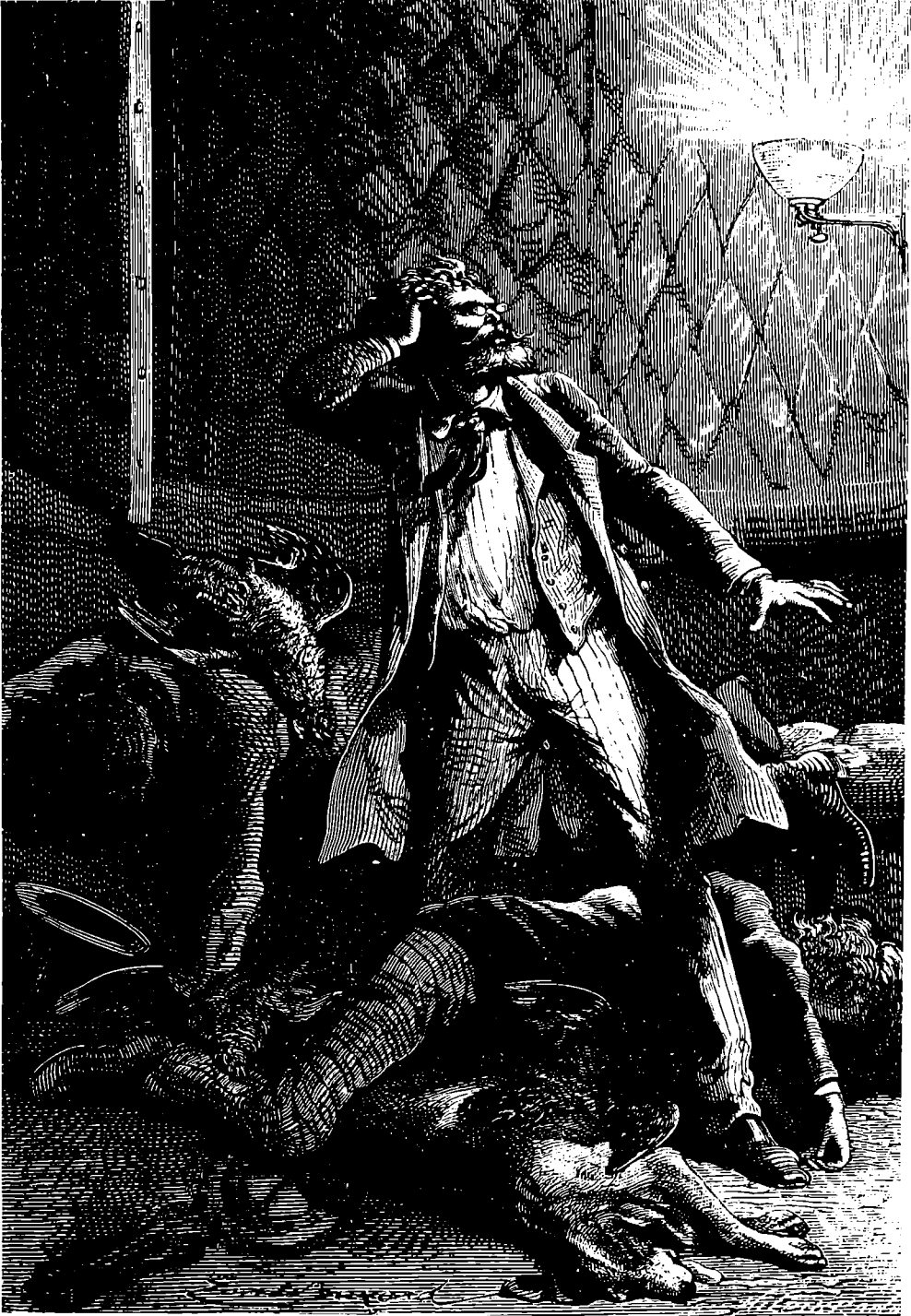
"Hurrah! hurrah! hurrah! for President Barbicane," exclaimed Nicholl.

"Hip! hip! hip!" vociferated Michel Ardan.

Then the President and the Senate struck up in a tremendous voice the popular song "Yankee Doodle," whilst from the Congress resounded the masculine tones of the "Marseillaise."

Then they struck up a frantic dance, with maniacal gestures, idiotic stampings, and somersaults like those of the boneless clowns in the circus. Diana, joining in the dance, and howling in her turn, jumped to the top of the projectile. An unaccountable flapping of wings was then heard amidst most fantastic cock-crows, while five or six hens fluttered like bats against the walls.

Then the three travelling companions, acted upon by some unaccountable influence above that of intoxication, inflamed by the air which had set their respiratory apparatus on fire, fell motionless to the bottom of the projectile.



“The oxygen!” he exclaimed.

Round the Moon

CHAPTER VIII

AT SEVENTY-EIGHT THOUSAND FIVE HUNDRED AND FOURTEEN LEAGUES

WHAT had happened? Whence the cause of this singular intoxication, the consequences of which might have been very disastrous? A simple blunder of Michel's, which, fortunately, Nicholl was able to correct in time.

After a perfect swoon, which lasted some minutes, the captain, recovering first, soon collected his scattered senses. Although he had breakfasted only two hours before, he felt a gnawing hunger, as if he had not eaten anything for several days. Everything about him, stomach and brain, were overexcited to the highest degree. He got up and demanded from Michel a supplementary repast. Michel, utterly done up, did not answer.

Nicholl then tried to prepare some tea destined to help the absorption of a dozen sandwiches. He first tried to get some fire, and struck a match sharply. What was his surprise to see the sulphur shine with so extraordinary a brilliancy as to be almost unbearable to the eye. From the gas-burner which he lit rose a flame equal to a jet of electric light.

A revelation dawned on Nicholl's mind. That intensity of light, the physiological troubles which had arisen in him, the overexcitement of all his moral and quarrelsome faculties,—he understood all.

"The oxygen!" he exclaimed.

And leaning over the air apparatus, he saw that the tap was allowing the scentless colourless gas to escape freely, life-giving, but in its pure state producing the gravest disorders in the system. Michel had blunderingly opened the tap of the apparatus to the full.

Nicholl hastened to stop the escape of oxygen with which the atmosphere was saturated, which would have been the death of the travellers, not by suffocation, but by combustion. An hour later, the air less charged with it restored the lungs to their normal condition. By degrees the three friends recovered from their intoxication; but they were obliged to sleep themselves sober over their oxygen, as a drunkard does over his wine.

When Michel learnt his share of the responsibility of this incident, he was not much disconcerted. This unexpected drunkenness broke the monotony of the journey.

Many foolish things had been said while under its influence, but also quickly forgotten.

"And then," added the merry Frenchman, "I am not sorry to have tasted a little of this heady gas. Do you know, my friends, that a curious establishment might be founded with rooms of oxygen, where people whose system is weakened could for a few hours live a more active life. Fancy parties where the room was saturated with this heroic fluid, theatres where it should be kept at high pressure; what passion in the souls of the actors and spectators! what fire, what enthusiasm! And if, instead of an assembly only a whole people could be saturated, what activity in its functions, what a supplement to life it would derive. From an exhausted nation they might make a great and strong one, and I know more than one state in old Europe which ought to put itself under the regime of oxygen for the sake of its health!"

Michel spoke with so much animation, that one might have fancied that the tap was still too open. But a few words from Barbicane soon scattered his enthusiasm.

"That is all very well, friend Michel," said he, "but will you inform us where these chickens came from which have mixed themselves up in our concert?"

"Those chickens?"

"Yes."

Indeed, half a dozen chickens and a fine cock were walking about, flapping their wings and chattering.

"Ah, the awkward things!" exclaimed Michel. "The oxygen has made them revolt."

"But what do you want to do with these chickens?" asked Barbicane.

"To acclimatize them in the moon, by Jove!"

"Then why did you hide them?"

"A joke, my worthy president, a simple joke, which has proved a miserable failure. I wanted to set them free on the lunar continent, without saying anything. Oh, what would have been your amazement on seeing these earthy-winged animals pecking in the lunar fields!"

"You rascal, you unmitigated rascal," replied Barbicane, "*you* do not want oxygen

to mount to the head. You are always what we were under the influence of the gas; you are always foolish!"

"Ah, who says that we were not wise then?" replied Michel Ardan.

After this philosophical reflection, the three friends set about restoring the order of the projectile. Chickens and cock were reinstated in their coup. But whilst proceeding with this operation, Barbicane and his two companions had a most desired perception of a new phenomenon. From the moment of leaving the earth, their own weight, that of the projectile, and the objects it enclosed, had been subject to an increasing diminution. If they could not prove this loss of the projectile, a moment would arrive when it would be sensibly felt upon themselves and the utensils and instruments they used.

It is needless to say that a *scale* would not show this loss; for the weight destined to weigh the object would have lost exactly as much as the object itself; but a spring steelyard for example, the tension of which was independent of the attraction, would have given a just estimate of this loss.

We know that the attraction, otherwise called the *weight*, is in proportion to the densities of bodies, and inversely as the squares of the distances. Hence this effect: If the earth had been alone in space, if the other celestial bodies had been suddenly annihilated, the projectile, according to Newton's laws, would weigh less as it got farther from the earth, but without ever losing its weight *entirely*, for the terrestrial attraction would always have made itself felt, at whatever distance.

But, in reality, a time must come when the projectile would no longer be subject to the law of weight, after allowing for the other celestial bodies whose effect could not be set down as zero. Indeed, the projectile's course was being traced between the earth and the moon. As it distanced the earth, the terrestrial attraction diminished: but the lunar attraction rose in proportion. There must then come a point where these two attractions would neutralize each other: the projectile would possess weight no longer. If the moon's and the earth's densities had been equal, this point would have been at an equal distance between the two orbs. But taking the different densities into consideration, it was easy to reckon that this point would be situated at 47-60ths of the whole journey, i.e. at 78,114 leagues from the earth. At this point, a body having no principle of speed or displacement in itself,

would remain immovable for ever, being attracted equally by both orbs, and not being drawn more towards one than towards the other.

Now if the projectile's impulsive force had been correctly calculated, it would attain this point without speed, having lost all trace of weight, as well as all the objects within it. What would happen then? Three hypotheses presented themselves.

1. Either it would retain a certain amount of motion, and pass the point of equal attraction, and fall upon the moon by virtue of the excess of lunar attraction over the terrestrial.

2. Or, its speed failing, and unable to reach the point of equal attraction, it would fall back upon the earth by virtue of the terrestrial attraction.

3. Or, lastly, animated with sufficient speed to enable it to reach the neutral point, but not sufficient to pass it, it would remain for ever suspended in that spot like the pretended tomb of Mahomet, between the zenith and the nadir.

Such was their situation; and Barbicane clearly explained the consequences to his travelling companions, which greatly interested them. But how should they know when the projectile had reached this neutral point situated at that distance, especially when neither themselves, nor the objects enclosed in the projectile, would be any longer subject to the laws of weight?

Up to this time, the travellers, whilst admitting that this action was constantly decreasing, had not yet become sensible to its total absence.

But that day, about eleven o'clock in the morning, Nicholl having accidentally let a glass slip from his hand, the glass, instead of falling, remained suspended in the air.

"Ah!" exclaimed Michel Ardan, "that is rather an amusing piece of natural philosophy."

And immediately divers other objects, firearms and bottles, abandoned to themselves, held themselves up as by enchantment. Diana too, placed in space by Michel, reproduced, but without any trick, the wonderful suspension practised by Caston and Robert Houdin. Indeed the dog did not seem to know that she was floating in air.

The three adventurous companions were surprised and stupefied, despite their scientific reasonings. They felt themselves being carried into the domain of wonders! they felt that *weight* was really wanting to their bodies. If they stretched out their arms, they did not attempt to fall. Their heads shook on their

shoulders. Their feet no longer clung to the floor of the projectile. They were like drunken men having no stability in themselves.

Fancy has depicted men without reflection, others without shadow. But here *reality*, by the neutralisation of attractive forces, produced men in whom nothing had any weight, and who weighed nothing themselves.

Suddenly Michel, taking a spring, left the floor and remained suspended in the air, like Murillo's monk of the *Cusine des Anges*.

The two friends joined him instantly, and all three formed a miraculous "Ascension" in the centre of the projectile.

"Is it to be believed? is it probable? is it possible?" exclaimed Michel; "and yet it is so. Ah! if Raphael had seen us thus, what an 'Assumption' he would have thrown upon canvas!"

"The 'Assumption' cannot last," replied Barbicane. "If the projectile passes the neutral point, the lunar attraction will draw us to the moon."

"Then our feet will be upon the roof," replied Michel.

"No," said Barbicane, "because the projectile's centre of gravity is very low; it will only turn by degrees."

"Then all our portables will be upset from top to bottom, that is a fact."

"Calm yourself, Michel," replied Nicholl; "no upset is to be feared; not a thing will move, for the projectile's evolution will be imperceptible."

"Just so," continued Barbicane; "and when it has passed the point of equal attraction, its base, being the heavier, will draw it perpendicularly to the moon; but, in order that this phenomenon should take place, we must have passed the neutral line."

"Pass the neutral line!" cried Michel; "then let us do as the sailors do when they cross the equator."

A slight side movement brought Michel back towards the padded side; thence he took a bottle and glasses, placed them "in space" before his companions, and, drinking merrily, they saluted the line with a triple hurrah. The influence of these attractions scarcely lasted an hour; the travellers felt themselves insensibly drawn towards the floor, and Barbicane fancied that the conical end of the projectile was varying a little from its normal direction towards the moon. By an inverse motion the base was approaching first; the lunar attraction was prevailing over the terrestrial; the fall towards the moon was beginning, almost imperceptibly as yet, but by degrees the

attractive force would become stronger, the fall would be more decided, the projectile, drawn by its base, would turn its cone to the earth, and fall with ever-increasing speed on to the surface of the Selenite continent; their destination would then be attained. Now nothing could prevent the success of their enterprise, and Nicholl and Michael Ardan shared Barbicane's joy.

Then they chatted of all the phenomena which had astonished them one after the other, particularly the neutralization of the laws of weight. Michel Ardan, always enthusiastic, drew conclusions which were purely fanciful.

"Ah, my worthy friends," he exclaimed, "what progress we should make if on earth we could throw off some of that weight, some of that chain which binds us to her; it would be the prisoner set at liberty; no more fatigue of either arms or legs. Or, if it is true that in order to fly on the earth's surface, to keep oneself suspended in the air merely by the play of the muscles, there requires a strength a hundred and fifty times greater than that which we possess, a simple act of volition, a caprice, would bear us into space, if attraction did not exist."

"Just so," said Nicholl, smiling; "if we could succeed in suppressing weight as they suppress pain by anaesthesia, that would change the face of modern society!"

"Yes," cried Michel, full of his subject, "destroy weight, and no more burdens!"

"Well said," replied Barbicane; "but if nothing had any weight, nothing would keep in its place, not even your hat on your head, worthy Michel; nor your house, whose stones only adhere by weight; not a boat, whose stability on the water is caused only by weight; not even the ocean, whose waves would no longer be equalized by terrestrial attraction; and lastly, not even the *atmosphere*, whose atoms, being no longer held in their places, would disperse in space!"

"That is tiresome," retorted Michel; "nothing like these matter-of-fact people for bringing one back to the bare reality."

"But console yourself, Michel," continued Barbicane, "for if no orb exists from whence all laws of weight are banished, you are at least going to visit one where it is much less than on the earth."

"The moon?"

"Yes, the moon, on whose surface objects weigh six times less than on the earth, a phenomenon easy to prove."

"And we shall feel it?" asked Michel.

"Evidently, as 200lbs. will only weigh 30lbs.



"Ah! If Raphael had seen us thus."



"I should be nothing more than a pigmy."

on the surface of the moon."

"And our muscular strength will not diminish?"

"Not at all; instead of jumping one yard high, you will rise eighteen feet high."

"But we shall be regular Herculeses in the moon!" exclaimed Michel.

"Yes," replied Nicholl; "for if the height of the Selenites is in proportion to the density of their globe, they will be scarcely a foot high."

"Lilliputians!" ejaculated Michel; "I shall play the part of Gulliver. We are going to realize the fable of the giants. This is the advantage of leaving one's own planet and overrunning the solar world."

"One moment, Michel," answered Barbicane; "if you wish to play the part of Gulliver, only visit the inferior planets, such as Mercury, Venus, or Mars, whose density is a little less than that of the earth; but do not venture into the great planets, Jupiter, Saturn, Uranus, Neptune; for there the order will be changed, and *you* will become Lilliputian."

"And in the sun?"

"In the sun, if its density is thirteen hundred and twenty-four thousand times greater, and

the attraction is twenty-seven times greater than on the surface of our globe, keeping everything in proportion, the inhabitants ought to be at least two hundred feet high."

"By Jove!" exclaimed Michel; "I should be nothing more than a pigmy, a shrimp!"

"Gulliver with the giants," said Nicholl.

"Just so," replied Barbicane.

"And it would not be quite useless to carry some pieces of artillery to defend oneself."

"Good," replied Nicholl; "your projectiles would have no effect on the sun; they would fall back on the earth after some minutes."

"That is a strong remark."

"It is certain," replied Barbicane; "the attraction is so great on this enormous orb, that an object weighing 140lbs. on the earth would weigh 3860lbs. on the surface of the sun. If you were to fall upon it you would weigh—let me see—about 5000lbs., a weight which you would never be able to raise again."

"The devil!" said Michel; "one would want a portable crane. However, we will be satisfied with the moon for the present; there at least we shall cut a great figure. We will see about the sun by and by."

Round the Moon

CHAPTER IX

THE CONSEQUENCES OF A DEVIATION

BARBICANE had now no fear of the issue of the journey, at least as far as the projectile's impulsive force was concerned; its own speed would carry it beyond the neutral line; it would certainly not return to earth; it would certainly not remain motionless on the line of attraction. One single hypothesis remained to be realized, the arrival of the projectile at its destination by the action of the lunar attraction.

It was in reality a fall of 8296 leagues on an orb, it is true, where weight could only be reckoned at one-sixth of terrestrial weight; a formidable fall, nevertheless, and one against which every precaution must be taken without delay.

These precautions were of two sorts, some to deaden the shock when the projectile should touch the lunar soil, others to delay the fall, and consequently make it less violent.

To deaden the shock, it was a pity that Barbicane was no longer able to employ the means which had so ably weakened the shock at departure, that is to say, by water used as springs and the partition-breaks.

The partitions still existed but water failed, for they could not use their reserve, which was precious, in case during the first days the liquid element should be found wanting on lunar soil.

And indeed this reserve would have been quite insufficient for a spring. The layer of water stored in the projectile at their departure, and on which the waterproof disc lay, occupied no less than three feet in depth, and spread over a surface of not less than fifty-four square feet. Besides, the cistern did not contain one fifth part of it; they must therefore give up this efficient means of deadening the shock of arrival. Happily, Barbicane, not content with employing water, had furnished the movable disc with strong spring plugs, destined to lessen the shock against the base after the breaking of the horizontal partitions. These plugs still existed; they had only to readjust them and replace the movable disc; every piece, easy to handle, as their weight was now scarcely felt, was quickly mounted.

The different pieces were fitted without trouble, it being only a matter of bolts and

screws; tools were not wanting, and soon the reinstated disc lay on its steel plugs, like a table on its legs. One inconvenience resulted from the replacing of the disc, the lower window was blocked up; thus it was impossible for the travellers to observe the moon from that opening while they were being precipitated perpendicularly upon her; but they were obliged to give it up; even by the side openings they could still see vast lunar regions, as an aëronaut sees the earth from his car.

This replacing of the disc was at least an hour's work. It was past twelve when all preparations were finished. Barbicane took fresh observations on the inclination of the projectile, but to his annoyance it had not turned over sufficiently for its fall; it seemed to take a curve parallel to the lunar disc. The orb of night shone splendidly into space, whilst, opposite, the orb of day blazed with fire.

Their situation began to make them uneasy.

"Are we reaching our destination?" said Nicholl.

"Let us act as if we were about reaching it," replied Barbicane.

"You are funklers," retorted Michel Ardan. "We shall arrive, and that, too, quicker than we like."

This answer brought Barbicane back to his preparations, and he occupied himself with placing the contrivances intended to break their descent. We may remember the scene of the meeting held at Tampa Town, in Florida, when Captain Nicholl came forward as Barbicane's enemy and Michel Ardan's adversary. To Captain Nicholl's maintaining that the projectile would smash like glass, Michel replied that he would break their fall by means of rockets properly placed.

Thus, powerful fireworks, taking their starting-point from the base and bursting outside, could, by producing a recoil, check to a certain degree the projectile's speed. These rockets were to burn in space, it is true; but oxygen would not fail them, for they could supply themselves with it, like the lunar volcanoes, the burning of which has never yet been stopped by the want of atmosphere round the moon.

Barbicane had accordingly supplied himself

with these fireworks, enclosed in little steel guns, which could be screwed on to the base of the projectile. Inside, these guns were flush with the bottom; outside, they protruded about eighteen inches. There were twenty of them. An opening left in the disc allowed them to light the match with which each was provided. All the effect was felt outside. The burning mixture had been already rammed into each gun. They had, then, nothing to do but to raise the metallic buffers fixed in the base, and replace them by the guns, which fitted closely in their places.

This new work was finished about three o'clock, and after taking all these precautions there remained but to wait. But the projectile was perceptibly nearing the moon, and evidently succumbed to her influence to a certain degree; though its own velocity also drew it in an oblique direction. From these conflicting influences resulted a line which might become a tangent. But it was certain that the projectile would not fall directly on the moon; for its lower part, by reason of its weight, ought to be turned towards her.

Barbicane's uneasiness increased as he saw his projectile resist the influence of gravitation. The Unknown was opening before him, the Unknown in interplanetary space. The man of science thought he had foreseen the only three hypotheses possible—the return to the earth, the return to the moon, or stagnation on the neutral line; and here a fourth hypothesis, big with all the terrors of the Infinite, surged up inopportunely. To face it without flinching, one must be a resolute savant like Barbicane, a phlegmatic being like Nicholl, or an audacious adventurer like Michel Ardan.

Conversation was started upon this subject. Other men would have considered the question from a practical point of view; they would have asked themselves whither their projectile carriage was carrying them. Not so with these; they sought for the cause which produced this effect.

"So we have become diverted from our route," said Michel; "but why?"

"I very much fear," answered Nicholl, "that, in spite of all precautions taken, the Columbiad was not fairly pointed. An error, however small, would be enough to throw us out of the moon's attraction."

"Then they must have aimed badly?" asked Michel.

"I do not think so," replied Barbicane. "The perpendicularity of the gun was exact, its direction to the zenith of the spot incon-

testible; and the moon passing to the zenith of the spot, we ought to reach it at the full. There is another reason, but it escapes me."

"Are we not arriving too late?" asked Nicholl.

"Too late?" said Barbicane.

"Yes," continued Nicholl. "The Cambridge Observatory's note says that the transit ought to be accomplished in ninety-seven hours thirteen minutes and twenty seconds; which means to say, that *sooner* the moon will *not* be at the point indicated, and that *later* it will have passed it."

"True," replied Barbicane. "But we started the 1st of December, at thirteen minutes and twenty-five seconds to eleven at night; and we ought to arrive on the 5th at midnight, at the exact moment when the moon would be full; and we are now at the 5th of December. It is now half past three in the evening; half past eight ought to see us at the end of our journey. Why do we not arrive?"

"Might it not be an excess of speed?" answered Nicholl; "for we know now that its initial velocity was greater than they supposed."

"No! a hundred times, No!" replied Barbicane. "An excess of speed, if the direction of the projectile had been right, would not have prevented us reaching the moon. No, there has been a deviation. We have been turned out of our course."

"By whom? by what?" asked Nicholl.

"I cannot say," replied Barbicane.

"Very well, then, Barbicane," said Michel, "do you wish to know my opinion on the subject of finding out this deviation?"

"Speak."

"I would not give half a dollar to know it. That *we have deviated* is *a fact*. Where we are going to matters little; we shall soon see. Since we are being borne along in space we shall end by falling into some centre of attraction or other."

Michel Ardan's indifference did not content Barbicane. Not that he was uneasy about the future, but he wanted to know at any cost *why* his projectile had deviated.

But the projectile continued its course sideways to the moon, and with it the mass of things thrown out. Barbicane could even prove, by the elevations which served as landmarks upon the moon, which was only 2000 leagues distant, that its speed was becoming uniform—fresh proof that there was no fall. Its impulsive force still prevailed over the lunar attraction, but the projectile's course was certainly bringing it nearer to the moon, and

they might hope that at a nearer point the weight, predominating, would cause a decided fall.

The three friends, having nothing better to do, continued their observations; but they could not yet determine the topographical position of the satellite; every relief was levelled under the reflection of the solar rays.

They watched thus through the side windows until eight o'clock at night. The moon had then grown so large in their eyes that it filled half of the firmament. The sun on one side, and the orb of night on the other, flooded the projectile with light.

At that moment, Barbicane thought he could estimate the distance which separated them from their aim at no more than 700 leagues. The speed of the projectile seemed to him to be more than 200 yards a second, or about 170 leagues an hour. Under the centripetal force, the base of the projectile tended towards the moon; but the centrifugal still prevailed; and it was probable that its rectilinear course would be changed to a curve of some sort, the nature of which they could not at present determine.

Barbicane was still seeking the solution of his insoluble problem. Hours passed without any result. The projectile was evidently *nearing* the moon, but it was also evident that

it would never *reach* her. As to the nearest distance at which it would pass her, that must be the result of the two forces, attraction and repulsion, affecting its motion.

"I ask but one thing," said Michel; "that we may pass near enough to penetrate her secrets."

"Cursed be the thing that has caused our projectile to deviate from its course," cried Nicholl.

And, as if a light had suddenly broken in upon his mind, Barbicane answered, "Then cursed be the meteor which crossed our path."

"What?" said Michel Ardan.

"What do you mean?" exclaimed Nicholl.

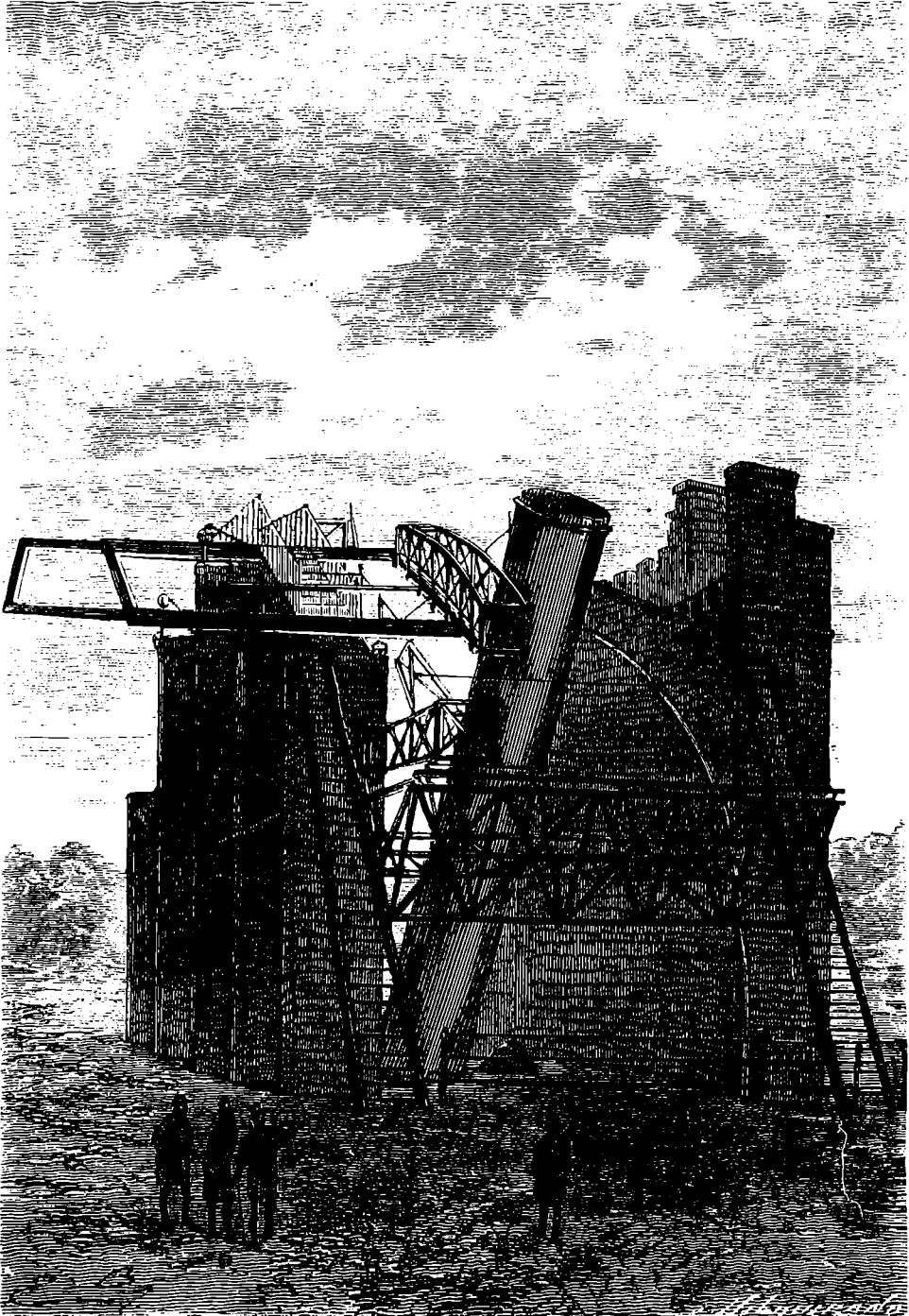
"I mean," said Barbicane in a decided tone, "I mean that our deviation is owing solely to our meeting with this erring body."

"But it did not even brush us as it passed," said Michel.

"What does that matter? Its mass, compared to that of our projectile, was enormous, and its attraction was enough to influence our course."

"So little?" cried Nicholl.

"Yes, Nicholl; but however little it might be," replied Barbicane, "in a distance of 84,000 leagues, it wanted no more to make us miss the moon."



The telescope at Parsonstown.

Round the Moon

CHAPTER X

THE OBSERVERS OF THE MOON

BARBICANE had evidently hit upon the only plausible reason of this deviation. However slight it might have been, it had sufficed to modify the course of the projectile. It was a fatality. The bold attempt had miscarried by a fortuitous circumstance; and unless by some exceptional event, they could now never reach the moon's disc.

Would they pass near enough to be able to solve certain physical and geological questions until then insoluble? This was the question, and the only one, which occupied the minds of these bold travellers. As to the fate in store for themselves, they did not even dream of it.

But what would become of them amid these infinite solitudes, these who would soon want air? A few more days, and they would fall stifled in this wandering projectile. But some days to these intrepid fellows was a century; and they devoted all their time to observe that moon which they no longer hoped to reach.

The distance which then separated the projectile from the satellite was estimated at about 200 leagues. Under these conditions, as regards the visibility of the details of the disc, the travellers were farther from the moon than are the inhabitants of the earth with their powerful telescopes.

Indeed, we know that the instrument mounted by Lord Rosse at Parsonstown, which magnifies 6500 times, brings the moon to within an apparent distance of sixteen leagues. And more than that, with the powerful one set up at Long's Peak, the orb of night, magnified 48,000 times, is brought to within less than two leagues, and objects having a diameter of thirty feet are seen very distinctly. So that, at this distance, the topographical details of the moon, observed without glasses, could not be determined with precision. The eye caught the vast outline of those immense depressions inappropriately called "seas," but they could not recognize their nature. The prominence of the mountains disappeared under the splendid irradiation produced by the reflection of the solar rays. The eye, dazzled as if it was leaning over a bath of molten silver, turned from it involuntarily; but the oblong form of the orb was quite clear. It appeared like a gigantic egg, with the small end turned

towards the earth. Indeed the moon, liquid and pliable in the first days of its formation, was originally a perfect sphere; but, being soon drawn within the attraction of the earth, it became elongated under the influence of gravitation. In becoming a satellite, she lost her native purity of form; her centre of gravity was in advance of the centre of her figure; and from this fact some savants draw the conclusion that the air and water had taken refuge on the opposite surface of the moon, which is never seen from the earth. This alteration in the primitive form of the satellite was only perceptible for a few moments. The distance of the projectile from the moon diminished very rapidly under its speed, though that was much less than its initial velocity,—but eight or nine times greater than that which propels our express trains. The oblique course of the projectile, from its very obliquity, gave Michel Ardan some hopes of striking the lunar disc at some point or other. He could not think that they would never reach it. No! he could not believe it; and this opinion he often repeated. But Barbicane, who was a better judge, always answered him with merciless logic.

"No, Michel, no! We can only reach the moon by a fall, and we are not falling. The centripetal force keeps us under the moon's influence, but the centrifugal force draws us irresistibly away from it."

This was said in a tone which quenched Michel Ardan's last hope.

The portion of the moon which the projectile was nearing was the northern hemisphere, that which the Selenographic maps place below; for these maps are generally drawn after the outline given by the glasses, and we know that they reverse the objects. Such was the *Mappa Selenographica* of Boer and Moedler which Barbicane consulted. This northern hemisphere presented vast plains, dotted with isolated mountains.

At midnight the moon was full. At that precise moment the travellers should have alighted upon it, if the mischievous meteor had not diverted their course. The orb was exactly in the condition determined by the Cambridge Observatory. It was mathematically at its

perigee, and at the zenith of the twenty-eighth parallel. An observer placed at the bottom of the enormous Columbiad, pointed perpendicularly to the horizon, would have framed the moon in the mouth of the gun. A straight line drawn through the axis of the piece would have passed through the centre of the orb of night. It is needless to say, that during the night of the 5th—6th of December, the travellers took not an instant's rest. Could they close their eyes when so near this new world? No! All their feelings were concentrated in one single thought:—See! Representatives of the earth, of humanity, past and present, all centred in them! It is through their eyes that the human race look at these lunar regions, and penetrate the secrets of their

satellite! A strange emotion filled their hearts as they went from one window to the other.

Their observations, reproduced by Barbicane, were rigidly determined. To take them, they had glasses; to correct them, maps.

As regards the optical instruments at their disposal, they had excellent marine glasses specially constructed for this journey. They possessed magnifying powers of 100. They would thus have brought the moon to within a distance (apparent) of less than 2000 leagues from the earth. But then, at a distance which for three hours in the morning did not exceed sixty-five miles, and in a medium free from all atmospheric disturbances, these instruments could reduce the lunar surface to within less than 1500 yards!

Round the Moon

CHAPTER XI

FANCY AND REALITY

"HAVE you ever seen the moon?" asked a professor, ironically of one of his pupils.

"No, sir!" replied the pupil, still more ironically, "but I must say I have heard it spoken of."

In one sense, the pupil's witty answer might be given by a large majority of sublunary beings. How many people have heard speak of the moon, who have never seen it—at least through a glass or a telescope! How many have never examined the map of their satellite!

In looking at a selenographic map, one peculiarity strikes us. Contrary to the arrangement followed for that of the Earth and Mars, the continents occupy more particularly the southern hemisphere of the lunar globe. These continents do not show such decided, clear, and regular boundary lines as South America, Africa, and the Indian peninsula. Their angular, capricious, and deeply indented coasts, are rich in gulfs and peninsulas. They remind one of the confusion in the islands of the Sound, where the land is excessively indented. If navigation ever existed on the surface of the moon, it must have been wonderfully difficult and dangerous; and we may well pity the Selenite sailors and hydrographers; the former, when they came upon these perilous coasts, the latter, when they took the soundings of its stormy banks.

We may also notice that, on the lunar sphere, the south pole is much more continental than the north pole. On the latter, there is but one slight strip of land separated from other continents by vast seas. Towards the south, continents clothe almost the whole of the hemisphere. It is even possible that the Selenites have already planted the flag on one of their poles, whilst Franklin, Ross, Kane, Dumont d'Urville, and Lambert, have never yet been able to attain that unknown point of the terrestrial globe.

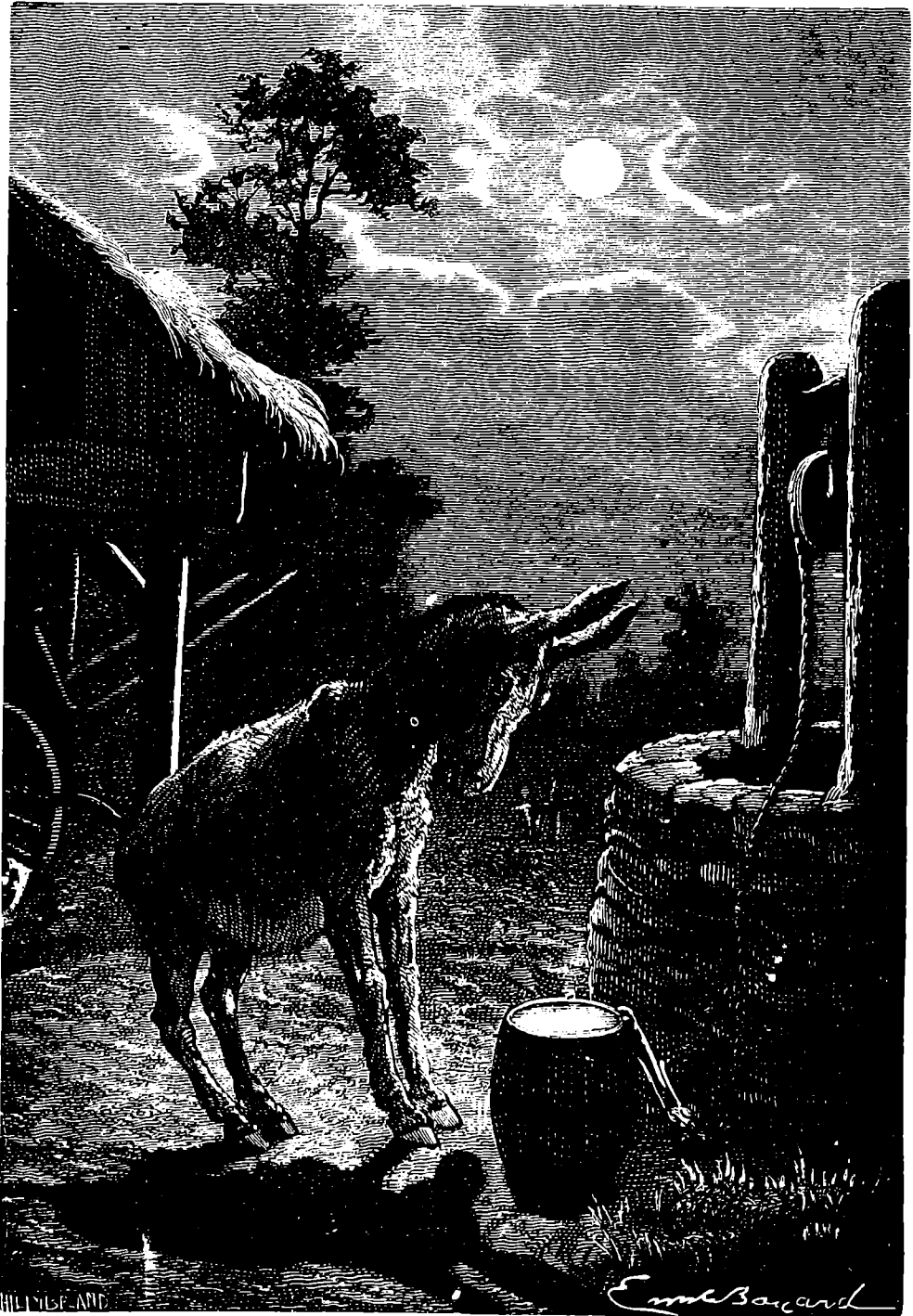
As to islands, they are numerous on the surface of the moon. Nearly all oblong or circular, and as if traced with the compass, they seem to form one vast Archipelago, equal to that charming group lying between Greece and Asia Minor, and which mythology in ancient times adorned with most graceful legends. Involuntarily the names of Naxos,

Tenedos, and Carpathos, rise before the mind, and we seek vainly for Ulysses' vessel or the "clipper" of the Argonauts. So at least it was in Michel Ardan's eyes. To him it was a Grecian Archipelago that he saw on the map. To the eyes of his matter-of-fact companions, the aspect of these coasts recalled rather the parcelled-out land of New Brunswick and Nova Scotia; and where the Frenchman discovered traces of the heroes of fable, these Americans were marking the most favourable points for the establishment of stores in the interests of lunar commerce and industry.

After wandering over these vast continents, the eye is attracted by still greater seas. Not only their formation, but their situation and aspect remind one of the terrestrial oceans; but again, as on earth, these seas occupy the greater portion of the globe. But in point of fact, these are not liquid spaces, but plains, the nature of which the travellers hoped soon to determine. Astronomers, we must allow, have graced these pretended seas with at least odd names, which science has respected up to the present time. Michel Ardan was right when he compared this map to a "Tendre card," got up by a Scudary or a Cyrano de Bergerac. "Only," said he, "it is no longer the sentimental card of the seventeenth century, it is the card of life, very neatly divided into two parts, one feminine, the other masculine; the right hemisphere for woman, the left for man."

In speaking thus, Michel made his prosaic companions shrug their shoulders. Barbicane and Nicholl looked upon the lunar map from a very different point of view to that of their fantastic friend. Nevertheless, their fantastic friend was a little in the right. Judge for yourselves.

In the left hemisphere stretches the "Sea of Clouds," where human reason is so often shipwrecked. Not far off lies the "Sea of Rains," fed by all the fever of existence. Near this is the "Sea of Storms," where man is ever fighting against his passions, which too often gain the victory. Then, worn out by deceit, treasons, infidelity, and the whole body of terrestrial misery, what does he find at the end of his career? that vast "Sea of Humours," barely



How many people have heard speak of the moon.

softened by some drops of the waters from the "Gulf of Dew!" Clouds, rain, storms, and humours,—does the life of man contain aught but these? and is it not summed up in these four words?

The right hemisphere, "dedicated to the ladies," encloses smaller seas, whose significant names contain every incident of a feminine existence. There is the "Sea of Serenity," over which the young girl bends; "The Lake of Dreams," reflecting a joyous future; "the Sea of Nectar," with its waves of tenderness and breezes of love; "The Sea of Fruitfulness;" "The Sea of Crises;" then the "Sea of Vapours," whose dimensions are perhaps a little too confined; and lastly, that vast "Sea of Tranquillity," in which every

false passion, every useless dream, every unsatisfied desire is at length absorbed, and whose waves emerge peaceably into the "Lake of Death!"

What a strange succession of names! What a singular division of the moon's two hemispheres, joined to one another like man and woman, and forming that sphere of life carried into space! And was not the fantastic Michel right in thus interpreting the fancies of the ancient astronomers? But whilst his imagination thus roved over "the seas," his grave companions were considering things more geographically. They were learning this new world by heart. They were measuring angles and diameters.

Round the Moon

CHAPTER XII

OROGRAPHIC DETAILS

THE course taken by the projectile, as we have before remarked, was bearing it towards the moon's northern hemisphere. The travellers were far from the central point which they would have struck, had their course not been subject to an irremediable deviation. It was past midnight; and Barbicane then estimated the distance at 750 miles, which was a little greater than the length of the lunar radius, and which would diminish as it advanced nearer to the North Pole. The projectile was then not at the altitude of the equator; but across the tenth parallel, and from that latitude, carefully taken on the map to the pole, Barbicane and his two companions were able to observe the moon under the most favourable conditions. Indeed, by means of glasses, the above named distance was reduced to little more than fourteen miles. The telescope of the Rocky Mountains brought the moon much nearer; but the terrestrial atmosphere singularly lessened its power. Thus Barbicane, posted in his projectile, with the glasses to his eyes, could seize upon details which were almost imperceptible to earthly observers.

"My friends," said the president, in a serious voice, "I do not know whither we are going; I do not know if we shall ever see the terrestrial globe again. Nevertheless, let us proceed as if our work would one day be useful to our fellow-men. Let us keep our minds free from every other consideration. We are astronomers; and this projectile is a room in the Cambridge University, carried into space. Let us make our observations!"

This said, work was begun with great exactness; and they faithfully reproduced the different aspects of the moon, at the different distances which the projectile reached.

At the time that the projectile was as high as the tenth parallel, N. latitude, it seemed rigidly to follow the twentieth degree, E. longitude. We must here make one important remark with regard to the map by which they were taking observations. In the selenographical maps where, on account of the reversing of the objects by the glasses, the south is above and the north below, it would seem natural that, on account of that inversion, the east should be to the left hand, and the west to the right.

But it is not so. If the map were turned upside down, showing the moon as we see her, the east would be to the *left*, and the west to the *right*, contrary to that which exists on terrestrial maps. The following is the reason of this anomaly. Observers in the northern hemisphere (say in Europe) see the moon in the south,—according to them. When they take observations, they turn their backs to the north, the reverse position to that which they occupy when they study a terrestrial map. As they turn their backs to the north, the east is on their left, and the west to their right. To observers in the southern hemisphere (Patagonia for example), the moon's west would be quite to their left, and the east to their right, as the south is behind them. Such is the reason of the apparent reversing of these two cardinal points, and we must bear it in mind in order to be able to follow President Barbicane's observations.

With the help of Boer and Moedler's *Mappa Selenographica*, the travellers were able at once to recognize that portion of the disc enclosed within the field of their glasses.

"What are we looking at, at this moment?" asked Michel.

"At the northern part of the 'Sea of Clouds,'" answered Barbicane. "We are too far off to recognize its nature. Are these plains composed of arid sand, as the first astronomer maintained? Or are they nothing but immense forests, according to M. Warren de la Rue's opinion, who gives the moon an atmosphere, though a very low and a very dense one? That we shall know by and by. We must affirm nothing until we are in a position to do so."

This "Sea of Clouds" is rather doubtfully marked out upon the maps. It is supposed that these vast plains are strewn with blocks of lava from the neighbouring volcanoes on its right, Ptolemy, Purbach, Arzachel. But the projectile was advancing, and sensibly nearing it. Soon there appeared the heights which bound this sea at this northern limit. Before them rose a mountain radiant with beauty, the top of which seemed lost in an eruption of solar rays.

"That is—?" asked Michel.

"Copernicus," replied Barbicane.

"Let us see Copernicus."

This amount situated in 9° north latitude and 20° east longitude, rose to a height of 10,600 feet above the surface of the moon. It is quite visible from the earth; and astronomers can study it with ease, particularly during the phase between the last quarter and the new moon, because then the shadows are thrown lengthways from east to west, allowing them to measure the heights.

This Copernicus forms the most important of the radiating system, situated in the southern hemisphere, according to Tycho Brahé. It rises isolated like a gigantic lighthouse on that portion of the Sea of Clouds, which is bounded by the "Sea of Tempests," thus lighting by its splendid rays two oceans at a time. It was a sight without an equal, those long luminous trains, so dazzling in the full moon, and which, passing the boundary chain on the north, extends to the "Sea of Rains." At one o'clock of the terrestrial morning, the projectile, like a balloon borne into space, overlooked the top of this superb mountain. Barbicane could recognize perfectly its chief features. Copernicus is comprised in the series of ringed mountains of the first order, in the division of great circles. Like Kepler and Aristarchus, which overlook the Ocean of Tempests, sometimes it appeared like a brilliant point through the cloudy light, and was taken for a volcano in activity. But it is only an extinct one,—like all on that side of the moon. Its circumference showed a diameter of about twenty-two leagues. The glasses discovered traces of stratification produced by successive eruptions, and the neighbourhood was strewn with volcanic remains which still choked some of the craters.

"There exist," said Barbicane, "several kinds of circles on the surface of the moon, and it is easy to see that Copernicus belongs to the radiating class. If we were nearer, we should see the cones bristling on the inside, which in former times were so many fiery mouths. A curious arrangement, and one without an exception on the lunar disc, is that the interior surface of these circles is the reverse of the exterior, and contrary to the form taken by terrestrial craters. It follows, then, that the general curve of the bottom of these circles gives a sphere of a smaller diameter than that of the moon."

"And why this peculiar disposition?" asked Nicholl.

"We do not know," replied Barbicane.

"What splendid radiation!" said Michel. "One could hardly see a finer spectacle, I think."

"What would you say, then," replied Barbicane, "if chance should bear us towards the southern hemisphere?"

"Well, I should say that it was still more beautiful," retorted Michel Ardan.

At this moment the projectile hung perpendicularly over the circle. The circumference of Copernicus formed almost a perfect circle, and its steep escarpments were clearly defined. They could even distinguish a second ringed enclosure. Around spread a greyish plain, of a wild aspect, on which every relief was marked in yellow. At the bottom of the circle, as if enclosed in a jewel case, sparkled for one instant two or three eruptive cones, like enormous dazzling gems. Towards the north the escarpments were lowered by a depression which would probably have given access to the interior of the crater.

In passing over the surrounding plains, Barbicane noticed a great number of less important mountains; and among others a little ringed one called Guy Lussac, the breadth of which measured twelve miles.

Towards the south, the plain was very flat, without one elevation, without one projection. Towards the north, on the contrary, till where it was bounded by the Sea of Storms it resembled a liquid surface agitated by a storm, of which the hills and hollows formed a succession of waves suddenly congealed. Over the whole of this, and in all directions, lay the luminous lines, all converging to the summit of Copernicus.

The travellers discussed the origin of these strange rays; but they could not determine their nature any more than terrestrial observers.

"But why," said Nicholl, "should not these rays be simply spurs of mountains which reflect more vividly the light of the sun?"

"No," replied Barbicane; "if it was so, under certain conditions of the moon, these ridges would cast shadows, and they do not cast any."

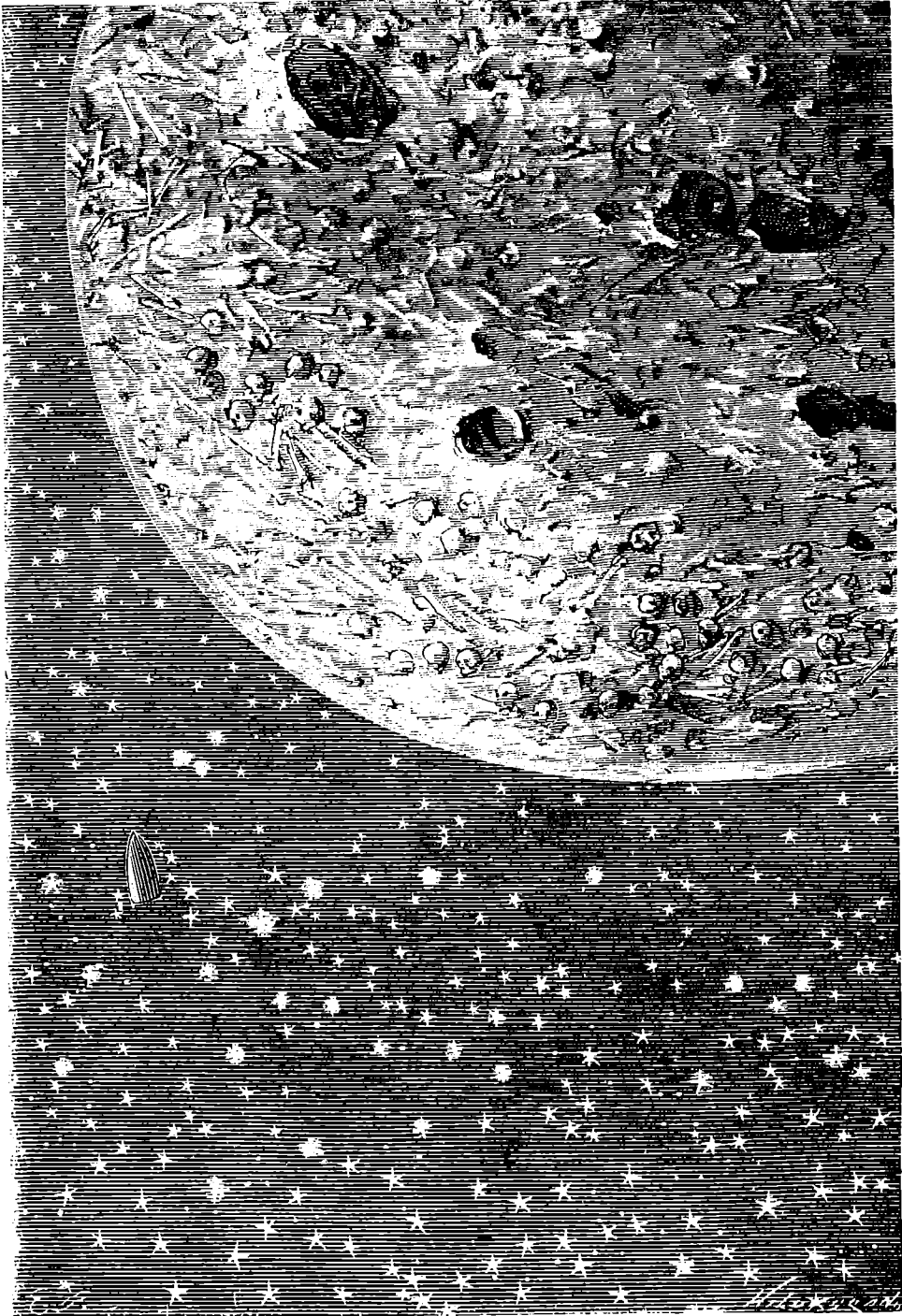
And indeed, these rays only appeared when the orb of day was in opposition to the moon, and disappeared as soon as its rays became oblique.

"But how have they endeavoured to explain these lines of light?" asked Michel; "for I cannot believe that savants would ever be stranded for want of an explanation."

"Yes," replied Barbicane; "Herschel has put forward an opinion, but he did not venture to affirm it."

"Never mind. What was the opinion?"

"He thought that these rays might be



“This plain would then be nothing but an immense cemetery.”

streams of cooled lava which shone when the sun beat straight upon them. It may be so; but nothing can be less certain. Besides, if we pass nearer to Tycho, we shall be in a better position to find out the cause of this radiation."

"Do you know, my friends, what that plain, seen from the height we are at, resembles?" said Michel.

"No," replied Nicholl.

"Very well; with all those pieces of lava lengthened like rockets, it resembles an immense game of spelikans thrown pellmell. There wants but the hook to pull them out one by one."

"Do be serious," said Barbicane.

"Well, let us be serious," replied Michel, quietly; "and instead of spelikans, let us put bones. This plain would then be nothing but an immense cemetery, on which would repose the mortal remains of thousands of extinct generations. Do you prefer that high-flown comparison?"

"One is as good as the other," retorted Barbicane.

"My word, you are difficult to please," answered Michel.

"My worthy friend," continued the matter-of-fact Barbicane, "it matters but little what it *resembles*, when we do not know what it *is*."

"Well answered," exclaimed Michel. "That will teach me to reason with savants."

But the projectile continued to advance with almost uniform speed around the lunar disc. The travellers, we may easily imagine, did not dream of taking a moment's rest. Every minute changed the landscape which fled from beneath their gaze. About half-past one o'clock in the morning, they caught a glimpse of the tops of another mountain. Barbicane, consulting his map, recognized Eratosthenes.

It was a ringed mountain 9000 feet high, and one of those circles so numerous on this

satellite. With regard to this, Barbicane related Kepler's singular opinion on the formation of circles. According to that celebrated mathematician, these crater-like cavities had been dug by the hand of man.

"For what purpose?" asked Nicholl.

"For a very natural one," replied Barbicane. "The Selenites might have undertaken these immense works and dug these enormous holes for a refuge and shield from the solar rays which beat upon them during fifteen consecutive days."

"The Selenites are not fools," said Michel.

"A singular idea," replied Nicholl; "but it is probable that Kepler did not know the true dimensions of these circles, for the digging of them would have been the work of giants, quite impossible for the Selenites."

"Why? if weight on the moon's surface is six times less than on the earth?" said Michel.

"But if the Selenites are six times smaller?" retorted Nicholl.

"And if there are *no* Selenites?" added Barbicane.

This put an end to the discussion.

Soon Eratosthenes disappeared under the horizon without the projectile being sufficiently near to allow of close observation. This mountain separated the Apennines from the Carpathians. In the lunar orography they have discerned some chains of mountains, which are chiefly distributed over the northern hemisphere. Some, however, occupy certain portions of the southern hemisphere also.

About two o'clock in the morning Barbicane found that they were above the twentieth lunar parallel. The distance of the projectile from the moon was not more than 600 miles. Barbicane, now perceiving that the projectile was steadily approaching the lunar disc, did not despair, if of reaching her, at least of discovering the secrets of her configuration.



“What giant oxen!”

Round the Moon

CHAPTER XIII

LUNAR LANDSCAPES

AT half-past two in the morning, the projectile was over the thirteenth lunar parallel and at the effective distance of 500 miles, reduced by the glasses to five. It still seemed impossible, however, that it could ever touch any part of the disc. Its motive speed, comparatively so moderate, was inexplicable to President Barbicane. At that distance from the moon it must have been considerable, to enable it to bear up against her attraction. Here was a phenomenon the cause of which escaped them again. Besides, time failed them to investigate the cause. All lunar relief was defiling under the eyes of the travellers, and they would not lose a single detail.

Under the glasses the disc appeared at the distance of five miles. What would an aeronaut, borne to this distance from the earth, distinguish on its surface? We cannot say, since the greatest ascension has not been more than 25,000 feet.

This, however, is an exact description of what Barbicane and his companions saw at this height. Large patches of different colours appeared on the disc. Selenographers are not agreed upon the nature of these colours. There are several, and rather vividly marked. Julius Schmidt, pretends that, if the terrestrial oceans were dried up, a Selenite observer could not distinguish on the globe a greater diversity of shades between the oceans and the continental plains than those on the moon present to a terrestrial observer. According to him, the colour common to the vast plains known by the name of "seas" is a dark grey mixed with green and brown. Some of the large craters present the same appearance. Barbicane knew this opinion of the German selenographer, an opinion shared by Boeer and Moedler. Observation has proved that right was on their side, and not on that of some astronomers who admit the existence of only grey on the moon's surface. In some parts green was very distinct, such as springs, according to Julius Schmidt, from the seas of Serenity and Humours. Barbicane also noticed large craters, without any interior cones, which shed a bluish tint similar to the reflection of a sheet of steel freshly polished. These colours belonged really to the lunar disc, and did not result, as some astronomers say, either from the imperfection

in the objective of the glasses or from the interposition of the terrestrial atmosphere.

Not a doubt existed in Barbicane's mind with regard to it, as he observed it through space, and so could not commit any optical error. He considered the establishment of this fact as an acquisition to science. Now, were these shades of green, belonging to tropical vegetation, kept up by a low dense atmosphere? He could not yet say.

Farther on, he noticed a reddish tint, quite defined. The same shade had before been observed at the bottom of an isolated enclosure, known by the name of Lichtenburg's circle, which is situated near the Hercynian mountains, on the borders of the moon; but they could not tell the nature of it.

They were not more fortunate with regard to another peculiarity of the disc, for they could not decide upon the cause of it.

Michel Ardan was watching near the president, when he noticed long white lines, vividly lighted up by the direct rays of the sun. It was a succession of luminous furrows, very different from the radiation of Copernicus not long before; they ran parallel with each other.

Michel, with his usual readiness, hastened to exclaim,—

"Look there! cultivated fields!"

"Cultivated fields!" replied Nicholl, shrugging his shoulders.

"Ploughed, at all events," retorted Michel Ardan; "but what labourers those Selenites must be, and what giant oxen they must harness to their plough to cut such furrows!"

"They are not furrows," said Barbicane; "they are *riffts*."

"Riffts? stuff!" replied Michel mildly; "but what do you mean by 'riffts' in the scientific world?"

Barbicane immediately enlightened his companion as to what he knew about lunar riffts. He knew that they were a kind of furrow found on every part of the disc which was not mountainous; that these furrows, generally isolated, measured from 400 to 500 leagues in length; that their breadth varied from 1000 to 1500 yards, and that their borders were strictly parallel; but he knew nothing more either of their formation or their nature.

Barbicane, through his glasses, observed

these rifts with great attention. He noticed that their borders were formed of steep declivities; they were long parallel ramparts, and with some small amount of imagination he might have admitted the existence of long lines of fortifications, raised by Selenite engineers. Of these different rifts some were perfectly straight, as if cut by a line; others were slightly curved, though still keeping their borders parallel; some crossed each other, some cut through craters; here they wound through ordinary cavities, such as Posidonius or Petavius; there they wound through the seas, such as the Sea of Serenity.

These natural accidents naturally excited the imaginations of these terrestrial astronomers. The first observations had not discovered these rifts. Neither Hevelius, Cassim, La Hire, nor Herschel seemed to have known them. It was Schroeter who in 1789 first drew attention to them. Others followed who studied them, as Pastorff, Gruithuysen, Boeer, and Moedler. At this time their number amounts to seventy; but, if they have been counted, their nature has not yet been determined; they are certainly *not* fortifications, any more than they are the ancient beds of dried-up rivers; for, on one side, the waters, so slight on the moon's surface, could never have worn such drains for themselves; and, on the other, they often cross craters of great elevation.

We must, however, allow that Michel Ardan had "an idea," and that, without knowing it, he coincided in that respect with Julius Schmidt.

"Why," said he, "should not these unaccountable appearances be simply phenomena of vegetation?"

"What do you mean?" asked Barbicane quickly.

"Do not excite yourself, my worthy president," replied Michel; "might it not be possible that the dark lines forming that bastion were rows of trees regularly placed?"

"You stick to your vegetation, then?" said Barbicane.

"I like," retorted Michel Ardan, "to explain what you savants cannot explain; at least my hypothesis has the advantage of indicating why these rifts disappear, or seem to disappear, at certain seasons."

"And for what reason?"

"For the reason that the trees become invisible when they lose their leaves, and visible when they regain them."

"Your explanation is ingenious, my dear companion," replied Barbicane, "but inadmissible."

"Why?"

"Because, so to speak, there are no seasons on the moon's surface, and that, consequently, the phenomena of vegetation of which you speak cannot occur."

Indeed, the slight obliquity of the lunar axis keeps the sun at an almost equal height in every latitude. Above the equatorial regions the radiant orb almost invariably occupies the zenith, and does not pass the limits of the horizon in the polar regions; thus, according to each region, there reigns a perpetual winter, spring, summer, or autumn, as in the planet Jupiter, whose axis is but little inclined upon its orbit.

What origin do they attribute to these rifts? That is a question difficult to solve. They are certainly anterior to the formation of craters and circles, for several have introduced themselves by breaking through their circular ramparts. Thus it may be that, contemporary with the latter geological epochs, they are due to the expansion of natural forces.

But the projectile had now attained the 40° of lunar lat., at a distance not exceeding 400 miles. Through the glasses objects appeared to be only four miles distant.

At this point, under their feet, rose Mount Helicon, 1520 feet high, and round about the left rose moderate elevations, enclosing a small portion of the "Sea of Rains," under the name of the Gulf of Iris. The terrestrial atmosphere would have to be one hundred and seventy times more transparent than it is, to allow astronomers to make perfect observations on the moon's surface; but in the void in which the projectile floated no fluid interposed itself between the eye of the observer and the object observed. And more, Barbicane found himself carried to a greater distance than the most powerful telescopes had ever done before, either that of Lord Rosse or that of the Rocky Mountains. He was, therefore, under extremely favourable conditions for solving that great question of the habitability of the moon; but the solution still escaped him; he could distinguish nothing but desert beds, immense plains, and towards the north, arid mountains. Not a work betrayed the hand of man; not a ruin marked his course; not a group of animals was to be seen indicating life, even in an inferior degree. In no part was there life, in no part was there an appearance of vegetation. Of the three kingdoms which share the terrestrial globe between them, one alone was represented on the lunar, and that the mineral.

"Ah, indeed!" said Michel Ardan, a little



He could distinguish nothing but desert beds.

out of countenance; "then you see no one?"

"No," answered Nicholl; "up to this time not a man, not an animal, not a tree! After all, whether the atmosphere has taken refuge at the bottom of cavities, in the midst of the circles, or even on the opposite face of the moon, we cannot decide."

"Besides," added Barbicane, "even to the most piercing eye a man cannot be distinguished farther than three miles and a half off; so that, if there are any Selenites, they can see our projectile, but we cannot see them."

Towards four in the morning, at the height of the fiftieth parallel, the distance was reduced to 300 miles. To the left ran a line of mountains capriciously shaped, lying in the full light. To the right, on the contrary, lay a black hollow resembling a vast well, unfathomable and gloomy, drilled into the lunar soil.

This hole was the "Black Lake;" it was Pluto, a deep circle which can be conveniently studied from the earth, between the last quarter and the new moon, when the shadows fall from west to east.

This black colour is rarely met with on the surface of the satellite. As yet it has only been recognized in the depths of the circle of Endymion, to the east of the Cold Sea, in the northern hemisphere, and at the bottom of Grimaldi's circle, on the equator, towards the eastern border of the orb.

Pluto is an annular mountain, situated in 51° north latitude, and 9° east longitude. Its circuit is forty-seven miles long and thirty-two broad.

Barbicane regretted that they were not passing directly above this vast opening. There was an abyss to fathom, perhaps some mysterious phenomenon to surprise; but the projectile's course could not be altered. They must rigidly submit. They could not guide a balloon, still less a projectile, when once enclosed within its walls. Towards five in the morning the northern limits of the Sea of Rains was at length passed. The mounts of Condamine and Fontenelle remained—one on the right, the other on the left. That part of the disc beginning with 60° was becoming quite mountainous. The glasses brought them to within two miles, less than that separating the summit of Mont Blanc from the level of the sea. The whole region was bristling with spikes and circles. Towards the 60° Philolaus stood predominant at a height of 5550 feet with its elliptical crater, and seen from this distance, the disc showed a very fantastical appearance. Landscapes were presented to the eye under

very different conditions from those on the earth, and also very inferior to them.

The moon having no atmosphere, the consequences arising from the absence of this gaseous envelope have already been shown. No twilight on her surface; night following day and day following night with the suddenness of a lamp which is extinguished or lighted amidst profound darkness,—no transition from cold to heat, the temperature falling in an instant from boiling point to the cold of space.

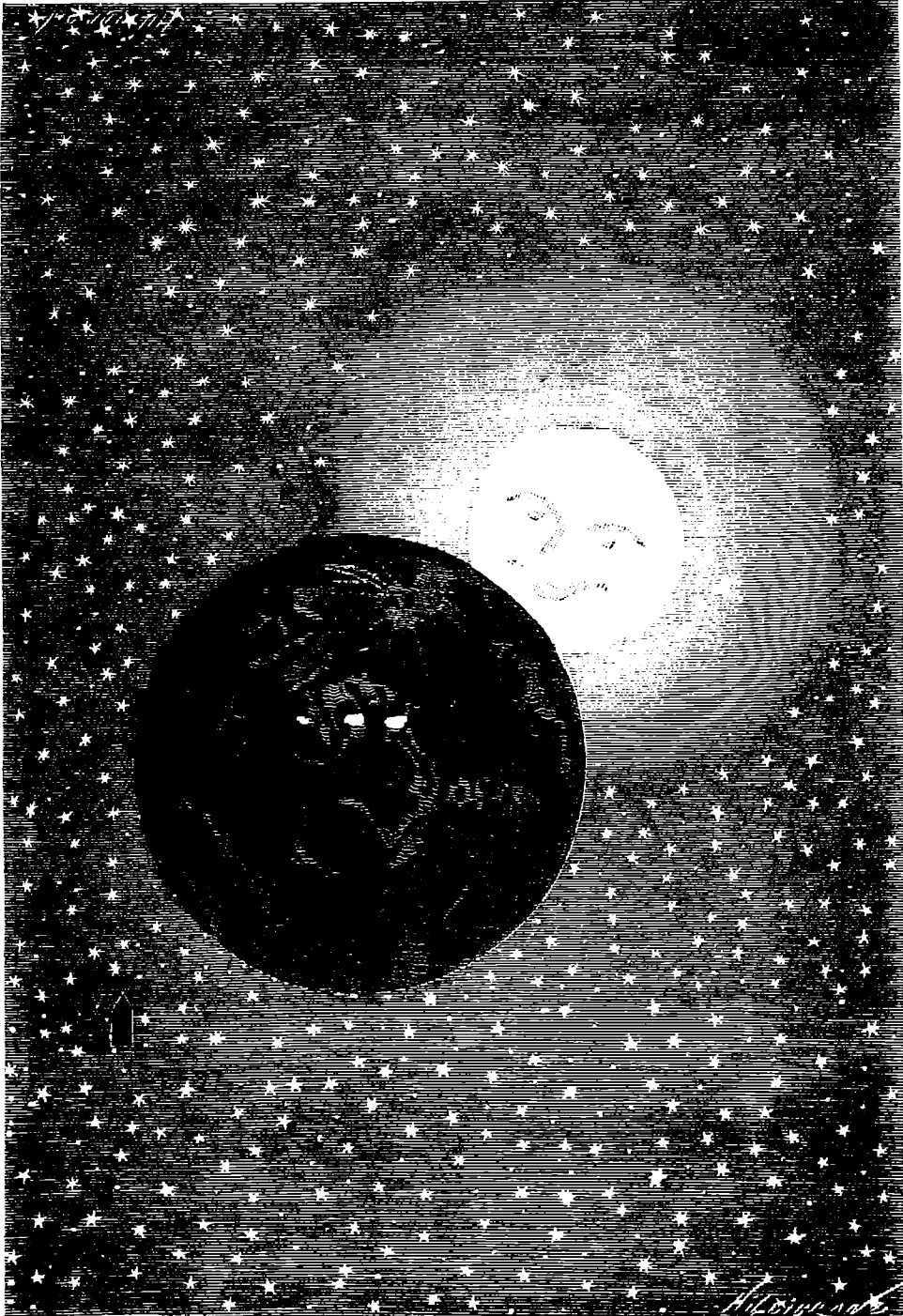
Another consequence of this want of air is that absolute darkness reigns where the sun's rays do not penetrate. That which on earth is called diffusion of light, that luminous matter which the air holds in suspension, which creates the twilight and the daybreak, which produces the *umbræ* and the *penumbræ*, and all the magic of *chiaro-oscuro*, does not exist on the moon. Hence the harshness of contrasts, which only admit of two colours, black and white. If a Selenite were to shade his eyes from the sun's rays, the sky would seem absolutely black, and the stars would shine to him as on the darkest night. Judge of the impression produced on Barbicane and his three friends by this strange scene! Their eyes were confused. They could no longer grasp the respective distances of the different plains. A lunar landscape without the softening of the phenomena of *chiaro-oscuro* could not be rendered by an earthly landscape painter: it would be spots of ink on a white page—nothing more.

This aspect was not altered even when the projectile, at the height of 80°, was only separated from the moon by a distance of fifty miles; not even when, at five in the morning, it passed at less than twenty-five miles from the mountain of Gioja, a distance reduced by the glasses to a quarter of a mile. It seemed as if the moon might be touched by the hand! It seemed impossible that, before long, the projectile would not strike her, if only at the north pole, the brilliant arch of which was so distinctly visible on the black sky.

Michel Ardan wanted to open one of the scuttles and throw himself on to the moon's surface! A very useless attempt; for if the projectile could not attain any point whatever of the satellite, Michel, carried along by its motion, could not attain it either.

At that moment, at six o'clock, the lunar pole appeared. The disc only presented to the travellers' gaze one half brilliantly lit up, whilst the other disappeared in the darkness. Suddenly the projectile passed the line of

demarcation between intense light and absolute darkness, and was plunged in profound night!



“It is the fault of the moon.”

Round the Moon

CHAPTER XIV

THE NIGHT OF THREE HUNDRED AND FIFTY-FOUR HOURS AND A HALF

AT the moment when this phenomenon took place so rapidly, the projectile was skirting the moon's north pole at less than twenty-five miles distance. Some seconds had sufficed to plunge it into the absolute darkness of space. The transition was so sudden, without shade, without gradation of light, without attenuation of the luminous waves, that the orb seemed to have been extinguished by a powerful blow.

"Melted, disappeared!" Michel Ardan exclaimed, aghast.

Indeed, there was neither reflection nor shadow. Nothing more was to be seen of that disc, formerly so dazzling. The darkness was complete, and rendered even more so by the rays from the stars. It was "that blackness" in which the lunar nights are instepped, which last three hundred and four hours and a half at each point of the disc, a long night resulting from the equality of the translatory and rotatory movements of the moon. The projectile, immersed in the conical shadow of the satellite, experienced the action of the solar rays no more than any of its invisible points.

In the interior, the obscurity was complete. They could not see each other. Hence the necessity of dispelling the darkness. However desirous Barbicane might be to husband the gas, the reserve of which was small, he was obliged to ask from it a fictitious light, an expensive brilliancy which the sun then refused.

"Devil take the radiant orb!" exclaimed Michel Ardan, "which forces us to expend gas, instead of giving us his rays gratuitously."

"Do not let us accuse the sun," said Nicholl, "it is not his fault, but that of the moon, which has come and placed herself like a screen between us and it."

"It is the sun!" continued Michel.

"It is the moon!" retorted Nicholl.

An idle dispute, which Barbicane put an end to by saying,—

"My friends, it is neither the fault of the sun nor of the moon; it is the fault of the *projectile*, which, instead of rigidly following its course, had awkwardly missed it. To be more just, it is the fault of that unfortunate meteor which has so deplorably altered our first direction.

"Well," replied Michel Ardan, "as the matter is settled, let us have breakfast. After a whole night of watching, it is fair to build ourselves up a little."

This proposal meeting with no contradiction, Michel prepared the repast in a few minutes. But they ate for eating's sake, they drank without toasts, without hurrahs. The bold travellers being borne away into gloomy space, without their accustomed cortège of rays, felt a vague uneasiness at their hearts. The "strange" shadow so dear to Victor Hugo's pen bound them on all sides. But they talked over the interminable night of three hundred and fifty-four hours and a half, nearly fifteen days, which the law of physics has imposed on the inhabitants of the moon.

Barbicane gave his friends some explanation of the causes and the consequences of this curious phenomenon.

"Curious indeed," said they; "for, if each hemisphere of the moon is deprived of solar light for fifteen days, that above which we now float does not even enjoy during its long night any view of the earth so beautifully lit up. In a word she has no moon (applying this designation to our globe) but on one side of her disc. Now if this were the case with the earth,—if, for example, Europe never saw the moon, and she was only visible at the Antipodes, imagine to yourself the astonishment of a European on arriving in Australia."

"They would make the voyage for nothing but to see the moon!" replied Michel.

"Very well!" continued Barbicane, "that astonishment is reserved for the Selenites who inhabit the face of the moon opposite to the earth, a face which is ever invisible to our countrymen of the terrestrial globe."

"And which we should have seen," added Nicholl, "if we had arrived here when the moon was new, that is to say fifteen days later."

"I will add, to make amends," continued Barbicane, "that the inhabitants of the visible face are singularly favoured by nature, to the detriment of their brethren on the invisible face. The latter, as you see, have dark nights of 354 hours, without one single ray to break the darkness. The other, on the contrary, when the sun which has given its light for fifteen

days sinks below the horizon, see a splendid orb rise on the opposite horizon. It is the earth, which is thirteen times greater than that diminutive moon that we know;—the earth which develops itself at a diameter of two degrees, and which sheds a light thirteen times greater than that qualified by atmospheric strata—the earth which only disappears at the moment when the sun reappears in its turn!”

“Nicely worded!” said Michel, “slightly academical perhaps.”

“It follows, then,” continued Barbicane, without knitting his brows, “that the visible face of the disc must be very agreeable to inhabit, since it always looks on either the sun when the moon is full, or on the earth when the moon is new.”

“But,” said Nicholl, “that advantage must be well compensated by the insupportable heat which the light brings with it.”

“The inconvenience, in that respect, is the same for the two faces, for the earth’s light is evidently deprived of heat. But the invisible face is still more searched by the heat than the visible face. I say that for *you*, Nicholl, because Michel will probably not understand.”

“Thank you,” said Michel.

“Indeed,” continued Barbicane, “when the invisible face receives at the same time light and heat from the sun, it is because the moon is new; that is to say, she is situated between the sun and the earth. It follows, then, considering the position which she occupies in opposition when full, that she is nearer to the sun by twice her distance from the earth; and that distance may be estimated at the two-hundredth part of that which separates the sun from the earth, or in round numbers 400,000 miles. So that invisible face is so much nearer to the sun when she receives its rays.”

“Quite right,” replied Nicholl.

“On the contrary,” continued Barbicane.

“One moment,” said Michel, interrupting his grave companion.

“What do you want?”

“I ask to be allowed to continue the explanation.”

“And why?”

“To prove that I understand.”

“Get along with you,” said Barbicane, smiling.

“On the contrary,” said Michel, imitating the tone and gestures of the president, “on the contrary, when the visible face of the moon is lit by the sun, it is because the moon is full, that is to say, opposite the sun with regard to the earth. The distance separating it from the

radiant orb is then increased in round numbers to 400,000 miles, and the heat which she receives must be a little less.”

“Very well said!” exclaimed Barbicane. “Do you know, Michel, that, for an amateur, you are intelligent.”

“Yes,” replied Michel coolly, “we are all so on the Boulevard des Italiens.”

Barbicane gravely clasped the hand of his amiable companion, and continued to enumerate the advantages reserved for the inhabitants of the visible face.

Amongst others, he mentioned eclipses of the sun, which only take place on this side of the lunar disc; since, in order that they may take place, it is necessary for the moon to be *in opposition*. These eclipses, caused by the interposition of the earth between the moon and the sun, can last *two hours*; during which time, by reason of the rays refracted by its atmosphere, the terrestrial globe can appear as nothing but a black point upon the sun.

“So,” said Nicholl, “there is a hemisphere, that invisible hemisphere which is very ill supplied, very ill treated, by nature.”

“Never mind,” replied Michel; “if we ever become Selenites, we will inhabit the visible face. I like the light.”

“Unless, by any chance,” answered Nicholl, “the atmosphere should be condensed on the other side, as certain astronomers pretend.”

“That would be a consideration,” said Michel.

Breakfast over, the observers returned to their post. They tried to see through the darkened scuttles by extinguishing all light in the projectile; but not a luminous spark made its way through the darkness.

One inexplicable fact preoccupied Barbicane. Why, having passed within such a short distance of the moon—about twenty-five miles only—why the projectile had not fallen? If its speed had been enormous, he could have understood that the fall would not have taken place; but, with a relatively moderate speed, that resistance to the moon’s attraction could not be explained. Was the projectile under some foreign influence? Did some kind of body retain it in the ether? It was quite evident that it could never reach any point of the moon. Whither was it going? Was it going farther from, or nearing, the disc? Was it being borne in that profound darkness through the infinity of space? How could they learn, how calculate, in the midst of this night? All these questions made Barbicane uneasy, but he could not solve them.

Certainly, the invisible orb was *there*,

perhaps only some few miles off; but neither he nor his companions could see it. If there was any noise on its surface, they could not hear it. Air, that medium of sound, was wanting to transmit the groanings of that moon which the Arabic legends call "a man already half granite, and still breathing."

One must allow that that was enough to aggravate the most patient observers. It was just that unknown hemisphere which was stealing from their sight. That face which fifteen days sooner, or fifteen days later, had been, or would be, splendidly illuminated by the solar rays, was then being lost in utter darkness. In fifteen days where would the projectile be? Who could say? Where would the chances of conflicting attractions have drawn it to? The disappointment of the travellers in the midst of this utter darkness may be imagined. All observation of the lunar disc was impossible. The constellations alone claimed all their attention; and we must allow that the astronomers Faye, Charconac, and Secchi, never found themselves in circumstances so favourable for their observation.

Indeed, nothing could equal the splendour of this starry world, bathed in limpid ether. Its diamonds set in the heavenly vault sparkled magnificently. The eye took in the firmament from the Southern Cross to the North Star, those two constellations which in 12,000 years, by reason of the succession of equinoxes, will resign their part of polar stars, the one to Canopus in the southern hemisphere, the other to Vega in the northern. Imagination loses itself in this sublime Infinity, amidst which the projectile was gravitating, like a new star created by the hand of man. From a natural cause, these constellations shone with a soft lustre; they did not *twinkle*, for there was no atmosphere which, by the intervention of its layers unequally dense and of different degrees of humidity, produces this scintillation. These stars were soft eyes, looking out into the dark night, amidst the silence of absolute space.

Long did the travellers stand mute, watching the constellated firmament, upon which the moon, like a vast screen, made an enormous black hole. But at length a painful sensation drew them from their watchings. This was an intense cold, which soon covered the inside of the glass of the scuttles with a thick coating of ice. The sun was no longer warming the projectile with its direct rays, and thus it was losing the heat stored up in its walls by degrees. This heat was rapidly evaporating

into space by radiation, and a considerably lower temperature was the result. The humidity of the interior was changed into ice upon contact with the glass, preventing all observation.

Nicholl consulted the thermometer, and saw that it had fallen to seventeen degrees (centigrade) below zero.* So that, in spite of the many reasons for economizing, Barbicane, after having begged light from the gas, was also obliged to beg for heat. The projectile's low temperature was no longer endurable. Its tenants would have been frozen to death.

"Well!" observed Michel, "we cannot reasonably complain of the monotony of our journey! What variety we have had, at least in temperature. Now we are blinded with light and saturated with heat, like the Indians of the Pampas! now plunged into profound darkness, amidst the cold like the Esquimaux of the north pole. No, indeed! we have no right to complain; nature does wonders in our honour."

"But," asked Nicholl, "what is the temperature outside?"

"Exactly that of the planetary space," replied Barbicane.

"Then," continued Michel Ardan, "would not this be the time to make the experiment which we dared not attempt, when we were drowned in the sun's rays?"

"It is now or never," replied Barbicane, "for we are in a good position to verify the temperature of space, and see if Fourier or Pouillet's calculations are exact."

"In any case it is cold," said Michel. "See! the steam of the interior is condensing on the glasses of the scuttles. If the fall continues, the vapour of our breath will fall in snow around us."

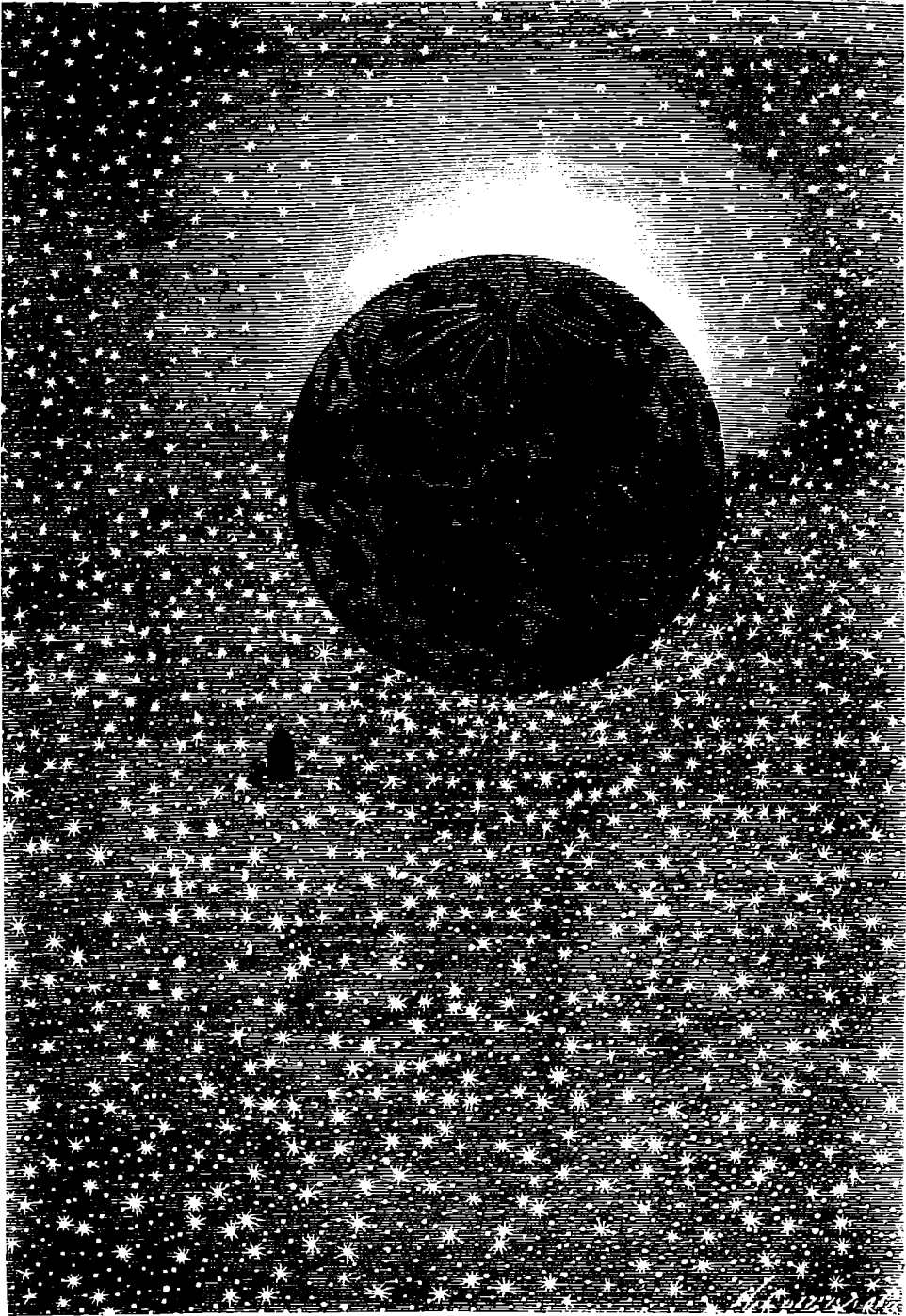
"Let us prepare a thermometer," said Barbicane.

We may imagine that an ordinary thermometer would afford no result under the circumstances in which this instrument was to be exposed. The mercury would have been frozen in its ball, as below forty-two degrees below zero* it is no longer liquid. But Barbicane had furnished himself with a spirit thermometer on Wafferdin's system, which gives the minima of excessively low temperatures.

Before beginning the experiment, this instrument was compared with an ordinary one, and then Barbicane prepared to use it.

"How shall we set about it?" asked Nicholl.

*1° Fahr. (Ed.) *—44° Fahr. (Ed.)



Nothing could equal the splendour of this starry world.



“The vapour of our breath will fall in snow around us.”

“Nothing is easier,” replied Michel Ardan, who was never at a loss. “We open the scuttle rapidly; throw out the instrument; it follows the projectile with exemplary docility; and a quarter of an hour after, draw it in.

“With the hand?” asked Barbicane.

“With the hand,” replied Michel.

“Well then, my friend, do not expose yourself,” answered Barbicane, “for the hand that you draw in again will be nothing but a stump frozen and deformed by the frightful cold.”

“Really!”

“You will feel as if you had had a terrible burn, like that of iron at a white heat; for whether the heat leaves our bodies briskly or enters briskly, it is exactly the same thing. Besides, I am not at all certain that the objects we have thrown out are still following us.”

“Why not?” asked Nicholl.

“Because, if we are passing through an atmosphere of the slightest density, these objects will be retarded. Again, the darkness prevents our seeing if they still float around us. But in order not to expose ourselves to the loss of our thermometer, we will fasten it, and we can then more easily pull it back again.”

Barbicane’s advice was followed. Through the scuttle rapidly opened, Nicholl threw out the instrument which was held by a short cord, so that it might be more easily drawn up. The scuttle had not been opened more than a second, but that second had sufficed to let in a most intense cold.

“The devil!” exclaimed Michel Ardan, “it is cold enough to freeze a white bear.”

Barbicane waited until half an hour had elapsed, which was more than time enough to allow the instrument to fall to the level of the surrounding temperature. Then it was rapidly pulled in.

Barbicane calculated the quantity of spirits of wine overflowed into the little phial soldered to the lower part of the instrument, and said,—

“A hundred and forty degrees centigrade* below zero!”

M. Pouillet was right and Fourier wrong. That was the undoubted temperature of the starry space. Such is, perhaps, that of the lunar continents, when the orb of night has lost by radiation all the heat which fifteen days of sun have poured into her.

*—218° Fahr. (Ed.)

Round the Moon

CHAPTER XV

HYPERBOLA OR PARABOLA

WE may, perhaps, be astonished to find Barbicane and his companions so little occupied with the future reserved for them in their metal prison which was bearing them through the infinity of space. Instead of asking where they were going, they passed their time making experiments, as if they had been quietly installed in their own study.

We might answer that men so strong-minded were above such anxieties—that they did not trouble themselves about such trifles—and that they had something else to do than to occupy their minds with the future.

The truth was that they were not masters of their projectile; they could neither check its course, nor alter its direction.

A sailor can change the head of his ship as he pleases; an *aëronaut* can give a vertical motion to his balloon. They, on the contrary, had no power over their vehicle. Every manoeuvre was forbidden. Hence the inclination to let things alone, or as the sailors say, "let her run."

Where did they find themselves at this moment, at eight o'clock in the morning of the day called upon the earth the 6th of December? Very certainly in the neighbourhood of the moon, and even near enough for her to look to them like an enormous black screen upon the firmament. As to the distance which separated them, it was impossible to estimate it. The projectile, held by some unaccountable force, had been within four miles of grazing the satellite's north pole.

But since entering the cone of shadow these last two hours, had the distance increased or diminished? Every point of mark was wanting by which to estimate both the direction and the speed of the projectile.

Perhaps it was rapidly leaving the disc, so that it would soon quit the pure shadow. Perhaps, again, on the other hand, it might be nearing it so much that in a short time it might strike some high point on the invisible hemisphere, which would doubtlessly have ended the journey much to the detriment of the travellers.

A discussion arose on this subject, and Michel Ardan, always ready with an explana-

tion, gave it as his opinion that the projectile, held by the lunar attraction, would end by falling on the surface of the terrestrial globe like an *aërolite*.

"First of all, my friend," answered Barbicane, "every *aërolite* does not fall to the earth; it is only a small proportion which do so; and if we had passed into an *aërolite*, it does not necessarily follow that we should ever reach the surface of the moon."

"But how if we get near enough?" replied Michel.

"Pure mistake," replied Barbicane. "Have you not seen shooting stars rush through the sky by thousands at certain seasons?"

"Yes."

"Well, these stars, or rather corpuscles, only shine when they are heated by gliding over the atmospheric layers. Now, if they enter the atmosphere, they pass at least within forty miles of the earth, but they seldom fall upon it. The same with our projectile. It may approach very near to the moon, and yet not fall upon it."

"But then," asked Michel, "I shall be curious to know how our erring vehicle will act in space?"

"I see but two hypotheses," replied Barbicane, after some moments' reflection.

"What are they?"

"The projectile has the choice between two mathematical curves, and it will follow one or the other according to the speed with which it is animated, and which at this moment I cannot estimate."

"Yes," said Nicholl, "it will follow either a parabola or a hyperbola."

"Just so," replied Barbicane. "With a certain speed it will assume the parabola, and with a greater the hyperbola."

"I like those grand words," exclaimed Michel Ardan; "one knows directly what they mean. And pray what is your parabola, if you please?"

"My friend," answered the captain, "the parabola is a curve of the second order, the result of the section of a cone intersected by a plane parallel to one of its sides."

"Ah! ah!" said Michel, in a satisfied tone.



A discussion arose.

"It is very nearly," continued Nicholl, "the course described by a bomb launched from a mortar."

"Perfect! And the hyperbola?"

"The hyperbola, Michel, is a curve of the second order, produced by the intersection of a conic surface and a plane parallel to its axis, and constitutes two branches separated one from the other, both tending indefinitely in the two directions."

"Is it possible!" exclaimed Michel Ardan in a serious tone, as if they had told him of some serious event. "What I particularly like in your definition of the hyperbola (I was going to say hyperblague) is that it is still more obscure than the word you pretend to define."

Nicholl and Barbicane cared little for Michel Ardan's fun. They were deep in a scientific discussion. What curve would the projectile follow? was their hobby. One maintained the hyperbola, the other the parabola. They gave each other reasons bristling with *x*. Their arguments were couched in language which made Michel jump. The discussion was hot, and neither would give up his chosen curve to his adversary.

This scientific dispute lasted so long that it made Michel very impatient.

"Now, gentlemen co-sines, will you cease to throw parabolas and hyperbolas at each other's heads? I want to understand the only interesting question in the whole affair. We shall follow one or other of these curves? Good. But where will they lead us to?"

"Nowhere," replied Nicholl.

"How, nowhere?"

"Evidently," said Barbicane, "they are open curves, which may be prolonged indefinitely."

"Ah, savants!" cried Michel; "and what are either the one or the other to us from the moment we know that they equally lead us into infinite space?"

Barbicane and Nicholl could not forbear smiling. They had just been creating "art for art's sake." Never had so idle a question been raised at such an inopportune moment. The sinister truth remained that, whether hyperbolically or parabolically borne away, the projectile would never again meet either the earth or the moon.

What would become of these bold travellers in the immediate future? If they did not die of hunger, if they did not die of thirst, in some days, when the gas failed, they would die from want of air, unless the cold had killed them first. Still, important as it was to economize the gas, the excessive lowness of the surround-

ing temperature obliged them to consume a certain quantity. Strictly speaking, they could do without its *light*, but not without its *heat*. Fortunately the calorific generated by Reiset's and Regnaut's apparatus raised the temperature of the interior of the projectile a little, and without much expenditure they were able to keep it bearable.

But observations had now become very difficult. The dampness of the projectile was condensed on the windows and congealed immediately. This cloudiness had to be dispersed continually. In any case they might hope to be able to discover some phenomena of the highest interest.

But up to this time the disc remained dumb and dark. It did not answer the multiplicity of questions put by these arden minds; a matter which drew this reflection from Michel, apparently a just one,—

"If ever we begin this journey over again, we shall do well to choose the time when the moon is at the full."

"Certainly," said Nicholl, "that circumstance will be more favourable. I allow that the moon, immersed in the sun's rays, will not be visible during the transit, but instead we should see the *earth*, which would be full. And what is more, if we were drawn round the moon, as at this moment, we should at least have the advantage of seeing the invisible part of her disc magnificently lit."

"Well said, Nicholl," replied Michel Ardan. "What do you think, Barbicane?"

"I think this," answered the grave president: "If ever we begin this journey again, we shall start at the same time and under the same conditions. Suppose we had attained our end, would it not have been better to have found continents in broad daylight, than a country plunged in utter darkness? Would not our first installation have been made under better circumstances? Yes, evidently. As to the *invisible* side, we could have visited it in our exploring expeditions on the lunar globe. So that the time of the full moon was well chosen. But we ought to have arrived at the end; and in order to have so arrived, we ought to have suffered no deviation on the road."

"I have nothing to say to that," answered Michel Ardan. "Here is, however, a good opportunity lost of observing the other side of the moon."

But the projectile was now describing in the shadow that incalculable course which no sight-mark would allow them to ascertain. Had its direction been altered, either by the influence of the lunar attraction, or by the



A prey to frightful terror.

action of some unknown star? Barbicane could not say. But a change had taken place in the relative position of the vehicle; and Barbicane verified it about four in the morning.

The change consisted in this, that the base of the projectile had turned towards the moon's surface, and was so held by a perpendicular passing through its axis. The attraction, that is to say the *weight*, had brought about this alteration. The heaviest part of the projectile inclined towards the invisible disc as if it would fall upon it.

Was it falling? Were the travellers attaining that much desired end? No. And the observation of a sign-point, quite inexplicable in itself, showed Barbicane that his projectile was not nearing the moon, and that it had shifted by following an almost concentric curve.

This point of mark was a luminous brightness, which Nicholl sighted suddenly, on the limit of the horizon formed by the black disc. This point could not be confounded with a star. It was a reddish incandescence which increased by degrees, a decided proof that the projectile was shifting towards it and not falling normally on the surface of the moon.

"A volcano! it is a volcano in action!" cried Nicholl; "a disembowelling of the interior fires of the moon! That world is not quite extinguished."

"Yes, an eruption," replied Barbicane, who was carefully studying the phenomenon through his night glass. "What should it be, if not a volcano?"

"But, then," said Michel Ardan, "in order to maintain that combustion, there must be air. So an atmosphere *does* surround that part of the moon."

"*Perhaps* so," replied Barbicane, "but not necessarily. The volcano, by the decomposition of certain substances, can provide its own oxygen, and thus thrown flames into space. It seems to me that the deflagration, by the intense brilliancy of the substances in combustion, is produced in pure oxygen. We must not be in a hurry to proclaim the existence of a lunar atmosphere."

The fiery mountain must have been situated about the 45° south latitude on the invisible part of the disc; but, to Barbicane's great displeasure, the curve which the projectile was describing was taking it far from the point indicated by the eruption. Thus he could not determine its nature exactly. Half an hour after being sighted, this luminous point had disappeared behind the dark horizon; but the

verification of this phenomenon was of considerable consequence in their selenographic studies. It proved that all heat had not yet disappeared from the bowels of this globe; and where heat exists, who can affirm that the vegetable kingdom, nay, even the animal kingdom itself, has not up to this time resisted all destructive influences? The existence of this volcano in eruption, unmistakably seen by these earthly savants, would doubtless give rise to many theories favourable to the grave question of the habitability of the moon.

Barbicane allowed himself to be carried away by these reflections. He forgot himself in a deep reverie in which the mysterious destiny of the lunar world was uppermost. He was seeking to combine together the facts observed up to that time, when a new incident recalled him briskly to reality. This incident was more than a cosmical phenomenon; it was a threatened danger, the consequences of which might be disastrous in the extreme.

Suddenly, in the midst of the ether, in the profound darkness, an enormous mass appeared. It was like a moon, but an incandescent moon, whose brilliancy was all the more intolerable as it cut sharply on the frightful darkness of space. This mass, of a circular form, threw a light which filled the projectile. The forms of Barbicane, Nicholl, and Michel Ardan, bathed in its white sheets, assumed that livid spectral appearance which physicians produce with the fictitious light of alcohol impregnated with salt.

"By Jove!" cried Michel Ardan, "we are hideous. What is that ill-conditioned moon?"

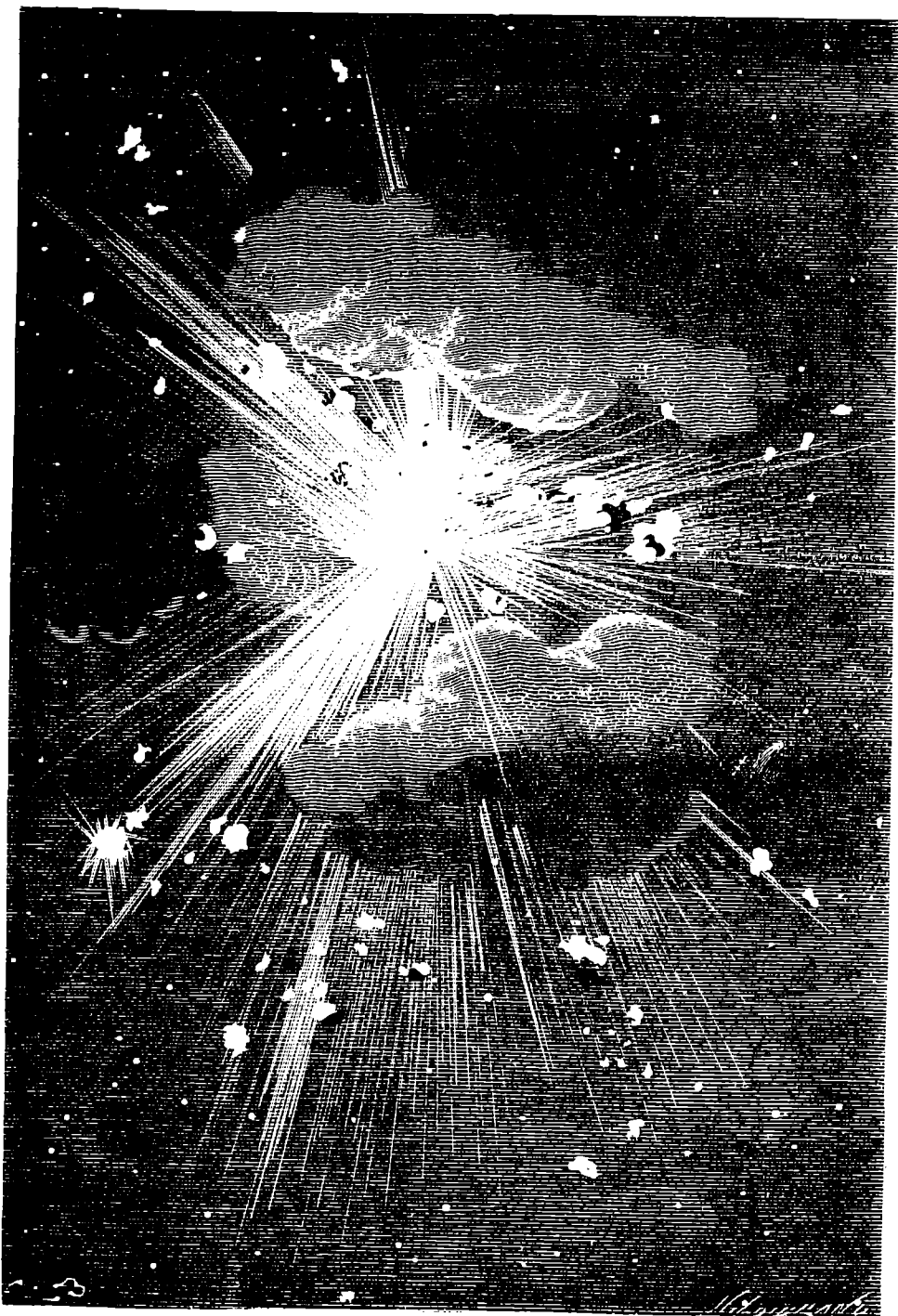
"A meteor," replied Barbicane.

"A meteor burning space?"

"Yes."

This shooting globe suddenly appearing in shadow at a distance of at most 200 miles, ought, according to Barbicane, to have a diameter of 2000yards. It advanced at a speed of about one mile and a half per second. It cut the projectile's path, and must reach it in some minutes. As it approached it grew to enormous proportions.

Imagine, if possible, the situation of the travellers! It is impossible to describe it. In spite of their courage, their *sangfroid*, their carelessness of danger, they were mute, motionless with stiffened limbs, a prey to frightful terror. Their projectile, the course of which they could not alter, was rushing straight on this ignited mass, more intense than the open mouth of an oven. It seemed as though they were being precipitated towards an abyss of fire.



What a sight!

Barbicane had seized the hands of his two companions, and all three looked through their half-open eyelids upon that asteroid heated to a white heat. If thought was not destroyed within them, if their brains still worked amidst all this awe, they must have given themselves up for lost.

Two minutes after the sudden appearance of the meteor (to them two centuries of anguish) the projectile seemed almost about to strike it, when the globe of fire burst like a bomb, but without making any noise in that void where sound, which is but the agitation of the layers of air, could not be generated.

Nicholl uttered a cry, and he and his companions rushed to the scuttle. What a sight! What pen can describe it? What palette is rich enough in colours to reproduce so magnificent a spectacle?

It was like the opening of a crater, like the scattering of an immense conflagration. Thousands of luminous fragments lit up and irradiated space with their fires. Every size, every colour, was there intermingled. There were rays of yellow and pale yellow, red, green, grey—a crown of fireworks of all colours. Of the enormous and much-dreaded globe there remained nothing but these fragments carried in all directions, now become asteroids in their turn, some flaming like a sword, some surrounded by a whitish cloud, and others leaving behind them trains of brilliant cosmical dust.

These incandescent blocks crossed and struck each other, scattering still smaller fragments, some of which struck the projectile. Its left scuttle was even cracked by a violent shock. It seemed to be floating amidst a hail of howitzer shells, the smallest of which might

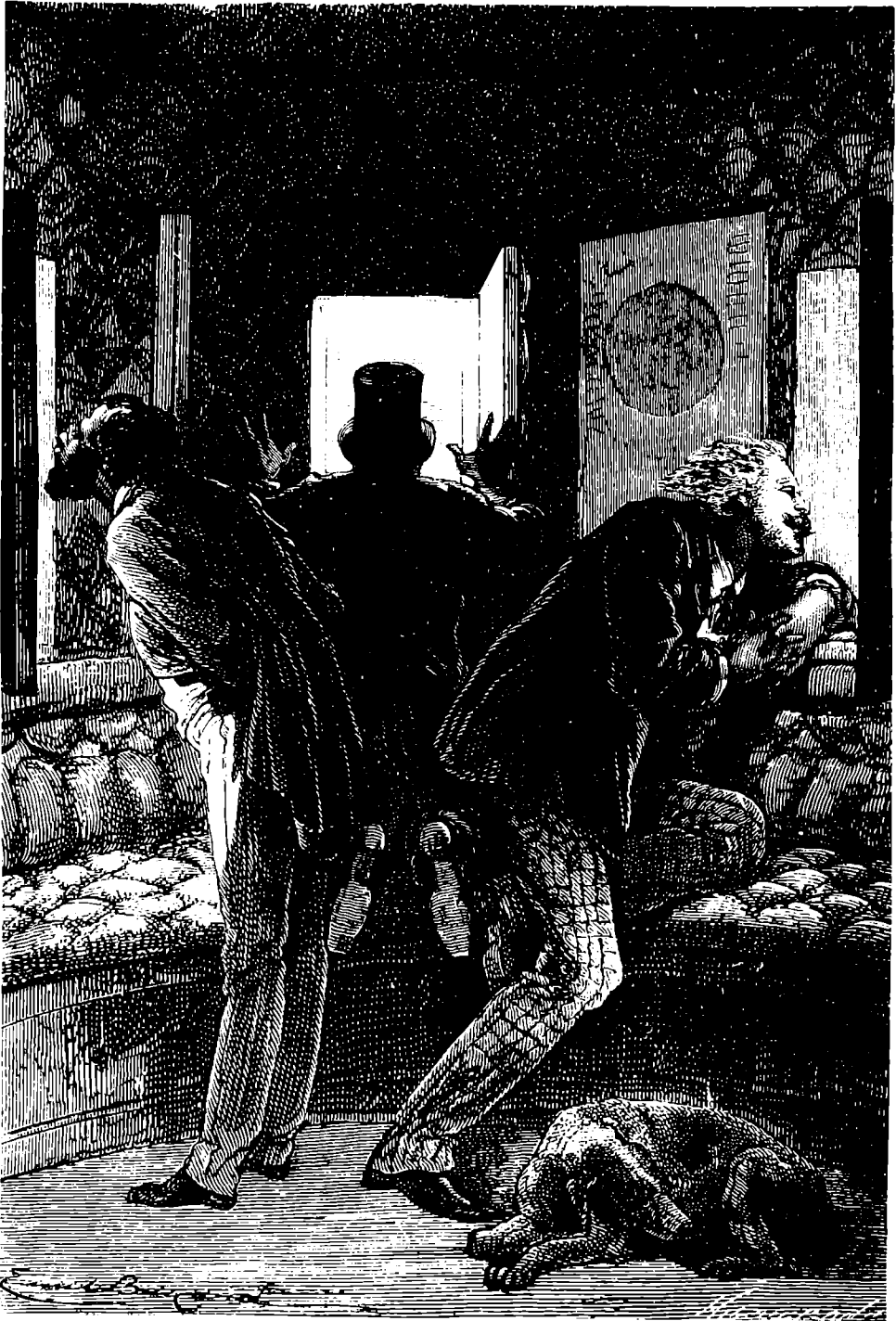
destroy it instantly.

The light which saturated the ether was so wonderfully intense, that Michel, drawing Barbicane and Nicholl to his window, exclaimed, "The invisible moon, visible at last!"

And through a luminous emanation, which lasted some seconds, the whole three caught a glimpse of that mysterious disc which the eye of man now saw for the first time. What could they distinguish at a distance which they could not estimate? Some lengthened bands along the disc, real clouds formed in the midst of a very confined atmosphere, from which emerged not only all the mountains, but also projections of less importance; its circles, its yawning craters, as capriciously placed as on the visible surface. Then immense spaces, no longer arid plains, but real seas, oceans, widely distributed, reflecting on their liquid surface all the dazzling magic of the fires of space; and, lastly, on the surface of the continents, large dark masses, looking like immense forests under the rapid illumination of a brilliance.

Was it an illusion, a mistake, an optical illusion? Could they give a scientific assent to an observation so superficially obtained? Dared they pronounce upon the question of its habitability after so slight a glimpse of the invisible disc?

But the lightnings in space subsided by degrees; its accidental brilliancy died away; the asteroids dispersed in different directions and were extinguished in the distance. The ether returned to its accustomed darkness; the stars, eclipsed for a moment, again twinkled in the firmament, and the disc, so hastily discerned, was again buried in impenetrable night.



“The sun.”

Round the Moon

CHAPTER XVI

THE SOUTHERN HEMISPHERE

THE projectile had just escaped a terrible danger, and a very unforeseen one. Who would have thought of such a rencontre with meteors? These erring bodies might create serious perils for the travellers. They were to them so many sandbanks upon that sea of ether which, less fortunate than sailors, they could not escape. But did these adventurers complain of space? No, not since nature had given them the splendid sight of a cosmical meteor bursting from expansion, since this inimitable firework, which no Ruggieri could imitate, had lit up for some seconds the invisible glory of the moon. In that flash, continents, seas, and forests had become visible to them. Did an atmosphere, then, bring to this unknown face its life-giving atoms? Questions still insoluble, and for ever closed against human curiosity!

It was then half past three in the afternoon. The projectile was following its curvilinear direction round the moon. Had its course been again altered by the meteor? It was to be feared so. But the projectile must describe a curve unalterably determined by the laws of mechanical reasoning. Barbicane was inclined to believe that this curve would be rather a parabola than a hyperbola. But admitting the parabola, the projectile must quickly have passed through the cone of shadow projected into space opposite the sun. This cone, indeed, is very narrow, the angular diameter of the moon being so little when compared with the diameter of the orb of day; and up to this time the projectile had been floating in this deep shadow. Whatever had been its speed (and it could not have been insignificant) its period of occultation continued. That was evident, but perhaps that would not have been the case in a supposed rigidly parabolical trajectory,—a new problem which tormented Barbicane's brain, imprisoned as he was in a circle of unknowns which he could not unravel.

Neither of the travellers thought of taking an instant's repose. Each one watched for an unexpected fact, which might throw some new light on their uranographic studies. About five o'clock, Michel Ardan distributed, under the

name of dinner, some pieces of bread and cold meat, which were quickly swallowed without either of them abandoning their scuttle, the glass of which was incessantly encrusted by the condensation of vapour.

About forty-five minutes past five in the evening, Nicholl, armed with his glass, sighted towards the southern border of the moon, and in the direction followed by the projectile, some bright points cut upon the dark shield of the sky. They looked like a succession of sharp points lengthened into a tremulous line. They were very bright. Such appeared the terminal line of the moon when in one of her octants.

They could not be mistaken. It was no longer a simple meteor. This luminous ridge had neither colour nor motion. Nor was it a volcano in eruption. And Barbicane did not hesitate to pronounce upon it.

"The sun!" he exclaimed.

"What! the sun?" answered Nicholl and Michel Ardan.

"Yes, my friends, it is the radiant orb itself lighting up the summit of the mountains situated on the southern borders of the moon. We are evidently nearing the south pole."

"After having passed the north pole," replied Michel. "We have made the circuit of our satellite, then?"

"Yes, my good Michel."

"Then, no more hyperbolas, no more parabolas, no more open curves to fear?"

"No, but a *closed* curve."

"Which is called—"

"An ellipse. Instead of losing itself in interplanetary space, it is probable that the projectile will describe an elliptical orbit around the moon."

"Indeed!"

"And that it will become *her* satellite."

"Moon of the moon!" cried Michel Ardan.

"Only, I would have you observe, my worthy friend," replied Barbicane, "that we are none the less lost for that."

"Yes, in another manner, and much more pleasantly," answered the careless Frenchman with his most amiable smile.



“Light and heat; all life is contained in them.”

Round the Moon

CHAPTER XVII

TYCHO

At six in the evening the projectile passed the south pole at less than forty miles off, a distance equal to that already reached at the north pole. The elliptical curve was being rigidly carried out.

At this moment the travellers once more entered the blessed rays of the sun. They saw once more those stars which move slowly from east to west. The radiant orb was saluted by a triple hurrah. With its light it also sent heat, which soon pierced the metal walls. The glass resumed its accustomed appearance. The layers of ice melted as if by enchantment; and immediately, for economy's sake, the gas was put out, the air apparatus alone consuming its usual quantity.

"Ah!" said Nicholl, "these rays of heat are good. With what impatience must the Selenites wait the reappearance of the orb of day."

"Yes," replied Michel Ardan, "imbibing as it were the brilliant ether, light and heat, all life is contained in them."

At this moment the bottom of the projectile deviated somewhat from the lunar surface, in order to follow the slightly lengthened elliptical orbit. From this point, had the earth been at the full, Barbicane and his companions could have seen it, but immersed in the sun's irradiation she was quite invisible. Another spectacle attracted their attention, that of the southern part of the moon, brought by the glasses to within 450 yards. They did not again leave the scuttles, and noted every detail of this fantastical continent.

Mounts Doerfel and Leibnitz formed two separate groups very near the south pole. The first group extended from the pole to the eighty-fourth parallel, on the eastern part of the orb; the second occupied the eastern border, extending from the 65° of latitude to the pole.

On their capriciously formed ridge appeared dazzling sheets, as mentioned by Père Secchi. With more certainty than the illustrious Roman astronomer, Barbicane was enabled to recognize their nature.

"They are snow," he exclaimed.

"Snow?" repeated Nicholl.

"Yes, Nicholl, snow; the surface of which is deeply frozen. See how they reflect the

luminous rays. Cooled lava would never give out such intense reflection. There must then be water, there must be air on the moon. As little as you please, but the fact can no longer be contested." No, it could not be. And if ever Barbicane should see the earth again, his notes will bear witness to this great fact in his selenographic observations.

These mountains of Doerfel and Leibnitz rose in the midst of plains of a medium extent, which were bounded by an indefinite succession of circles and annular ramparts. These two chains are the only ones met with in this region of circles. Comparatively but slightly marked, they throw up here and there some sharp points, the highest summit of which attains an altitude of 24,600 feet.

But the projectile was high above all this landscape, and the projections disappeared in the intense brilliancy of the disc. And to the eyes of the travellers there reappeared that original aspect of the lunar landscapes, raw in tone, without gradation of colours, and without degrees of shadow, roughly black and white, from the want of diffusion of light.

But the sight of this desolate world did not fail to captivate them by its very strangeness. They were moving over this region as if they had been borne on the breath of some storm, watching heights defile under their feet, piercing the cavities with their eyes, going down into the rifts, climbing the ramparts, sounding these mysterious holes, and levelling all cracks. But no trace of vegetation, no appearance of cities; nothing but stratification, beds of lava, overflowings polished like immense mirrors, reflecting the sun's rays with overpowering brilliancy. Nothing belonging to a *living* world—everything to a dead world, where avalanches, rolling from the summits of the mountains, would disperse noiselessly at the bottom of the abyss, retaining the motion, but wanting the sound. In any case it was the image of death, without its being possible even to say that life had ever existed there.

Michel Ardan, however, thought he recognized a heap of ruins, to which he drew Barbicane's attention. It was about the 80th parallel, in 30° longitude. This heap of stones, rather regularly placed, represented a vast



He distinguished all this.

fortress, overlooking a long rift, which in former days had served as a bed to the rivers of prehistorical times. Not far from that, rose to a height of 17,400 feet the annular mountain of Short, equal to the Asiatic Caucasus. Michel Ardan, with his accustomed ardour, maintained "the evidences" of his fortress. Beneath it he discerned the dismantled ramparts of a town; here the still intact arch of a portico, there two or three columns lying under their base; farther on, a succession of arches which must have supported the conduit of an aqueduct; in another part the sunken pillars of a gigantic bridge, run into the thickest parts of the rift. He distinguished all this, but with so much imagination in his glance, and through glasses so fantastical, that we must mistrust his observation. But who could affirm, who would dare to say, that the amiable fellow did not really see that which his two companions would not see?

Moments were too precious to be sacrificed in idle discussion. The Selenite city, whether imaginary or not, had already disappeared afar off. The distance of the projectile from the lunar disc was on the increase, and the details of the soil were being lost in a confused jumble. The reliefs, the circles, the craters and plains alone remained, and still showed their boundary lines distinctly. At this moment, to the left, lay extended one of the finest circles of lunar orography, one of the curiosities of this continent. It was Newton, which Barbicane recognized without trouble, by referring to the *Mappa Selenographica*.

Newton is situated in exactly 77° south lat., and 16° east long. It forms an annular crater, the ramparts of which, rising to a height of 21,300 feet, seemed to be impassable.

Barbicane made his companions observe that the height of this mountain above the surrounding plain was far from equalling the depth of its crater. This enormous hole was beyond all measurement, and formed a gloomy abyss, the bottom of which the sun's rays could never reach. There, according to Humboldt, reigns utter darkness, which the light of the sun and the earth cannot break. Mythologists could well have made it the mouth of hell.

"Newton," said Barbicane, "is the most perfect type of these annular mountains, of which the earth possesses no sample. They prove that the moon's formation, by means of cooling, is due to violent causes; for whilst under the pressure of internal fires the reliefs rise to considerable height, the depths withdraw far below the lunar level."

"I do not dispute the fact," replied Michel Ardan.

Some minutes after passing Newton, the projectile directly overlooked the annular mountain of Moret. It skirted at some distance the summits of Blancanus, and at about half-past seven in the evening reached the circle of Clavius.

This circle, one of the most remarkable of the disc, is situated in 58° south lat., and 15° east long. Its height is estimated at 22,950 feet. The travellers, at a distance of twenty-four miles (reduced to four by their glasses), could admire this vast crater in its entirety.

"Terrestrial volcanoes," said Barbicane, "are but molehills compared with those of the moon. Measuring the old craters formed by the first eruptions of Vesuvius and Etna, we find them little more than three miles in breadth. In France the circle of Cantal measures six miles across; at Ceyland the circle of the island is forty miles, which is considered the largest on the globe. What are these diameters against that of Clavius, which we overlook at this moment?"

"What is its breadth?" asked Nicholl.

"It is 150 miles," replied Barbicane. "This circle is certainly the most important on the moon, but many others measure 150, 100, or 75 miles."

"Ah! my friends," exclaimed Michel, "can you picture to yourselves what this now peaceful orb of night must have been when its craters, filled with thunderings, vomited at the same time smoke and tongues of flame. What a wonderful spectacle then, and now what decay! This moon is nothing more than a thin carcase of fireworks, whose squibs, rockets, serpents and suns, after a superb brilliancy, have left but sadly broken cases. Who can say the cause, the reason, the motive force of these cataclysms?"

Barbicane was not listening to Michel Ardan; he was contemplating those ramparts of Clavius, formed by large mountains spread over several miles. At the bottom of the immense cavity burrowed hundreds of small extinguished craters, riddling the soil like a colander, and overlooked by a peak 15,000 feet high.

Around, the plain appeared desolate. Nothing so arid as these reliefs, nothing so sad as these ruins of mountains, and (if we may so express ourselves) these fragments of peaks and mountains which strewed the soil. The satellite seemed to have burst at this spot.

The projectile was still advancing, and this movement did not subside. Circles, craters,



Can you picture to yourselves?

and uprooted mountains succeeded each other incessantly. No more plains; no more seas. A never-ending Switzerland and Norway. And lastly, in the centre of this region of crevasses, the most splendid mountain on the lunar disc, the dazzling Tycho, in which posterity will ever preserve the name of the illustrious Danish astronomer.

In observing the full moon in a cloudless sky no one has failed to remark this brilliant point of the southern hemisphere. Michel Ardan used every metaphor that his imagination could supply to designate it by. To him this Tycho was a focus of light, a centre of irradiation, a crater vomiting rays. It was the tire of a brilliant wheel, an *asteria* enclosing the disc with its silver tentacles, an enormous eye filled with flames, a glory carved for Pluto's head, a star launched by the Creator's hand, and crushed against the face of the moon!

Tycho forms such a concentration of light that the inhabitants of the earth can see it without glasses, though at a distance of 240,000 miles! Imagine, then, its intensity to the eye of observers placed at a distance of only fifty miles! Seen through this pure ether, its brilliancy was so intolerable that Barbicane and his friends were obliged to blacken their glasses with the gas smoke before they could bear the splendour. Then silent, scarcely uttering an interjection of admiration, they gazed, they contemplated. All their feelings, all their impressions, were concentrated in that look, as under any violent emotion all life is concentrated at the heart.

Tycho belongs to the system of radiating mountains, like Aristarchus and Copernicus; but it is of all the most complete and decided, showing unquestionably the frightful volcanic action to which the formation of the moon is due. Tycho is situated in 43° south lat., and 12° east long. Its centre is occupied by a crater fifty miles broad. It assumes a slightly elliptical form, and is surrounded by an enclosure of annular ramparts, which on the east and west overlook the outer plain from a height of 15,000 feet. It is a group of Mont Blancs, placed round one common centre, and crowned by radiating beams.

What this incomparable mountain really is, with all the projections converging towards it, and the interior excrescences of its crater, photography itself could never represent. Indeed, it is during the full moon that Tycho is

seen in all its splendour. Then all shadows disappear, the foreshortening of perspective disappears, and all proofs become white—a disagreeable fact, for this strange region would have been marvellous if reproduced with photographic exactness. It is but a group of hollows, craters, circles, a network of crests; then, as far as the eye could see, a whole volcanic network cast upon this encrusted soil. One can then understand that the bubbles of this central eruption have kept their first form. Crystallized by cooling, they have stereotyped that aspect which the moon formerly presented when under the Plutonian forces.

The distance which separated the travellers from the annular summits of Tycho was not so great but that they could catch the principal details. Even on the causeway forming the fortifications of Tycho, the mountains hanging on to the interior and exterior sloping flanks rose in stories like gigantic terraces. They appeared to be higher by 300 or 400 feet to the west than to the east. No system of terrestrial encampment could equal these natural fortifications. A town built at the bottom of this circular cavity would have been utterly inaccessible.

Inaccessible and wonderfully extended over this soil covered with picturesque projections! Indeed, nature had not left the bottom of this crater flat and empty. It possessed its own peculiar orography, a mountainous system, making it a world in itself. The travellers could distinguish clearly cones, central hills, remarkable positions of the soil, naturally placed to receive the chefs-d'oeuvre of Selenite architecture. There was marked out the place for a temple, here the ground of a forum, on this spot the plan of a palace, in another the plateau for a citadel; the whole overlooked by a central mountain of 1500 feet. A vast circle, in which ancient Rome could have been held in its entirety ten times over.

"Ah!" exclaimed Michel Ardan, enthusiastic at the sight; "what a grand town might be constructed within that ring of mountains! A quiet city, a peaceful refuge, beyond all human misery. How calm and isolated those misanthropes, those haters of humanity might live there, and all who have a distaste for social life!"

"All! It would be too small for them," replied Barbicane simply.



A violent contraction of the lunar crust.

Round the Moon

CHAPTER XVIII

GRAVE QUESTIONS

BUT the projectile had passed the enceinte of Tycho, and Barbicane and his two companions watched with scrupulous attention the brilliant rays which the celebrated mountain shed so curiously all over the horizon.

What was this radiant glory? What geological phenomenon had designed these ardent beams? This question occupied Barbicane's mind.

Under his eyes ran in all directions luminous furrows, raised at the edges and concave in the centre, some twelve miles, others thirty miles broad. These brilliant trains extended in some places to within 600 miles of Tycho, and seemed to cover, particularly towards the east, the north-east and the north, the half of the southern hemisphere. One of these jets extended as far as the circle of Neander, situated on the 40th meridian. Another by a slight curve furrowed the Sea of Nectar, breaking against the chain of Pyrenees, after a circuit of 800 miles. Others, towards the west, covered the Sea of Clouds and the Sea of Humours with a luminous network. What was the origin of these sparkling rays, which shone on the plains as well as on the reliefs, at whatever height they might be? All started from a common centre, the crater of Tycho. They sprang from him. Herschel attributed their brilliancy to currents of lava congealed by the cold; an opinion, however, which has not been generally adopted. Other astronomers have seen in these inexplicable rays a kind of *moraines*, rows of erratic blocks, which had been thrown up at the period of Tycho's formation.

"And why not?" asked Nicholl of Barbicane, who was relating and rejecting these different opinions.

"Because the regularity of these luminous lines, and the violence necessary to carry volcanic matter to such distances, is inexplicable."

"Eh! by Jove!" replied Michel Ardan, "it seems easy enough to me to explain the origin of these rays."

"Indeed?" said Barbicane.

"Indeed," continued Michel. "It is enough to say that it is a vast star, similar to that produced by a ball or a stone thrown at a square of glass!"

"Well!" replied Barbicane, smiling. "And what hand would be powerful enough to throw a ball to give such a shock as that?"

"The hand is not necessary," answered Nicholl, not at all confounded; "and as to the stone, let us suppose it to be a comet."

"Ah! those much-abused comets!" exclaimed Barbicane. "My brave Michel, your explanation is not bad; but your comet is useless. The shock which produced that rent must have come from the inside of the star. A violent contraction of the lunar crust, while cooling, might suffice to imprint this gigantic star."

"A contraction! something like a lunar stomach-ache," said Michel Ardan.

"Besides," added Barbicane, "this opinion is that of an English savant, Nasmyth, and it seems to me to sufficiently explain the radiation of these mountains."

"That Nasmyth was no fool!" replied Michel.

Long did the travellers, whom such a sight could never weary, admire the splendours of Tycho. Their projectile, saturated with luminous gleams in the double irradiation of sun and moon, must have appeared like an incandescent globe. They had passed suddenly from excessive cold to intense heat. Nature was thus preparing them to become Selenites. Become Selenites! That idea brought up once more the question of the habitability of the moon. After what they had seen, could the travellers solve it? Would they decide for or against it? Michel Ardan persuaded his two friends to form an opinion, and asked them directly if they thought that men and animals were represented in the lunar world.

"I think that we can answer," said Barbicane; "but according to my idea the question ought not to be put in that form. I ask it to be put differently."

"Put it your own way," replied Michel.

"Here it is," continued Barbicane. "The problem is a double one, and requires a double solution. Is the moon *habitable*? Has the moon ever been *inhabited*?"

"Good!" replied Nicholl. "First let us see whether the moon is habitable."

"To tell the truth, I know nothing about it," answered Michel.

"And I answer in the negative," continued Barbicane. "In her actual state, with her surrounding atmosphere certainly very much reduced, her seas for the most part dried up, her insufficient supply of water restricted, vegetation, sudden alterations of cold and heat, her days and nights of 354 hours; the moon does not seem habitable to me, nor does she seem propitious to animal development, nor sufficient for the wants of existence as we understand it."

"Agreed," replied Nicholl. "But is not the moon habitable for creatures differently organized from ourselves?"

"That question is more difficult to answer, but I will try; and I ask Nicholl if *motion* appears to him to be a necessary result of *life*, whatever be its organization?"

"Without a doubt!" answered Nicholl.

"Then, my worthy companion, I would answer that we have observed the lunar continent at a distance of 500 yards at most, and that nothing seemed to us to move on the moon's surface. The presence of any kind of life would have been betrayed by its attendant marks, such as divers buildings, and even by ruins. And what have we seen? Everywhere and always the geological works of nature, never the work of man. If, then, there exist representatives of the animal kingdom on the moon, they must have fled to those unfathomable cavities which the eye cannot reach; which I cannot admit, for they must have left traces of their passage on those plains which the atmosphere must cover, however slightly raised it may be. These traces are nowhere visible. There remains but one hypothesis, that of a living race to which motion, which is life, is foreign."

"One might as well say, living creatures which do not live," replied Michel.

"Just so," said Barbicane, "which for us has no meaning."

"Then we may form our opinion?" said Michel.

"Yes," replied Nicholl.

"Very well," continued Michel Ardan, "the Scientific Commission assembled in the projectile of the Gun Club, after having founded their argument on facts recently observed, decide unanimously upon the question of the habitability of the moon—*No!* the moon is not habitable."

This decision was consigned by President Barbicane to his notebook, where the process of the sitting of the 6th of December may be seen.

"Now," said Nicholl, "let us attack the

second question, an indispensable complement of the first. I ask the honourable Commission, if the moon is not habitable, had she ever been inhabited, Citizen Barbicane?"

"My friends," replied Barbicane, "I did not undertake this journey in order to form an opinion on the past habitability of our satellite; but I will add that our personal observations only confirm me in this opinion. I believe, indeed I affirm, that the moon has been inhabited by a human race organized like our own; that she has produced animals anatomically formed like the terrestrial animals; but I add that these races, human or animal, have had their day, and are now for ever extinct!"

"Then," asked Michel, "the moon must be older than the earth?"

"No!" said Barbicane decidedly, "but a world which has *grown old* quicker, and whose formation and deformation have been more rapid. Relatively, the organizing force of matter has been much more violent in the interior of the moon than in the interior of the terrestrial globe. The actual state of this cracked, twisted, and burst die abundantly proves this. The moon and the earth were nothing but gaseous masses originally. These gases have passed into a liquid state under different influences, and the solid masses have been formed later. But most certainly our sphere was still gaseous or liquid, when the moon was solidified by cooling, and had become habitable."

"I believe it," said Nicholl.

"Then," continued Barbicane, "an atmosphere surrounded it, the waters contained within this gaseous envelope could not evaporate. Under the influence of air, water, light, solar heat, and central heat, vegetation took possession of the continents prepared to receive it, and certainly life showed itself about this period, for nature does not expend herself in vain; and a world so wonderfully formed for habitation must necessarily be inhabited.

"But," said Nicholl, "many phenomena inherent in our satellite might cramp the expansion of the animal and vegetable kingdom. For example, its days and nights of 354 hours?"

"At the terrestrial poles they last six months," said Michel.

"And argument of little value, since the poles are not inhabited."

"Let us observe, my friends," continued Barbicane, "that if in the actual state of the moon its long nights and long days created differences of temperature insupportable to

organization, it was not so at the historical period of time. The atmosphere enveloped the disc with a fluid mantle; vapour deposited itself in the shape of clouds; this natural screen tempered the ardour of the solar rays, and retained the nocturnal radiation. Light, like heat, can diffuse itself in the air; hence an equality between the influences which no longer exists, now that that atmosphere has almost entirely disappeared. And now I am going to astonish you."

"Astonish us?" said Michel Ardan.

"I firmly believe that at the period when the moon was inhabited, the nights and days did not last 354 hours!"

"And why?" asked Nicholl quickly.

"Because most probably then the rotary motion of the moon upon her axis was not equal to her revolution, an equality which presents each part of her disc during fifteen days to the action of the solar rays."

"Granted," replied Nicholl, "but why should not these two motions have been equal, as they are really so?"

"Because that equality has only been determined by terrestrial attraction. And who can say that this attraction was powerful enough to alter the motion of the moon at that period when the earth was still fluid?"

"Just so," replied Nicholl; "and who can say that the moon has always been a satellite of the earth?"

"And who can say," exclaimed Michel Ardan, "that the moon did not exist before the earth?"

Their imaginations carried them away into an indefinite field of hypothesis. Barbicane sought to restrain them.

"Those speculations are too high," said he; "problems utterly insoluble. Do not let us enter upon them. Let us only admit the insufficiency of the primordial attraction; and then by the inequality of the two motions of rotation and revolution, the days and nights could have succeeded each other on the moon as they succeed each other on the earth. Besides, even without these conditions, life was possible."

"And so," asked Michel Ardan, "humanity has disappeared from the moon?"

"Yes," replied Barbicane, "after having doubtless remained persistently for millions of centuries; by degrees the atmosphere becoming rarefied, the disc became uninhabitable, as the terrestrial globe will one day become by cooling."

"By cooling?"

"Certainly," replied Barbicane; "as the internal fires became extinguished, and the incandescent matter concentrated itself, the lunar crust cooled. By degrees the consequences of these phenomena showed themselves in the disappearance of organized beings, and by the disappearance of vegetation. Soon the atmosphere was rarefied, probably withdrawn by terrestrial attraction; then aerial departure of respirable air, and disappearance of water by means of evaporation. At this period the moon becoming uninhabitable, was no longer inhabited. It was a dead world, such as we see it to-day."

"And you say that the same fate is in store for the earth?"

"Most probably."

"But when?"

"When the cooling of its crust shall have made it uninhabitable."

"And have they calculated the time which our unfortunate sphere will take to cool?"

"Certainly."

"And you know these calculations?"

"Perfectly."

"But speak, then, my clumsy savant," exclaimed Michel Ardan, "for you make me boil with impatience!"

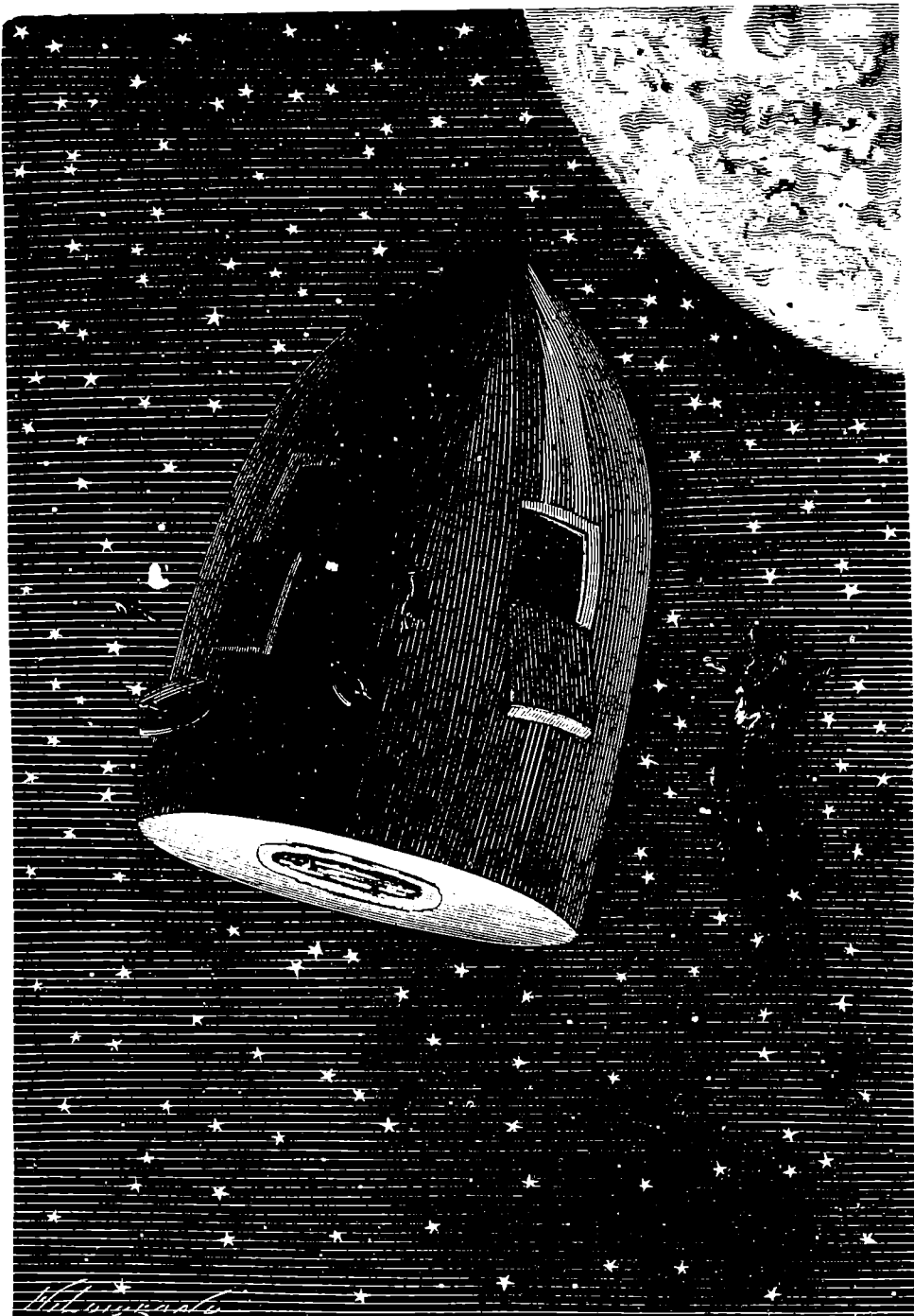
"Very well, my good Michel," replied Barbicane quietly, "we know what diminution of temperature the earth undergoes in the lapse of a century. And according to certain calculations, this mean temperature will, after a period of 400,000 years, be brought down to zero!"

"Four hundred thousand years!" exclaimed Michel. "Ah! I breathe again. Really I was frightened to hear you; I imagined that we had not more than 50,000 years to live."

Barbicane and Nicholl could not help laughing at their companion's uneasiness. Then Nicholl, who wished to end the discussion, put the second question, which had just been considered again.

"Has the moon been inhabited?" he asked.

The answer was unanimously in the affirmative. But during this discussion, fruitful in somewhat hazardous theories, the projectile was rapidly leaving the moon; the lineaments faded away from the travellers' eyes, mountains were confused in the distance; and of all the wonderful, strange, and fantastical form of the earth's satellite, there soon remained nothing but the imperishable remembrance.



Around the projectile were the objects which had been thrown out.

Round the Moon

CHAPTER XIX

A STRUGGLE AGAINST THE IMPOSSIBLE

FOR a long time Barbicane and his companions looked silently and sadly upon that world which they had only seen from a distance, as Moses saw the land of Canaan, and which they were leaving without a possibility of ever returning to it. The projectile's position with regard to the moon had altered, and the base was now turned to the earth.

This change, which Barbicane verified, did not fail to surprise them. If the projectile was to gravitate round the satellite in an elliptical orbit, why was not its heaviest part turned towards it, as the moon turns hers to the earth? That was a difficult point.

In watching the course of the projectile they could see that on leaving the moon it followed a course analogous to that traced in approaching her. It was describing a very long ellipse, which would most likely extend to the point of equal attraction, where the influences of the earth and its satellite are neutralized.

Such was the conclusion which Barbicane very justly drew from facts already observed, a conviction which his two friends shared with him.

"And when arrived at this dead point, what will become of us?" asked Michel Ardan.

"We don't know," replied Barbicane.

"But one can draw some hypotheses, I suppose?"

"Two," answered Barbicane; "either the projectile's speed will be insufficient, and it will remain for ever immovable on this line of double attraction—"

"I prefer the other hypothesis, whatever it may be," interrupted Michel.

"Or," continued Barbicane, "its speed will be sufficient, and it will continue its elliptical course, to gravitate for ever around the orb of night."

"A revolution not at all consoling," said Michel, "to pass to the state of humble servants to a moon whom we are accustomed to look upon as our own handmaid. So that is the fate in store for us?"

Neither Barbicane nor Nicholl answered.

"You do not answer," continued Michel impatiently.

"There is nothing to answer," said Nicholl.

"Is there nothing to try?"

"No," answered Barbicane. "Do you pretend to fight against the impossible?"

"Why not? Do one Frenchman and two Americans shrink from such a word?"

"But what would you do?"

"Subdue this motion which is bearing us away."

"Subdue it?"

"Yes," continued Michel, getting animated, "or else alter it, and employ it to the accomplishment of our own ends."

"And how?"

"That is your affair. If artillerymen are not masters of their projectile they are not artillerymen. If the projectile is to command the gunner, we had better ram the gunner into the gun. My faith! fine savants! who do not know what is to become of us after inducing me—"

"Inducing you!" cried Barbicane and Nicholl. "Inducing you! What do you mean by that?"

"No recrimination," said Michel. "I do not complain; the trip has pleased me, the projectile agrees with me; but let us do all that is humanly possible to do to fall somewhere, even if only on the moon."

"We ask no better, my worthy Michel," replied Barbicane, "but means fail us."

"We cannot alter the motion of the projectile?"

"No."

"Nor diminish its speed?"

"No."

"Not even by lightening it, as they lighten an overloaded vessel?"

"What would you throw out?" said Nicholl. "We have no ballast on board; and indeed it seems to me that if lightened it would go much quicker."

"Slower."

"Quicker."

"Neither slower nor quicker," said Barbicane, wishing to make his two friends agree; "for we float in space, and must no longer consider specific weight."

"Very well," cried Michel Ardan in a decided voice; "then there remains but one thing to do."

"What is it?" said Nicholl.

"Breakfast," answered the cool, audacious Frenchman, who always brought up this solution at the most difficult juncture.

In any case, if this operation had no influence on the projectile's course, it could at least be tried without inconvenience, and even with success from a stomachic point of view. Certainly Michel had none but good ideas.

They breakfasted then at two in the morning; the hour mattered little. Michel served his usual repast, crowned by a glorious bottle drawn from his private cellar. If ideas did not crowd on their brains, we must despair of the Chambertin of 1853. The repast finished, observations began again. Around the projectile, at an invariable distance, were the objects which had been thrown out. Evidently, in its translatory motion round the moon, it had not passed through any atmosphere, for the specific weight of these different objects would have checked their relative speed.

On the side of the terrestrial sphere nothing was to be seen. The earth was but a day old, having been new the night before at twelve; and two days must elapse before its crescent, freed from the solar rays, would serve as a clock to the Selenites, as in its rotatory movement each of its points after twenty-four hours repasses the same lunar meridian.

On the moon's side the sight was different; the orb shone in all her splendour amidst innumerable constellations, whose purity could not be troubled by her rays. On the disc, the plains were already returning to the dark tint which is seen from the earth. The other part of the nimbus remained brilliant, and in the midst of this general brilliancy, Tycho shone prominently like a sun.

Barbicane had no means of estimating the projectile's speed, but reasoning showed that it must uniformly decrease, according to all the laws of mechanical reasoning. Having admitted that the projectile was describing an orbit round the moon, this orbit must necessarily be elliptical; science proves that it must be so. No motive body circulating round an attracting body fails in this law. Every orbit described in space is elliptical. And why should the projectile of the Gun Club escape this natural arrangement? In elliptical orbits, the attracting body always occupies one of the foci; so that at one moment the satellite is nearer, and at another farther from the orb around which it gravitates. When the earth is nearest the sun, she is in her perihelion; and in her aphelion at the farthest point. Speaking of

the moon, she is nearest to the earth in her perigee, and farthest from it in her apogee. To use analogous expressions, with which the astronomers' language is enriched, if the projectile remains as a satellite of the moon, we must say that it is in its "aposelene" at its farthest point, and in its "periselene" at its nearest. In the latter case, the projectile would attain its maximum of speed; and in the former its minimum. It was evidently moving towards its aposelenital point; and Barbicane had reason to think that its speed would decrease up to this point, and then increase by degrees as it neared the moon. This speed would even become *nil*, if this point joined that of equal attraction. Barbicane studied the consequences of these different situations, and thinking what inference he could draw from them, when he was roughly disturbed by a cry from Michel Ardan.

"By Jove!" he exclaimed, "I must admit we are downright simpletons!"

"I do not say we are not," replied Barbicane; "but why?"

"Because we have a very simple means of checking this speed which is bearing us from the moon, and we do not use it!"

"And what is the means?"

"To use the recoil contained in our rockets."

"Done!" said Nicholl.

"We have not used this force yet," said Barbicane, "it is true, but we will do so."

"When?" asked Michel.

"When the time comes. Observe, my friends, that in the position occupied by the projectile, an oblique position with regard to the lunar disc, our rockets, in slightly altering its direction, might turn it from the moon instead of drawing it nearer?"

"Just so," replied Michel.

"Let us wait, then. By some inexplicable influence, the projectile is turning its base towards the earth. It is probable that at the point of equal attraction, its conical cap will be directed rigidly towards the moon; at that moment we may hope that its speed will be *nil*; then will be the moment to act, and with the influence of our rockets, we may perhaps provoke a fall directly on the surface of the lunar disc."

"Bravo!" said Michel. "What we did not do, what we could not do on our first passage at the dead point, because the projectile was then endowed with too great a speed."

"Very well reasoned," said Nicholl.

"Let us wait patiently," continued Barbicane. "Putting every chance on our side,

and after having so much despaired, I may say I think that we shall gain our end."

This conclusion was a signal for Michel Ardan's hips and hurrahs. And none of the audacious boobies remembered the question that they themselves had solved in the negative. No! the moon is not inhabited; no! the moon is probably not habitable. And yet they were going to try every thing to reach her.

One single question remained to be solved. At what precise moment the projectile would reach the point of equal attraction, on which the travellers must play their last card. In order to calculate this to within a few seconds, Barbicane had only to refer to his notes, and to reckon the different heights taken on the lunar parallels. Thus the time necessary to travel over the distance between the dead point and the south pole would be equal to the distance separating the north pole from the dead point. The hours representing the time travelled over were carefully noted, and the calculation was easy. Barbicane found that this point would be reached at one in the morning on the night of the 7th—8th of December. So that, if nothing interfered with its course, it would reach the given point in twenty-two hours.

The rockets had primarily been placed to check the fall of the projectile upon the moon, and now they were going to employ them for a directly contrary purpose. In any case they were ready, and they had only to wait for the moment to set fire to them.

"Since there is nothing else to be done," said Nicholl, "I make a proposition."

"What is it?" asked Barbicane.

"I propose to go to sleep."

"What a motion!" exclaimed Michel Ardan.

"It is forty hours since we closed our eyes," said Nicholl. "Some hours of sleep will restore our strength."

"Never," interrupted Michel.

"Well," continued Nicholl, "every one to his taste; I shall go to sleep." And stretching himself on the divan, he soon snored like a forty-eight pounder.

"That Nicholl has a good deal of sense," said Barbicane, "presently I shall follow his example." Some moments after his continued base supported the captain's barytone.

"Certainly," said Michel Ardan, finding himself alone, "these practical people had sometimes most opportune ideas."

And with his long legs stretched out, and his great arms folded under his head, Michel slept in his turn.

But this sleep could be neither peaceful nor

lasting, the minds of these three men were too much occupied, and some hours after, about seven in the morning, all three were on foot at the same instant.

The projectile was still leaving the moon, and turning its conical part more and more towards her.

An explicable phenomenon, but one which happily served Barbicane's ends.

Seventeen hours more, and the moment for action would have arrived.

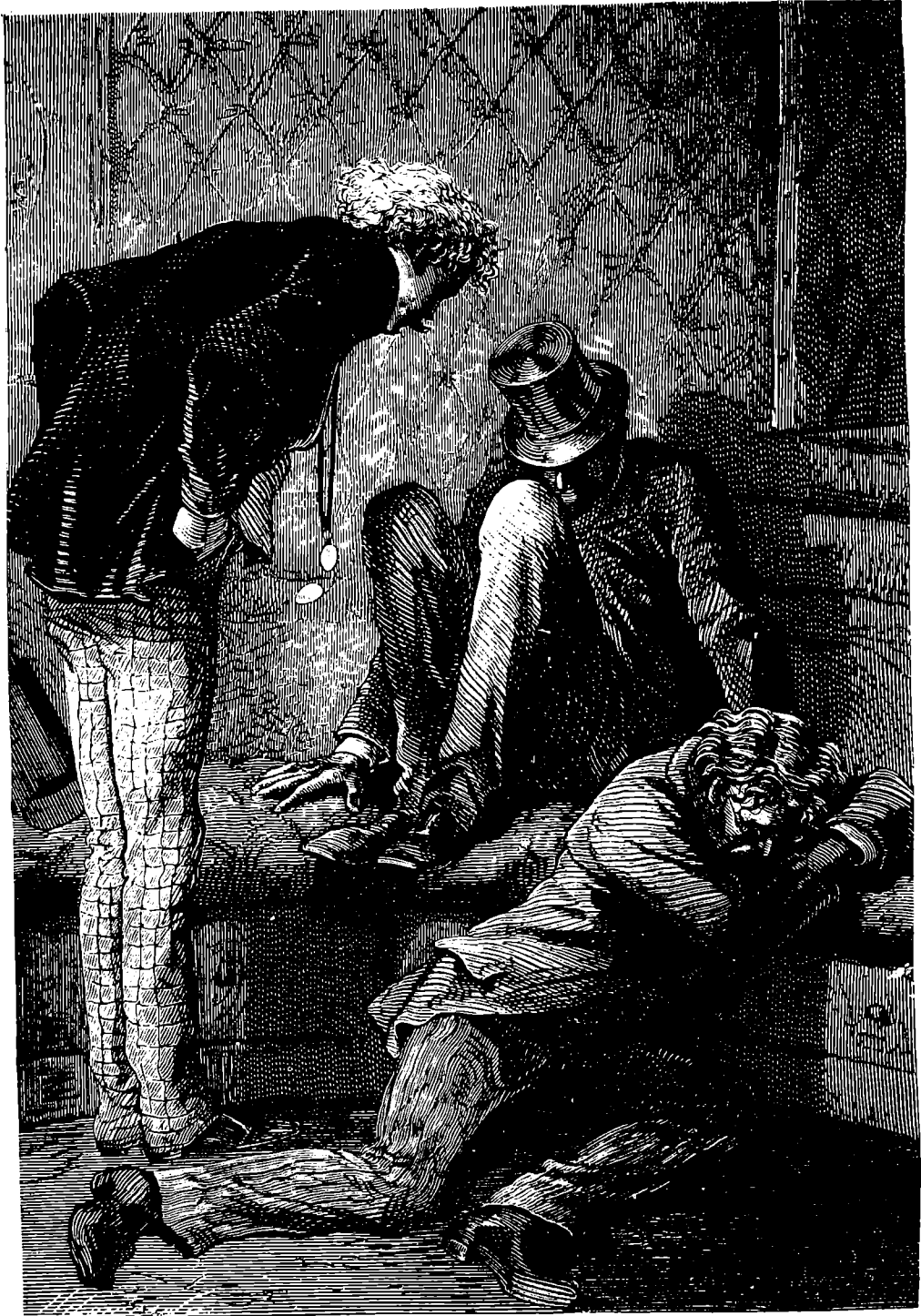
The day seemed long. However bold the travellers might be, they were greatly impressed by the approach of that moment which would decide all—either precipitate their fall on to the moon, or for ever chain them in an immutable orbit. They counted the hours as they passed too slow for their wish; Barbicane and Nicholl obstinately plunged in their calculations, Michel going and coming between the narrow walls, and watching that impassive moon with a longing eye.

At times recollections of the earth crossed their minds. They saw once more their friends of the Gun Club, and the dearest of all, J. T. Maston. At that moment, the honourable secretary must be filling his post on the Rocky Mountains. If he could see the projectile through the glass of his gigantic telescope what would he think? After seeing it disappear behind the moon's south pole, he would see them reappear by the north pole! They must therefore be a satellite of a satellite! Had J. T. Maston given this unexpected news to the world? Was this the dénouement of this great enterprise?

But the day passed without incident. The terrestrial midnight arrived. The 8th of December was beginning. One hour more, and the point of equal attraction would be reached. What speed would then animate the projectile? They could not estimate it. But no error could vitiate Barbicane's calculations. At one in the morning, this speed ought to be and would be *nil*.

Besides, another phenomenon would mark the projectile's stopping-point on the neutral line. At that spot the two attractions, lunar and terrestrial, would be annulled. Objects would "weigh" no more. This singular fact, which had surprised Barbicane and his companions so much in going, would be repeated on their return under the very same conditions. At this precise moment they must act.

Already the projectile's conical top was sensibly turned towards the lunar disc, presented in such a way as to utilize the whole of the recoil produced by the pressure of the



“These practical people have sometimes most inopportune ideas.”



Ardan applied the lighted match.

rocket apparatus. The chances were in favour of the travellers. If its speed was utterly annulled on this dead point, a decided movement towards the moon would suffice, however slight, to determine its fall.

"Five minutes to one," said Nicholl.

"All is ready," replied Michel Ardan, directing a lighted match to the flame of the gas.

"Wait!" said Barbicane, holding his chronometer in his hand.

At that moment weight had no effect. The travellers felt in themselves the entire disappearance of it. They were very near the neutral point, if they did not touch it.

"One o'clock," said Barbicane.

Michel Ardan applied the lighted match to a train in communication with the rockets. No detonation was heard in the inside, for there was no air. But, through the scuttles Barbicane saw a prolonged smoke, the flames of which were immediately extinguished.

The projectile sustained a certain shock, which was sensibly felt in the interior.

The three friends looked and listened without speaking, and scarcely breathing. One might have heard the beating of their hearts amidst this perfect silence.

"Are we falling?" asked Michel Ardan, at length.

"No," said Nicholl, "since the bottom of the projectile is not turning to the lunar disc!"

At this moment, Barbicane, quitting the scuttle, turned to his two companions. He was frightfully pale, his forehead wrinkled, and his lips contracted.

"We are falling!" said he.

"Ah!" cried Michel Ardan, "on to the moon?"

"On to the earth!"

"The devil!" exclaimed Michel Ardan,

adding philosophically, "well, when we came into this projectile we were very doubtful as to the ease with which we should get out of it!"

And now this fearful fall had begun. The speed retained had borne the projectile beyond the dead point. The explosion of the rockets could not divert its course. This speed in going had carried it over the neutral line, and in returning had done the same thing. The laws of physics condemned *it to pass through every point which it had already gone through*. It was a terrible fall, from a height of 160,000 miles, and no springs to break it. According to the laws of gunnery, the projectile must strike the earth with a speed equal to that with which it left the mouth of the Columbiad, a speed of 16,000 yards in the last second.

But to give some figures of comparison, it has been reckoned that an object thrown from the top of the towers of Notre Dame, the height of which is only 200 feet, will arrive on the pavement at a speed of 240 miles per hour. Here the projectile must strike the earth with a speed of 115,200 miles per hour.

"We are lost!" said Michel coolly.

"Very well! if we die," answered Barbicane, with a sort of religious enthusiasm, "the result of our travels will be magnificently spread. It is His own secret that God will tell us! In the other life, the soul will want to know nothing, either of machines or engines! It will be identified with eternal wisdom!"

"In fact," interrupted Michel Ardan, "the whole of the other world may well console us for the loss of that inferior orb called the moon!"

Barbicane crossed his arms on his breast, with a motion of sublime resignation, saying at the same time,—

"The will of heaven be done!"

Round the Moon

CHAPTER XX

THE SOUNDINGS OF THE "SUSQUEHANNA"

"WELL, lieutenant, and our soundings?"

"I think, sir, that the operation is nearing its completion," replied Lieutenant Bronsfield. "But who would have thought of finding such a depth so near in shore, and only 200 miles from the American coast?"

"Certainly, Bronsfield, there is a great depression," said Captain Blomsberry. "In this spot there is a submarine valley worn by Humboldt's current, which skirts the coast of America as far as the Straits of Magellan."

"These great depths," continued the lieutenant, "are not favourable for laying telegraphic cables. A level bottom, like that supporting the American cable between Valentia and Newfoundland, is much better."

"I agree with you, Bronsfield. With your permission, lieutenant, where are we now?"

"Sir, at this moment we have 3508 fathoms of line out, and the ball which draws the sounding lead has not yet touched the bottom; for if so, it would have come up of itself."

"Brook's apparatus is very ingenious," said Captain Blomsberry; "it gives us very exact soundings."

"Touch!" cried at this moment one of the men at the forewheel, who was superintending the operation.

The captain and the lieutenant mounted the quarter-deck.

"What depth have we?" asked the captain.

"Three thousand six hundred and twenty-seven fathoms," replied the lieutenant, entering it in his note-book.

"Well, Bronsfield," said the captain, "I will take down the result. Now haul in the sounding line. It will be the work of some hours. In that time the engineer can light the furnaces, and we shall be ready to start as soon as you have finished. It is ten o'clock, and with your permission, lieutenant, I will turn in."

"Do so, sir; do so!" replied the lieutenant obligingly.

The captain of the "Susquehanna," as brave a man as need be, and the humble servant of his officers, returned to his cabin, took a brandy-grog, which earned for the steward no end of praise, and turned in, not without having complimented his servant upon his making beds, and slept a peaceful sleep.

It was then ten at night. The eleventh day of the month of December was drawing to a close in a magnificent night.

The "Susquehanna," a corvette of 500 horse-power, of the United States' navy, was occupied in taking soundings in the Pacific Ocean about 200 miles off the American coast, following that long peninsula which stretches down the coast of New Mexico.

The wind had dropped by degrees. There was no disturbance in the air. Their pennant hung motionless from the maintop-gallant-mast truck.

Captain Jonathan Blomsberry (cousin-german of Colonel Blomsberry, one of the most ardent supporters of the Gun Club, who had married an aunt of the captain and daughter of an honourable Kentucky merchant,)—Captain Blomsberry could not have wished for finer weather in which to bring to a close his delicate operations of sounding. His corvette had not even felt the great tempest, which by sweeping away the groups of clouds on the Rocky Mountains, had allowed them to observe the course of the famous projectile.

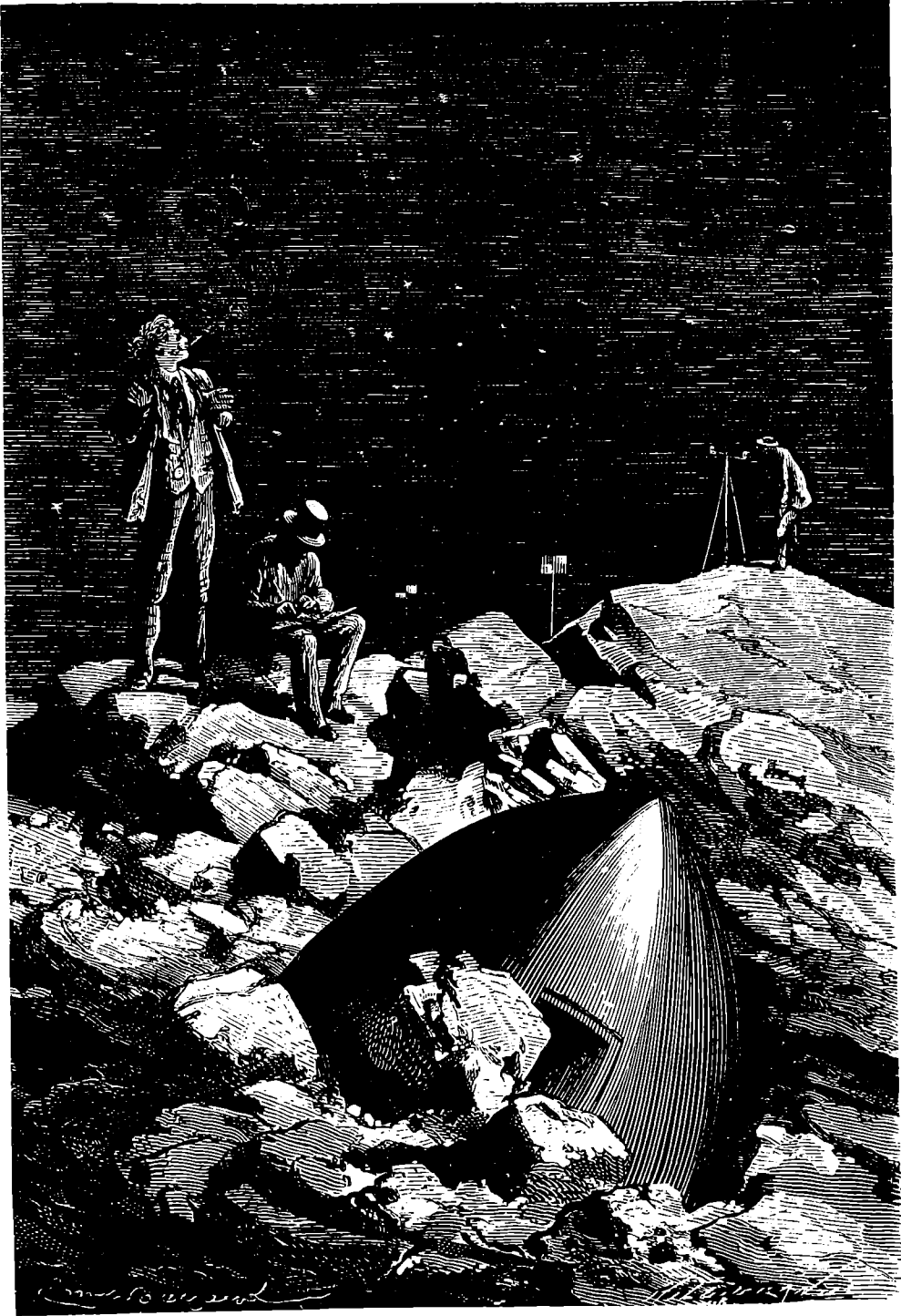
Everything went well, and with all the fervour of a Presbyterian, he did not forget to thank heaven for it. The series of soundings taken by the "Susquehanna," had for its aim the finding of a favourable spot for the laying of a submarine cable to connect the Hawaiian Islands with the coast of America.

It was a great undertaking, due to the instigation of a powerful company. Its managing director, the intelligent Cyrus Field, purposed even covering all the islands of Oceania with a vast electrical network, an immense enterprise, and one worthy of American genius.

To the corvette "Susquehanna" had been confided the first operations of sounding. It was on the night of the 11th—12th December, she was in exactly 27° 7' north lat., and 41° 37' west long., on the meridian of Washington.

The moon, then in her last quarter, was beginning to rise above the horizon.

After the departure of Captain Blomsberry, the lieutenant and some officers were standing together on the poop. On the appearance of



“I fancy I see them.”

the moon, their thoughts turned to that orb which the eyes of a whole hemisphere were contemplating. The best naval glasses could not have discovered the projectile wandering around its hemisphere, and yet all were pointed towards that brilliant disc which millions of eyes were looking at at the same moment.

"They have been gone ten days," said Lieutenant Bronsfield at last. "What has become of them?"

"They have arrived, lieutenant," exclaimed a young midshipman, "and they are doing what all travellers do when they arrive in a new country, taking a walk!"

"Oh! I am sure of that, if you tell me so, my young friend," said Lieutenant Bronsfield, smiling.

"But," continued another officer, "their arrival cannot be doubted. The projectile was to reach the moon when full on the 5th at midnight. We are now at the 11th of December, which makes six days. And in six times twenty-four hours, without darkness, one would have time to settle comfortably. I fancy I see my brave countrymen encamped at the bottom of some valley, on the borders of a Selenite stream, near a projectile half buried by its fall amidst volcanic rubbish, Captain Nicholl beginning his levelling operations, President Barbicane writing out his notes, and Michel Ardan embalming the lunar solitudes with the perfume of his—"

"Yes! it must be so, it is so!" exclaimed the young midshipman, worked up to a pitch of enthusiasm by this ideal description of his superior officer.

"I should like to believe it," replied the lieutenant, who was quite unmoved. "Unfortunately direct news from the lunar world is still wanting."

"Beg pardon, lieutenant," said the midshipman, "but cannot President Barbicane write?"

A burst of laughter greeted this answer.

"No letters!" continued the young man quickly. "The postal administration has something to see to there."

"Might it not be the telegraphic service that is at fault?" asked one of the officer ironically.

"Not necessarily," replied the midshipman, not at all confused. "But it is very easy to set up a graphic communication with the earth."

"And how?"

"By means of the telescope at Long's Peak. You know it brings the moon to within four miles of the Rocky Mountains, and that it

shows objects on its surface of only nine feet in diameter. Very well; let our industrious friends construct a gigantic alphabet; let them write words three fathoms long, and sentences three miles long, and then they can send us news of themselves?"

The young midshipman, who had a certain amount of imagination, was loudly applauded; Lieutenant Bronsfield allowing that the idea was possible, but observing that if by these means they could *receive* news from the lunar world they could not send any from the terrestrial, unless the Selenites had instruments fit for taking distant observations at their disposal.

"Evidently," said one of the officers; "but what has become of the travellers? what they have done, what they have seen, that above all must interest us. Besides, if the experiment has succeeded (which I do not doubt), they will try it again. The Columbiad is still sunk in the soil of Florida. It is now only a question of powder and shot; and every time the moon is at her zenith, a cargo of visitors may be sent to her."

"It is clear," replied Lieutenant Bronsfield, "that J. T. Marston will one day join his friends."

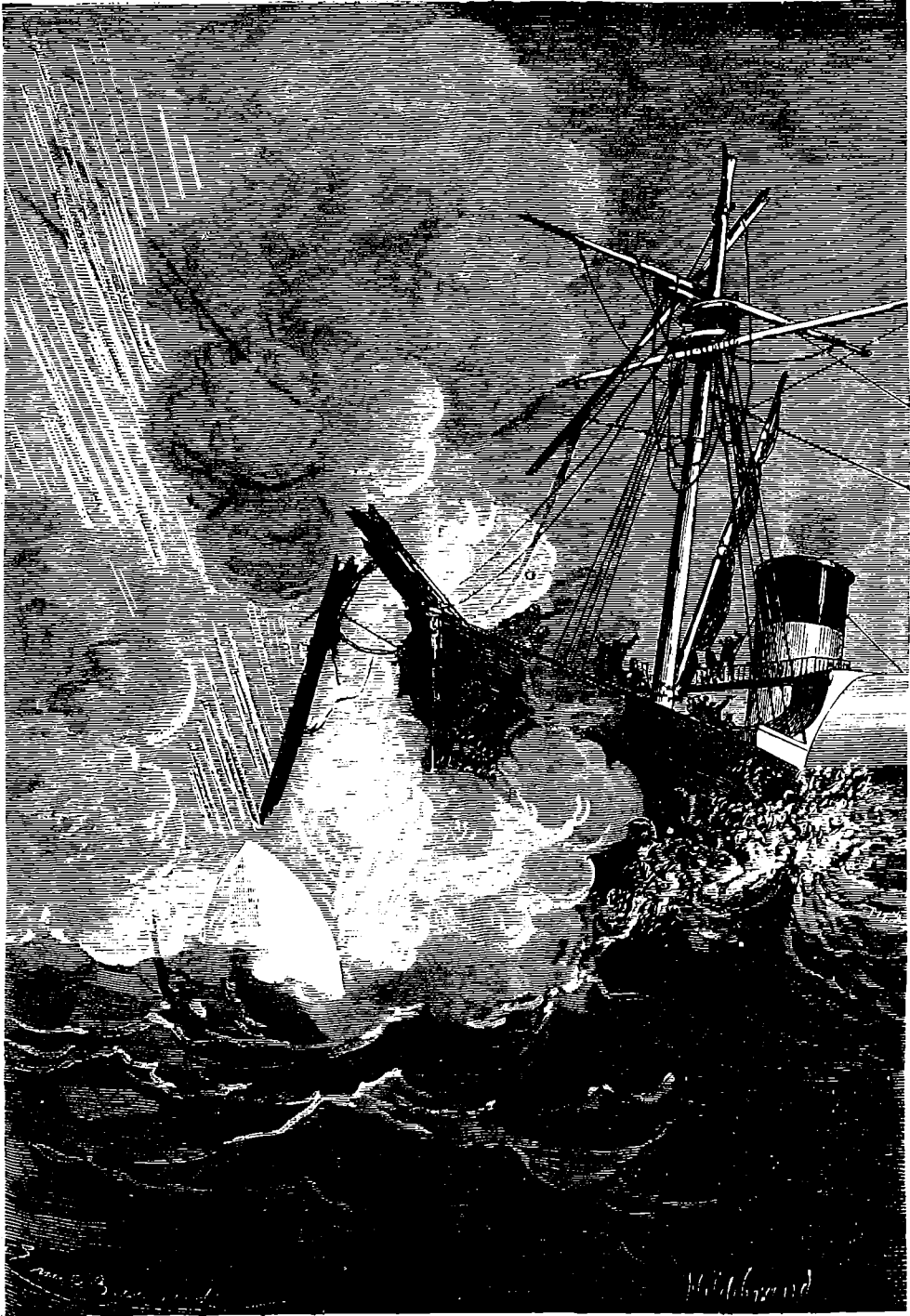
"If he will have me," cried the midshipman, "I am ready!"

"Oh! volunteers will not be wanting," answered Bronsfield; "and if it were allowed, half of the earth's inhabitants would emigrate to the moon!"

This conversation between the officers of the "Susquehanna" was kept up until nearly one in the morning. We cannot say what blundering systems were broached, what inconsistent theories advanced by these bold spirit. Since Barbicane's attempt, nothing seemed impossible to the Americans. They had already designed an expedition, not only of savants, but of a whole colony towards the Selenite borders, and a complete army, consisting of infantry, artillery, and cavalry, to conquer the lunar world.

At one in the morning, the hauling in of the sounding-line was not yet completed; 1670 fathoms were still out, which would entail some hours' work. According to the commander's orders, the fires had been lighted, and steam was being got up. The "Susquehanna" could have started that very instant.

At that moment (it was seventeen minutes past one in the morning) Lieutenant Bronsfield was preparing to leave the watch and return to his cabin, when his attention was attracted by a distant hissing noise. His comrades and



A few feet nearer.

himself first thought that this hissing was caused by the letting off of steam; but lifting their heads, they found that the noise was produced in the highest regions of the air. They had not time to question each other before the hissing became frightfully intense, and suddenly there appeared to their dazzled eyes an enormous meteor, ignited by the rapidity of its course and its friction through the atmospheric strata.

This fiery mass grew larger to their eyes, and fell, with the noise of thunder, upon the bowsprit, which it smashed close to the stem,

and buried itself in the waves with a deafening roar!

A few feet nearer, and the "Susquehanna" would have foundered with all on board!

At this instant Captain Blomsberry appeared, half dressed, and rushing on to the fore-castle-deck, whither all the officers had hurried, exclaimed, "With your permission, gentlemen, what has happened?"

And the midshipman, making himself as it were the echo of the body, cried, "Commander, it is 'they' come back again!"

Round the Moon

CHAPTER XXI

J. T. MASTON RECALLED

"IT is 'they' come back again!" the young midshipman had said; and every one had understood him. No one doubted but that the meteor was the projectile of the Gun Club. As to the travellers which it enclosed, opinions were divided regarding their fate.

"They are dead!" said one.

"They are alive!" said another; "the crater is deep, and the shock was deadened."

"But they must have wanted air," continued a third speaker; "they must have died of suffocation."

"Burnt!" replied a fourth; "the projectile was nothing but an incandescent mass as it crossed the atmosphere."

"What does it matter!" they exclaimed unanimously; "living or dead, we must pull them out!"

But Captain Blomsberry had assembled his officers, and "with their permission," was holding a council. They must decide upon something to be done immediately. The more hasty ones were for fishing up the projectile. A difficult operation, though not an impossible one. But the corvette had no proper machinery, which must be both fixed and powerful; so it was resolved that they should put in at the nearest port, and give information to the Gun Club of the projectile's fall.

This determination was unanimous. The choice of the port had to be discussed. The neighbouring coast has no anchorage on 27° lat. Higher up, above the peninsula of Monterey, stands the important town from which it takes its name; but, seated on the borders of a perfect desert, it was not connected with the interior by a network of telegraphic wires, and electricity alone could spread these important news fast enough.

Some degrees above opened the bay of San Francisco. Through the capital of the gold country, communication would be easy with the heart of the Union. And in less than two days the "Susquehanna," by putting on high pressure, could arrive in that port. She must therefore start at once.

The fires were made up; they could set off immediately. Two thousand fathoms of line were still out, which Captain Blomsberry, not

wishing to lose precious time in hauling in, resolved to cut.

"We will fasten the end to a buoy," said he; "and that buoy will show us the exact spot where the projectile fell."

"Besides," replied Lieutenant Bronsfield, "we have our situation exact—27° 7' north lat. and 41° 37' west long."

"Well, Mr. Bronsfield," replied the captain, "now, with your permission, we will have the line cut."

A strong buoy, strengthened by a couple of spars, was thrown into the ocean. The end of the rope was carefully lashed to it; and, left solely to the rise and fall of the billows, the buoy would not sensibly deviate from the spot.

At this moment the engineer sent to inform the captain that steam was up and they could start, for which agreeable communication the captain thanked him. The course was then given north-north-east, and the corvette, wearing, steered at full steam direct for San Francisco. It was three in the morning.

Four hundred and fifty miles to cross; it was nothing for a good vessel like the "Susquehanna." In thirty-six hours she had covered that distance; and on the 14th of December, at twenty-seven minutes past one at night, she entered the bay of San Francisco.

At the sight of a ship of the national navy arriving at full speed, with her bowsprit broken, public curiosity was greatly roused. A dense crowd soon assembled on the quay, waiting for them to disembark.

After casting anchor, Captain Blomsberry and Lieutenant Bronsfield entered an eight-oared cutter, which soon brought them to land.

They jumped on to the quay.

"The telegraph?" they asked, without answering one of the thousand questions addressed to them.

The officer of the port conducted them to the telegraph-office through a concourse of spectators. Blomsberry and Bronsfield entered, while the crowd crushed each other at the door.

Some minutes later a fourfold telegram was sent out—the first to the Naval Secretary at

Washington; the second to the Vice-President of the Gun Club, Baltimore; the third to the Hon. J. T. Maston, Long's Peak, Rocky Mountains; the fourth to the Sub-Director of the Cambridge Observatory, Massachusetts.

It was worded as follows—

"In 20° 7' north lat., and 41° 37' west long., on the 12th of December, at 17 minutes past 1 in the morning, the projectile of the Columbiad fell into the Pacific. Send instructions.—BLOMSBERRY, Commander 'Susquehanna.'"

Five minutes afterwards the whole town of San Francisco learned the news. Before six in the evening the different States of the Union had heard the great catastrophe; and after midnight, by the cable, the whole of Europe knew the result of the great American experiment.

We will not attempt to picture the effect produced on the entire world by that unexpected dénouement.

On receipt of the telegram the Naval Secretary telegraphed to the "Susquehanna" to wait in the bay of San Francisco without extinguishing her fires. Day and night she must be ready to put to sea.

The Cambridge Observatory called a special meeting; and, with that composure which distinguishes learned bodies in general, peacefully discussed the scientific bearings of the question. At the Gun Club there was an explosion. All the gunners were assembled. Vice-President the Hon. Wilcome was in the act of reading the premature despatch, in which J. T. Maston and Belfast announced that the projectile had just been seen in the gigantic reflector of Long's Peak, and also that it was held by lunar attraction, and was playing the part of under satellite to the lunar world.

We know the truth on that point.

But on the arrival of Blomsberry's despatch, so decidedly contradicting J. T. Maston's telegram, two parties were formed in the bosom of the Gun Club. On one side were those who admitted the fall of the projectile, and consequently the return of the travellers; on the other, those who believed in the observations of Long's Peak, concluded that the commander of the "Susquehanna" had made a mistake. To the latter the pretended projectile was nothing but a meteor! nothing but a meteor, a shooting globe, which in its fall had smashed the bows of the corvette. It was difficult to answer this argument, for the speed

with which it was animated must have made observation very difficult. The commander of the "Susquehanna" and her officers might have made a mistake in all good faith; one argument, however, was in their favour, namely, that if the projectile had fallen on the earth, its place of meeting with the terrestrial globe could only take place on this 27° north lat., and (taking into consideration the time that had elapsed, and the rotary motion of the earth) between the forty-first and the forty-second degree of west longitude. In any case, it was decided in the Gun Club that Blomsberry brothers, Bilsby, and Major Elphinstone should go straight to San Francisco, and consult as to the means of raising the projectile from the depths of the ocean.

These devoted men set off at once; and the railroad, which will soon cross the whole of central America, took them as far as St. Louis, where the swift mail-coaches awaited them. Almost at the same moment in which the Secretary of Marine, the Vice-President of the Gun Club, and the Sub-Director of the Observatory received the despatch from San Francisco, the Honourable J. T. Maston was undergoing the greatest excitement he had ever experienced in his life, an excitement which even the bursting of his pet gun, which had more than once nearly cost him his life, had not caused him. We may remember that the Secretary of the Gun Club had started soon after the projectile (and almost as quickly) for the station in Long's Peak, in the Rocky Mountains, J. Belfast, Director of the Cambridge Observatory, accompanying him. Arrived there, the two friends had installed themselves at once, never quitting the summit of their enormous telescope. We know that this gigantic instrument had been set up according to the reflecting system, called by the English, "front view." This arrangement subjected all objects to but one reflection, making the view consequently much clearer; the result was that, when they were taking observations, J. T. Maston and Belfast were placed in the *upper* part of the instrument and not in the lower, which they reached by a circular staircase, a masterpiece of lightness, while below them opened a metal well, terminated by the metallic mirror, which measured 280 feet in depth.

It was on a narrow platform placed above the telescope that the two savants passed their existence, execrating the day which hid the moon from their eyes, and the clouds which obstinately veiled her during the night.

What, then, was their delight when, after



The unfortunate man had disappeared.

some days of waiting, on the night of the 5th of December, they saw the vehicle which was bearing their friends into space! To this delight succeeded a great deception, when, trusting to a cursory observation, they launched their first telegram to the world, erroneously affirming that the projectile had become a satellite of the moon, gravitating in an immutable orbit.

From that moment it had never shown itself to their eyes—a disappearance all the more easily explained, as it was then passing behind the moon's invisible disc; but when it was time for it to reappear on the visible disc, one may imagine the impatience of the fuming J. T. Maston and his not less impatient companion. Each minute of the night they thought they saw the projectile once more, and they did not see it. Hence constant discussions and violent disputes between them, Belfast affirming that the projectile could not be seen, J. T. Maston maintaining that "it had put his eyes out."

"It is the projectile!" repeated J. T. Maston.

"No," answered Belfast; "it is an avalanche detached from a lunar mountain."

"Well, we shall see it to-morrow."

"No, we shall not see it any more. It is carried into space."

"Yes!"

"No!"

And at these moments, when contradictions rained like hail, the well-known irritability of the Secretary of the Gun Club constituted a permanent danger for the Hon. Belfast. The existence of these two together would soon have become impossible; but an unforeseen event cut short their everlasting discussions.

During the night, from the 14th to the 15th of December, the two irreconcilable friends were busy observing the lunar disc, J. T. Maston abusing the learned Belfast as usual, who was by his side; the Secretary of the Gun Club maintaining for the thousandth time that he had just seen the projectile, and adding that he could see Michel Ardan's face looking through one of the scuttles, at the same time enforcing his argument by a series of gestures which his formidable hook rendered very

unpleasant.

At this moment Belfast's servant appeared on the platform (it was ten at night) and gave him a despatch. It was the commander of the "Susquehanna's" telegram.

Belfast tore the envelope and read, and uttered a cry.

"What!" said J. T. Maston.

"The projectile!"

"Well!"

"Has fallen to the earth!"

Another cry, this time a perfect howl, answered him. He turned towards J. T. Maston. The unfortunate man, imprudently leaning over the metal tube, had disappeared in the immense telescope. A fall of 280 feet! Belfast, dismayed, rushed to the orifice of the reflector.

He breathed. J. T. Maston, caught by his metal hook, was holding on by one of the rings which bound the telescope together, uttering fearful cries.

Belfast called. Help was brought, tackle was let down, and they hoisted up, not without some trouble, the imprudent Secretary of the Gun Club.

He reappeared at the upper orifice without hurt.

"Ah!" said he, "if I had broken the mirror?"

"You would have paid for it," replied Belfast severely.

"And that cursed projectile has fallen?" asked J. T. Maston.

"Into the Pacific!"

"Let us go!"

A quarter of an hour after the two savants were descending the declivity of the Rocky Mountains; and two days after, at the same time as their friends of the Gun Club, they arrived at San Francisco, having killed five horses on the road.

Elphinstone, the brothers Blomsberry, and Bilsby rushed towards them on their arrival.

"What shall we do?" they exclaimed.

"Fish up the projectile," replied J. T. Maston, "and the sooner the better."

Round the Moon

CHAPTER XXII

RECOVERED FROM THE SEA

THE spot where the projectile sank under the waves was exactly known; but machinery to grasp it and bring it to the surface of the ocean was still wanting. It must first be invented, then made. American engineers could not be troubled with such trifles. The grappling-irons once fixed, by their help they were sure to raise it in spite of its weight, which was lessened by the density of the liquid in which it was plunged.

But fishing-up the projectile was not the only thing to be thought of. They must act promptly in the interest of the travellers. No one doubted that they were still living.

"Yes," repeated J. T. Maston incessantly, whose confidence gained over everybody, "our friends are clever people, and they cannot have fallen like simpletons. They are alive, quite alive; but we must make haste if we wish to find them so. Food and water do not trouble me; they have enough for a long while. But air, air, that is what they will soon want; so quick, quick!"

And they did go quick. They fitted up the "Susquehanna" for her new destination. Her powerful machinery was brought to bear upon the hauling-chains. The aluminium projectile only weighed 19,250lbs., a weight very inferior to that of the transatlantic cable which had been drawn up under similar conditions. The only difficulty was in fishing-up a cylindrical projectile, the walls of which were so smooth as to offer no hold for the hooks. On that account engineer Murchison hastened to San Francisco, and had some enormous grappling-irons fixed on an automatic system, which would never let the projectile go if it once succeeded in seizing it in its powerful claws. Diving-dresses were also prepared, which through this impervious covering allowed the divers to observe the bottom of the sea. He also had put on board an apparatus of compressed air very cleverly designed. There were perfect chambers pierced with scuttles, which, with water let into certain compartments, could draw it down into great depths. These apparatuses were at San Francisco, where they had been used in the construction of a submarine breakwater; and very fortu-

nately it was so, for there was no time to construct any. But in spite of the perfection of the machinery, in spite of the ingenuity of the savants entrusted with the use of them, the success of the operation was far from being certain. How great were the chances against them, the projectile being 20,000 feet under the water! And if even it was brought to the surface, how would the travellers have borne the terrible shock which 20,000 feet of water had perhaps not sufficiently broken? At any rate they must act quickly. J. T. Maston hurried the workmen day and night. He was ready to don the diving-dress himself, or try the air apparatus, in order to reconnoitre the situation of his courageous friends.

But in spite of all diligence displayed in preparing the different engines, in spite of the considerable sum placed at the disposal of the Gun Club by the Government of the Union, five long days (five centuries!) elapsed before the preparations were complete. During this time public opinion was excited to the highest pitch. Telegrams were exchanged incessantly throughout the entire world by means of wires and electric cables. The saving of Barbicane, Nicholl, and Michel Ardan was an international affair. Every one who had subscribed to the Gun Club was directly interested in the welfare of the travellers.

At length the hauling-chains, the air-chambers, and the automatic grappling-irons were put on board. J. T. Maston, Engineer Murchison, and the delegates of the Gun Club, were already in their cabins. They had but to start, which they did on the 21st of December, at eight o'clock at night, the corvette meeting with a beautiful sea, a north-easterly wind, and rather sharp cold. The whole population of San Francisco was gathered on the quay, greatly excited but silent, reserving their hurrahs for the return. Steam was fully up, and the screw of the "Susquehanna" carried them briskly out of the bay.

It is needless to relate the conversations on board between the officers, sailors, and passengers. All these men had but one thought. All these hearts beat under the same

emotion. Whilst they were hastening to help them, what were Barbicane and his companions doing? What had become of them? Were they able to attempt any bold manoeuvre to regain their liberty? None could say. The truth is that every attempt must have failed! Immersed nearly four miles under the ocean, this metal prison defied every effort of its prisoners.

On the 23rd inst., at eight in the morning, after a rapid passage, the "Susquehanna" was due at the fatal spot. They must wait till twelve to take the reckoning exactly. The buoy to which the sounding line had been lashed had not yet been recognized.

At twelve, Captain Blomsberry, assisted by his officers who superintended the observations, took the reckoning in the presence of the delegates of the Gun Club. Then there was a moment of anxiety. Her position decided, the "Susquehanna" was found to be some minutes to westward of the spot where the projectile had disappeared beneath the waves.

The ship's course was then changed so as to reach this exact point.

At forty-seven minutes past twelve they reached the buoy, it was in perfect condition, and must have shifted but little.

"At last!" exclaimed J. T. Maston.

"Shall we begin?" asked Captain Blomsberry.

"Without losing a second."

Every precaution was taken to keep the corvette almost completely motionless. Before trying to seize the projectile, Engineer Murchison wanted to find its exact position at the bottom of the ocean. The submarine apparatus destined for this expedition was supplied with air. The working of these engines was not without danger, for at 20,000 feet below the surface of the water, and under such great pressure, they were exposed to fracture, the consequences of which would be dreadful.

J. T. Maston, the Brothers Blomsberry, and Engineer Murchison, without heeding these dangers, took their places in the air-chamber. The commander, posted on his bridge, superintended the operation, ready to stop or haul in the chains on the slightest signal. The screw had been shipped, and the whole power of the machinery collected on the capstan would have quickly drawn the apparatus on board. The descent began at twenty-five minutes past one at night, and the chamber, drawn under by the reservoirs full of water, disappeared from the surface of the ocean.

The emotion of the officers and sailors on

board was now divided between the prisoners in the projectile and the prisoners in the submarine apparatus. As to the latter, they forgot themselves, and, glued to the windows of the scuttles, attentively watched the liquid mass through which they were passing.

The descent was rapid. At seventeen minutes past two, J. T. Maston and his companions had reached the bottom of the Pacific; but they saw nothing but an arid desert, no longer animated by either fauna or flora. By the light of their lamps, furnished with powerful reflectors, they could see the dark beds of the ocean for a considerable extent of view, but the projectile was nowhere to be seen.

The impatience of these bold divers cannot be described, and having an electrical communication with the corvette, they made a signal already agreed upon, and for the space of a mile the "Susquehanna" moved their chamber along some yards above the bottom.

Thus they explored the whole submarine plain, deceived at every turn by optical illusions which almost broke their hearts. Here a rock, there a projection from the ground, seemed to be the much-sought-for projectile; but their mistake was soon discovered and then they were in despair.

"But where are they? where are they?" cried J. T. Maston. And the poor man called loudly upon Nicholl, Barbicane, and Michel Ardan, as if his unfortunate friends could either hear or answer him through such an impenetrable medium! The search continued under these conditions until the vitiated air compelled the divers to ascend.

The hauling in began about six in the evening, and was not ended before midnight.

"To-morrow," said J. T. Maston, as he set foot on the bridge of the corvette.

"Yes," answered Captain Blomsberry.

"And on another spot?"

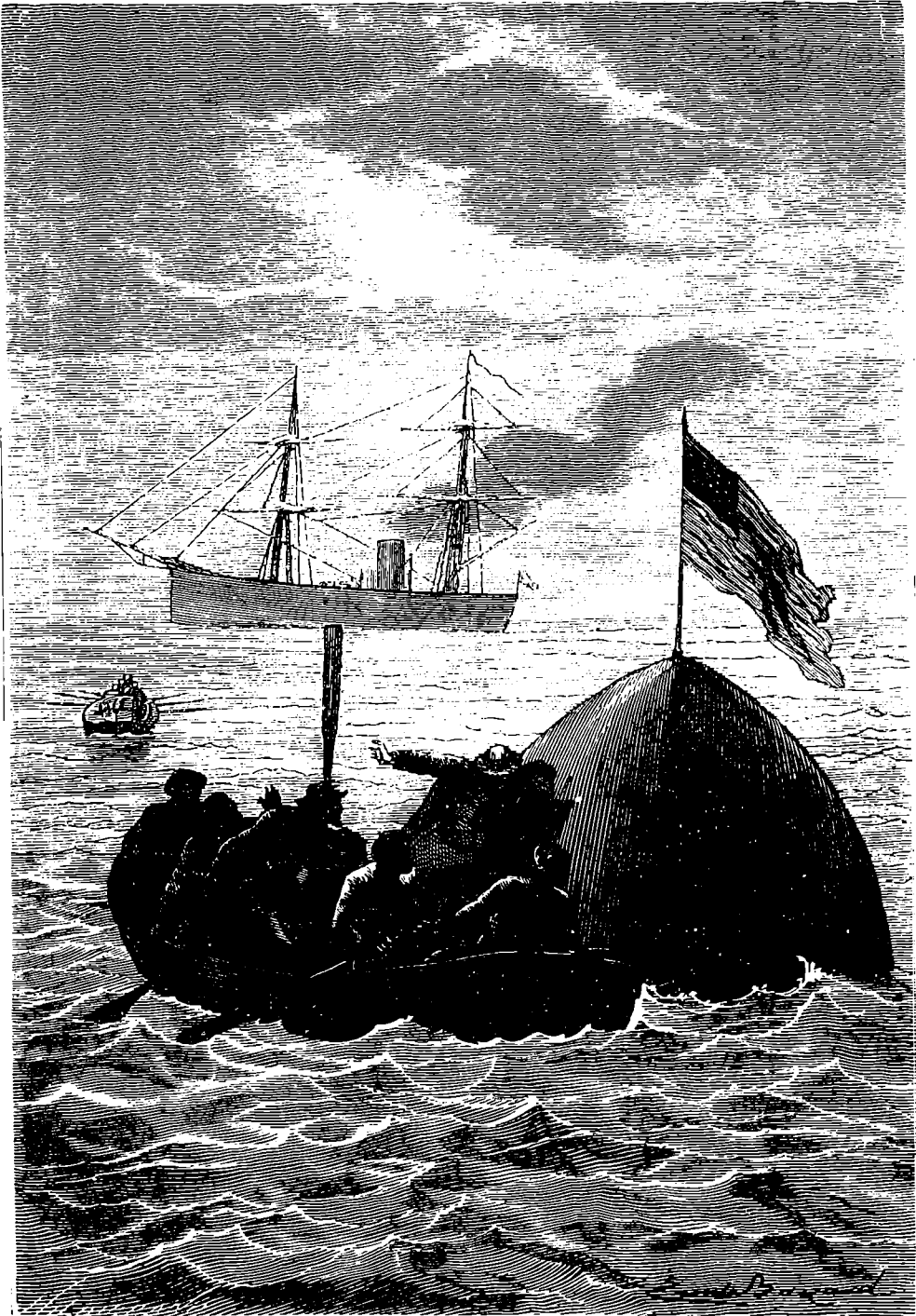
"Yes."

J. T. Maston did not doubt of their final success, but his companions, no longer upheld by the excitement of the first hours, understood all the difficulty of the enterprise. What seemed easy at San Francisco, seemed here in the wide ocean almost impossible. The chances of success diminished in rapid proportion; and it was from chance alone that the meeting with the projectile might be expected.

The next day, the 24th, in spite of the fatigue of the previous day, the operation was renewed. The corvette advanced some minutes to westward, and the apparatus, provided with air, bore the same explorers to the depths of the ocean.



The descent began.



“White all, Barbicane.”

The whole day passed in fruitless research; the bed of the sea was a desert. The 25th brought no other result, nor the 26th.

It was disheartening. They thought of those unfortunates shut up in the projectile for twenty-six days. Perhaps at that moment they were experiencing the first approach of suffocation; that is, if they had escaped the dangers of their fall. The air was spent, and doubtless with the air all their *morale*.

"The air, possibly," answered J. T. Maston resolutely, "but their *morale* never!"

On the 28th, after two more days of search, all hope was gone. This projectile was but an atom in the immensity of the ocean. They must give up all idea of finding it.

But J. T. Maston would not hear of going away. He would not abandon the place without at least discovering the tomb of his friends. But Commander Blomsberry could no longer persist, and in spite of the exclamations of the worthy Secretary, was obliged to give the order to sail.

On the 29th of December, at nine a.m., the "Susquehanna," heading N.E., resumed her course to the bay of San Francisco.

It was ten in the morning; the corvette was under half steam, as if regretting to leave the spot where the catastrophe had taken place, when a sailor, perched on the maintop gallant cross-trees, watching the sea, cried suddenly,—
"A buoy on the lee bow!"

The officers looked in the direction indicated, and by the help of their glasses, saw that the object signalled had the appearance of one of those buoys, which are used to mark the passages of bays or rivers. But, singularly to say, a flag floating on the wind surmounted its cone, which emerged five or six feet out of water. This buoy shone under the rays of the sun as if it had been made of plates of silver. Commander Blomsberry, J. T. Maston, and the delegates of the Gun Club were mounted on the bridge, examining this object straying at random on the waves.

All looked with feverish anxiety, but in silence. None dared give expression to the thoughts which came to the minds of all.

The corvette approached to within two cables' lengths of the object.

A shudder ran through the whole crew. That flag was the American flag!

At this moment a perfect howling was

heard; it was the brave J. T. Maston, who had just fallen all in a heap. Forgetting on the one hand that his right arm had been replaced by an iron hook, and on the other that a simple gutta-percha cap covered his brainbox, he had given himself a formidable blow.

They hurried towards him, picked him up, restored him to life. And what were his first words?

"Ah! trebly brutes! quadruply idiots! quintuply boobies that we are!"

"What is it?" exclaimed every one around him.

"What is it?"

"Come, speak!"

"It is, simpletons," howled the terrible Secretary, "it is that the projectile only weighs 19,250lbs.!"

"Well?"

"And that it displaces twenty-eight tons, or in other words 56,000lbs., and that consequently *it floats!*"

Ah! what stress the worthy man laid on the verb "float!" And it was true! All, yes! all these savants had forgotten this fundamental law, namely, that on account of its specific lightness, the projectile, after having been drawn by its fall to the greatest depths of the ocean, must naturally return to the surface. And now it was floating quietly at the mercy of the waves.

The boats were put to sea. J. T. Maston and his friends had rushed into them! Excitement was at its height! Every heart beat loudly whilst they advanced to the projectile. What did it contain? Living or dead? Living, yes! living, at least unless death had struck Barbicane and his two friends since they had hoisted the flag. Profound silence reigned on the boats. All were breathless. Eyes no longer saw. One of the scuttles of the projectile was open. Some pieces of glass remained in the frame, showing that it had been broken. This scuttle was actually five feet above the water.

A boat came alongside, that of J. T. Maston, and J. T. Maston rushed to the broken window.

At that moment they heard a clear and merry voice, the voice of Michel Ardan, exclaiming in an accent of triumph,—

"White all, Barbicane, white all!"

Barbicane, Michel Ardan, and Nicholl were playing at dominoes!

Round the Moon

CHAPTER XXIII

THE END

WE may remember the intense sympathy which had accompanied the travellers on their departure. If at the beginning of the enterprise they had excited such emotion both in the old and new world, with what enthusiasm would they be received on their return! The millions of spectators which had beset the peninsula of Florida, would they not rush to meet these sublime adventurers? Those legions of strangers, hurrying from all parts of the globe towards the American shores, would they leave the Union without having seen Barbicane, Nicholl, and Michel Ardan? No! and the ardent passion of the public was bound to respond worthily to the greatness of the enterprise. Human creatures who had left the terrestrial sphere, and returned after this strange voyage into celestial space, could not fail to be received as the prophet Elias would be if he came back to earth. To see them first, and then to hear them, such was the universal longing.

Barbicane, Michel Ardan, Nicholl, and the delegates of the Gun Club, returning without delay to Baltimore, were received with indescribable enthusiasm. The notes of President Barbicane's voyage were ready to be given to the public. The *New York Herald* bought the manuscript at a price not yet known, but which must have been very high. Indeed, during the publication of "A Journey to the Moon," the sale of this paper amounted to five millions of copies. Three days after the return of the travellers to the earth, the slightest detail of their expedition was known. There remained nothing more but to see the heroes of this superhuman enterprise.

The expedition of Barbicane and his friends round the moon had enabled them to correct the many admitted theories regarding the terrestrial satellite. These savants had observed *de visu*, and under particular circumstances. They knew what systems should be rejected, what retained with regard to the formation of that orb, its origin, its habitability. Its past, present, and future had even given up their last secrets. Who could advance objections against conscientious observers, who at less than twenty-four miles distance had marked that curious mountain of Tycho, the strangest

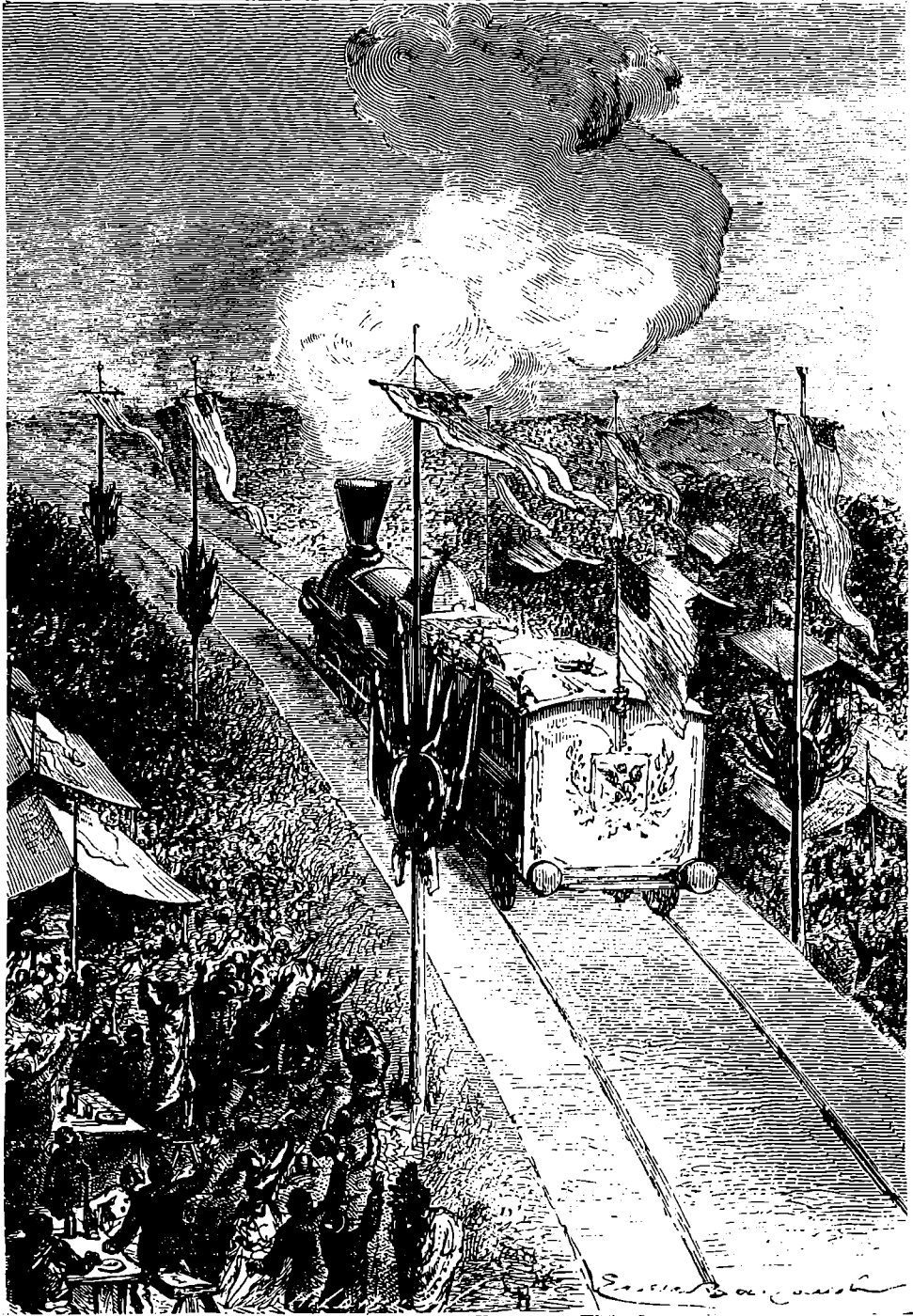
system of lunar orography? How answer those savants whose sight had penetrated the abyss of Pluto's circle? How contradict those bold ones whom the chances of their enterprise had borne over that invisible face of the disc, which no human eye until then had ever seen? It was now their turn to impose some limit on that Selenographic science, which had reconstructed the lunar world as Cuvier did the skeleton of a fossil, and say, "The moon was this, a habitable world, inhabited before the earth! The moon is that, a world uninhabitable, and now uninhabited."

To celebrate the return of its most illustrious member and his two companions, the Gun Club decided upon giving a banquet, but a banquet worthy of the conquerors, worthy of the American people, and under such conditions that all inhabitants of the Union could directly take part in it.

All the head lines of railroads in the State were joined by flying rails; and on all the platforms, lined with the same flags, and decorated with the same ornaments, were tables laid and all served alike. At certain hours, successively calculated, marked by electric clocks which beat the seconds at the same time, the population were invited to take their place at the banquet tables. For four days, from the 5th to the 9th of January, the trains were stopped as they are on Sundays on the Union railways, and every road was open. One engine only at full speed, drawing a triumphal carriage, had the right of travelling for those four days on the railroads of the United States.

The engine was manned by a driver and a stoker, and bore, by special favour, the Hon. J. T. Maston, Secretary of the Gun Club. The carriage was reserved for President Barbicane, Colonel Nicholl, and Michel Ardan. At the whistle of the driver, amid the hurrahs, and all the admiring vociferations of the American language, the train left the platform of Baltimore. It travelled at a speed of 160 miles in the hour. But what was this speed compared with that which had carried the three heroes from the mouth of the Columbiad?

Thus they sped from one town to the other, finding whole populations at table on their



The apotheosis was worthy of the three heroes.

road, saluting them with the same acclamations, lavishing the same bravos! They travelled in this way through the east of the Union, Pennsylvania, Connecticut, Massachusetts, Vermont, Maine, and New Brunswick; the north and the west by New York, Ohio, Michigan, and Wisconsin; returning to the south by Illinois, Missouri, Arkansas, Texas, and Louisiana; they went to the south-east by Alabama and Florida, going up by Georgia and the Carolinas, visiting the centre by Tennessee, Kentucky, Virginia, and Indiana, and, after quitting the Washington station, re-entered Baltimore, where for four days one would have thought that the United States of America were seated at one immense banquet, saluting them simultaneously with the same hurrahs! The apotheosis was worthy of these three heroes whom fable would have placed in the rank of demigods.

And now will this attempt, unprecedented in the annals of travels, lead to any practical result? Will direct communication with the moon ever be established? Will they ever lay the foundation of a travelling service through the solar world? Will they go from one planet

to another, from Jupiter to Mercury, and after awhile from one star to another, from the Polar to Sirius? Will this means of locomotion allow us to visit those suns which swarm in the firmament?

To such questions no answer can be given. But knowing the bold ingenuity of the Anglo-Saxon race, no one would be astonished if the Americans seek to make some use of President Barbicane's attempt.

Thus, some time after the return of the travellers, the public received with marked favour the announcement of a company, limited, with a capital of a hundred million of dollars, divided into a hundred thousand shares of a thousand dollars each, under the name of the "*National Company of Interstellar Communication.*" President, Barbicane; Vice-president, Captain Nicholl; Secretary, J. T. Maston; Director of Movements, Michel Ardan.

And as it is part of the American temperament to foresee everything in business, even failure, the Honourable Harry Trollope, judge commissioner, and Francis Drayton, magistrate, were nominated beforehand!

Twenty Thousand Leagues Under the Sea

Twenty Thousand Leagues Under the Sea

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Part I

Twenty Thousand Leagues Under the Sea

CHAPTER I

A SHIFTING REEF

THE year 1866 was signalised by a remarkable incident, a mysterious and inexplicable phenomenon, which doubtless no one has yet forgotten. Not to mention rumours which agitated the maritime population, and excited the public mind, even in the interior of continents, seafaring men were particularly excited. Merchants, common sailors, captains of vessels, skippers, both of Europe and America, naval officers of all countries, and the Governments of several states on the two continents, were deeply interested in the matter.

For some time past, vessels had been met by "an enormous thing," a long object, spindle-shaped, occasionally phosphorescent, and infinitely larger and more rapid in its movements than a whale.

The facts relating to this apparition (entered in various log-books) agreed in most respects as to the shape of the object or creature in question, the untiring rapidity of its movements, its surprising power of locomotion, and the peculiar life with which it seemed endowed. If it was a cetacean, it surpassed in size all those hitherto classified in science. Taking into consideration the mean of observations made at divers times,—rejecting the timid estimate of those who assigned to this object a length of two hundred feet, equally with the exaggerated opinions which set it down as a mile in width and three in length,—we might fairly conclude that this mysterious being surpassed greatly all dimensions admitted by the ichthyologists of the day, if it existed at all. And that it *did* exist was an undeniable fact; and, with that tendency which disposes the human mind in favour of the marvellous, we can understand the excitement produced in the entire world by this supernatural apparition. As to classing it in the list of fables, the idea was out of the question.

On the 20th of July 1866, the steamer *Governor Higginson*, of the Calcutta and Burnach Steam Navigation Company, had met this moving mass five miles off the east coast of Australia. Captain Baker thought at first that he was in the presence of an unknown sandbank; he even prepared to determine its exact position, when two columns of water,

projected by the inexplicable object, shot with a hissing noise a hundred and fifty feet up into the air. Now, unless the sandbank had been submitted to the intermittent eruption of a geyser, the *Governor Higginson* had to do neither more nor less than with an aquatic mammal, unknown till then, which threw up from its blow-holes columns of water mixed with air and vapour.

Similar facts were observed on the 23rd of July in the same year, in the Pacific Ocean, by the *Columbus*, of the West India and Pacific Steam Navigation Company. But this extraordinary cetaceous creature could transport itself from one place to another with surprising velocity; as, in an interval of three days, the *Governor Higginson* and the *Columbus* had observed it at two different points of the chart, separated by a distance of more than seven hundred nautical leagues.

Fifteen days later, two thousand miles farther off, the *Helvetia*, of the Compagnie-Nationale, and the *Shannon*, of the Royal Mail Steamship Company, sailing to windward in that portion of the Atlantic lying between the United States and Europe, respectively signalled the monster to each other in 42° 15' N. lat. and 60° 35' W. long. In these simultaneous observations, they thought themselves justified in estimating the minimum length of the mammal at more than three hundred and fifty feet, as the *Shannon* and *Helvetia* were of smaller dimensions than it, though they measured three hundred feet over all.

Now the largest whales, those which frequent those parts of the sea round the Aleutian, Kulammak, and Umgullich islands, have never exceeded the length of sixty yards, if they attain that.

These reports arriving one after the other, with fresh observations made on board the transatlantic ship *Pereira*, a collision which occurred between the *Etna* of the Inman line and the monster, a *procès verbal* directed by the officers of the French frigate *Normandie*, a very accurate survey made by the staff of Commodore Fitz-James on board the *Lord Clyde*, greatly influenced public opinion. Light-thinking people jested upon the phenomenon, but grave practical countries, such as

England, America, and Germany, treated the matter more seriously.

In every place of great resort the monster was the fashion. They sang of it in the cafés, ridiculed it in the papers, and represented it on the stage. All kinds of stories were circulated regarding it. There appeared in the papers caricatures of every gigantic and imaginary creature, from the white whale, the terrible "Moby Dick" of hyperborean regions, to the immense kraken whose tentacles could entangle a ship of five hundred tons, and hurry it into the abyss of the ocean. The legends of ancient times were even resuscitated, and the opinions of Aristotle and Pliny revived, who admitted the existence of these monsters, as well as the Norwegian tales of Bishop Pontoppidan, the accounts of Paul Heggede, and, last of all, the reports of Mr Harrington (whose good faith no one could suspect), who affirmed that, being on board the *Castillan*, in 1857, he had seen this enormous serpent, which had never until that time frequented any other seas but those of the ancient "*Constitutionel*."

Then burst forth the interminable controversy between the credulous and the incredulous in the societies of savants and scientific journals. "The question of the monster" inflamed all minds. Editors of scientific journals, quarrelling with believers in the supernatural, spilled seas of ink during this memorable campaign, some even drawing blood; for, from the sea-serpent, they came to direct personalities.

For six months war was waged with various fortune in the leading articles of the Geographical Institution of Brazil, the Royal Academy of Science of Berlin, the British Association, the Smithsonian Institution of Washington, in the discussions of the "Indian Archipelago," of the *Cosmos* of the Abbé Moigno, in the *Mittheilungen* of Petermann, in the scientific chronicles of the great journals of France and other countries. The cheaper journals replied keenly and with inexhaustible zest. These satirical writers parodied a remark of Linnaeus, quoted by the adversaries of the monster, maintaining "that nature did not make fools," and adjured their contemporaries not to give the lie to nature, by admitting the existence of krakens, sea-serpents, "Moby Dicks," and other lucubrations of delirious sailors. At length an article in a well-known satirical journal by a favourite contributor, the chief of the staff, settled the monster, like Hippolytus, giving it the death-blow amidst an universal burst of laughter. Wit had conquered science.

During the first months of the year 1867, the question seemed buried never to revive, when new facts were brought before the public. It was then no longer a scientific problem to be solved, but a real danger seriously to be avoided. The question took quite another shape. The monster became a small island, a rock, a reef, but a reef of indefinite and shifting proportions.

On the 5th of March 1867, the *Moravian*, of the Montreal Ocean Company, finding herself during the night in 27° 30' lat. and 72° 15' long., struck on her starboard quarter a rock, marked in no chart for that part of the sea. Under the combined efforts of the wind and its four hundred horse-power, it was going at the rate of thirteen knots. Had it not been for the superior strength of the hull of the *Moravian*, she would have been broken by the shock and gone down with the 237 passengers she was bringing home from Canada.

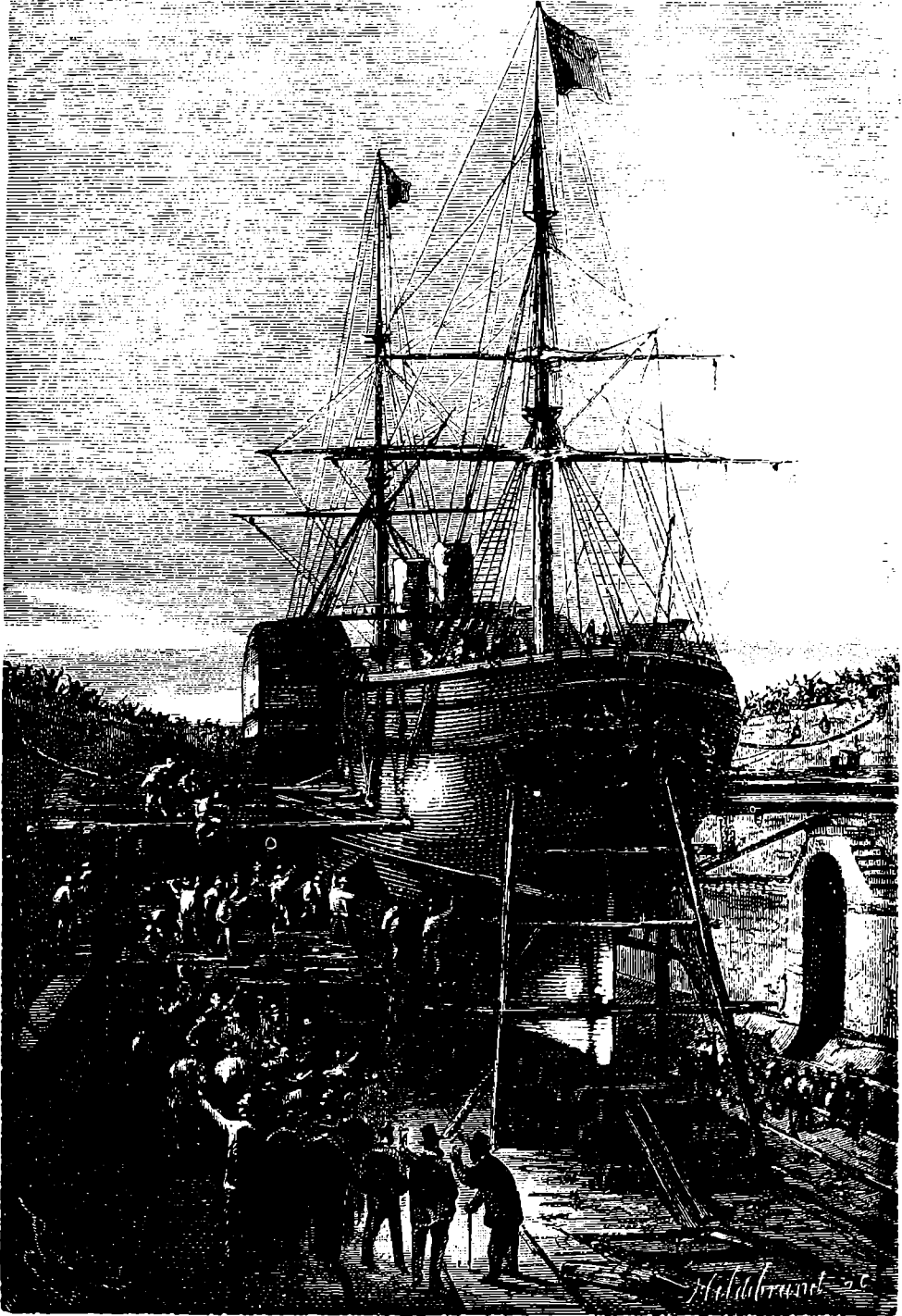
The accident happened about five o'clock in the morning, as the day was breaking. The officers of the quarter-deck hurried to the after-part of the vessel. They examined the sea with the most scrupulous attention. They saw nothing but a strong eddy about three cables' length distant, as if the surface has been violently agitated. The bearings of the place were taken exactly, and the *Moravian* continued its route without apparent damage. Had it struck on a submerged rock, or an enormous wreck? they could not tell; but on examination of the ship's bottom when undergoing repairs, it was found that part of her keel was broken.

This fact, so grave in itself, might perhaps have been forgotten like many others, if, three weeks after, it had not been re-enacted under similar circumstances. But, thanks to the nationality of the victim of the shock, thanks to the reputation of the company to which the vessel belonged, the circumstance became extensively circulated.

The 13th of April 1867, the sea being beautiful, the breeze favourable, the *Scotia* of the Cunard Company's line, found herself in 15° 12' long. and 45° 37' lat. She was going at the speed of thirteen knots and a half.

At seventeen minutes past four in the afternoon, whilst the passengers were assembled at lunch in the great saloon, a slight shock was felt on the hull of the *Scotia*, on her quarter, a little aft of the port-paddle.

The *Scotia* had not struck, but she had been struck, and seemingly by something rather sharp and penetrating than blunt. The shock had been so slight that no one had been



The mysterious accident to the Scotia.

alarmed, had it not been for the shouts of the carpenter's watch, who rushed on to the bridge exclaiming, "We are sinking! we are sinking!" At first the passengers were much frightened, but Captain Anderson hastened to reassure them. The danger could not be imminent. The *Scotia*, divided into seven compartments by strong partitions, could brave with impunity any leak. Captain Anderson went down immediately into the hold. He found that the sea was pouring into the fifth compartment; and the rapidity of the influx proved that the force of the water was considerable. Fortunately this compartment did not hold the boilers, or the fires would have been immediately extinguished. Captain Anderson ordered the engines to be stopped at once, and one of the men went down to ascertain the extent of the injury. Some minutes afterwards they discovered the existence of a large hole, of two yards in diameter, in the ship's bottom. Such a leak could not be stopped; and the *Scotia*, her paddles half submerged, was obliged to continue her course. She was then three hundred miles from Cape Clear, and after three days' delay, which caused great uneasiness in Liverpool, she entered the basin of the company.

The engineers visited the *Scotia*, which was put in dry dock. They could scarcely believe it possible; at two yards and a half below water-

mark was a regular rent, in the form of an isosceles triangle. The broken place in the iron plates was so perfectly defined, that it could not have been more neatly done by a punch. It was clear, then, that the instrument producing the perforation was not of a common stamp; and after having been driven with prodigious strength, and piercing an iron plate $1\frac{3}{4}$ inches thick, had withdrawn itself by a retrograde motion truly inexplicable.

Such was the last fact, which resulted in exciting once more the torrent of public opinion. From this moment all unlucky casualties which could not be otherwise accounted for were put down to the monster.

Upon this imaginary creature rested the responsibility of all these shipwrecks, which unfortunately were considerable; for of three thousand ships whose loss was annually recorded at Lloyds', the number of sailing and steam ships supposed to be totally lost, from the absence of all news, amounted to not less than two hundred!

Now, it was the "monster" who, justly or unjustly, was accused of their disappearance, and, thanks to it, communication between the different continents became more and more dangerous. The public demanded peremptorily that the seas should at any price be relieved from this formidable cetacean.

Twenty Thousand Leagues Under the Sea

CHAPTER II

PRO AND CON

AT the period when these events took place, I had just returned from a scientific research in the disagreeable territory of Nebraska, in the United States. In virtue of my office as Assistant Professor in the Museum of Natural History in Paris, the French Government had attached me to that expedition. After six months in Nebraska, I arrived in New York towards the end of March, laden with a precious collection. My departure for France was fixed for the first days in May. Meanwhile, I was occupying myself in classifying my mineralogical, botanical, and zoological riches, when the accident happened to the *Scotia*.

I was perfectly up in the subject which was the question of the day. How could I be otherwise? I had read and re-read all the American and European papers without being any nearer a conclusion. This mystery puzzled me. Under the impossibility of forming an opinion, I jumped from one extreme to the other. That there really was something could not be doubted, and the incredulous were invited to put their finger on the wound of the *Scotia*.

On my arrival at New York, the question was at its height. The hypothesis of the floating island, and the unapproachable sand-bank, supported by minds little competent to form a judgment, was abandoned. And, indeed, unless this shoal had a machine in its stomach, how could it change its position with such astonishing rapidity?

From the same cause, the idea of a floating hull of an enormous wreck was given up.

There remained then only two possible solutions of the question, which created two distinct parties: on one side, those who were for a monster of colossal strength; on the other, those who were for a submarine vessel of enormous motive power.

But this last hypothesis, plausible as it was, could not stand against inquiries made in both worlds. That a private gentleman should have such a machine at his command was not likely. Where, when, and how was it built? and how could its construction have been kept secret? Certainly a Government might possess such a destructive machine. And in these disastrous times, when the ingenuity of man has multi-

plied the power of weapons of war, it was possible that, without the knowledge of others, a state might try to work such a formidable engine. After the chassepots came the torpedoes, after the torpedoes the submarine rams, then—the reaction. At least, I hope so.

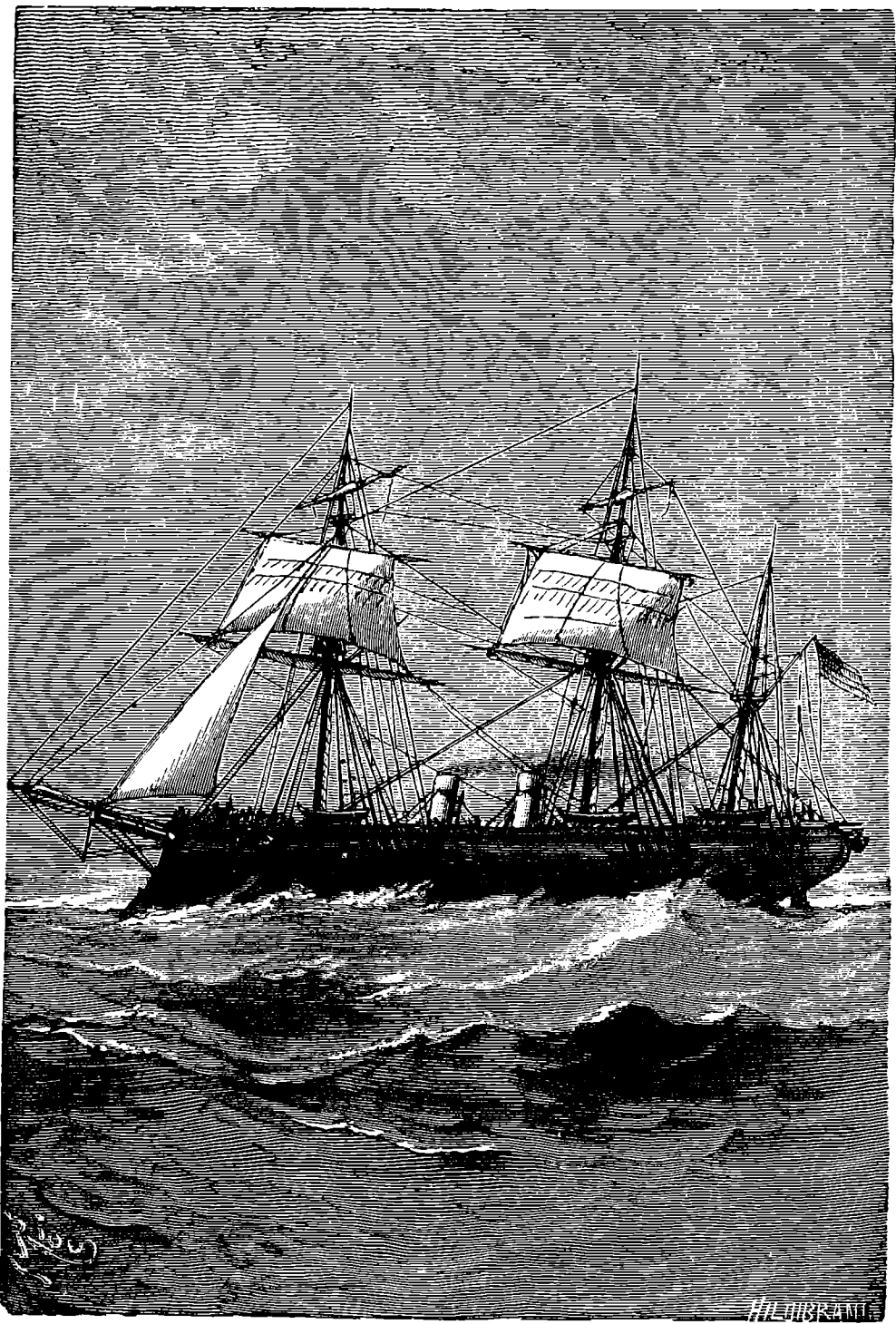
But the hypothesis of a war machine fell before the declaration of Governments. As public interest was in question, and transatlantic communications suffered, their veracity could not be doubted. But, how admit that the construction of this submarine boat had escaped the public eye? For a private gentleman to keep the secret under such circumstances would be very difficult, and for a state whose every act is persistently watched by powerful rivals, certainly impossible.

After inquiries made in England, France, Russia, Prussia, Spain, Italy, and America, even in Turkey, the hypothesis of a submarine monitor was definitely rejected.

Upon my arrival in New York several persons did me the honour of consulting me on the phenomenon in question. I had published in France a work in quarto, in two volumes, entitled, "Mysteries of the Great Submarine Grounds." This book, highly approved of in the learned world, gained for me a special reputation in this rather obscure branch of Natural History. My advice was asked. As long as I could deny the reality of the fact, I confined myself to a decided negative. But soon finding myself driven into a corner, I was obliged to explain myself categorically. And even "the Honourable Pierre Aronnax, Professor in the Museum of Paris," was called upon by the *New York Herald* to express a definite opinion of some sort. I did something. I spoke, for want of power to hold my tongue. I discussed the question in all its forms, politically and scientifically; and I give here an extract from a carefully-studied article which I published in the number of the 30th of April. It ran as follows:—

"After examining one by one the different hypotheses, rejecting all other suggestions, it becomes necessary to admit the existence of a marine animal of enormous power.

"The great depths of the ocean are entirely



The U.S. frigate *Abraham Lincoln*.

TWENTY THOUSAND LEAGUES UNDER THE SEA

unknown to us. Soundings cannot reach them. What passes in those remote depths—what beings live, or can live, twelve or fifteen miles beneath the surface of the waters—what is the organisation of these animals, we can scarcely conjecture. However, the solution of the problem submitted to me may modify the form of the dilemma. Either we do know all the varieties of beings which people our planet, or we do not. If we do *not* know them all—if Nature has still secrets in ichthyology for us, nothing is more conformable to reason than to admit the existence of fishes, or cetaceans of other kinds, or even of new species, of an organisation formed to inhabit the strata inaccessible to soundings, and which an accident of some sort, either fantastical or capricious, has brought at long intervals to the upper level of the ocean.

“If, on the contrary, we *do* know all living kinds, we must necessarily seek for the animal in question amongst those marine beings already classed; and, in that case, I should be disposed to admit the existence of a gigantic narwhal.

“The common narwhal, or unicorn of the sea, often attains a length of sixty feet. Increase its size fivefold or tenfold, give it strength proportionate to its size, lengthen its destructive weapons, and you obtain the animal required. It will have the proportions determined by the officers of the *Shannon*, the instrument required by the perforation of the *Scotia*, and the power necessary to pierce the hull of the steamer.

“Indeed the narwhal is armed with a sort of ivory sword, a halberd, according to the expression of certain naturalists. The principal tusk has the hardness of steel. Some of these tusks have been found buried in the bodies of whales, which the unicorn always attacks with success. Others have been drawn out, not without trouble, from the bottom of ships, which they had pierced through and through, as a gimlet pierces a barrel. The Museum of the Faculty of Medicine of Paris possesses one of these defensive weapons, two yards and a quarter in length, and fifteen inches in diameter at the base.

“Very well! suppose this weapon to be six times stronger, and the animal ten times more powerful; launch it at the rate of twenty miles an hour, and you obtain a shock capable of producing the catastrophe required. Until further information, therefore, I shall maintain it to be a sea-unicorn of colossal dimensions, armed, not with a halberd, but with a real spur, as the armoured frigates, or

the “rams” of war, whose massiveness and motive power it would possess at the same time. Thus may this inexplicable phenomenon be explained, unless there be something over and above all that one has ever conjectured, seen, perceived, or experienced; which is just within the bounds of possibility.”

These last words were cowardly on my part; but, up to a certain point, I wished to shelter my dignity as Professor, and not give too much cause for laughter to the Americans, who laugh well when they do laugh. I reserved for myself a way of escape: In effect, however, I admitted the existence of the “monster.” My article was warmly discussed, which procured it a high reputation. It rallied round it a certain number of partisans. The solution it proposed gave, at least, full liberty to the imagination. The human mind delights in grand conceptions of supernatural beings. And the sea is precisely their best vehicle, the only medium through which these giants (against which terrestrial animals, such as elephants or rhinoceroses, are as nothing), can be produced or developed.

The industrial and commercial papers treated the question chiefly from this point of view. The *Shipping and Mercantile Gazette*, the *Lloyds' List*, the *Packet-Boat*, and the *Maritime and Colonial Review*, all papers devoted to insurance companies which threatened to raise their rates of premium, were unanimous on this point. Public opinion had been pronounced. The United States were the first in the field; and in New York they made preparations for an expedition destined to pursue this narwhal. A frigate of great speed, the *Abraham Lincoln*, was put in commission as soon as possible. The arsenals were opened to Commander Farragut, who hastened the arming of his frigate; but, as it always happens, the moment it was decided to pursue the monster, the monster did not appear. For two months no one heard it spoken of. No ship met with it. It seemed as if this unicorn knew of the plots weaving around it. It had been so much talked of, even through the Atlantic cable, that jesters pretended that this slender fly had stopped a telegram on its passage, and was making the most of it.

So when the frigate had been armed for a long campaign, and provided with formidable fishing apparatus, no one could tell what course to pursue. Impatience grew apace, when, on the 2nd of July, they learned that a steamer of the line of San Francisco, from California to Shanghai, had seen the animal three weeks before in the North Pacific Ocean. The excitement caused by this news was

extreme. The ship was revictualled and well stocked with coal.

Three hours before the *Abraham Lincoln* left Brooklyn pier, I received a letter worded as follows:—

“To M. ARONNAX, Professor in the Museum of Paris,

“Fifth Avenue Hotel, New York.

“SIR,—If you will consent to join the *Abraham Lincoln* in this expedition, the Government of the United States will with pleasure see France represented in the enterprise. Commander Farragut has a cabin at your disposal.—Very cordially yours, J. B. HOBSON,

“Secretary of Marine.”

Twenty Thousand Leagues Under the Sea

CHAPTER III

I FORM MY RESOLUTION

THREE seconds before the arrival of J. B. Hobson's letter, I no more thought of pursuing the unicorn than of attempting the passage of the North Sea. Three seconds after reading the letter of the honourable Secretary of Marine, I felt that my true vocation, the sole end of my life, was to chase this disturbing monster, and purge it from the world.

But I had just returned from a fatiguing journey, weary and longing for repose. I aspired to nothing more than again seeing my country, my friends, my little lodging by the Jardin des Plantes, my dear and precious collections. But nothing could keep me back! I forgot all—fatigue, friends, and collections—and accepted without hesitation the offer of the American Government.

"Besides," thought I, "all roads lead back to Europe; and the unicorn may be amiable enough to hurry me towards the coast of France. This worthy animal may allow itself to be caught in the seas of Europe (for my particular benefit), and I will not bring back less than half a yard of his ivory halberd to the Museum of Natural History." But in the meanwhile I must seek this narwhal in the North Pacific Ocean, which, to return to France, was taking the road to the antipodes.

"Conseil," I called, in an impatient voice.

Conseil was my servant, a true, devoted Flemish boy, who had accompanied me in all my travels. I liked him, and he returned the liking well. He was phlegmatic by nature, regular from principle, zealous from habit, evincing little disturbance at the different surprises of life, very quick with his hands, and apt at any service required of him; and, despite his name, never giving advice—even when asked for it.

Conseil had followed me for the last ten years wherever science led. Never once did he complain of the length or fatigue of a journey, never make an objection to pack his portmanteau for whatever country it might be, or however far away, whether China or Congo. Besides all this, he had good health, which defied all sickness, and solid muscles, but no nerves; good morals are understood. This boy was thirty years old, and his age to that of his master as fifteen to twenty. May I be excused

for saying that I was forty years old?

But Conseil had one fault, he was ceremonious to a degree, and would never speak to me but in the third person, which was sometimes provoking.

"Conseil," said I again, beginning with feverish hands to make preparations for my departure.

Certainly I was sure of this devoted boy. As a rule, I never asked him if it were convenient for him or not to follow me in my travels; but this time the expedition in question might be prolonged, and the enterprise might be hazardous in pursuit of an animal capable of sinking a frigate as easily as a nutshell. Here there was matter for reflection even to the most impassive man in the world. What would Conseil say?

"Conseil," I called a third time.

Conseil appeared.

"Did you call, sir?" said he, entering.

"Yes, my boy; make preparations for me and yourself too. We leave in two hours."

"As you please, sir," replied Conseil, quietly.

"Not an instant to lose;—lock in my trunk all travelling utensils, coats, shirts, and stockings—without counting, as many as you can, and make haste."

"And your collections, sir?" observed Conseil.

"We will think of them by and by."

"What! the archiotherium, the hyracotherium, the oreodons, the cheropotamus, and the other skins?"

"They will keep them at the hotel."

"And your live Babiroussa, sir?"

"They will feed it during our absence; besides, I will give orders to forward our menagerie to France."

"We are not returning to Paris, then?" said Conseil.

"Oh! certainly," I answered, evasively, "by making a curve."

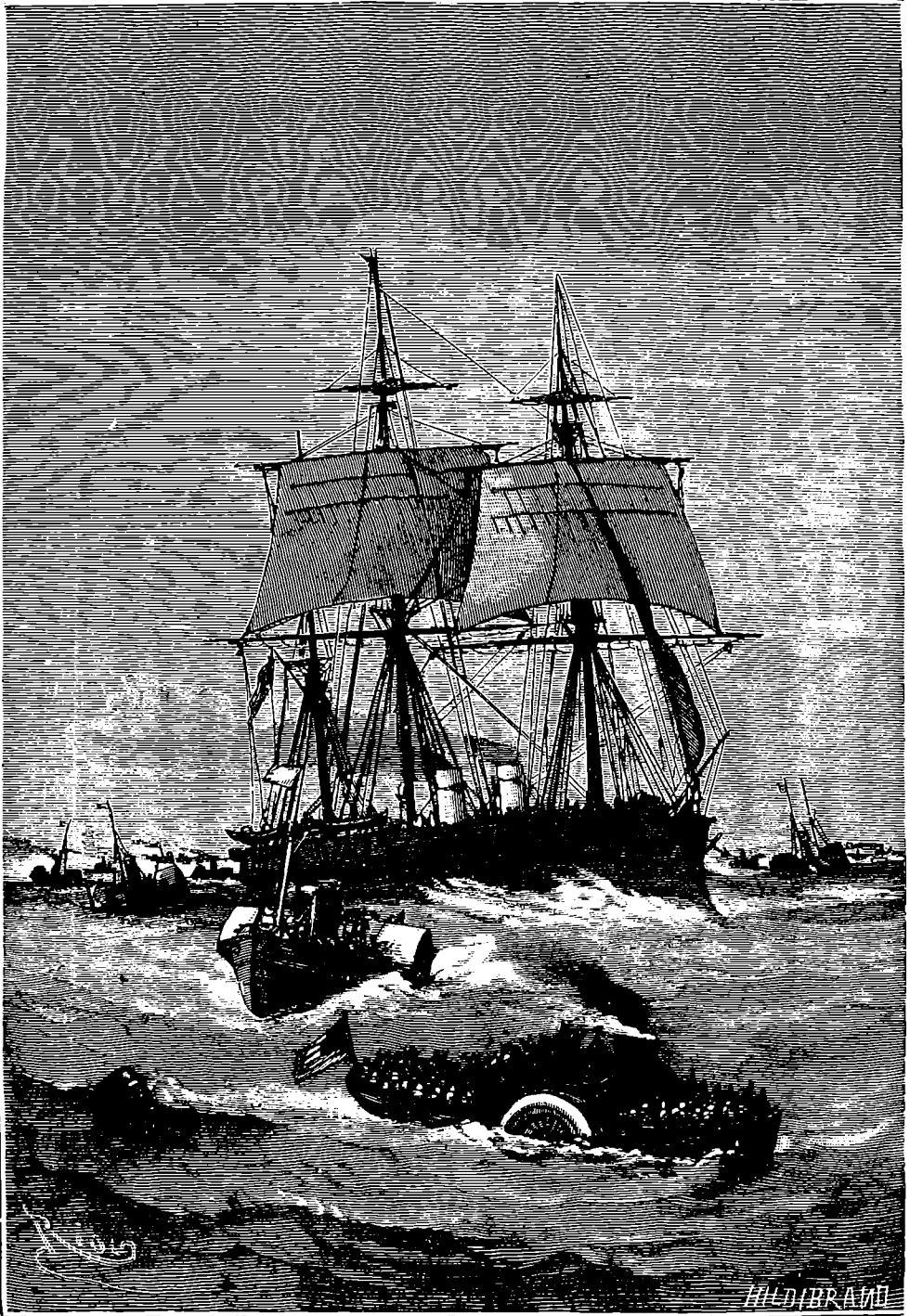
"Will the curve please you, sir?"

"Oh! it will be nothing; not quite so direct a road, that is all. We take our passage in the *Abraham Lincoln*."

"As you think proper, sir," coolly replied Conseil.



“As you please, sir,” replied Conseil, quietly.”



The *Abraham Lincoln* escorted out of the Hudson.

“You see, my friend, it has to do with the monster—the famous narwhal. We are going to purge it from the seas. The author of a work in quarto, in two volumes, on the ‘Mysteries of the Great Submarine Grounds’ cannot forbear embarking with Commander Farragut. A glorious mission, but a dangerous one! We cannot tell where we may go; these animals can be very capricious. But we will go whether or no; we have got a captain who is pretty wide-awake.”

I opened a credit account for Babiroussa, and, Conseil following, I jumped into a cab. Our luggage was transported to the deck of the frigate immediately. I hastened on board and asked for Commander Farragut. One of the sailors conducted me to the poop, where I found myself in the presence of a good-looking officer, who held out his hand to me.

“Monsieur Pierre Aronnax?” said he.

“Himself,” replied I; “Commander Farragut?”

“You are welcome, Professor; your cabin is ready for you.”

I bowed, and desired to be conducted to the cabin destined for me.

The *Abraham Lincoln* had been well chosen and equipped for her new destination. She was a frigate of great speed, fitted with high-pressure engines which admitted a pressure of seven atmospheres. Under this the *Abraham Lincoln* attained the mean speed of nearly eighteen knots and a third an hour—a considerable speed, but, nevertheless, insufficient to grapple with this gigantic cetacean.

The interior arrangements of the frigate corresponded to its nautical qualities. I was well satisfied with my cabin, which was in the after part, opening upon the gunroom.

“We shall be well off here,” said I to Conseil.

“As well, by your honour’s leave, as a hermit-crab in the shell of a whelk,” said Conseil.

I left Conseil to stow our trunks conveniently away, and remounted the poop in order to survey the preparations for departure.

At that moment Commander Farragut was

ordering the last moorings to be cast loose which held the *Abraham Lincoln* to the pier of Brooklyn. So in a quarter of an hour, perhaps less, the frigate would have sailed without me. I should have missed this extraordinary, supernatural, and incredible expedition, the recital of which may well meet with some scepticism.

But Commander Farragut would not lose a day nor an hour in scouring the seas in which the animal had been sighted. He sent for the engineer.

“Is the steam full on?” asked he.

“Yes, sir,” replied the engineer.

“Go a-head,” cried Commander Farragut.

The quay of Brooklyn, and all that part of New York bordering on the East River, was crowded with spectators. Three cheers burst successively from five hundred thousand throats; thousands of handkerchiefs were waved above the heads of the compact mass, saluting the *Abraham Lincoln*, until she reached the water of the Hudson, at the point of that elongated peninsula which forms the town of New York. The the frigate, following the coast of New Jersey along the right bank of the beautiful river, covered with villas, passed between the forts, which saluted her with their heaviest guns. The *Abraham Lincoln* answered by hoisting the American colours three times, whose thirty-nine stars shone resplendent from the mizen-peak; then modifying its speed to take the narrow channel marked by buoys placed in the inner bay formed by Sandy Hook Point, it coasted the long sandy beach, where some thousands of spectators gave it one final cheer. The escort of boats and tenders still followed the frigate, and did not leave her until they came abreast of the lightship, whose two lights marked the entrance of New York Channel.

Six bells struck, the pilot got into his boat, and rejoined the little schooner which was waiting under our lee, the fires were made up, the screw beat the waves more rapidly, the frigate skirted the low yellow coast of Long Island; and at eight bells, after having lost sight in the north-west of the lights of Fire Island, she ran at full steam on to the dark waters of the Atlantic.

Twenty Thousand Leagues Under the Sea

CHAPTER IV

NED LAND

CAPTAIN FARRAGUT was a good seaman, worthy of the frigate he commanded. His vessel and he were one. He was the soul of it. On the question of the cetacean there was no doubt in his mind, and he would not allow the existence of the animal to be disputed on board. He believed in it, as certain good women believe in the leviathan,—by faith, not by reason. The monster did exist, and he had sworn to rid the seas of it. He was a kind of Knight of Rhodes, a second Dieudonné de Gozon, going to meet the serpent which desolated the island. Either Captain Farragut would kill the narwhal, or the narwhal would kill the captain. There was no third course.

The officers on board shared the opinion of their chief. They were ever chatting, discussing, and calculating the various chances of a meeting, watching narrowly the vast surface of the ocean. More than one took up his quarters voluntarily in the cross-trees, who would have cursed such a berth under any other circumstances. As long as the sun described its daily course, the rigging was crowded with sailors, whose feet were burnt to such an extent by the heat of the deck as to render it unbearable; still the *Abraham Lincoln* had not yet breasted the suspected waters of the Pacific. As to the ship's company, they desired nothing better than to meet the unicorn, to harpoon it, hoist it on board, and despatch it. They watched the sea with eager attention.

Besides, Captain Farragut had spoken of a certain sum of two thousand dollars, set apart for whoever should first sight the monster, were he cabin-boy, common seaman, or officer.

I leave you to judge how eyes were used on board the *Abraham Lincoln*.

For my own part, I was not behind the others, and left to no one my share of daily observations. The frigate might have been called the *Argus*, for a hundred reasons. Only one amongst us, Conseil, seemed to protest by his indifference against the question which so interested us all, and seemed to be out of keeping with the general enthusiasm on board.

I have said that Captain Farragut had carefully provided his ship with every apparatus for catching the gigantic cetacean.

No whaler had ever been better armed. We possessed every known engine, from the harpoon thrown by the hand to the barbed arrows of the blunderbuss, and the explosive balls of the duck-gun. On the fore-castle lay the perfection of a breech-loading gun, very thick at the breech, and very narrow in the bore, the model of which had been in the Exhibition of 1867. This precious weapon of American origin could throw with ease a conical projectile of nine pounds to a mean distance of ten miles.

Thus the *Abraham Lincoln* wanted for no means of destruction; and, what was better still, she had on board Ned Land, the prince of harpooners.

Ned Land was a Canadian, with an uncommon quickness of hand, and who knew no equal in his dangerous occupation. Skill, coolness, audacity, and cunning, he possessed in a superior degree, and it must be a cunning whale or a singularly "cute" cachalot to escape the stroke of his harpoon.

Ned Land was about forty years of age; he was a tall man (more than six feet high), strongly built, grave and taciturn, occasionally violent, and very passionate when contradicted. His person attracted attention, but above all the boldness of his look, which gave a singular expression to his face.

Who calls himself Canadian calls himself French; and little communicative as Ned Land was, I must admit that he took a certain liking for me. My nationality drew him to me, no doubt. It was an opportunity for him to talk, and for me to hear, that old language of Rabelais, which is still in use in some Canadian provinces. The harpooner's family was originally from Quebec, and was already a tribe of hardy fishermen when this town belonged to France.

Little by little, Ned Land acquired a taste for chatting, and I loved to hear the recital of his adventures in the polar seas. He related his fishing, and his combats, with natural poetry of expression; his recital took the form of an epic poem, and I seemed to be listening to a Canadian Homer singing the Iliad of the regions of the North.

I am portraying this hardy companion as I



Ned Land the Canadian Harpooner.

really knew him. We are old friends now, united in that unchangeable friendship which is born and cemented amidst extreme dangers. Ah, brave Ned! I ask no more than to live a hundred years longer, that I may have more time to dwell the longer on your memory.

Now, what was Ned Land's opinion upon the question of the marine monster? I must admit that he did not believe in the unicorn, and was the only one on board who did not share that universal conviction. He even avoided the subject, which I one day thought it my duty to press upon him. One magnificent evening, the 30th July—that is to say, three weeks after our departure—the frigate was abreast of Cape Blanc, thirty miles to leeward of the coast of Patagonia. We had crossed the tropic of Capricorn, and the Straits of Magellan opened less than seven hundred miles to the south. Before eight days were over, the *Abraham Lincoln* would be ploughing the waters of the Pacific.

Seated on the poop, Ned Land and I were chatting of one thing and another as we looked at this mysterious sea, whose great depths had up to this time been inaccessible to the eye of man. I naturally led up the conversation to the giant unicorn, and examined the various chances of success or failure of the expedition. But seeing that Ned Land let me speak without saying too much himself, I pressed him more closely.

"Well, Ned," said I, "is it possible that you are not convinced of the existence of this cetacean that we are following? Have you any particular reason for being so incredulous?"

The harpooner looked at me fixedly for some moments before answering, struck his broad forehead with his hand (a habit of his), as if to collect himself, and said at last, "Perhaps I have, Mr Aronnax."

"But, Ned, you, a whaler by profession, familiarised with all the great marine mammalia—you, whose imagination might easily accept the hypothesis of enormous cetaceans, *you* ought to be the last to doubt under such circumstances!"

"That is just what deceives you, Professor," replied Ned. "That the vulgar should believe in extraordinary comets traversing space, and in the existence of antediluvian monsters in the heart of the globe, may well be; but neither astronomers nor geologists believe in such chimeras. As a whaler, I have followed many a cetacean, harpooned a great number, and killed several; but, however strong or well-armed they may have been, neither their tails nor their weapons would have been able even

to scratch the iron plates of a steamer."

"But, Ned, they tell of ships which the teeth of the narwhal has pierced through and through."

"Wooden ships—that is possible," replied the Canadian; "but I have never seen it done; and, until further proof, I deny that whales, cetaceans, or sea-unicorns could ever produce the effect you describe."

"Well, Ned, I repeat it with a conviction resting on the logic of facts. I believe in the existence of a mammal powerfully organised, belonging to the branch of vertebrata, like the whales, the cachalots, or the dolphins, and furnished with a horn of defence of great penetrating power."

"Hum!" said the harpooner, shaking his head with the air of a man who would not be convinced.

"Notice one thing, my worthy Canadian," I resumed. "If such an animal is in existence, if it inhabits the depths of the ocean, if it frequents the strata lying miles below the surface of the water, it must necessarily possess an organisation the strength of which would defy all comparison."

"And why this powerful organisation?" demanded Ned.

"Because it requires incalculable strength to keep one's self in these strata and resist their pressure. Listen to me. Let us admit that the pressure of the atmosphere is represented by the weight of a column of water thirty-two feet high. In reality the column of water would be shorter, as we are speaking of sea water, the density of which is greater than that of fresh water. Very well, when you dive, Ned, as many times thirty-two feet of water as there are above you, so many times does your body bear a pressure equal to that of the atmosphere, that is to say, 15 lbs. for each square inch of its surface. It follows then, that at 320 feet this pressure = that of 10 atmospheres, of 100 atmospheres at 3200 feet, and of 1000 atmospheres at 32,000 feet, that is, about 6 miles; which is equivalent to saying that, if you could attain this depth in the ocean, each square $\frac{3}{4}$ of an inch of the surface of your body would bear a pressure of 5600 lbs. Ah! my brave Ned, do you know how many square inches you carry on the surface of your body?"

"I have no idea, Mr Aronnax."

"About 6500; and, as in reality the atmospheric pressure is about 15 lbs. to the square inch, your 6500 square inches bear at this moment a pressure of 97,500 lbs."

"Without my perceiving it?"

“Without your perceiving it. And if you are not crushed by such a pressure, it is because the air penetrates the interior of your body with equal pressure. Hence perfect equilibrium between the interior and exterior pressure, which thus neutralise each other, and which allows you to bear it without inconvenience. But in the water it is another thing.”

“Yes, I understand,” replied Ned, becoming more attentive; “because the water surrounds me, but does not penetrate.”

“Precisely, Ned: so that at 32 feet beneath the surface of the sea you would undergo a pressure of 97,500 lbs.; at 320 feet, ten times that pressure; at 3200 feet, a hundred times that pressure; lastly, at 32,000 feet, a thousand times that pressure would be 97,500,000 lbs.—that is to say, that you would be flattened as if you had been drawn from the plates of a hydraulic machine!”

“The devil!” exclaimed Ned.

“Very well, my worthy harpooner, if some vertebrate, several hundred yards long, and large in proportion, can maintain itself in such depths—of those whose surface is represented

by millions of square inches, that is by tens of millions of pounds, we must estimate the pressure they undergo. Consider, then, what must be the resistance of their bony structure, and the strength of their organisation to withstand such pressure!”

“Why!” exclaimed Ned Land, “they must be made of iron plates eight inches thick, like the armoured frigates.”

“As you say, Ned. And think what destruction such a mass would cause, if hurled with the speed of an express train against the hull of a vessel.”

“Yes—certainly—perhaps,” replied the Canadian, shaken by these figures, but not yet willing to give in.

“Well, have I convinced you?”

“You have convinced me of one thing, sir, which is that, if such animals do exist at the bottom of the seas, they must necessarily be as strong as you say.”

“But if they do not exist, mine obstinate harpooner, how explain the accident to the *Scotia*?”

Twenty Thousand Leagues Under the Sea

CHAPTER V

AT A VENTURE

THE voyage of the *Abraham Lincoln* was for a long time marked by no special incident. But one circumstance happened which showed the wonderful dexterity of Ned Land, and proved what confidence we might place in him.

The 30th of June, the frigate spoke some American whalers, from whom we learned that they knew nothing about the narwhal. But one of them, the captain of the *Monroe*, knowing that Ned Land had shipped on board the *Abraham Lincoln*, begged for his help in chasing a whale they had in sight. Commander Farragut, desirous of seeing Ned Land at work, gave him permission to go on board the *Monroe*. And fate served our Canadian so well that, instead of one whale, he harpooned two with a double blow, striking one straight to the heart, and catching the other after some minutes' pursuit.

Decidedly, if the monster ever had to do with Ned Land's harpoon, I would not bet in its favour.

The frigate skirted the south-east coast of America with great rapidity. The 3rd of July we were at the opening of the Straits of Magellan, level with Cape Vierge. But Commander Farragut would not take a tortuous passage, but doubled Cape Horn.

The ship's crew agreed with him. And certainly it was possible that they might meet the narwhal in this narrow pass. Many of the sailors affirmed that the monster could not pass there, "that he was too big for that!"

The 6th of July, about three o'clock in the afternoon, the *Abraham Lincoln*, at fifteen miles to the South, doubled the solitary island, this lost rock at the extremity of the American continent, to which some Dutch sailors gave the name of their native town, Cape Horn. The course was taken towards the north-west, and the next day the screw of the frigate was at last beating the waters of the Pacific.

"Keep your eyes open!" called out the sailors.

And they were opened widely. Both eyes and glasses, a little dazzled, it is true, by the prospect of two thousand dollars, had not an instant's repose. Day and night they watched the surface of the ocean, and even nyctalopes, whose faculty of seeing in the darkness

multiplies their chances a hundredfold, would have had enough to do to gain the prize.

I myself, for whom money had no charms, was not the least attentive on board. Giving but few minutes to my meals, but a few hours to sleep, indifferent to either rain or sunshine, I did not leave the poop of the vessel. Now leaning on the netting of the fore-castle, now on the taffrail, I devoured with eagerness the soft foam which whitened the sea as far as the eye could reach; and how often have I shared the emotion of the majority of the crew, when some capricious whale raised its black back above the waves! The poop of the vessel was crowded in a moment. The cabins poured forth a torrent of sailors and officers, each with heaving breast and troubled eye watching the course of the cetacean. I looked, and looked, till I was nearly blind, whilst Conseil, always phlegmatic, kept repeating in a calm voice:

"If, sir, you would not squint so much, you would see better!"

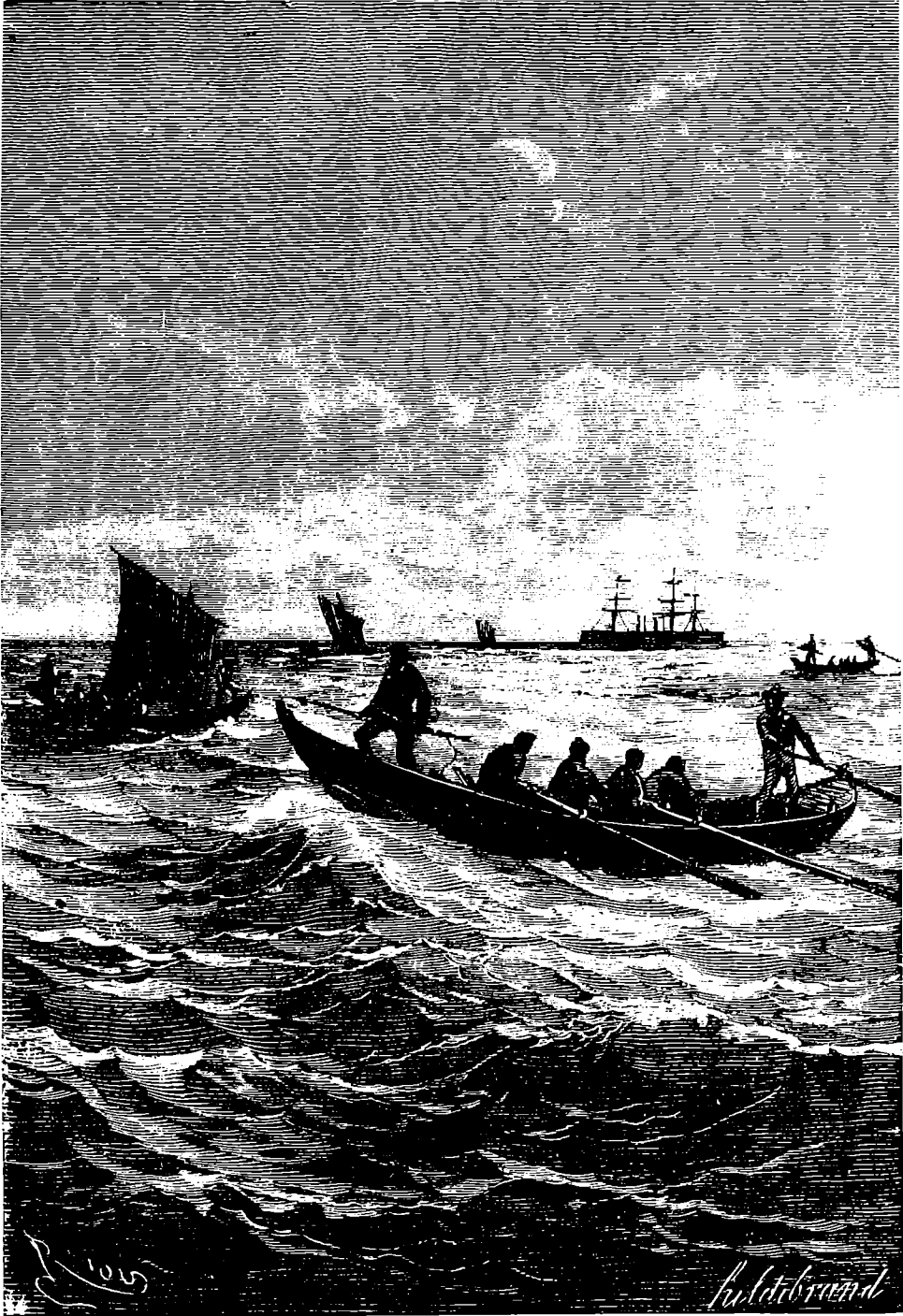
But vain excitement! the *Abraham Lincoln* checked its speed and made for the animal signalled, a simple whale, or common cachalot, which soon disappeared amidst a storm of execration.

But the weather was good. The voyage was being accomplished under the most favourable auspices. It was then the bad season in Australia, the July of that zone corresponding to our January in Europe; but the sea was beautiful and easily scanned round a vast circumference.

The 20th July, the tropic of Capricorn was cut by 105° of longitude, and the 27th of the same month we crossed the equator on the 110th meridian. This passed, the frigate took a more decided westerly direction, and scoured the central waters of the Pacific. Commander Farragut thought, and with reason, that it was better to remain in deep water, and keep clear of continents or islands, which the beast itself seemed to shun (perhaps because there was not enough water for him! suggested the greater part of the crew). The frigate passed at some distance from the Marquesas and the Sandwich Islands, crossed the tropic of Cancer, and made for the China Seas. We were on the



“I devoured with eagerness the soft foam which whitened the sea as far as the eye could reach.”



Searching for the Mysterious Cetacean.

theatre of the last diversions of the monster; and to say truth, we no longer *lived* on board. Hearts palpitated, fearfully preparing themselves for future incurable aneurism. The entire ship's crew were undergoing a nervous excitement, of which I can give no idea: they could not eat, they could not sleep—twenty times a day, misconception or an optical illusion of some sailor seated on the taffrail, would cause dreadful perspirations, and these emotions, twenty times repeated, kept us in a state of excitement so violent that a reaction was unavoidable.

And truly, reaction soon showed itself. For three months, during which a day seemed an age, the *Abraham Lincoln* furrowed all the waters of the Northern Pacific, running at whales, making sharp deviations from her course, veering suddenly from one tack to another, stopping suddenly, putting on steam, and backing ever and anon at the risk of deranging her machinery; and not one point of the Japanese or American coast was left unexplored.

The warmest partisans of the enterprise now became its most ardent detractors. Reaction mounted from the crew to the captain himself, and certainly, had it not been for resolute determination on the part of Captain Farragut, the frigate would have headed due southward. This useless search could not last much longer. The *Abraham Lincoln* had nothing to reproach herself with, she had done her best to succeed. Never had an American ship's crew shown more zeal or patience; its failure could not be placed to their charge—there remained nothing but to return.

This was represented to the commander. The sailors could not hide their discontent, and the service suffered. I will not say there was a mutiny on board, but after a reasonable period of obstinacy, Captain Farragut (as Columbus did) asked for three days' patience. If in three days the monster did not appear, the man at the helm should give three turns of the wheel, and the *Abraham Lincoln* would make for the European seas.

This promise was made on the 2nd of November. It had the effect of rallying the ship's crew. The ocean was watched with renewed attention. Each one wished for a last glance in which to sum up his remembrance. Glasses were used with feverish activity. It was a grand defiance given to the giant narwhal, and he could scarcely fail to answer the summons and "appear."

Two days passed, the steam was at half pressure; a thousand schemes were tried to

attract the attention and stimulate the apathy of the animal in case it should be met in those parts. Large quantities of bacon were trailed in the wake of the ship, to the great satisfaction (I must say) of the sharks. Small craft radiated in all directions round the *Abraham Lincoln* as she lay to, and did not leave a spot of the sea unexplored. But the night of the 4th of November arrived without the unveiling of this submarine mystery.

The next day, the 5th of November, at twelve the delay would (morally speaking) expire; after that time, Commander Farragut, faithful to his promise, was to turn the course to the south-east and abandon for ever the northern regions of the Pacific.

The frigate was then in 31° 15' north latitude and 136° 42' east longitude. The coast of Japan still remained less than two hundred miles to leeward. Night was approaching. They had just struck eight bells; large clouds veiled the face of the moon, then in its first quarter. The sea undulated peaceably under the stern of the vessel.

At that moment I was leaning forward on the starboard netting. Conseil, standing near me, was looking straight before him. The crew, perched in the ratlines, examined the horizon, which contracted and darkened by degrees. Officers with their night glasses scoured the growing darkness: sometimes the ocean sparkled under the rays of the moon, which darted between two clouds, then all trace of light was lost in the darkness.

In looking at Conseil, I could see he was undergoing a little of the general influence. At least I thought so. Perhaps for the first time his nerves vibrated to a sentiment of curiosity.

"Come, Conseil," said I, "this is the last chance of pocketing the two thousand dollars."

"May I be permitted to say, sir," replied Conseil, "that I never reckoned on getting the prize; and, had the government of the Union offered a hundred thousand dollars, it would have been none the poorer."

"You are right, Conseil. It is a foolish affair after all, and one upon which we entered too lightly. What time lost, what useless emotions! We should have been back in France six months ago."

"In your little room, sir," replied Conseil, "and in your museum, sir; and I should have already classed all your fossils, sir. And the Babiroussa would have been installed in its cage in the Jardin des Plantes, and have drawn all the curious people of the capital!"

"As you say, Conseil. I fancy we shall run a

fair chance of being laughed at for our pains.”

“That’s tolerably certain,” replied Conseil, quietly; “I think they will make fun of you, sir. And, must I say it?”—

“Go on, my good friend.”

“Well, sir, you will only get your deserts.”

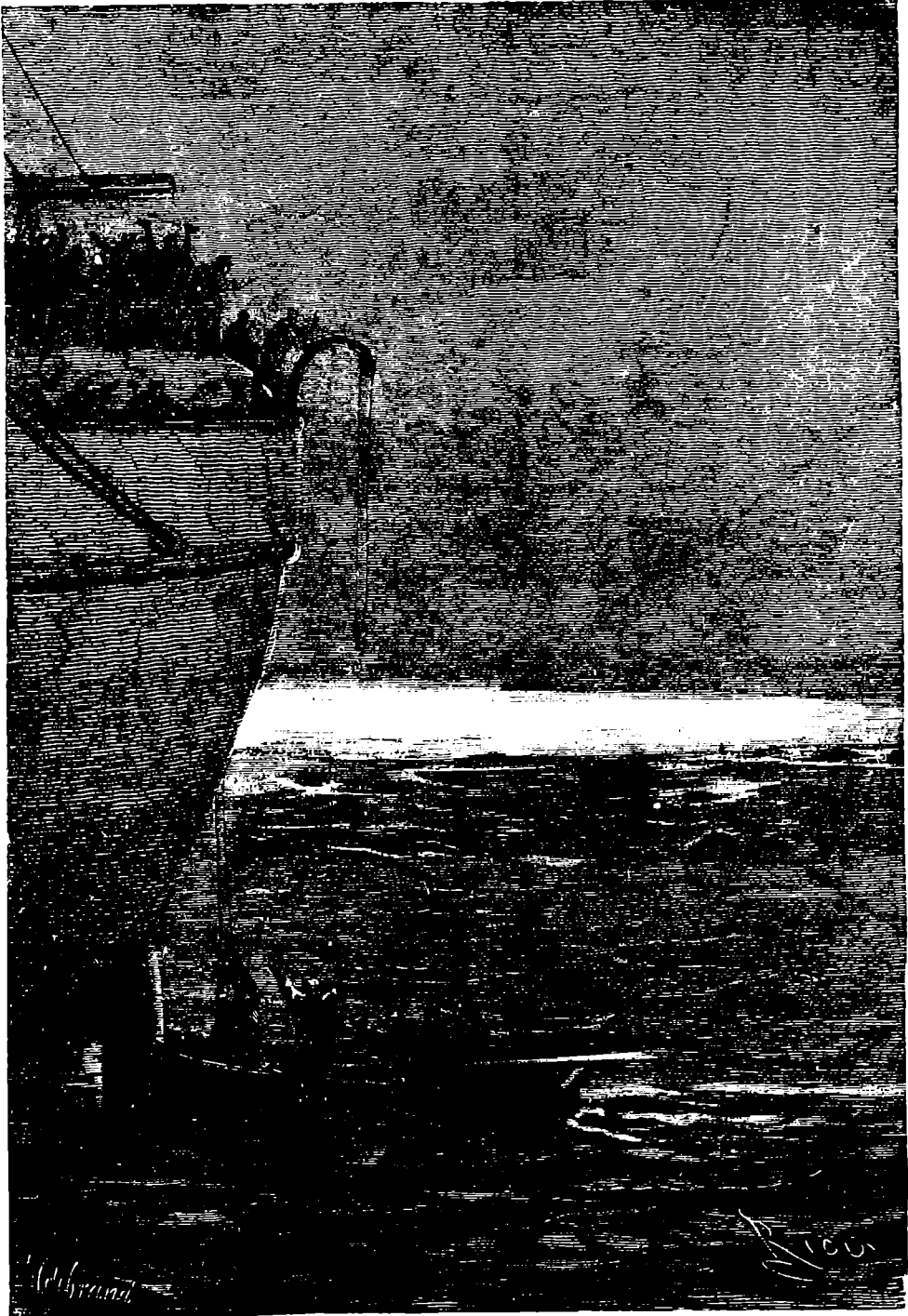
“Indeed!”

“When one has the honour of being a

savant as you are, sir, one should not expose one’s self to”—

Conseil had not time to finish his compliment. In the midst of general silence a voice had just been heard. It was the voice of Ned Land shouting—

“Look out there! the very thing we are looking for—on our weather beam!”



Sudden appearance of the Marine Monster.

Twenty Thousand Leagues Under the Sea

CHAPTER VI

AT FULL STEAM

AT this cry the whole ship's crew hurried towards the harpooner,—commander, officers, masters, sailors, cabin boys; even the engineers left their engines, and the stokers their furnaces.

The order to stop her had been given, and the frigate now simply went on by her own momentum. The darkness was then profound, and however good the Canadian's eyes were, I asked myself how he had managed to see, and what he had been able to see. My heart beat as if it would break. But Ned Land was not mistaken, and we all perceived the object he pointed to. At two cables' lengths from the *Abraham Lincoln*, on the starboard quarter, the sea seemed to be illuminated all over. It was not a mere phosphoric phenomenon. The monster emerged some fathoms from the water, and then threw out that very intense but inexplicable light mentioned in the report of several captains. This magnificent irradiation must have been produced by an agent of great *shining* power. The luminous part traced on the sea an immense oval, much elongated, the centre of which condensed a burning heat, whose overpowering brilliancy died out by successive gradations.

"It is only an agglomeration of phosphoric particles," cried one of the officers.

"No, sir, certainly not," I replied. "Never did pholades or salpae produce such a powerful light. That brightness is of an essentially electrical nature. Besides, see, see! it moves; it is moving forwards, backwards, it is darting towards us!"

A general cry rose from the frigate.

"Silence!" said the Captain; "up with the helm, reverse the engines."

The steam was shut off, and the *Abraham Lincoln*, beating to port, described a semi-circle.

"Right the helm, go a-head," cried the Captain.

These orders were executed, and the frigate moved rapidly from the burning light.

I was mistaken. She tried to sheer off, but the supernatural animal approached with a velocity double her own.

We gasped for breath. Stupefaction more than fear made us dumb and motionless. The

animal gained on us, sporting with the waves. It made the round of the frigate, which was then making fourteen knots, and enveloped it with its electric rings like luminous dust. Then it moved away two or three miles, leaving a phosphorescent track, like those volumes of steam that the express trains leave behind. All at once from the dark line of the horizon whither it retired to gain its momentum, the monster rushed suddenly towards the *Abraham Lincoln* with alarming rapidity, stopped suddenly about twenty feet from the hull, and died out,—not diving under the water, for its brilliancy did not abate,—but suddenly, and as if the source of this brilliant emanation was exhausted. Then it reappeared on the other side of the vessel, as if it had turned and slid under the hull. Any moment a collision might have occurred which would have been fatal to us. However, I was astonished at the manoeuvres of the frigate. She fled and did not attack.

On the captain's face, generally so impassive, was an expression of unaccountable astonishment.

"Mr Aronnax," he said, "I do not know with what formidable being I have to deal, and I will not imprudently risk my frigate in the midst of this darkness. Besides, how attack this unknown thing, how defend one's self from it? Wait for daylight, and the scene will change."

"You have no further doubt, captain, of the nature of the animal?"

"No, sir; it is evidently a gigantic narwhal, and an electric one."

"Perhaps," added I, "one can only approach it with a gymnotus or a torpedo."

"Undoubtedly," replied the captain, "if it possesses such dreadful power, it is the most terrible animal that ever was created. That is why, sir, I must be on my guard."

The crew were on their feet all night. No one thought of sleep. The *Abraham Lincoln*, not being able to struggle with such velocity, had moderated its pace, and sailed at half speed. For its part, the narwhal, imitating the frigate, let the waves rock it at will, and seemed decided not to leave the scene of the struggle. Towards midnight, however, it disappeared,

or, to use a more appropriate term, it "died out" like a large glow-worm. Had it fled? One could only fear, not hope it. But at seven minutes to one o'clock in the morning a deafening whistling was heard, like that produced by a body of water rushing with great violence.

The captain, Ned Land, and I, were then on the poop, eagerly peering through the profound darkness.

"Ned Land," asked the commander, "you have often heard the roaring of whales?"

"Often, sir; but never such whales the sight of which brought me in two thousand dollars. If I can only approach within four harpoon lengths of it!"

"But to approach it," said the commander, "I ought to put a whaler at your disposal?"

"Certainly, sir."

"That will be trifling with the lives of my men."

"And mine too," simply said the harpooner.

Towards two o'clock in the morning, the burning light reappeared, not less intense, about five miles to windward of the *Abraham Lincoln*. Notwithstanding the distance, and the noise of the wind and sea, one heard distinctly the loud strokes of the animal's tail, and even its panting breath. It seemed that, at the moment that the enormous narwhal had come to take breath at the surface of the water, the air was engulfed in its lungs, like the steam in the vast cylinders of a machine of two thousand horse power.

"Hum!" thought I, "a whale with the strength of a cavalry regiment would be a pretty whale!"

We were on the *qui vive* till daylight, and prepared for the combat. The fishing implements were laid along the hammock nettings. The second lieutenant loaded the blunderbusses, which could throw harpoons to the distance of a mile, and long duck-guns, with explosive bullets, which inflicted mortal wounds even to the most terrible animals. Ned Land contented himself with sharpening his harpoon—a terrible weapon in his hands.

At six o'clock, day began to break; and with the first glimmer of light, the electric light of the narwhal disappeared. At seven o'clock the day was sufficiently advanced, but a very thick sea fog obscured our view, and the best spy-glasses could not pierce it. That caused disappointment and anger.

I climbed the mizen-mast. Some officers were already perched on the mast heads. At eight o'clock the fog lay heavily on the waves, and its thick scrolls rose little by little. The

horizon grew wider and clearer at the same time. Suddenly, just as on the day before, Ned Land's voice was heard:

"The thing itself on the port quarter!" cried the harpooner.

Every eye was turned towards the point indicated. There, a mile and a half from the frigate, a long blackish body emerged a yard above the waves. Its tail, violently agitated, produced a considerable eddy. Never did a caudal appendage beat the sea with such violence. An immense track, of a dazzling whiteness, marked the passage of the animal, and described a long curve.

The frigate approached the cetacean. I examined it thoroughly.

The reports of the *Shannon* and of the *Helvetia* had rather exaggerated its size, and I estimated its length at only two hundred and fifty feet. As to its dimensions, I could only conjecture them to be admirably proportioned. While I watched this phenomenon, two jets of steam and water were ejected from its vents, and rose to the height of 120 feet, thus I ascertained its way of breathing. I concluded definitely that it belonged to the vertebrate branch, class mammalia.

The crew waited impatiently for their chief's orders. The latter, after having observed the animal attentively, called the engineer. The engineer ran to him.

"Sir," said the commander, "you have steam up?"

"Yes, sir," answered the engineer.

"Well, make up your fires and put on all steam."

Three hurrahs greeted this order. The time for the struggle had arrived. Some moments after, the two funnels of the frigate vomited torrents of black smoke, and the bridge quaked under the trembling of the boilers.

The *Abraham Lincoln*, propelled by her powerful screw, went straight at the animal. The latter allowed it to come within half a cable's length; then, as if disdainful to dive, it took a little turn, and stopped a short distance off.

This pursuit lasted nearly three-quarters of an hour, without the frigate gaining two yards on the cetacean. It was quite evident that at that rate we should never come up with it.

"Well, Mr Land," asked the captain, "do you advise me to put the boats out to sea?"

"No, sir," replied Ned Land; "because we shall not take that beast easily."

"What shall we do then?"

"Put on more steam if you can, sir. With your leave, I mean to post myself under the



“The old gunner, with steady eye and grave face, took a long aim.”

bowsprit, and if we get within harpooning distance, I shall throw my harpoon."

"Go, Ned," said the captain. "Engineer, put on more pressure."

Ned Land went to his post. The fires were increased, the screw revolved forty-three times a minute, and the steam poured out of the valves. We heaved the log, and calculated that the *Abraham Lincoln* was going at the rate of 18½ miles an hour.

But the accursed animal swam too at the rate of 18½ miles.

For a whole hour, the frigate kept up this pace, without gaining six feet. It was humiliating for one of the swiftest sailers in the American navy. A stubborn anger seized the crew; the sailors abused the monster, who, as before, disdained to answer them; the captain no longer contented himself with twisting his beard—he gnawed it.

The engineer was again called.

"You have turned full steam on?"

"Yes sir," replied the engineer.

The speed of the *Abraham Lincoln* increased. Its mast trembled down to their stepping holes, and the clouds of smoke could hardly find way out of the narrow funnels.

They heaved the log a second time.

"Well?" asked the captain of the man at the wheel.

"Nineteen miles and 3/10, sir."

"Clap on more steam."

The engineer obeyed. The manometer showed ten degrees. But the cetacean grew warm itself, no doubt; for, without straining itself it made 193/10 miles.

What a pursuit! No, I cannot describe the emotion that vibrated through me. Ned Land kept his post, harpoon in hand. Several times the animal let us gain upon it.—"We shall catch it! we shall catch it!" cried the Canadian. But just as he was going to strike, the cetacean stole away with a rapidity that could not be estimated at less than thirty miles an hour, and even during our maximum of speed, it bullied the frigate, going round and round it. A cry of fury broke from every one!

At noon we were no further advanced than at eight o'clock in the morning.

The captain then decided to take more direct means.

"Ah!" said he, "that animal goes quicker than the *Abraham Lincoln*. Very well! we will see whether it will escape these conical bullets. Send your men to the fore-castle, sir."

The fore-castle gun was immediately loaded and slewed round. But the shot passed some feet above the cetacean, which was half a mile

off.

"Another more to the right," cried the commander, "and five dollars to whoever will hit that infernal beast."

An old gunner with a grey beard—that I can see now—with steady eye and grave face, went up to the gun and took a long aim. A loud report was heard, with which were mingled the cheers of the crew.

The bullet did its work; it hit the animal, but not fatally, and sliding off the rounded surfaces, was lost in two miles depth of sea.

The chase began again, and the captain, leaning towards me, said—

"I will pursue that beast till my frigate bursts up."

"Yes," answered I; "and you will be quite right to do it."

I wished the beast would exhaust itself, and not be insensible to fatigue like a steam engine! But it was of no use. Hours passed, without its showing any signs of exhaustion.

However, it must be said in praise of the *Abraham Lincoln*, that she struggled on indefatigably. I cannot reckon the distance she made under three hundred miles during this unlucky day, November the 6th. But night came on, and overshadowed the rough ocean.

Now I thought our expedition was at an end, and that we should never again see the extraordinary animal. I was mistaken. At ten minutes to eleven in the evening, the electric light reappeared three miles to windward of the frigate, as pure, as intense as during the preceding night.

The narwhal seemed motionless; perhaps, tired with its day's work, it slept, letting itself float with the undulation of the waves. Now was a chance of which the captain resolved to take advantage.

He gave his orders. The *Abraham Lincoln* kept up half steam, and advanced cautiously so as not to awake its adversary. It is no rare thing to meet in the middle of the ocean whales so sound asleep that they can be successfully attacked, and Ned Land had harpooned more than one during its sleep. The Canadian went to take his place again under the bowsprit.

The frigate approached noiselessly, stopped at two cables' lengths from the animal, and following its track. No one breathed; a deep silence reigned on the bridge. We were not a hundred feet from the burning focus, the light of which increased and dazzled our eyes.

At this moment, leaning on the fore-castle bulwark, I saw below me Ned Land grappling the martingale in one hand, brandishing his terrible harpoon in the other, scarcely twenty

feet from the motionless animal. Suddenly his arm straightened, and the harpoon was thrown; I heard the sonorous stroke of the weapon, which seemed to have struck a hard body. The electric light went out suddenly, and two enormous waterspouts broke over the bridge of the frigate, rushing like a torrent from stem to stern, overthrowing men, and breaking the lashing of the spars. A fearful shock followed, and, thrown over the rail without having time to stop myself, I fell into the sea.

Twenty Thousand Leagues Under the Sea

CHAPTER VII

AN UNKNOWN SPECIES OF WHALE

THIS unexpected fall so stunned me that I have no clear recollection of my sensations at the time. I was at first drawn down to a depth of about twenty feet. I am a good swimmer (though without pretending to rival Byron or Edgar Poe, who were masters of the art), and in that plunge I did not lose my presence of mind. Two vigorous strokes brought me to the surface of the water. My first care was to look for the frigate. Had the crew seen me disappear? Had the *Abraham Lincoln* veered round? Would the captain put out a boat? Might I hope to be saved?

The darkness was intense. I caught a glimpse of a black mass disappearing in the east, its beacon lights dying out in the distance. It was the frigate! I was lost.

"Help, Help!" I shouted, swimming towards the *Abraham Lincoln* in desperation.

My clothes encumbered me; they seemed glued to my body, and paralysed my movements.

I was sinking! I was suffocating!

"Help!"

This was my last cry. My mouth filled with water; I struggled against being drawn down the abyss. Suddenly my clothes were seized by a strong hand, and I felt myself quickly drawn up to the surface of the sea; and I heard, yes, I heard these words pronounced in my ear—

"If master would be so good as to lean on my shoulder, master would swim with much greater ease."

I seized with one hand my faithful Conseil's arm.

"Is it you?" said I, "you?"

"Myself," answered Conseil; "and waiting master's orders."

"That shock threw you as well as me into the sea?"

"No; but being in my master's service, I followed him."

The worthy fellow thought that was but natural.

"And the frigate?" I asked.

"The frigate?" replied Conseil, turning on his back; "I think the master had better not count too much on her."

"You think so?"

"I say that, at the time I threw myself into

the sea, I heard the men at the wheel say, 'The screw and the rudder are broken.'"

"Broken?"

"Yes, broken by the monster's teeth. It is the only injury the *Abraham Lincoln* has sustained. But it is a bad look out for us—she no longer answers her helm."

"Then we are lost!"

"Perhaps so," calmly answered Conseil. "However, we have still several hours before us, and one can do a good deal in some hours."

Conseil's imperturbable coolness set me up again. I swam more vigorously; but, cramped by my clothes, which stuck to me like a leaden weight, I felt great difficulty in bearing up. Conseil saw this.

"Will master let me make a slit?" said he; and slipping an open knife under my clothes, he ripped them up from top to bottom very rapidly. Then he cleverly slipped them off me, while I swam for both of us.

Then I did the same for Conseil, and we continued to swim near to each other.

Nevertheless, our situation was no less terrible. Perhaps our disappearance had not been noticed; and if it had been, the frigate could not tack, being without its helm. Conseil argued on this supposition, and laid his plans accordingly. This phlegmatic boy was perfectly self-possessed. We then decided that, as our only chance of safety was being picked up by the *Abraham Lincoln's* boats, we ought to manage so as to wait for them as long as possible. I resolved then to husband our strength, so that both should not be exhausted at the same time; and this is how we managed: while one of us lay on our back, quite still, with arms crossed, and legs stretched out, the other would swim and push the other on in front. This towing business did not last more than ten minutes each; and relieving each other thus, we could swim on for some hours, perhaps till daybreak. Poor chance! but hope is so firmly rooted in the heart of man! Moreover, there were two of us. Indeed I declare (though it may seem improbable) if I sought to destroy all hope,—if I wished to despair, I could not.

The collision of the frigate with the cetacean

had occurred about eleven o'clock the evening before. I reckoned then we should have eight hours to swim before sunrise, an operation quite practicable if we relieved each other. The sea, very calm, was in our favour. Sometimes I tried to pierce the intense darkness that was only dispelled by the phosphorescence caused by our movements. I watched the luminous waves that broke over my hand, whose mirror-like surface was spotted with silvery rings. One might have said that we were in a bath of quicksilver.

Near one o'clock in the morning, I was seized with dreadful fatigue. My limbs stiffened under the strain of violent cramp. Conseil was obliged to keep me up, and our preservation devolved on him alone. I heard the poor boy pant; his breathing became short and hurried. I found that he could not keep up much longer.

"Leave me! leave me!" I said to him.

"Leave my master? never!" replied he. "I would drown first."

Just then the moon appeared through the fringes of a thick cloud that the wind was driving to the east. The surface of the sea glittered with its rays. This kindly light re-animating us. My head got better again. I looked at all the points of the horizon. I saw the frigate! She was five miles from us, and looked like a dark mass, hardly discernible. But no boats!

I would have cried out. But what good would it have been at such a distance! My swollen lips could utter no sounds. Conseil could articulate some words, and I heard him repeat at intervals, "Help! help!"

Our movements were suspended for an instant; we listened. It might be only a singing in the ear, but it seemed to me as if a cry answered the cry from Conseil.

"Did you hear?" I murmured.

"Yes! yes!"

And Conseil gave one more despairing call.

This time there was no mistake! A human voice responded to ours! Was it the voice of another unfortunate creature, abandoned in the middle of the ocean, some other victim of the shock sustained by the vessel? Or rather was it a boat from the frigate, that was hailing us in the darkness?

Conseil made a last effort, and leaning on my shoulder, while I struck out in a despairing effort, he raised himself half out of the water, then fell back exhausted.

"What did you see?"

"I saw"—murmured he; "I saw—but do not talk—reserve all your strength!"

What had he seen? Then, I know not why, the thought of the monster came into my head for the first time! But that voice? The time is past for Jonahs to take refuge in whales' bellies! However, Conseil was towing me again. He raised his head sometimes, looked before us, and uttered a cry of recognition, which was responded to by a voice that came nearer and nearer. I scarcely heard it. My strength was exhausted; my fingers stiffened; my hand afforded me support no longer; my mouth, convulsively opening, filled with salt water. Cold crept over me. I raised my head for the last time, then I sank.

At this moment a hard body struck me. I clung to it: then I felt that I was being drawn up, that I was brought to the surface of the water, that my chest collapsed:—I fainted.

It is certain that I soon came too, thanks to the vigorous rubbings that I received. I half opened my eyes.

"Conseil!" I murmured.

"Does master call me?" asked Conseil.

Just then, by the waning light of the moon, which was sinking down to the horizon, I saw a face which was not Conseil's, and which I immediately recognised.

"Ned!" I cried.

"The same, sir, who is seeking his prize!" replied the Canadian.

"Were you thrown into the sea by the shock of the frigate?"

"Yes, Professor; but more fortunate than you, I was able to find a footing almost directly upon a floating island."

"An island?"

"Or, more correctly speaking, on our gigantic narwhal."

"Explain yourself, Ned!"

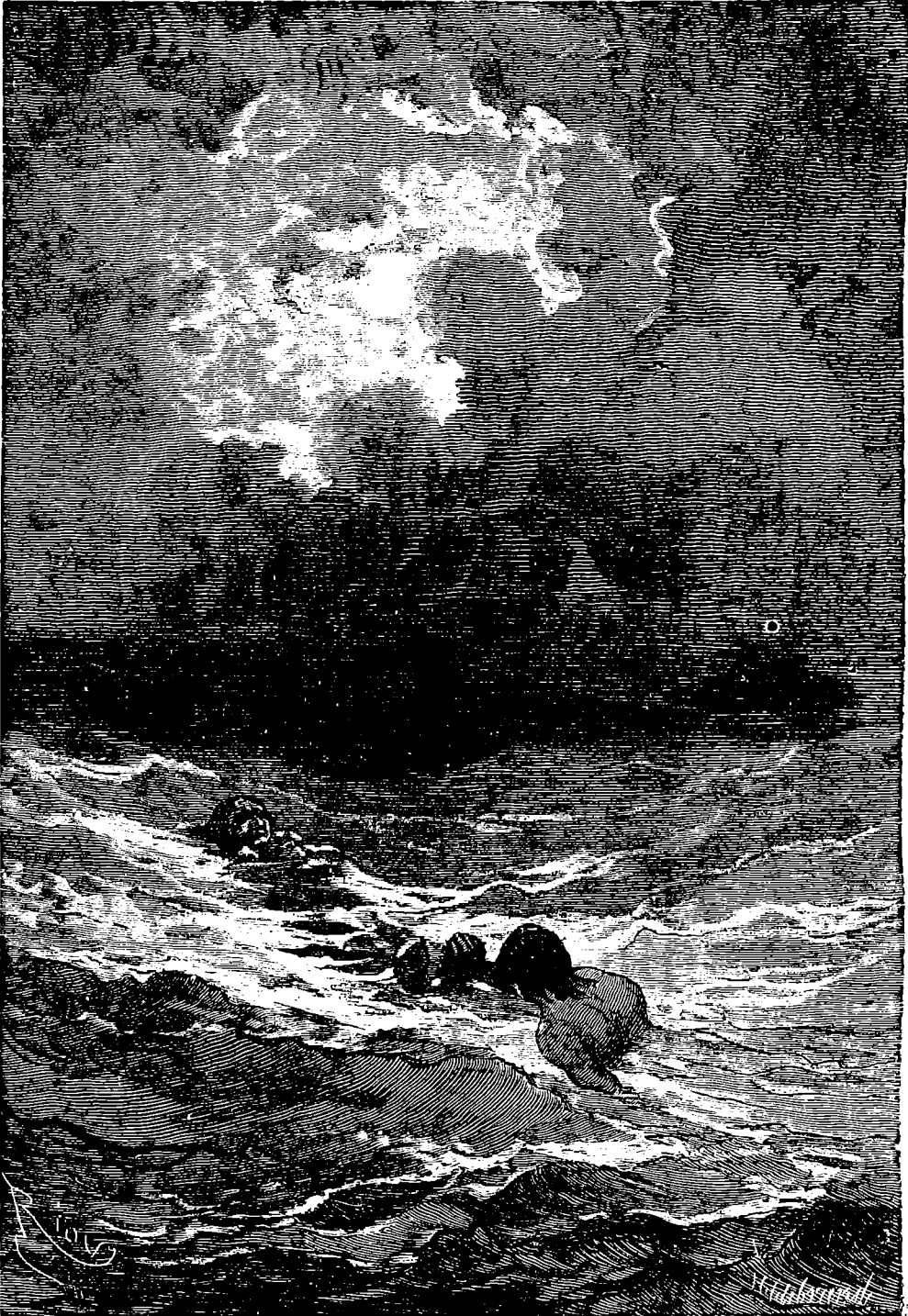
"Only I soon found out why my harpoon had not entered its skin and was blunted."

"Why, Ned, why?"

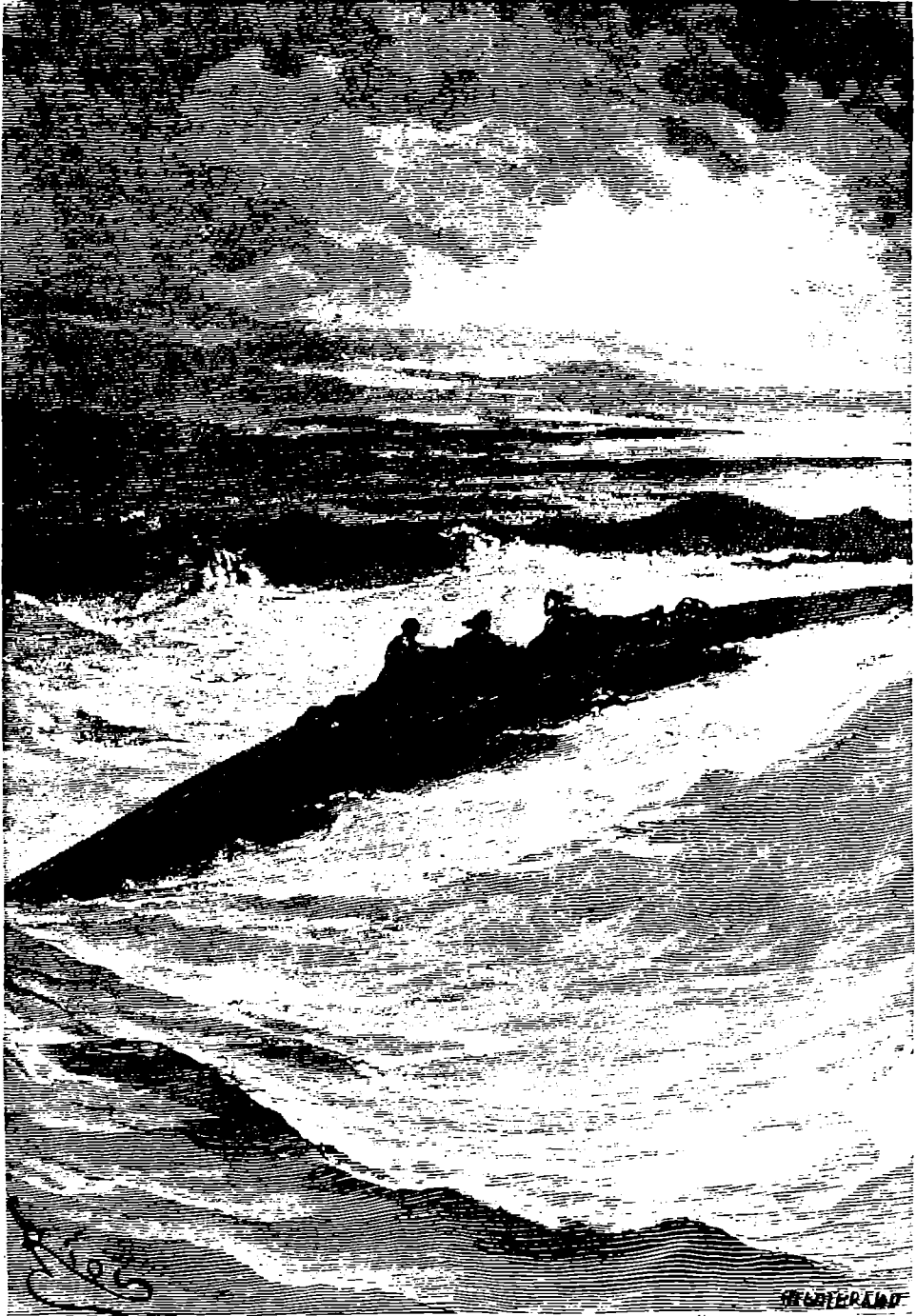
"Because, Professor, that beast is made of sheet iron."

The Canadian's last words produced a sudden revolution in my brain. I wriggled myself quickly to the top of the being, or object, half out of the water, which served us for a refuge. I kicked it. It was evidently a hard impenetrable body, and not the soft substance that forms the bodies of the great marine mammalia. But this hard body might be a bony carapace, like that of the antediluvian animals; and I should be free to class this monster among amphibious reptiles, such as tortoises or alligators.

Well, no! the blackish back that supported me was smooth, polished, without scales. The



A night-long struggle with death.



On the back of the Submarine Boat.

blow produced a metallic sound; and incredible though it may be, it seemed, I might say, as if it were made of riveted plates.

There was no doubt about it! this monster, this natural phenomenon that had puzzled the learned world, and overthrown and misled the imagination of seamen of both hemispheres, was, it must be owned, a still more astonishing phenomenon, inasmuch as it was a simply human construction.

We had no time to lose, however. We were lying upon the back of a sort of submarine boat, which appeared (as far as I could judge) like a huge fish of steel. Ned Land's mind was made up on this point. Conseil and I could only agree with him.

Just then a bubbling began at the back of this strange thing, (which was evidently propelled by a screw), and it began to move. We had only just time to seize hold of the upper part, which rose about seven feet out of the water, and happily its speed was not great.

"As long as it sails horizontally," muttered Ned Land, "I do not mind; but if it takes a fancy to dive, I would not give two straws for my life."

The Canadian might have said still less. It became really necessary to communicate with the beings, whatever they were, shut up inside the machine. I searched all over the outside for an aperture, a panel, or a man-hole, to use a technical expression; but the lines of the iron rivets, solidly driven into the joints of the iron

plates, were clear and uniform. Besides, the moon disappeared then, and left us in total darkness.

At last this long night passed. My indistinct remembrance prevents my describing all the impressions it made. I can only recall one circumstance. During some lulls of the wind and sea, I fancied I heard several times vague sounds, a sort of fugitive harmony produced by distant words of command. What was then the mystery of this submarine craft, of which the whole world vainly sought an explanation? What kind of beings existed in this strange boat? What mechanical agent caused its prodigious speed?

Daybreak appeared. The morning mists surrounded us, but they soon cleared off. I was about to examine the hull, which formed on deck a kind of horizontal platform, when I felt it gradually sinking.

"Oh! confound it!" cried Ned Land, kicking the resounding plate; "Open, you inhospitable rascals!"

Happily the sinking movement ceased. Suddenly a noise, like iron works violently pushed aside, came from the interior of the boat. One iron plate was moved, a man appeared, uttered an odd cry, and disappeared immediately.

Some moments after, eight strong men, with masked faces, appeared noiselessly, and drew us down into their formidable machine.

Twenty Thousand Leagues Under the Sea

CHAPTER VIII

MOBILIS IN MOBILI

THIS forcible abduction, so roughly carried out, was accomplished with the rapidity of lightning. I shivered all over. Whom had we to deal with? No doubt some new sort of pirates, who explored the sea in their own way.

Hardly had the narrow panel closed upon me, when I was enveloped in darkness. My eyes, dazzled with the outer light, could distinguish nothing. I felt my naked feet cling to the rings of an iron ladder. Ned Land and Conseil, firmly seized, followed me. At the bottom of the ladder, a door opened, and shut after us immediately with a bang.

We were alone. Where, I could not say, hardly imagine. All was black, and such a dense black that, after some minutes, my eyes had not been able to discern even the faintest glimmer.

Meanwhile, Ned Land, furious at these proceedings, gave free vent to his indignation.

"Confound it!" cried he, "here are people who come up to the Scotch for hospitality. They only just miss being cannibals. I should not be surprised at it, but I declare that they shall not eat me without my protesting."

"Calm yourself, friend Ned, calm yourself," replied Conseil, quietly. "Do not cry out before you are hurt. We are not quite done for yet."

"Not quite," sharply replied the Canadian, "but pretty near, at all events. Things look black. Happily, my bowie-knife I have still, and I can always see well enough to use it. The first of these pirates who lays a hand on me"—

"Do not excite yourself, Ned," I said to the harpooner, "and do not compromise us by useless violence. Who knows that they will not listen to us? Let us rather try to find out where we are."

"I groped about. In five steps I came to an iron wall, made of plates bolted together. Then turning back I struck against a wooden table, near which were ranged several stools. The boards of this prison were concealed under a thick mat of phormium, which deadened the noise of the feet. The bare walls revealed no trace of window or door. Conseil, going round the reverse way, met me, and we went back to the middle of the cabin, which measured about twenty feet by ten. As to its

height, Ned Land, in spite of his own great height, could not measure it.

Half an hour had already passed without our situation being bettered, when the dense darkness suddenly gave way to extreme light. Our prison was suddenly lighted, that is to say, it became filled with a luminous matter, so strong that I could not bear it at first. In its whiteness and intensity I recognised that electric light which played round the submarine boat like a magnificent phenomenon of phosphorescence. After shutting my eyes involuntarily, I opened them and saw that this luminous agent came from a half globe, unpolished, placed in the roof of the cabin.

"At last one can see," cried Ned Land, who, knife in hand, stood on the defensive.

"Yes," said I; "but we are still in the dark about ourselves."

"Let master have patience," said the imperturbable Conseil.

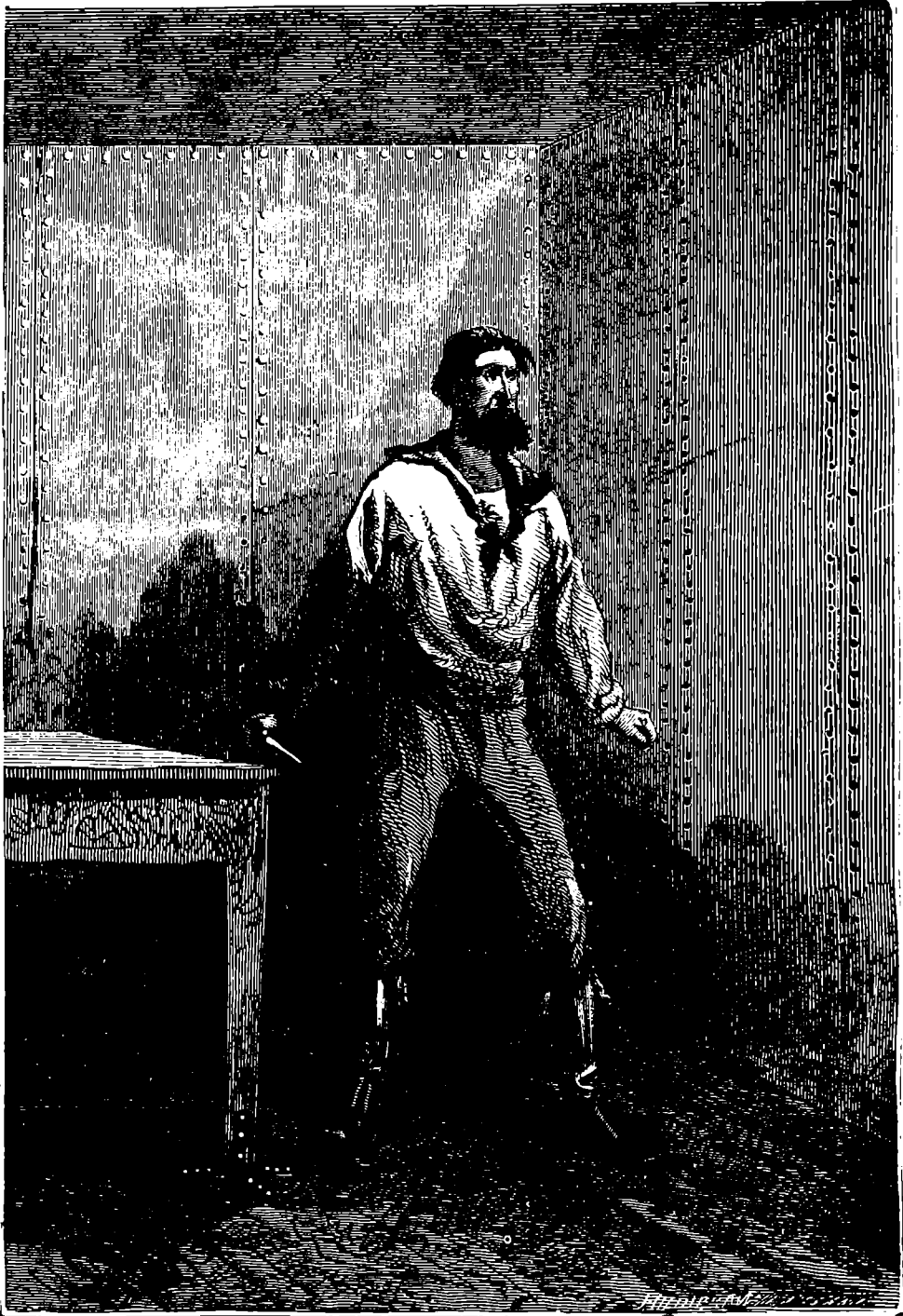
The sudden lighting of the cabin enabled me to examine it minutely. It only contained a table and five stools. The invisible door might be hermetically sealed. No noise was heard. All seemed dead in the interior of this boat. Did it move, did it float on the surface of the ocean, or did it dive into its depths? I could not guess.

A noise of bolts was now heard, the door opened, and two men appeared.

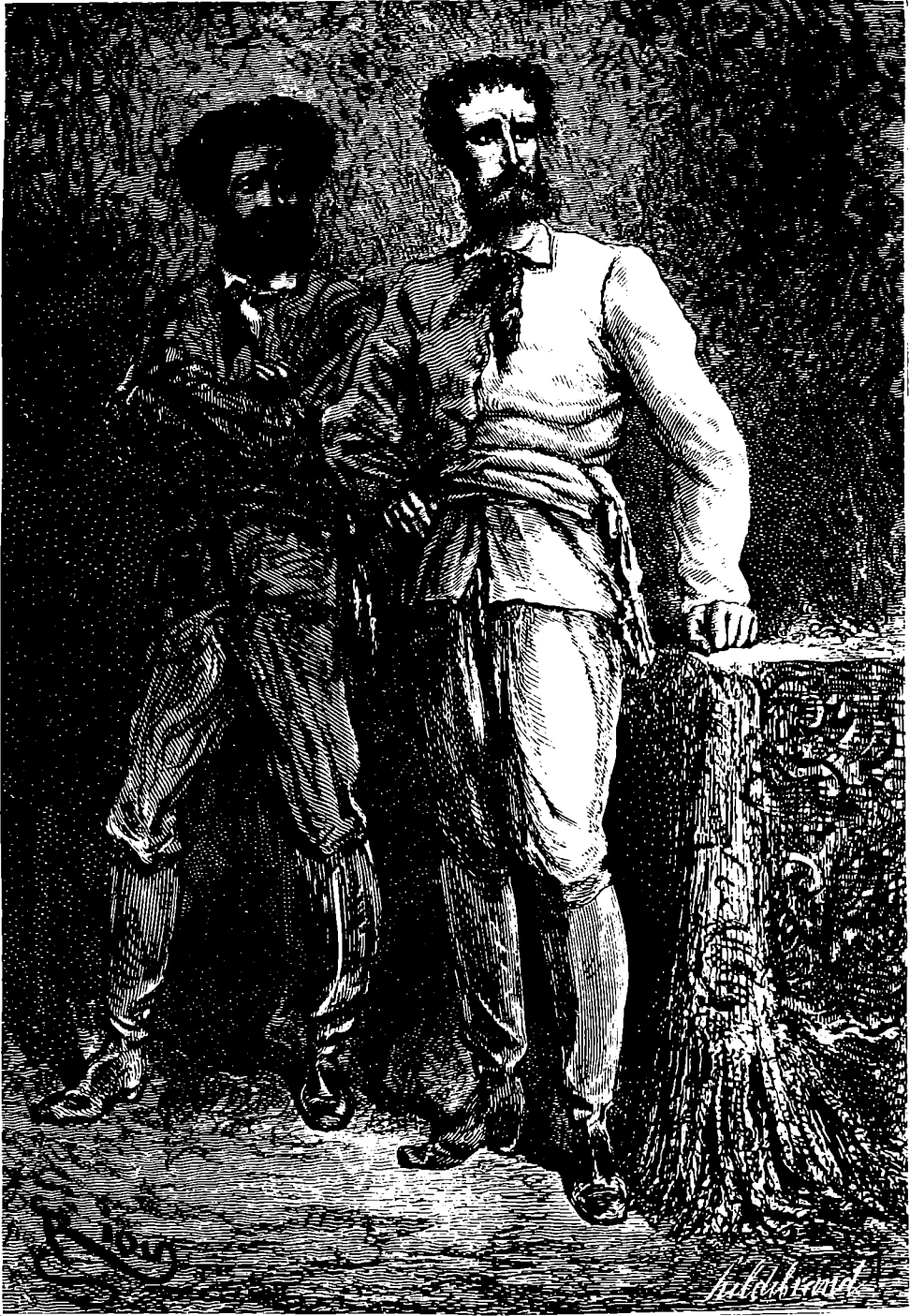
One was short, very muscular, broad-shouldered, with robust limbs, strong head, an abundance of black hair, thick moustache, a quick penetrating look, and the vivacity which characterises the population of Southern France.

The second stranger merits a more detailed description. A disciple of Gratiolet or Engel would have read his face like an open book. I made out his prevailing qualities directly:—self-confidence,—because his head was well set on his shoulders, and his black eyes looked around with cold assurance; calmness,—for his skin, rather pale, showed his coolness of blood; energy,—evinced by the rapid contraction of his lofty brows; and courage,—because his deep breathing denoted great power of lungs.

Whether this person was thirty-five or fifty



“Our prison was suddenly lighted.”



“The two strangers . . . examined us with great attention.”

years of age, I could not say. He was tall, had a large forehead, straight nose, a clearly cut mouth, beautiful teeth, with fine taper hands, indicative of a highly nervous temperament. This man was certainly the most admirable specimen I had ever met. One particular feature was his eyes, rather far from each other, and which could take in nearly a quarter of the horizon at once.

This faculty—(I verified it later)—gave him a range of vision far superior to Ned Land's. When this stranger fixed upon a object, his eyebrows met, his large eyelids closed around so as to contract the range of his vision, and he looked as if he magnified the objects lessened by distance, as if he pierced those sheets of water so opaque to our eyes, and as if he read the very depths of the seas.

The two strangers, with caps made from the fur of the sea otter, and shod with sea boots of seals' skin, were dressed in clothes of a particular texture, which allowed free movement of the limbs. The taller of the two, evidently the chief on board, examined us with great attention, without saying a word: then turning to his companion, talked with him in an unknown tongue. It was a sonorous, harmonious, and flexible dialect, the vowels seeming to admit of very varied accentuation.

The other replied by a shake of the head, and added two or three perfectly incomprehensible words. Then he seemed to question me by a look.

I replied in good French that I did not know his language; but he seemed not to understand me, and my situation became more embarrassing.

"If master were to tell our story," said Conseil, "perhaps these gentlemen may understand some words."

I began to tell our adventures, articulating each syllable clearly, and without omitting one single detail. I announced our names and rank, introducing in person Professor Aronnax, his servant Conseil, and master Ned Land, the harpooner.

The man with the soft calm eyes listened to me quietly, even politely, and with extreme attention; but nothing in his countenance indicated that he had understood my story. When I finished, he said not a word.

There remained one resource, to speak English. Perhaps they would know this almost universal language. I knew it, as well as the German language,—well enough to read it fluently, but not to speak it correctly. But, anyhow, we must make ourselves understood.

"Go on in your turn," I said to the

harpooner; "speak your best Anglo-Saxon, and try to do better than I."

Ned did not beg off, and recommenced our story.

To his great disgust, the harpooner did not seem to have made himself more intelligible than I had. Our visitors did not stir. They evidently understood neither the language of Arago nor of Faraday.

Very much embarrassed, after having vainly exhausted our philological resources, I knew not what part to take, when Conseil said—

"If master will permit me, I will relate it in German."

But in spite of the elegant turns and good accent of the narrator, the German language had no success. At last, nonplussed, I tried to remember my first lessons, and to narrate our adventures in Latin, but with no better success. This last attempt being of no avail, the two strangers exchanged some words in their unknown language, and retired.

The door shut.

"It is an infamous shame," cried Ned Land, who broke out for the twentieth time; "we speak to those rogues in French, English, German, and Latin, and not one of them has the politeness to answer!"

"Calm yourself," I said to the impetuous Ned, "anger will do no good."

"But do you see, Professor," replied our irascible companion, "that we shall absolutely die of hunger in this iron cage?"

"Bah," said Conseil, philosophically; "we can hold out some time yet."

"My friends," I said, "we must not despair. We have been worse off than this. Do me the favour to wait a little before forming an opinion upon the commander and crew of this boat."

"My opinion is formed," replied Ned Land, sharply. "They are rascals."

"Good! and from what country?"

"From the land of rogues!"

"My brave Ned, that country is not clearly indicated on the map of the world; but I admit that the nationality of the two strangers is hard to determine. Neither English, French, nor German, that is quite certain. However, I am inclined to think that the commander and his companion were born in low latitudes. There is southern blood in them. But I cannot abide by their appearance whether they are Spaniards, Turks, Arabians, or Indians. As to their language, it is quite incomprehensible."

"There is the disadvantage of not knowing all languages," said Conseil, "or the disadvantage of not having one universal language."



“My two companions stretched themselves on the cabin carpet,
and were soon sound asleep.”

As he said these words, the door opened. A steward entered. He brought us clothes, coats and trousers, made of a stuff I did not know. I hastened to dress myself, and my companions followed my example. During that time, the steward—dumb, perhaps deaf—had arranged the table, and laid three plates.

“This is something like,” said Conseil.

“Bah,” said the rancorous harpooner, “what do you suppose they eat here? Tortoise liver, filleted shark, and beefsteaks from seadogs.”

“We shall see,” said Conseil.

The dishes, of bell metal, were placed on the table, and we took our places. Undoubtedly we had to do with civilised people, and had it not been for the electric light which flooded us, I could have fancied I was in the dining-room of the Adelphi Hotel at Liverpool, or at the Grand Hotel in Paris. I must say, however, that there was neither bread nor wine. The water was fresh and clear, but it was water, and did not suit Ned Land’s taste. Amongst the dishes which were brought to us, I recognised several fish delicately dressed; but of some, although excellent, I could give no opinion, neither could I tell to what kingdom they belonged, whether animal or vegetable. As to the dinner service, it was elegant, and in perfect taste. Each utensil, spoon, fork, knife, plate, had a letter engraved on it, with a motto above it, of which this is an exact facsimile:—

MOBILIS IN MOBILI

N

The letter N was no doubt the initial of the name of the enigmatical person, who commanded at the bottom of the seas.

Ned and Conseil did not reflect much. They devoured the food, and I did likewise. I was, besides, reassured as to our fate; and it seemed evident that our hosts would not let us die of want.

However, everything has an end, everything passes away, even the hunger of people who have not eaten for fifteen hours. Our appetites satisfied, we felt overcome with sleep.

“Faith! I shall sleep well,” said Conseil.

“So shall I,” replied Ned Land.

My two companions stretched themselves on the cabin carpet, and were soon sound asleep. For my own part, too many thoughts crowded my brain, too many insoluble questions pressed upon me, too many fancies kept my eyes half open. Where were we? What strange power carried us on? I felt—or rather fancied I felt—the machine sinking down to the lowest beds of the sea. Dreadful nightmares beset me; I saw in these mysterious asylums a world of unknown animals, amongst which this submarine boat seemed to be of the same kind, living, moving, and formidable as they. Then my brain grew calmer, my imagination wandered into vague unconsciousness, and I soon fell into a deep sleep.

Twenty Thousand Leagues Under the Sea

CHAPTER IX

NED LAND'S TEMPER

HOW long we slept I do not know; but our sleep must have lasted long, for it rested us completely from our fatigues. I woke first. My companions had not moved, and were still stretched in their corner.

Hardly roused from my somewhat hard couch, I felt my brain freed, my mind clear. I then began an attentive examination of our cell. Nothing was changed inside. The prison was still a prison,—the prisoners, prisoners. However, the steward, during our sleep, had cleared the table. I breathed with difficulty. The heavy air seemed to oppress my lungs. Although the cell was large, we had evidently consumed a great part of the oxygen that it contained. Indeed, each man consumes, in one hour, the oxygen contained in more than 176 pints of air, and this air, charged (as then) with a nearly equal quantity of carbonic acid, becomes unbreathable.

It became necessary to renew the atmosphere of our prison, and no doubt the whole in the submarine boat. That gave rise to a question in my mind. How would the commander of this floating dwelling-place proceed? Would he obtain air by chemical means, in getting by heat the oxygen contained in chlorate of potash, and in absorbing carbonic acid by caustic potash? Or, a more convenient, economical, and consequently more probable alternative, would he be satisfied to rise and take breath at the surface of the water, like a cetacean, and so renew for twenty-four hours the atmospheric provision?

In fact, I was already obliged to increase my respirations to eke out of this cell the little oxygen it contained, when suddenly I was refreshed by a current of pure air, and perfumed with saline emanations. It was an invigorating sea breeze, charged with iodine. I opened my mouth wide, and my lungs saturated themselves with fresh particles.

At the same time I felt the boat rolling. The iron-plated monster had evidently just risen to the surface of the ocean to breathe, after the fashion of whales. I found out from that the mode of ventilating the boat.

When I had inhaled this air freely, I sought the conduit-pipe, which conveyed to us the beneficial whiff, and I was not long in finding

it. Above the door was a ventilator, through which volumes of fresh air renewed the impoverished atmosphere of the cell.

I was making my observations, when Ned and Conseil awoke almost at the same time, under the influence of this reviving air. They rubbed their eyes, stretched themselves, and were on their feet in an instant.

“Did master sleep well?” asked Conseil, with his usual politeness.

“Very well, my brave boy. And you, Mr Land?”

“Soundly, Professor. But I don’t know if I am right or not; there seems to be a sea breeze!”

A seaman could not be mistaken, and I told the Canadian all that had passed during his sleep.

“Good!” said he; “that accounts for those roarings we heard, when the supposed narwhal sighted the *Abraham Lincoln*.”

“Quite so, Master Land; it was taking breath.”

“Only, Mr Aronnax, I have no idea what o’clock it is, unless it is dinner-time.”

“Dinner-time! my good fellow? Say rather breakfast-time, for we certainly have begun another day.”

“So,” said Conseil, “we have slept twenty-four hours?”

“That is my opinion.”

“I will not contradict you,” replied Ned Land. “But dinner or breakfast, the steward will be welcome, whichever he brings.”

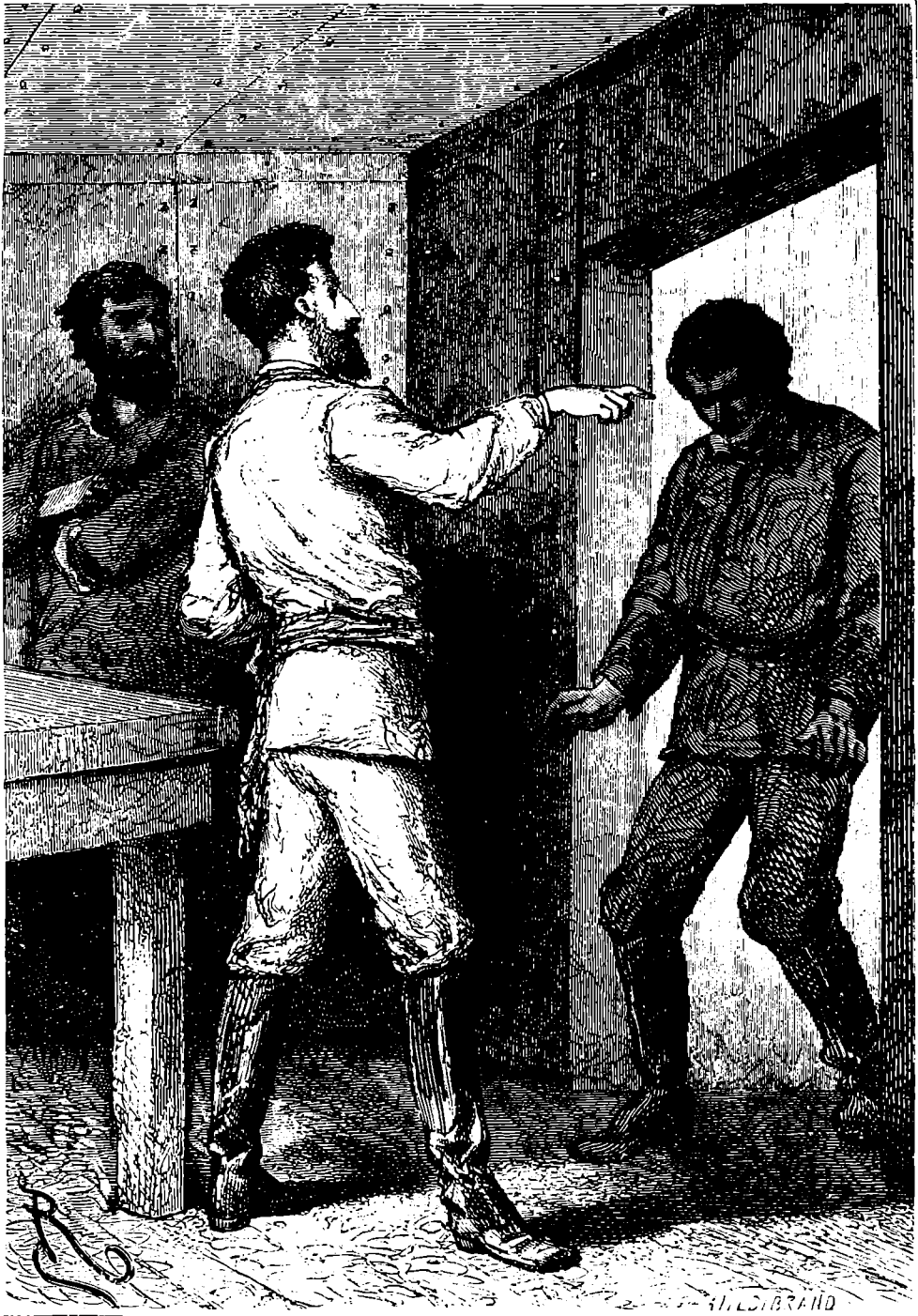
“Master Land, we must conform to the rules on board, and I suppose our appetites are in advance of the dinner hour.”

“That is just like you, friend Conseil,” said Ned, impatiently. “You are never out of temper, always calm; you would return thanks before grace, and die of hunger rather than complain!”

Time was getting on, and we were fearfully hungry; and this time the steward did not appear. It was rather too long to leave us, if they really had good intentions towards us. Ned Land, tormented by the cravings of hunger, got still more angry; and, notwithstanding his promise, I dreaded an explosion when he found himself with one of the crew.



Ned Land assaults the Steward.



“The Steward, nearly strangled, tottered out on a sign from his master.”

For two hours more, Ned Land's temper increased; he cried, he shouted, but in vain. The walls were deaf. There was no sound to be heard in the boat: all was still as death. It did not move, for I should have felt the trembling motion of the hull under the influence of the screw. Plunged in the depths of the waters, it belonged no longer to earth:—this silence was dreadful.

I felt terrified, Conseil was calm, Ned Land roared.

Just then a noise was heard outside. Steps sounded on the metal flags. The locks were

turned, the door opened, and the steward appeared.

Before I could rush forward to stop him, the Canadian had thrown him down, and held him by the throat. The steward was choking under the grip of his powerful hand.

Conseil was already trying to unclasp the harpooner's hand from his half-suffocated victim, and I was going to fly to the rescue, when suddenly I was nailed to the spot by hearing these words in French—

“Be quiet, Master Land; and you, Professor, will you be so good as to listen to me?”

Twenty Thousand Leagues Under the Sea

CHAPTER X

THE MAN OF THE SEAS

It was the commander of the vessel who thus spoke.

At these words, Ned Land rose suddenly. The steward, nearly strangled, tottered out on a sign from his master; but such was the power of the commander on board, that not a gesture betrayed the resentment which this man must have felt towards the Canadian. Conseil interested in spite of himself, I stupified, awaited in silence the result of this scene.

The commander, leaning against a corner of the table with his arms folded, scanned us with profound attention. Did he hesitate to speak? Did he regret the words which he had just spoken in French? One might almost think so.

After some moments of silence, which not one of us dreamed of breaking, "Gentlemen," said he, in a calm and penetrating voice, "I speak French, English, German, and Latin equally well. I could, therefore, have answered you at our first interview, but I wished to know you first, then to reflect. The story told by each one, entirely agreeing in the main points, convinced me of your identity. I know now that chance has brought before me M. Pierre Aronnax, Professor of Natural History at the Museum of Paris, entrusted with a scientific mission abroad, Conseil his servant, and Ned Land, of Canadian origin, harpooner on board the frigate *Abraham Lincoln* of the navy of the United States of America."

I bowed assent. It was not a question that the commander put to me. Therefore there was no answer to be made. This man expressed himself with perfect ease, without any accent. His sentences were well turned, his words clear, and his fluency of speech remarkable. Yet, I did not recognise in him a fellow-countryman.

He continued the conversation in these terms:

"You have doubtless thought, sir, that I have delayed long in paying you this second visit. The reason is that, your identity recognised, I wished to weigh maturely what part to act towards you. I have hesitated much. Most annoying circumstances have brought you into the presence of a man who has broken all the ties of humanity. You have come to trouble my existence."

"Unintentionally!" said I.

"Unintentionally?" replied the stranger, raising his voice a little; "was it unintentionally that the *Abraham Lincoln* pursued me all over the seas? Was it unintentionally that you took passage in this frigate? Was it unintentionally that your cannon balls rebounded off the plating of my vessel? Was it unintentionally that Mr Ned Land struck me with his harpoon?"

I detected a restrained irritation in these words. But to these recriminations I had a very natural answer to make, and I made it.

"Sir," said I, "no doubt you are ignorant of the discussions which have taken place concerning you in America and Europe. You do not know that divers accidents, caused by collisions with your submarine machine, have excited public feeling in the two continents. I omit the hypotheses without number by which it was sought to explain in inexplicable phenomenon of which you alone possess the secret. But you must understand that, in pursuing you over the high seas of the Pacific, the *Abraham Lincoln* believed itself to be chasing some powerful sea-monster, of which it was necessary to rid the ocean at any price."

A half-smile curled the lips of the commander: then, in a calmer tone—

"M. Aronnax," he replied, "dare you affirm that your frigate would not as soon have pursued and cannonaded a submarine boat as a monster?"

This question embarrassed me, for certainly Captain Farragut might not have hesitated. He might have thought it his duty to destroy a contrivance of this kind, as he would a gigantic narwhal.

"You understand then, sir," continued the stranger, "that I have the right to treat you as enemies?"

I answered nothing, purposely. For what good would it be to discuss such a proposition, when force could destroy the best arguments?

"I have hesitated for some time," continued the commander; "nothing obliged me to show you hospitality. If I chose to separate myself from you, I should have no interest in seeing you again; I could place you upon the deck of this vessel which has served you as a refuge, I

could sink beneath the waters, and forget that you had ever existed. Would not that be my right?"

"It might be the right of a savage," I answered, "but not that of a civilised man."

"Professor," replied the commander quickly, "I am not what you call a civilised man! I have done with society entirely, for reasons which I alone have the right of appreciating. I do not therefore obey its laws, and I desire you never to allude to them before me again!"

This was said plainly. A flash of anger and disdain kindled in the eyes of the Unknown, and I had a glimpse of a terrible past in the life of this man. Not only had he put himself beyond the pale of human laws, but he had made himself independent of them, free in the strictest acceptation of the word, quite beyond their reach! Who then would dare to pursue him at the bottom of the sea, when, on its surface, he defied all attempts made against him? What vessel could resist the shock of his submarine monitor? What cuirass, however thick, could withstand the blows of his spur? No man could demand from him an account of his actions; God, if he believed in one—his conscience, if he had one,—were the sole judges to whom he was answerable.

These reflections crossed my mind rapidly, whilst the stranger personage was silent, absorbed, and as if wrapped up in himself. I regarded him with fear mingled with interest, as, doubtless, OEdipus regarded the Sphinx.

After rather a long silence, the commander resumed the conversation.

"I have hesitated," said he, "but I have thought that my interest might be reconciled with that pity to which every human being has a right. You will remain on board my vessel, since fate has cast you there. You will be free; and in exchange for this liberty, I shall only impose one single condition. Your word of honour to submit to it will suffice."

"Speak, sir," I answered. "I suppose this condition is one which a man of honour may accept?"

"Yes, sir; it is this. It is possible that certain events, unforeseen, may oblige me to consign you to your cabins for some hours or some days, as the case may be. As I desire never to use violence, I expect from you, more than all the others, a passive obedience. In thus acting, I take all the responsibility: I acquit you entirely, for I make it an impossibility for you to see what ought not to be seen. Do you accept this condition?"

Then things took place on board which, to

say the least, were singular, and which ought not to be seen by people who were not placed beyond the pale of social laws. Amongst the surprises which the future was preparing for me, this might not be the least.

"We accept," I answered; "only I will ask your permission, sir, to address one question to you—one only."

"Speak, sir."

"You said that we should be free on board."

"Entirely."

"I ask you, then, what you mean by this liberty?"

"Just the liberty to go, to come, to see, to observe even all that passes here,—save under rare circumstances,—the liberty, in short, which we enjoy ourselves, my companions and I."

It was evident that we did not understand one another.

"Pardon me, sir," I resumed, "but this liberty is only what every prisoner has of pacing his prison. It cannot suffice us."

"It must suffice you, however."

"What! we must renounce for ever seeing our country, our friends, our relations again?"

"Yes, sir. But to renounce that unendurable worldly yoke which men believe to be liberty, is not perhaps so painful as you think."

"Well," exclaimed Ned Land, "never will I give my word of honour not to try to escape."

"I did not ask you for your word of honour, Master Land," answered the commander, coldly.

"Sir," I replied, beginning to get angry in spite of myself, "you abuse your situation towards us; it is cruelty."

"No, sir, it is clemency. You are my prisoners of war. I keep you, when I could, by a word, plunge you into the depths of the ocean. You attacked me. You came to surprise a secret which no man in the world must penetrate,—the secret of my whole existence. And you think that I am going to send you back to that world which must know me no more? Never! In retaining you, it is not you whom I guard—it is myself."

These words indicated a resolution taken on the part of the commander, against which no arguments would prevail.

"So, sir," I rejoined, "you give us simply the choice between life and death?"

"Simply."

"My friends," said I, "to a question thus put, there is nothing to answer. But no word of honour binds us to the master of this vessel."

"None, sir," answered the Unknown.

Then, in a gentler tone, he continued—

"Now, permit me to finish what I have to say to you. I know you, M. Aronnax. You and your companions will not, perhaps, have so much to complain of in the chance which has bound you to my fate. You will find amongst the books which are my favourite study the work which you have published on 'the depths of the sea.' I have often read it. You have carried your work as far as terrestrial science permitted you. But you do not know all—you have not seen all. Let me tell you then, Professor, that you will not regret the time passed on board my vessel. You are going to visit the land of marvels."

These words of the commander had a great effect upon me. I cannot deny it. My weak point was touched; and I forgot, for a moment, that the contemplation of these sublime subjects was not worth the loss of liberty. Besides, I trusted to the future to decide this grave question. So I contented myself with saying—

"By what name ought I to address you?"

"Sir," replied the commander, "I am nothing to you but Captain Nemo; and you and your companions are nothing to me but the passengers of the *Nautilus*."

Captain Nemo called. A steward appeared. The captain gave him his orders in that strange language which I did not understand. Then, turning towards the Canadian and Conseil—

"A repast awaits you in your cabin," said he. "Be so good as to follow this man."

"And now, M. Aronnax, our breakfast is ready. Permit me to lead the way."

"I am at your service, captain."

I followed Captain Nemo; and as soon as I had passed through the door, I found myself in a kind of passage lighted by electricity, similar to the waist of a ship. After we had proceeded a dozen yards, a second door opened before me.

I then entered a dining-room, decorated and furnished in severe taste. High oaken sideboards, inlaid with ebony, stood at the two extremities of the room, and upon their shelves glittered china, porcelain, and glass of inestimable value. The plate on the table sparkled in the rays which the luminous ceiling shed around, while the light was tempered and softened by exquisite paintings.

In the centre of the room was a table richly laid out. Captain Nemo indicated the place I was to occupy.

The breakfast consisted of a certain number of dishes, the contents of which were furnished

by the sea alone; and I was ignorant of the nature and mode of preparation of some of them. I acknowledged that they were good, but they had a peculiar flavour, which I easily became accustomed to. These different aliments appeared to me to be rich in phosphorus, and I thought they must have a marine origin.

Captain Nemo looked at me. I asked him no questions, but he guessed my thoughts, and answered of his own accord the questions which I was burning to address to him.

"The greater part of these dishes are unknown to you," he said to me. "However, you may partake of them without fear. They are wholesome and nourishing. For a long time I have renounced the food of the earth, and I am never ill now. My crew, who are healthy, are fed on the same food."

"So," said I, "all these eatables are the produce of the sea?"

"Yes, Professor, the sea supplies all my wants. Sometimes I cast my nets in tow, and I draw them in ready to break. Sometimes I hunt in the midst of this element, which appears to be inaccessible to man, and quarry the game which dwells in my submarine forests. My flocks, like those of Neptune's old shepherds, graze fearlessly in the immense prairies of the ocean. I have a vast property there, which I cultivate myself, and which is always sown by the hand of the Creator of all things."

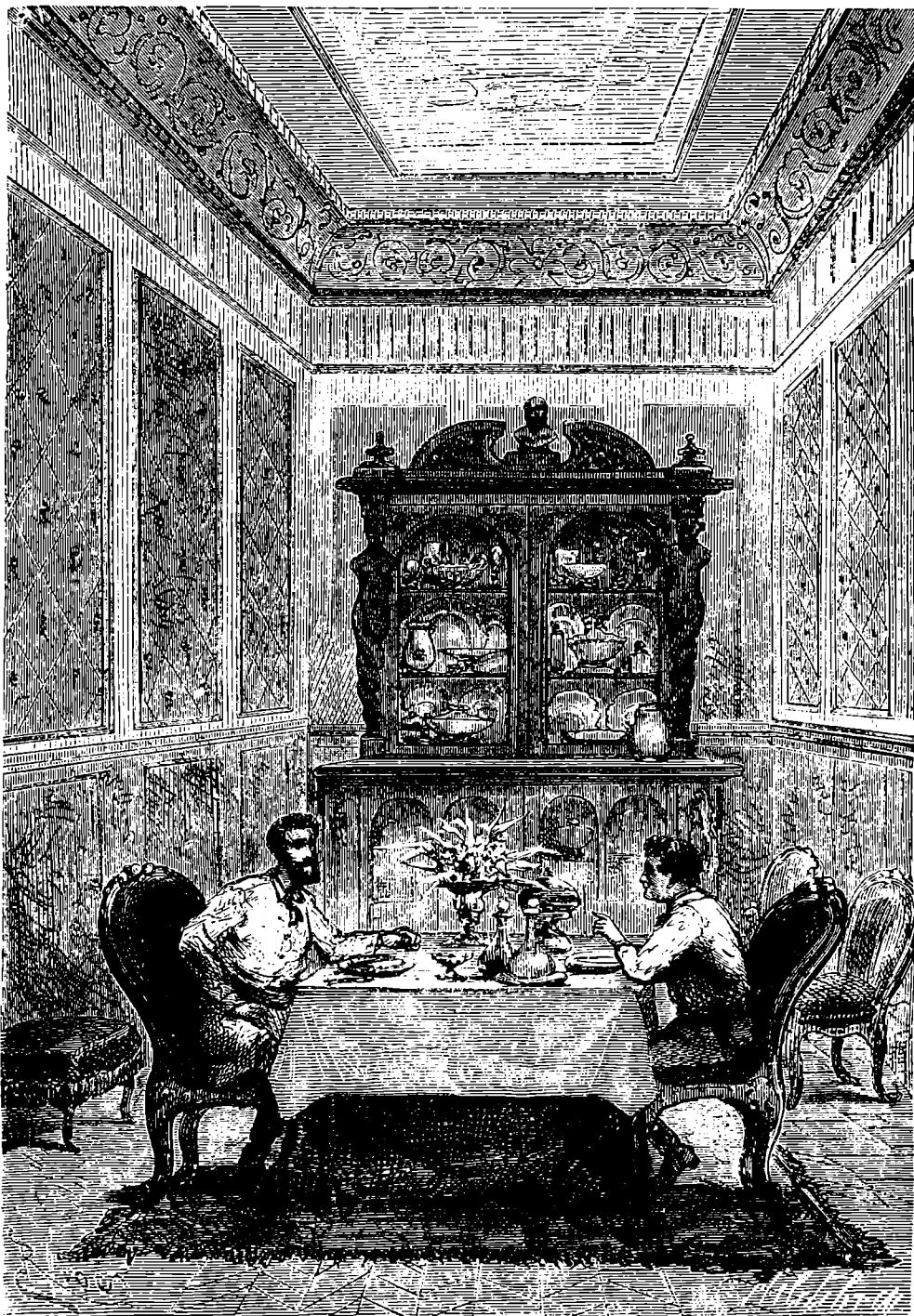
"I can understand perfectly, sir, that your nets furnish excellent fish for your table; I can understand also that you hunt aquatic game in your submarine forests; but I cannot understand at all how a particle of meat, no matter how small, can figure in your bill of fare."

"This, which you believe to be meat, Professor, is nothing else than fillet of turtle. Here are also some dolphin's livers, which you take to be ragout of pork. My cook is a clever fellow, who excels in dressing these various products of the ocean. Taste all these dishes. Here is a preserve of holothuria, which a Malay would declare to be unrivalled in the world; here is a cream, of which the milk has been furnished by the cetacea, and the sugar by the great fucus of the North Sea; and lastly, permit me to offer you some preserve of anemones, which is equal to that of the most delicious fruits."

I tasted, more from curiosity than as a connoisseur, whilst Captain Nemo enchanted me with his extraordinary stories.

"You like the sea, Captain?"

"Yes; I love it! The sea is everything. It



“In the centre of the room was a table richly laid out.”



“You must have six or seven thousand volumes here.”

covers seven-tenths of the terrestrial globe. Its breath is pure and healthy. It is an immense desert, where man is never lonely, for he feels life stirring on all sides. The sea is only the embodiment of a supernatural and wonderful existence. It is nothing but love and emotion; it is the "Living Infinite," as one of your poets has said. In fact, Professor, Nature manifests herself in it by her three kingdoms, mineral, vegetable, and animal. The sea is the vast reservoir of Nature. The globe began with sea, so to speak; and who knows if it will not end with it? In it is supreme tranquillity. The sea does not belong to despots. Upon its surface men can still exercise unjust laws, fight, tear one another to pieces, and be carried away with terrestrial horrors. But at thirty feet below its level, their reign ceases, their influence is quenched, and their power disappears. Ah! sir, live—live in the bosom of the waters! There only is independence! There I recognise no masters! There I am free!"

Captain Nemo suddenly became silent in the midst of this enthusiasm, by which he was quite carried away. For a few moments he paced up and down, much agitated. Then he became more calm, regained his accustomed coldness of expression, and turning towards me—

"Now, Professor," said he, "if you wish to go over the *Nautilus*, I am at your service."

Captain Nemo rose. I followed him. A double door, contrived at the back of the dining-room, opened, and I entered a room equal in dimensions to that which I had just quitted.

It was a library. High pieces of furniture, of black violet ebony inlaid with brass, supported upon their wide shelves a great number of books uniformly bound. They followed the shape of the room, terminating at the lower part in huge divans, covered with brown leather, which were curved, to afford the greatest comfort. Light moveable desks, made to slide in and out at will, allowed one to rest one's book while reading. In the centre stood an immense table, covered with pamphlets, amongst which were some newspapers, already of old date. The electric light flooded everything; it was shed from four unpolished globes half sunk in the volutes of the ceiling. I looked with real admiration at this room, so ingeniously fitted up, and I could scarcely believe my eyes.

"Captain Nemo," said I to my host, who had just thrown himself on one of the divans, "this is a library which would do honour to more than one of the continental palaces, and

I am absolutely astounded when I consider that it can follow you to the bottom of the seas."

"Where could one find greater solitude or silence, Professor?" replied Captain Nemo. "Did your study in the Museum afford you such perfect quiet?"

"No, sir; and I must confess that it is a very poor one after yours. You must have six or seven thousand volumes here."

"Twelve thousand, M. Aronnax. These are the only ties which bind me to the earth. But I had done with the world on the day when my *Nautilus* plunged for the first time beneath the waters. That day I bought my last volumes, my last pamphlets, my last papers, and from that time I wish to think that men no longer think or write. These books, Professor, are at your service besides, and you can make use of them freely."

I thanked Captain Nemo, and went up to the shelves of the library. Works on science, morals, and literature abounded in every language; but I did not see one single work on political economy; that subject appeared to be strictly proscribed. Strange to say, all these books were irregularly arranged, in whatever language they were written; and this medley proved that the Captain of the *Nautilus* must have read indiscriminately the books which he took up by chance.

"Sir," said I to the Captain, "I thank you for having placed this library at my disposal. It contains treasures of science, and I shall profit by them."

"This room is not only a library," said Captain Nemo, "it is also a smoking-room."

"A smoking-room!" I cried. "Then one may smoke on board?"

"Certainly."

"Then, sir, I am forced to believe that you have kept up a communication with Havannah."

"Not any," answered the Captain. "Accept this cigar, M. Aronnax; and though it does not come from Havannah, you will be pleased with it, if you are a connoisseur."

I took the cigar which was offered me; its shape recalled the London ones, but it seemed to be made of leaves of gold. I lighted it at a little brazier, which was supported upon an elegant bronze stem, and drew the first whiffs with the delight of a lover of smoking who has not smoked for two days.

"It is excellent," said I, "but it is not tobacco."

"No!" answered the Captain, "this tobacco comes neither from Havannah nor from the

East. It is a kind of sea-weed, rich in nicotine, with which the sea provides me, but somewhat sparingly."

At that moment Captain Nemo opened a door which stood opposite to that by which I had entered the library, and I passed into an immense drawing-room splendidly lighted.

It was a vast four-sided room, thirty feet long, eighteen wide, and fifteen high. A luminous ceiling, decorated with light arabesques, shed a soft clear light over all the marvels accumulated in this museum. For it was in fact a museum, in which an intelligent and prodigal hand had gathered all the treasures of nature and art, with the artistic confusion which distinguishes a painter's studio.

Thirty first-rate pictures, uniformly framed, separated by bright drapery, ornamented the walls, which were hung with tapestry of severe design. I saw works of great value, the greater part of which I had admired in the special collections of Europe, and in the exhibitions of paintings. The several schools of the old masters were represented by a Madonna of Raphael, a Virgin of Leonardo da Vinci, a nymph of Corregio, a woman of Titian, an Adoration of Veronese, an Assumption of Murillo, a portrait of Holbein, a monk of Velasquez, a martyr of Ribeira, a fair of Rubens, two Flemish landscapes of Teniers, three little "genre" pictures of Gérard Dow, Metsu, and Paul Potter, two specimens of Géricault and Prudhon, and some sea-pieces of Backhuysen and Vernet. Amongst the works of modern painters were pictures with the signatures of Delacroix, Ingres, Decamp, Troyon, Meissonnier, Daubigny, &c.; and some admirable statues in marble and bronze, after the finest antique models, stood upon pedestals in the corners of this magnificent museum. Amazement, as the Captain of the *Nautilus* had predicted, had already begun to take possession of me.

"Professor," said this strange man, "you must excuse the unceremonious way in which I receive you, and the disorder of this room."

"Sir," I answered, "without seeking to know who you are, I recognise in you an artist."

"An amateur, nothing more, sir. Formerly I loved to collect these beautiful works created by the hand of man. I sought them greedily, and ferreted them out indefatigably, and I have been able to bring together some objects of great value. These are my last souvenirs of that world which is dead to me. In my eyes, your modern artists are already old; they have

two or three thousand years of existence; I confound them in my own mind. Masters have no age."

"And these musicians?" said I, pointing out some works of Weber, Rossini, Mozart, Beethoven, Haydn, Meyerbeer, Hérold, Wagner, Auber, Gounod, and a number of others, scattered over a large model piano-organ which occupied one of the panels of the drawing-room.

"These musicians," replied Captain Nemo, "are the contemporaries of Orpheus; for in the memory of the dead all chronological differences are effaced; and I am dead, Professor; as much dead as those of your friends who are sleeping six feet under the earth!"

Captain Nemo was silent, and seemed lost in a profound reverie. I contemplated him with deep interest, analysing in silence the strange expression of his countenance. Leaning on his elbow against an angle of a costly mosaic table, he no longer saw me,—he had forgotten my presence.

I did not disturb this reverie, and continued my observation of the curiosities which enriched this drawing-room.

Under elegant glass cases, fixed by copper rivets, were classed and labelled the most precious productions of the sea which had ever been presented to the eye of a naturalist. My delight as a professor may be conceived.

The division containing the zoophytes presented the most curious specimens of the two groups of polypi and echinodermes. In the first group, the tubipores, were gorgones arranged like a fan, soft sponges of Syria, ises of the Moluccas, pennatules, an admirable virgularia of the Norwegian seas, variegated umbellulairae, alcyonariae, a whole series of madrepores, which my master Milne Edwards has so cleverly classified, amongst which I remarked some wonderful flabellinae, oculinae of the Island of Bourbon, the "Neptune's car" of the Antilles, superb varieties of corals, in short, every species of those curious polypi of which entire islands are formed, which will one day become continents. Of the echinodermes, remarkable for their coating of spines, asteri, sea-stars, pantacrinae, comatules, astérophons, echini, holothuri, &c., represented individually a complete collection of this group.

A somewhat nervous conchyliologist would certainly have fainted before other more numerous cases, in which were classified the specimens of molluscs. It was a collection of inestimable value, which time fails me to



“My delight as a professor may be conceived.”

describe minutely. Amongst these specimens, I will quote from memory only the elegant royal hammer-fish of the Indian Ocean, whose regular white spots stood out brightly on a red and brown ground, an imperial spondyle, bright-coloured, bristling with spines, a rare specimen in the European museums—(I estimated its value at not less than £1000); a common hammer-fish of the seas of New Holland, which is only procured with difficulty; exotic buccardia of Senegal; fragile white bivalve shells, which a breath might shatter like a soap-bubble; several varieties of the aspergillum of Java, a kind of calcareous tube, edged with leafy folds, and much debated by amateurs; a whole series of trochi, some a greenish-yellow, found in the American seas, others a reddish-brown, natives of Australian waters; others from the Gulf of Mexico, remarkable for their intricate shell; stellari found in the Southern Seas; and last, the rarest of all, the magnificent spur of New Zealand; and every description of delicate and fragile shells to which science has given appropriate names.

Apart, in separate compartments, were spread out chaplets of pearls of the greatest beauty, which reflected the electric light in little sparks of fire; pink pearls, torn from the pinna-marina of the Red Sea; green pearls of the halioyde iris; yellow, blue, and black pearls, the curious productions of the divers molluscs of every ocean, and certain mussels of the water-courses of the North; lastly, several specimens of inestimable value which had been gathered from the rarest pintadines. Some of these pearls were larger than a pigeon's egg, and were worth as much, and more than that which the traveller Tavernier sold to the Shah of Persia for three millions, and surpassed the one in the possession of the Imaum of Muscat, which I had believed to be unrivalled in the world.

Therefore, to estimate the value of this collection was simply impossible. Captain Nemo must have expended millions in the acquirement of these various specimens, and I was thinking what source he could have drawn from, to have been able thus to gratify his

fancy for collecting, when I was interrupted by these words—

“You are examining my shells, Professor? Unquestionably they must be interesting to a naturalist; but for me they have a far greater charm, for I have collected them all with my own hand, and there is not a sea on the face of the globe which has escaped by researches.”

“I can understand, Captain, the delight of wandering about in the midst of such riches. You are one of those who have collected their treasures themselves. No museum in Europe possesses such a collection of the produce of the ocean. But if I exhaust all my admiration upon it, I shall have none left for the vessel which carries it. I do not wish to pry into your secrets; but I must confess that this *Nautilus*, with the motive power which confined in it, the contrivances which enable it to be worked, the powerful agent which propels it, all excite my curiosity to the highest pitch. I see suspended on the walls of this room instruments of whose use I am ignorant.”

“You will find these same instruments in my own room, Professor, where I shall have much pleasure in explaining their use to you. But first come and inspect the cabin which is set apart for your own use. You must see how you will be accommodated on board the *Nautilus*.”

I followed Captain Nemo, who, by one of the doors opening from each panel of the drawing-room, regained the waist. He conducted me towards the bow, and there I found, not a cabin, but an elegant room, with a bed, dressing-table, and several other pieces of furniture.

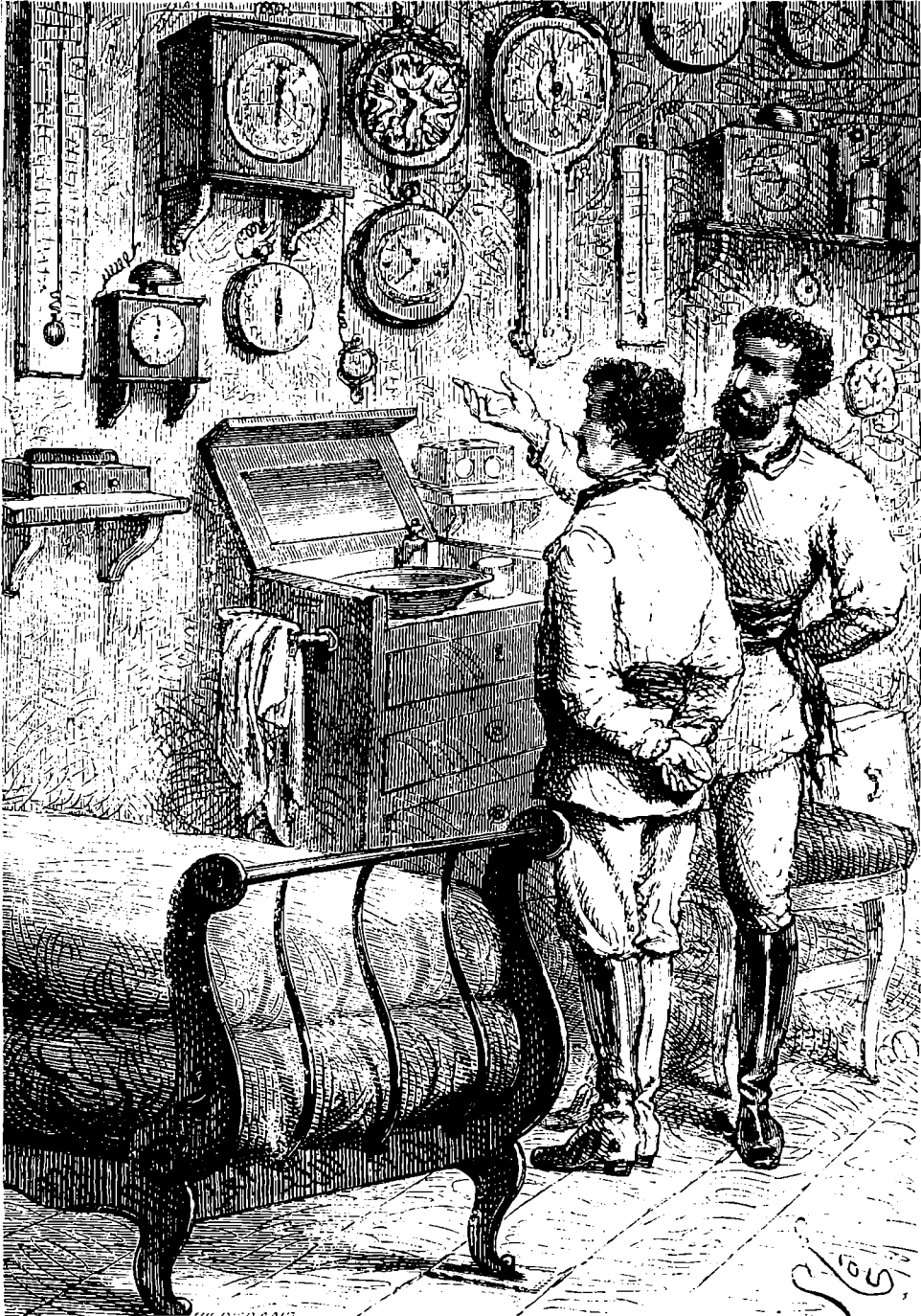
I could only thank my host.

“Your room adjoins mine,” said he, opening a door, “and mine opens into the drawing-room that we have just quitted.”

I entered the Captain's room: it had a severe, almost a monkish, aspect. A small iron bedstead, a table, some articles for the toilet; the whole lighted by a skylight. No comforts, the strictest necessaries only.

Captain Nemo pointed to a seat.

“Be so good as to sit down,” he said. I seated myself, and he began thus.



Captain Nemo's room.

Twenty Thousand Leagues Under the Sea

CHAPTER XI

ALL BY ELECTRICITY

“SIR,” said Captain Nemo, showing me the instruments hanging on the walls of his room, “here are the contrivances required for the navigation of the *Nautilus*. Here, as in the drawing-room, I have them always under my eyes, and they indicate my position and exact direction in the middle of the ocean. Some are known to you, such as the thermometer, which gives the internal temperature of the *Nautilus*; the barometer, which indicates the weight of the air and foretells the changes of the weather; the hygrometer, which marks the dryness of the atmosphere; the storm-glass, the contents of which, by decomposing, announce the approach of tempests; the compass, which guides my course; the sextant, which shows the latitude by the altitude of the sun; chronometers, by which I calculate the longitude; and glasses for day and night, which I use to examine the points of the horizon, when the *Nautilus* rises to the surface of the waves.”

“These are the usual nautical instruments,” I replied, “and I know the use of them. But these others, no doubt, answer to the particular requirements of the *Nautilus*. This dial with the moveable needle is a manometer, is it not?”

“It is actually a manometer. But by communication with the water, whose external pressure it indicates, it gives our depth at the same time.”

“And these other instruments, the use of which I cannot guess?”

“Here, Professor, I ought to give you some explanations. Will you be kind enough to listen to me?”

He was silent for a few moments, then he said—

“There is a powerful agent, obedient, rapid, easy, which conforms to every use, and reigns supreme on board my vessel. Everything is done by means of it. It lights it, warms it, and is the soul of my mechanical apparatus. This agent is electricity.”

“Electricity?” I cried in surprise.

“Yes, sir.”

“Nevertheless, Captain, you possess an extreme rapidity of movement, which does not agree well with the power of electricity. Until

now, its dynamic force has remained under restraint, and has only been able to produce a small amount of power.”

“Professor,” said Captain Nemo, “my electricity is not every body’s. You know what sea-water is composed of. In a thousand grammes are found 96½ per cent. of water, and about 22/3 per cent. of chloride of sodium; then, in a smaller quantity, chlorides of magnesium and of potassium, bromide of magnesium, sulphate of magnesia, sulphate and carbonate of lime. You see, then, that chloride of sodium forms a large part of it. So it is this sodium that I extract from sea-water, and of which I compose my ingredients, I owe all to the ocean; it produces electricity, and electricity gives heat, light, motion, and, in a word, life to the *Nautilus*.”

“But not the air you breathe?”

“Oh! I could manufacture the air necessary for my consumption, but it is useless, because I go up to the surface of the water when I please. However, if electricity does not furnish me with air to breathe, it works at least the powerful pumps that are stored in spacious reservoirs, and which enable me to prolong at need, and as long as I will, my stay in the depths of the sea. It gives a uniform and unintermittent light, which the sun does not. Now look at this clock; it is electrical, and goes with a regularity that defies the best chronometers. I have divided it into twenty-four hours, like the Italian clocks, because for me there is neither night nor day, sun nor moon, but only that factitious light that I take with me to the bottom of the sea. Look! just now, it is ten o’clock in the morning.”

“Exactly.”

“Another application of electricity. This dial hanging in front of us indicates the speed of the *Nautilus*. An electric thread puts it in communication with the screw, and the needle indicates the real speed. Look! now we are spinning along with a uniform speed of fifteen miles an hour.”

“It is marvellous! and I see, Captain, you were right to make use of this agent that takes the place of wind, water, and steam.”

“We have not finished, M. Aronnax,” said Captain Nemo, rising; “if you will follow me,

we will examine the stern of the *Nautilus*."

Really, I knew already the anterior part of this submarine boat, of which this is the exact division, starting from the ship's head:—the dining-room, five yards long, separated from the library by a water-tight partition; the library, five yards long; the large drawing-room, ten yards long, separated from the Captain's room by a second water-tight partition; the said room, five yards in length; mine, two and a half yards; and lastly, a reservoir of air, seven and a half yards, that extended to the bows. Total length thirty-five yards, or one hundred and five feet. The partitions had doors that were shut hermetically by means of india-rubber instruments, and they ensured the safety of the *Nautilus* in case of a leak.

I followed Captain Nemo through the waist, and arrived at the centre of the boat. There was a sort of well that opened between two partitions. An iron ladder, fastened with an iron hook to the partition, led to the upper end. I asked the Captain what the ladder was used for.

"It leads to the small boat," he said.

"What! have you a boat?" I exclaimed, in surprise.

"Of course; an excellent vessel, light and insubmersible, that serves either as a fishing or as a pleasure boat."

"But then, when you wish to embark, you are obliged to come to the surface of the water?"

"Not at all. This boat is attached to the upper part of the hull of the *Nautilus*, and occupies a cavity made for it. It is decked, quite water-tight, and held together by solid bolts. This ladder leads to a man-hole made in the hull of the *Nautilus*, that corresponds with a similar hole made in the side of the boat. By this double opening I get into the small vessel. They shut the one belonging to the *Nautilus*, I shut the other by means of screw pressure. I undo the bolts, and the little boat goes up to the surface of the sea with prodigious rapidity. I then open the panel of the bridge, carefully shut till then; I mast it, hoist my sail, take my oars, and I'm off."

"But how do you get back on board?"

"I do not come back, M. Aronnax; the *Nautilus* comes to me."

"By your orders?"

"By my orders. An electric thread connects us. I telegraph to it, and that is enough."

"Really," I said, astonished at these marvels, "nothing can be more simple."

After having passed by the cage of the stair-

case that led to the platform, I saw a cabin six feet long, in which Conseil and Ned Land, enchanted with their repast, were devouring it with avidity. Then a door opened into a kitchen nine feet long, situated between the large storerooms. There electricity, better than gas itself, did all the cooking. The streams under the furnaces gave out to the sponges of platina a heat which was regularly kept up and distributed. They also heated a distilling apparatus, which, by evaporation, furnished excellent drinkable water. Near this kitchen was a bath-room comfortably furnished, with hot and cold water taps.

Next to the kitchen was the berth-room of the vessel, sixteen feet long. But the door was shut, and I could not see the management of it, which might have given me an idea of the number of men employed on board the *Nautilus*.

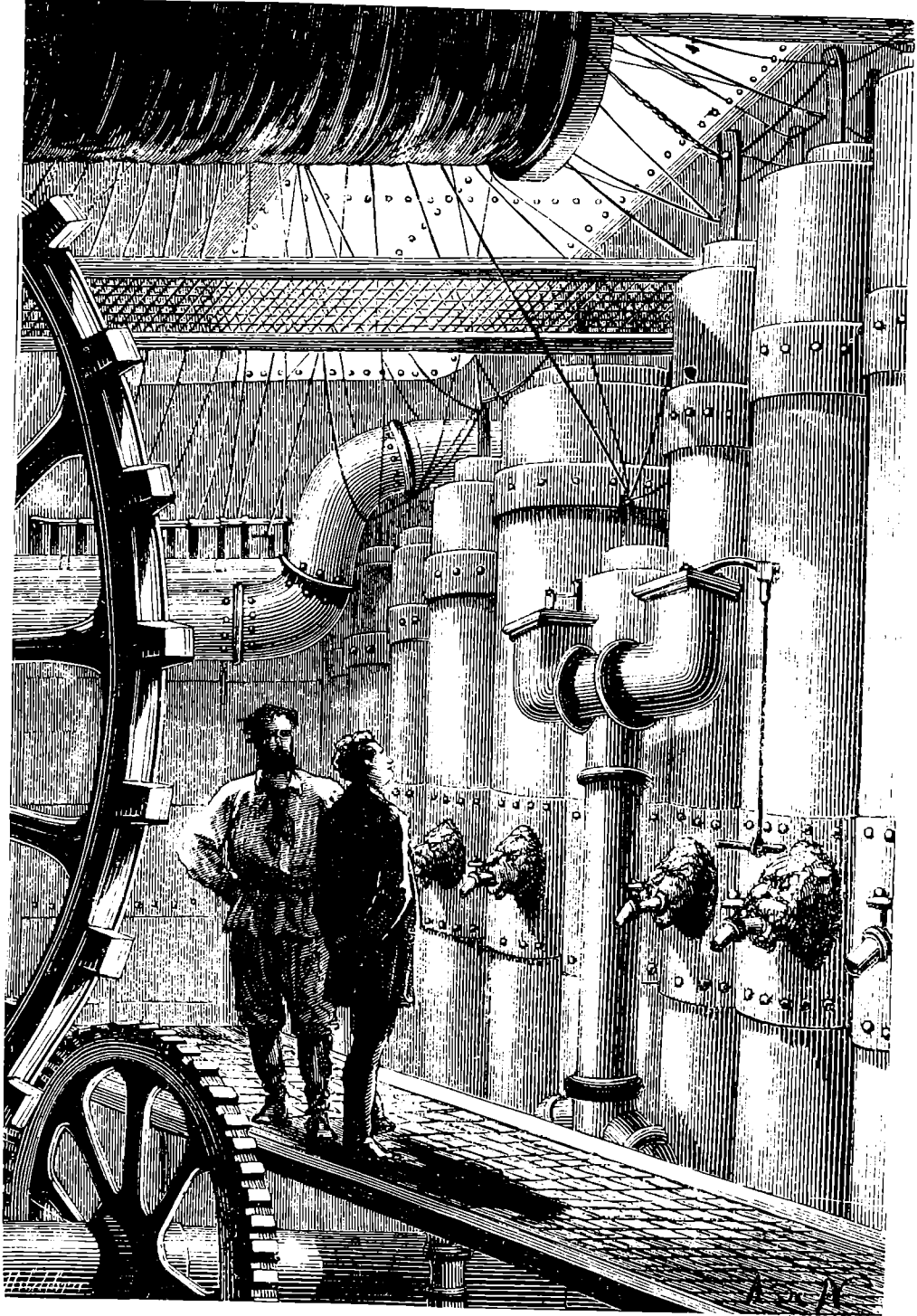
At the bottom was a fourth partition that separated this office from the engine-room. A door opened, and I found myself in the compartment where Captain Nemo—certainly an engineer of a very high order—had arranged his locomotive machinery. This engine-room, clearly lighted, did not measure less than sixty-five feet in length. It was divided into two parts; the first contained the materials for producing electricity, and the second the machinery that connected it with the screw. I examined it with great interest, in order to understand the machinery of the *Nautilus*.

"You see," said the Captain, "I use Bunsen's contrivances, not Ruhmkorff's. Those would not have been powerful enough. Bunsen's are fewer in number, but strong and large, which experience proves to be the best. The electricity produced passes forward, where it works, by electro-magnets of great size, on a system of levers and cog-wheels that transmit the movement to the axle of the screw. This one, the diameter of which is nineteen feet, and the thread twenty-three feet, performs about a hundred and twenty revolutions in a second."

"And you get then?"

"A speed of fifty miles an hour."

"I have seen the *Nautilus* manoeuvre before the *Abraham Lincoln*, and I have my own ideas as to its speed. But this is not enough. We must see where we go. We must be able to direct it to the right, to the left, above, below. How do you get to the great depths, where you find an increasing resistance, which is rated by hundreds of atmospheres? How do you return to the surface of the ocean? And how do you



The Engine-room of the *Nautilus*.

maintain yourselves in the requisite medium?
Am I asking too much?"

"Not at all, Professor," replied the Captain,
with some hesitation; "since you may never

leave this submarine boat. Come into the
saloon, it is our usual study, and there you will
learn all you want to know about the
Nautilus."

Twenty Thousand Leagues Under the Sea

CHAPTER XII

SOME FIGURES

A MOMENT after we were seated on a divan in the saloon smoking. The Captain showed me a sketch that gave the plan, section, and elevation of the *Nautilus*. Then he began his description in these words:—

“Here, M. Aronnax, are the several dimensions of the boat you are in. It is an elongated cylinder with conical ends. It is very like a cigar in shape, a shape already adopted in London in several constructions of the same sort. The length of this cylinder, from stem to stern, is exactly 232 feet, and its maximum breadth is twenty-six feet. It is not built quite like your long-voyage steamers, but its lines are sufficiently long, and its curves prolonged enough, to allow the water to slide off easily, and oppose no obstacle to its passage. These two dimensions enable you to obtain by a simple calculation the surface and cubic contents of the *Nautilus*. Its area measures 6032 feet; and its contents about 1500 cubic yards; that is to say, when completely immersed it displaces 50,000 feet of water, or weighs 1500 tons.

“When I made the plans for this submarine vessel, I meant that nine-tenths should be submerged: consequently, it ought only to displace nine-tenths of its bulk, that is to say, only to weigh that number of tons. I ought not, therefore, to have exceeded that weight, constructing it on the aforesaid dimensions.

“The *Nautilus* is composed of two hulls, one inside, the other outside, joined by T-shaped irons, which render it very strong. Indeed, owing to this cellular arrangement it resists like a block, as if it were solid. Its sides cannot yield; it coheres spontaneously, and not by the closeness of its rivets; and the homogeneity of its construction, due to the perfect union of the materials, enables it to defy the roughest seas.

“These two hulls are composed of steel plates, whose density is from .7 to .8 that of water. The first is not less than two inches and a half thick, and weighs 394 tons. The second envelope, the keel, twenty inches high and ten thick, weighs alone sixty-two tons. The engine, the ballast, the several accessories and apparatus appendages, the partitions and bulkheads, weigh 961.62 tons. Do you follow all this?”

“I do.”

“Then, when the *Nautilus* is afloat under these circumstances, one-tenth is out of the water. Now, if I have made reservoirs of a size equal to this tenth, or capable of holding 150 tons, and if I fill them with water, the boat, weighing then 1507 tons, will be completely immersed. That would happen, Professor. These reservoirs are in the lower parts of the *Nautilus*. I turn on taps and they fill, and the vessel sinks that had just been level with the surface.”

“Well, Captain, but now we come to the real difficulty. I can understand your rising to the surface; but diving below the surface, does not your submarine contrivance encounter a pressure, and consequently undergo an upward thrust of one atmosphere for every thirty feet of water, just about fifteen pounds per square inch?”

“Just so, sir.”

“Then, unless you quite fill the *Nautilus*, I do not see how you can draw it down to those depths.”

“Professor, you must not confound statics with dynamics, or you will be exposed to grave errors. There is very little labour spent in attaining the lower regions of the ocean, for all bodies have a tendency to sink. When I wanted to find out the necessary increase of weight required to sink the *Nautilus*, I had only to calculate the reduction of volume that seawater acquires according to the depth.”

“That is evident.”

“Now, if water is not absolutely incompressible, it is at least capable of very slight compression. Indeed, after the most recent calculations this reduction is only .000436 of an atmosphere for each thirty feet of depth. If we want to sink 3000 feet, I should keep account of the reduction of bulk under a pressure equal to that of a column of water of a thousand feet. The calculation is easily verified. Now, I have supplementary reservoirs capable of holding a hundred tons. Therefore I can sink to a considerable depth. When I wish to rise to the level of the sea, I only let off the water, and empty all the reservoirs if I want the *Nautilus* to emerge from the tenth part of her total capacity.”



“The Captain showed me a sketch of the *Nautilus*.”

I had nothing to object to these reasonings.

"I admit your calculations, Captain," I replied; "I should be wrong to dispute them since daily experience confirms them; but I foresee a real difficulty in the way."

"What, sir?"

"When you are about 1000 feet deep, the walls of the *Nautilus* bear a pressure of 100 atmospheres. If, then, just now you were to empty the supplementary reservoirs, to lighten the vessel, and to go up to the surface, the pumps must overcome the pressure of 100 atmospheres, which is 1500 lbs. per square inch. From that a power"—

"That electricity alone can give," said the Captain, hastily. "I repeat, sir, that the dynamic power of my engines is almost infinite. The pumps of the *Nautilus* have an enormous power, as you must have observed when their jets of water burst like a torrent upon the *Abraham Lincoln*. Besides I use subsidiary reservoirs only to attain a mean depth of 750 to 1000 fathoms, and that with a view of managing my machines. Also, when I have a mind to visit the depths of the ocean five or six miles below the surface, I make use of slower but not less infallible means."

"What are they, Captain?"

"That involves my telling you how the *Nautilus* is worked."

"I am impatient to learn."

"To steer this boat to starboard or port, to turn, in a word, following a horizontal plan, I use an ordinary rudder fixed on the back of the stern-post, and with one wheel and some tackle to steer by. But I can also make the *Nautilus* rise and sink, and sink and rise, by a vertical movement by means of two inclined planes fastened to its sides, opposite the centre of flotation, planes that move in every direction, and that are worked by powerful levers from the interior. If the planes are kept parallel with the boat, it moves horizontally. If slanted, the *Nautilus*, according to this inclination, and under the influence of the screw, either sinks diagonally or rises diagonally as it suits me. And even if I wish to rise more quickly to the surface, I ship the screw, and the pressure of the water causes the *Nautilus* to rise vertically like a balloon filled with hydrogen."

"Bravo, Captain! But how can the steersman follow the route in the middle of the waters?"

"The steersman is placed in a glazed box, that is raised above the hull of the *Nautilus*, and furnished with lenses."

"Are these lenses capable of resisting such

pressure?"

"Perfectly. Glass, which breaks at a blow, is, nevertheless, capable of offering considerable resistance. During some experiments of fishing by electric light in 1864 in the Northern Seas, we saw plates less than a third of an inch thick resist a pressure of sixteen atmospheres. Now, the glass that I use is not less than thirty times thicker."

"Granted. But, after all, in order to see, the light must exceed the darkness, and in the midst of the darkness in the water, how can you see?"

"Behind the steersman's cage is placed a powerful electric reflector, the rays from which light up the sea for half a mile in front."

"Ah! bravo, bravo, Captain! Now I can account for this phosphorescence in the supposed narwhal that puzzled us so. I now ask you if the boarding of the *Nautilus* and of the *Scotia*, that has made such a noise, has been the result of a chance rencontre?"

"Quite accidental, sir. I was sailing only one fathom below the surface of the water, when the shock came. It had no bad result."

"None, sir. But now, about your rencontre with the *Abraham Lincoln*?"

"Professor, I am sorry for one of the best vessels in the American navy; but they attacked me, and I was bound to defend myself. I contented myself, however, with putting the frigate *hors de combat*: she will not have any difficulty in getting repaired at the next port."

"Ah, Commander! your *Nautilus* is certainly a marvellous boat."

"Yes, Professor; and I love it as if it were part of myself. If danger threatens one of your vessels on the ocean, the first impression is the feeling of an abyss above and below. On the *Nautilus* men's hearts never fail them. No defects to be afraid of, for the double shell is as firm as iron; no rigging to attend to; no sails for the wind to carry away; no boilers to burst; no fire to fear, for the vessel is made of iron, not of wood; no coal to run short, for electricity is the only mechanical agent; no collision to fear, for it alone swims in deep water; no tempest to brave, for when it dives below the water, it reaches absolute tranquillity. There, sir! that is the perfection of vessels! And if it is true that the engineer has more confidence in the vessel than the builder, and the builder than the captain himself, you understand the trust I repose in my *Nautilus*; for I am at once captain, builder, and engineer."

"But how could you construct this wonder-



“Fire destroyed all trace of our proceedings.”

ful *Nautilus* in secret?"

"Each separate portion, M. Aronnax, was brought from different parts of the globe. The keel was forged at Creusot, the shaft of the screw at Penn & Co.'s, London, the iron plates of the hull at Laird's of Liverpool, the screw itself at Scott's at Glasgow. The reservoirs were made by Cail & Co. at Paris, the engine by Krupp in Prussia, its beak in Motala's workshop in Sweden, its mathematical instruments by Hart Brothers, of New York, &c.; and each of these people had my orders under different names."

"But these parts had to be put together and arranged?"

"Professor, I had set up my workshops upon a desert island in the ocean. There my workmen, that is to say, the brave men that I instructed and educated, and myself have put

together our *Nautilus*. Then, when the work was finished, fire destroyed all trace of our proceedings on this island, that I could have jumped over if I had liked."

"Then the cost of this vessel is great?"

"M. Aronnax, an iron vessel costs £45 per ton. Now the *Nautilus* weighed 1500. It came therefore to £67,500, and £80,000 more for fitting it up, and about £200,000 with the works of art and the collections it contains."

"One last question, Captain Nemo."

"Ask it, Professor."

"You are rich?"

"Immensely rich, sir; and I could, without missing it, pay the national debt of France."

I stared at the singular person who spoke thus. Was he playing upon my credulity? The future would decide that.



Captain Nemo taking the altitude of the sun.

Twenty Thousand Leagues Under the Sea

CHAPTER XIII

THE BLACK RIVER

THE portion of the terrestrial globe which is covered by water is estimated at upwards of eighty millions of acres. The fluid mass comprises two billions two hundred and fifty millions of cubic miles, forming a spherical body of a diameter of sixty leagues, the weight of which would be three quintillions of tons. To comprehend the meaning of these figures, it is necessary to observe that a quintillion is to a billion as a billion is to unity; in other words, there are as many billions in a quintillion as there are units in a billion. This mass of fluid is equal to about the quantity of water which would be discharged by all the rivers of the earth in forty thousand years.

During the geological epochs, the igneous period succeeded to the aqueous. The ocean originally prevailed everywhere. Then by degrees, in the silurian period, the tops of the mountains began to appear, the islands emerged, then disappeared in partial deluges, reappeared, became settled, formed continents, till at length the earth became geographically arranged, as we see in the present day. The solid had wrested from the liquid thirty-seven million six hundred and fifty seven square miles, equal to twelve billions nine hundred and sixty millions of acres.

The shape of continents allows us to divide the waters into five great portions: the Arctic or Frozen Ocean, the Antarctic or Frozen Ocean, the Indian, the Atlantic, and the Pacific Oceans.

The Pacific Ocean extends from north to south between the two polar circles, and from east to west between Asia and America, over an extent of 145 degrees of longitude. It is the quietest of seas; its currents are broad and slow, it has medium tides, and abundant rain. Such was the ocean that my fate destined me first to travel over under these strange conditions.

"Sir," said Captain Nemo, "we will, if you please, take our bearings and fix the starting-point of this voyage. It is a quarter to twelve, I will go up again to the surface."

The Captain pressed an electric clock three times. The pumps began to drive the water from the tanks; the needle of the manometer

marked by a different pressure the ascent of the *Nautilus*, then it stopped.

"We have arrived," said the Captain.

I went to the central staircase which opened on to the platform, clambered up the iron steps, and found myself on the upper part of the *Nautilus*.

The platform was only three feet out of water. The front and back of the *Nautilus* was of that spindle-shape which caused it justly to be compared to a cigar. I noticed that its iron plates, slightly overlaying each other, resembled the shell which clothes the bodies of our large terrestrial reptiles. It explained to me how natural it was, in spite of all glasses, that this boat should have been taken for a marine animal.

Towards the middle of the platform the long-boat, half buried in the hull of the vessel, formed a slight excrescence. Fore and aft rose two cages of medium height with inclined sides, and partly closed by thick lenticular glasses; one destined for the steersman who directed the *Nautilus*, the other containing a brilliant lantern to give light on the road.

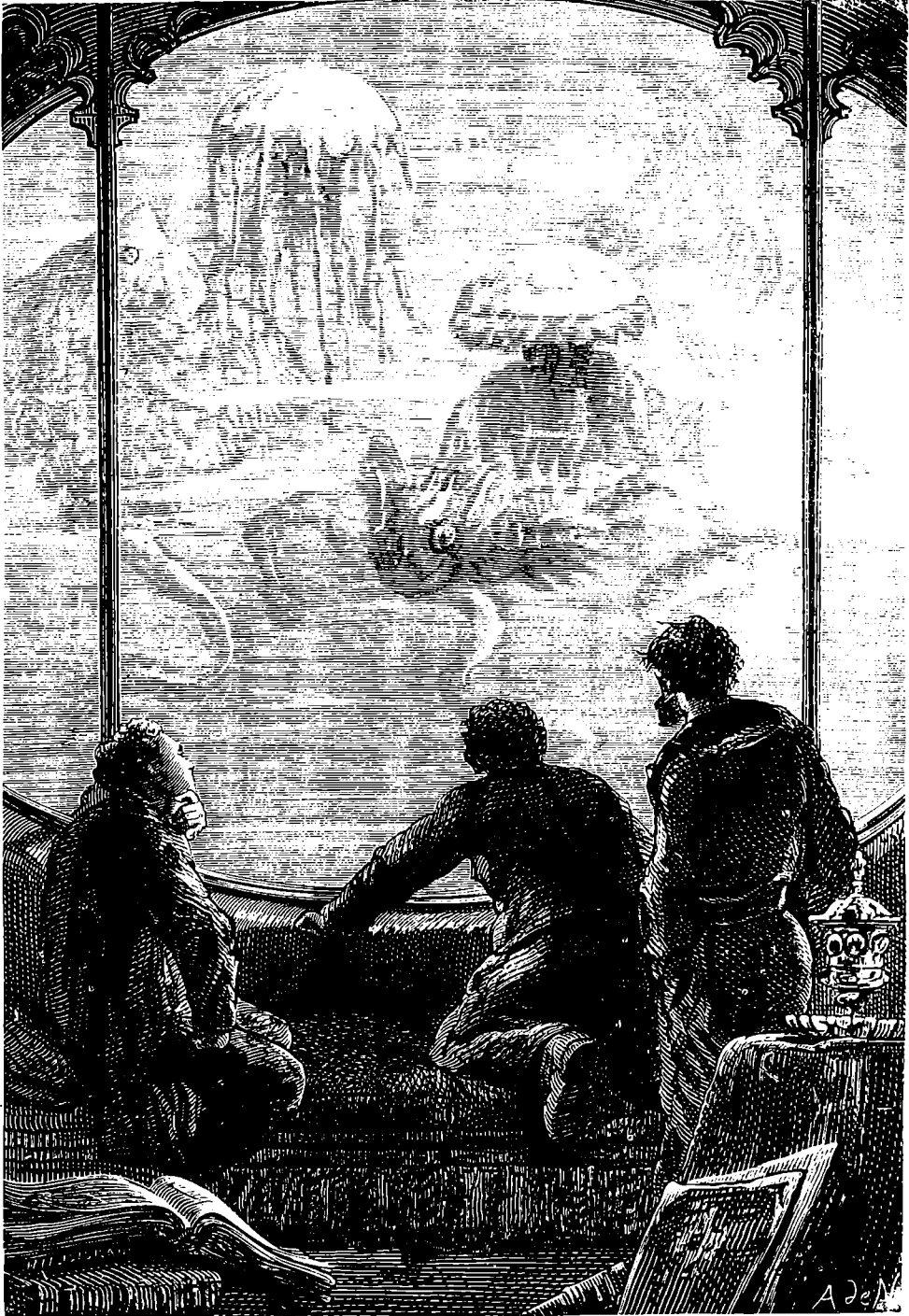
The sea was beautiful, the sky pure. Scarcely could the long vehicle feel the broad undulations of the ocean. A light breeze from the east rippled the surface of the waters. The horizon, free from fog, made observation easy. Nothing was in sight. Not a quicksand, not an island. A vast desert.

Captain Nemo, by the help of his sextant, took the altitude of the sun, which ought also to give the latitude. He waited for some moments till its disc touched the horizon. Whilst taking observations not a muscle moved, the instrument could not have been more motionless in a hand of marble.

"Twelve o'clock, sir," said he. "When you like"—

I cast a last look upon the sea, slightly yellowed by the Japanese coast, and descended to the saloon.

"And now, sir, I leave you to your studies," added the Captain; "our course is E.N.E., our depth is twenty-six fathoms. Here are maps on a large scale by which you may follow it. The saloon is at your disposal, and with your permission I will retire." Captain Nemo



“A window opened into this unexplored abyss.”

bowed, and I remained alone, lost in thoughts all bearing on the commander of the *Nautilus*.

For a whole hour was I deep in these reflections, seeking to pierce this mystery so interesting to me. Then my eyes fell upon the vast planisphere spread upon the table, and I placed my finger on the very spot where the given latitude and longitude crossed.

The sea has its large rivers like the continents. They are special currents known by their temperature and their colour. The most remarkable of these is known by the name of the Gulf Stream. Science has decided on the globe the direction of five principal currents: one in the North Atlantic, a second in the South, a third in the North Pacific, a fourth in the South, and a fifth in the Southern Indian Ocean. It is even probable that a sixth current existed at one time or another in the Northern Indian Ocean, when the Caspian and Aral seas formed but one vast sheet of water.

At this point indicated on the planisphere one of these currents was rolling, the Kuro-Scivo of the Japanese, the Black River, which, leaving the Gulf of Bengal where it is warmed by the perpendicular rays of a tropical sun, crosses the Straits of Malacca along the coast of Asia, turns into the North Pacific to the Aleutian Islands, carrying with it trunks of camphor-trees and other indigenous productions, and edging the waves of the ocean with the pure indigo of its warm water. It was this current that the *Nautilus* was to follow. I followed it with my eye; saw it lose itself in the vastness of the Pacific, and felt myself drawn with it, when Ned Land and Conseil appeared at the door of the saloon.

My two brave companions remained petrified at the sight of the wonders spread before them.

"Where are we, where are we?" exclaimed the Canadian. "In the museum at Quebec?"

"My friends," I answered, making a sign for them to enter, "you are not in Canada, but on board the *Nautilus* fifty yards below the level of the sea."

"But, M. Aronnax," said Ned Land, "can you tell me how many men there are on board? Ten, twenty, fifty, a hundred?"

"I cannot answer you, Mr Land; it is better to abandon for a time all idea of seizing the *Nautilus* or escaping from it. This ship is a masterpiece of modern industry, and I should be sorry not to have seen it. Many people would accept the situation forced upon us, if only to move amongst such wonders. So be quiet and let us try and see what passes around us."

"See!" exclaimed the harpooner, "but we can see nothing in this iron prison! We are walking—we are sailing—blindly."

Ned Land had scarcely pronounced these words when all was suddenly darkness. The luminous ceiling was gone, and so rapidly that my eyes received a painful impression.

We remained mute, not stirring, and not knowing what surprise awaited us, whether agreeable or disagreeable. A sliding noise was heard: one would have said that panels were working at the sides of the *Nautilus*.

"It is the end of the end!" said Ned Land.

Suddenly light broke at each side of the saloon, through two oblong openings. The liquid mass appeared vividly lit up by the electric gleam. Two crystal plates separated us from the sea. At first I trembled at the thought that this frail partition might break, but strong bands of copper bound them, giving an almost infinite power of resistance.

The sea was distinctly visible for a mile all round the *Nautilus*. What a spectacle! What pen can describe it? Who could paint the effects of the light through those transparent sheets of water, and the softness of the successive gradations from the lower to the superior strata of the ocean?

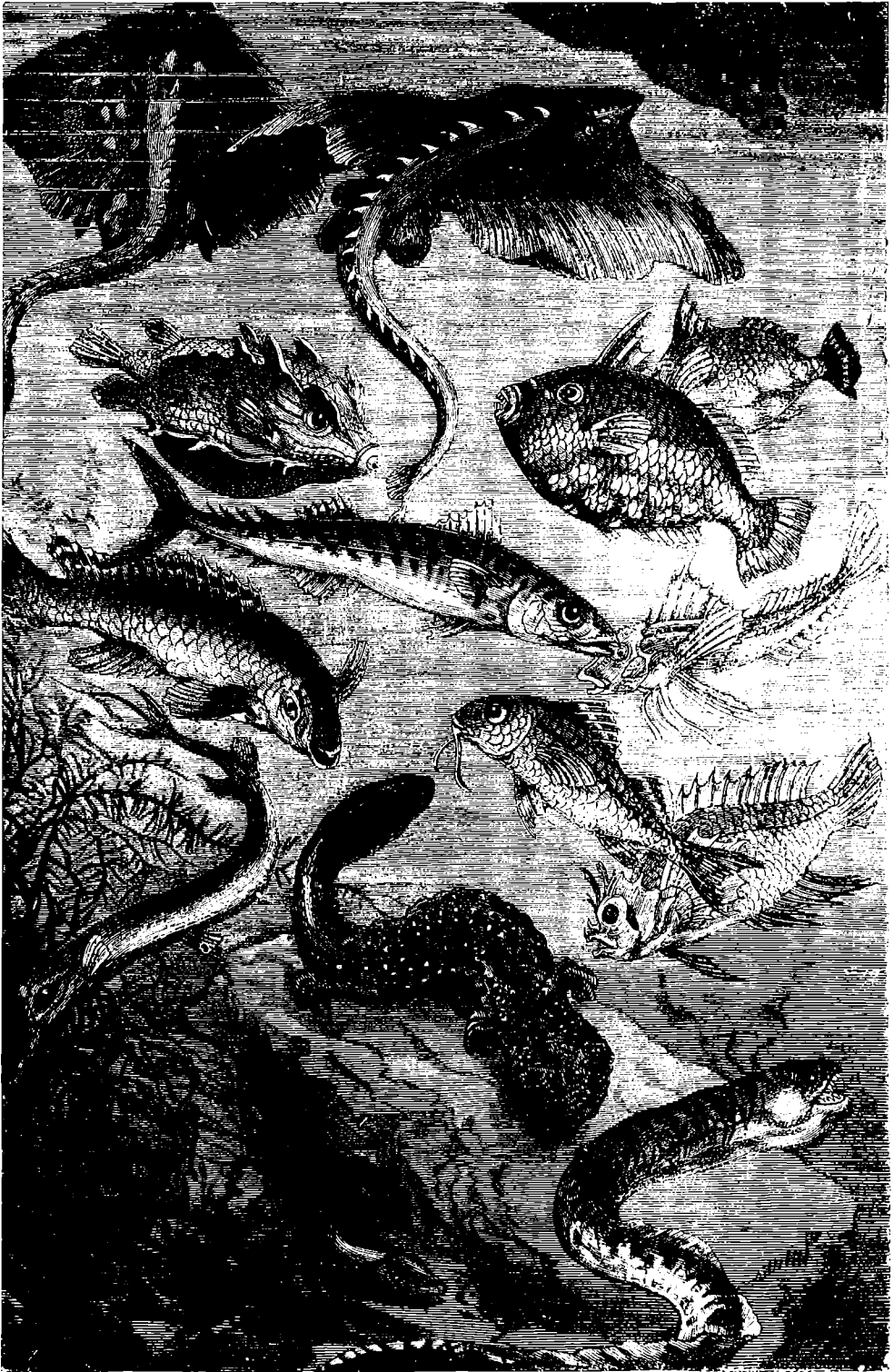
We know the transparency of the sea, and that its clearness is far beyond that of rock water. The mineral and organic substances, which it holds in suspension heightens its transparency. In certain parts of the ocean at the Antilles, under seventy-five fathoms of water, can be seen with surprising clearness a bed of sand. The penetrating power of the solar rays does not seem to cease for a depth of one hundred and fifty fathoms. But in this middle fluid travelled over by the *Nautilus*, the electric brightness was produced even in the bosom of the waves. It was no longer luminous water, but liquid light.

On each side a window opened into this unexplored abyss. The obscurity of the saloon showed to advantage the brightness outside, and we looked out as if this pure crystal had been the glass of an immense aquarium.

"You wished to see, friend Ned; well, you see now."

"Curious! curious!" muttered the Canadian, who, forgetting his ill-temper, seemed to submit to some irresistible attraction; "and one would come further than this to admire such a sight!"

"Ah!" thought I to myself, "I understand the life of this man; he has made a world apart for himself, in which he treasures all his greatest wonders."



Life in the Black River.

For two whole hours an aquatic army escorted the *Nautilus*. During their games, their bounds, while rivalling each other in beauty, brightness, and velocity, I distinguished the green labre; the banded mullet, marked by a double line of black; the round-tailed goby, of a white colour, with violet spots on the back; the Japanese scombrus, a beautiful mackerel of these seas, with a blue body and silvery head; the brilliant azurors, whose name alone defies description; some banded spares, with variegated fins of blue and yellow; some aclostones, the woodcocks of the seas, some specimens of which attain a yard in length; Japanese salamanders, spider lampreys, serpents six feet long, with eyes small and lively, and a huge mouth bristling with teeth; with many other species.

Our imagination was kept at its height, interjections followed quickly on each other. Ned named the fish, and Conseil classed them. I was in ecstasies with the vivacity of their movements and the beauty of their forms. Never had it been given to me to surprise these animals, alive and at liberty, in their natural element. I will not mention all the varieties which passed before my dazzled eyes, all the collection of the seas of China and Japan. These fish, more numerous than the birds of

the air, came, attracted, no doubt, by the brilliant focus of the electric light.

Suddenly there was daylight in the saloon, the iron panels closed again, and the enchanting vision disappeared. But for a long time I dreamt on till my eyes fell on the instruments hanging on the partition. The compass still showed the course to be N.N.E., the manometer indicated a pressure of five atmospheres, equivalent to a depth of twenty-five fathoms, and the electric log gave a speed of fifteen miles an hour. I expected Captain Nemo, but he did not appear. The clock marked the hour of five.

Ned Land and Conseil returned to their cabin, and I retired to my chamber. My dinner was ready. It was composed of turtle-soup made of the most delicate hawksbills, of a surmullet served with puff paste (the liver of which, prepared by itself, was most delicious), and fillets of the emperor-holocanthus, the savour of which seemed to me superior even to salmon.

I passed the evening reading, writing, and thinking. Then sleep overpowered me, and I stretched myself on my couch of zosteria, and slept profoundly, whilst the *Nautilus* was gliding rapidly through the current of the Black River.



“I was admiring this joyous rising of the sun.”

Twenty Thousand Leagues Under the Sea

CHAPTER XIV

A NOTE OF INVITATION

THE next day was the 9th of November. I awoke after a long sleep of twelve hours. Conseil came, according to custom, to know "how I had passed the night," and to offer his services. He had left his friend the Canadian sleeping like a man who had never done anything else all his life. I let the worthy fellow chatter as he pleased, without caring to answer him. I was pre-occupied by the absence of the Captain during our sitting of the day before, and hoping to see him to-day.

As soon as I was dressed I went into the saloon. It was deserted.

I plunged into the study of the conchological treasures hidden behind the glasses. I revelled also in great herbals filled with the rarest marine plants, which, although dried up, retained their lovely colours. Amongst these precious hydrophytes I remarked some vorticellae, pavonariae, delicate ceramies with scarlet tints, some fan-shaped agari, and some natabuli like flat mushrooms, which at one time used to be classed as zoophytes; in short, a perfect series of algae.

The whole day passed without my being honoured by a visit from Captain Nemo. The panels of the saloon did not open. Perhaps they did not wish us to tire of these beautiful things.

The course of the *Nautilus* was E.N.E., her speed twelve knots, the depth below the surface between twenty-five and thirty fathoms.

The next day, 10th of November, the same desertion, the same solitude. I did not see one of the ship's crew: Ned and Conseil spent the greater part of the day with me. They were astonished at the inexplicable absence of the Captain. Was this singular man ill?—had he altered his intentions with regard to us?

After all, as Conseil said, we enjoyed perfect liberty, we were delicately and abundantly fed. Our host kept to his terms of the treaty. We could not complain, and, indeed, the singularity of our fate reserved such wonderful compensation for us, that we had no right to accuse it as yet.

That day I commenced the journal of these adventures which has enabled me to relate them with more scrupulous exactitude and

minute detail. I wrote it on paper made from the *zostera marina*.

11th November, early in the morning. The fresh air spreading over the interior of the *Nautilus* told me that we had come to the surface of the ocean to renew our supply of oxygen. I directed my steps to the central staircase, and mounted the platform.

It was six o'clock, the weather was cloudy, the sea grey but calm. Scarcely a billow. Captain Nemo, whom I hoped to meet, would he be there? I saw no one but the steersman imprisoned in his glass cage. Seated upon the projection formed by the hull of the pinnace, I inhaled the salt breeze with delight.

By degrees the fog disappeared under the action of the sun's rays, the radiant orb rose from behind the eastern horizon. The sea flamed under its glance like a train of gunpowder. The clouds scattered in the heights were coloured with lively tints of beautiful shades, and numerous "mare's tails," which betokened wind for that day. But what was wind to this *Nautilus* which tempests could not frighten!

I was admiring this joyous rising of the sun, so gay, and so life-giving, when I heard steps approaching the platform. I was prepared to salute Captain Nemo, but it was his second (whom I had already seen on the Captain's first visit) who appeared. He advanced on the platform not seeming to see me. With his powerful glass to his eye he scanned every point of the horizon with great attention. This examination over, he approached the panel and pronounced a sentence in exactly these terms. I have remembered it, for every morning it was repeated under exactly the same conditions. It was thus worded—

"Nautron respoc lorni virch."

What it meant I could not say.

These words pronounced, the second descended. I thought that the *Nautilus* was about to return to its submarine navigation. I regained the panel and returned to my chamber.

Five days sped thus, without any change in our situation. Every morning I mounted the platform. The same phrase was pronounced by the same individual. But Captain Nemo did not appear.

I had made up my mind that I should never see him again, when, on the 16th November, on returning to my room with Ned and Conseil, I found upon my table a note addressed to me. I opened it impatiently. It was written in a bold, clear hand, the characters rather pointed, recalling the German type. The note was worded as follows:—

“To PROFESSOR ARONNAX, on board the *Nautilus*.

“16th of November 1867.

“Captain Nemo invites Professor Aronnax to a hunting-party, which will take place to-morrow morning in the forests of the island of Crespo. He hopes that nothing will prevent the Professor from being present, and he will with pleasure see him joined by his companions.

“CAPTAIN NEMO, Commander of the *Nautilus*.”

“A hunt!” exclaimed Ned.

“And in the forests of the island of Crespo!” added Conseil.

“Oh! then the gentlemen is going on *terra firma*?” replied Ned Land.

“That seems to me to be clearly indicated,” said I, reading the letter once more.

“Well, we must accept,” said the Canadian. “But once more on dry ground, we shall know what to do. Indeed, I shall not be sorry to eat a piece of fresh venison.”

Without seeking to reconcile what was contradictory between Captain Nemo’s manifest aversion to islands and continents, and his invitation to hunt in a forest, I contented myself with replying—

“Let us first see where the island of Crespo is.”

I consulted the planisphere, and in 32° 40’ north lat., and 157° 50’ west long., I found a small island, recognised in 1801 by Captain Crespo, and marked in the ancient Spanish maps as Rocca de la Plata, the meaning of which is “The Silver Rock.” We were then about eighteen hundred miles from our starting-point, and the course of the *Nautilus*, a little changed, was bringing it back towards the south-east.

I showed this little rock lost in the midst of the North Pacific to my companions.

“If Captain Nemo does sometimes go on dry ground,” said I, “he at least chooses desert islands.”

Ned Land shrugged his shoulders without speaking, and Conseil and he left me.

After supper, which was served by the steward, mute and impassion, I went to bed, not without some anxiety.

The next morning, the 17th of November, on awakening I felt that the *Nautilus* was perfectly still. I dressed quickly and entered the saloon.

Captain Nemo was there, waiting for me. He rose, bowed, and asked me if it was convenient for me to accompany him. As he made no allusion to his absence during the last eight days, I did not mention it, and simply answered that my companions and myself were ready to follow him.

We entered the dining-room, where breakfast was served.

“M. Aronnax,” said the Captain, “pray, share my breakfast without ceremony; we will chat as we eat. For though I promised you a walk in the forest, I did not undertake to find hotels there. So breakfast as a man who will most likely not have his dinner till very late.”

I did honour to the repast. It was composed of several kinds of fish, and slices of holothuridae (excellent zoophytes), and different sorts of sea-weed. Our drink consisted of pure water, to which the Captain added some drops of a fermented liquor, extracted by the Kamschatcha method from a sea-weed known under the name of *Rhodomenia palmata*. Captain Nemo ate at first without saying a word. Then he began—

“Sir, when I proposed to you to hunt in my submarine forest of Crespo, you evidently thought me mad. Sir, you should never judge lightly of any man.”

“But, Captain, believe me”—

“Be kind enough to listen, and you will then see whether you have any cause to accuse me of folly and contradiction.”

“I listen.”

“You know as well as I do, Professor, that man can live under water, providing he carries with him a sufficient supply of breathable air. In submarine works, the workman, clad in an impervious dress, with his head in a metal helmet, receives air from above by means of forcing pumps and regulators.”

“That is a diving apparatus,” said I.

“Just so, but under these conditions the man is not at liberty; he is attached to the pump which sends him air through an india-rubber tube, and if we were obliged to be thus held to the *Nautilus*, we could not go far.”

“And the means of getting free?” I asked.

“It is to use the Rouquayrol apparatus, invented by two of your own countrymen, which I have brought to perfection for my own

use, and which will allow you to risk yourself under these new physiological conditions, without any organ whatever suffering. It consists of a reservoir of thick iron plates, in which I store the air under a pressure of fifty atmospheres. This reservoir is fixed on the back by means of braces, like a soldier's knapsack. Its upper part forms a box in which the air is kept by means of a bellows, and therefore cannot escape unless at its normal tension. In the Rouquayrol apparatus such as we use, two india-rubber pipes leave this box and join a sort of tent which holds the nose and mouth; one is to introduce fresh air, the other to let out the foul, and the tongue closes one or the other according to the wants of the respirator. But I, in encountering great pressures at the bottom of the sea, was obliged to shut my head, like that of a diver, in a ball of copper; and it is to this ball of copper that the two pipes, the inspirator and the expirator, open."

"Perfectly, Captain Nemo; but the air that you carry with you must soon be used; when it only contains fifteen per cent. of oxygen, it is no longer fit to breathe."

"Right! but I told you, M. Aronnax, that the pumps of the *Nautilus* allow me to store the air under considerable pressure, and on those conditions, the reservoir of the apparatus can furnish breathable air for nine or ten hours."

"I have no further objections to make," I answered; "I will only ask you one thing, Captain—how can you light your road at the bottom of the sea?"

"With the Ruhmkorff apparatus, M. Aronnax; one is carried on the back, the other is fastened to the waist. It is composed of a Bunsen pile, which I do not work with bichromate of potash, but with sodium. A wire is introduced which collects the electricity produced, and directs it towards a particularly made lantern. In this lantern is a spiral glass which contains a small quantity of carbonic gas. When the apparatus is at work this gas becomes luminous, giving out a white and continuous light. Thus provided, I can breathe and I can see."

"Captain Nemo, to all my objections you make such crushing answers, that I dare no longer doubt. But if I am forced to admit the Rouquayrol and Ruhmkorff apparatus, I must be allowed some reservations with regard to the gun I am to carry."

"But it is not a gun for powder," answered

the Captain.

"Then it is an air-gun."

"Doubtless! How would you have me manufacture gunpowder on board, without either saltpetre, sulphur, or charcoal?"

"Besides," I added, "to fire under water in a medium eight hundred and fifty-five times denser than the air, we must conquer very considerable resistance."

"That would be no difficulty. There exist guns, according to Fulton, perfected in England by Philip Coles and Burley, in France by Furcy, and in Italy by Landi, which are furnished with a peculiar system of closing, which can fire under these conditions. But I repeat, having no powder, I use air under great pressure, which the pumps of the *Nautilus* furnish abundantly."

"But this air must be rapidly used?"

"Well, have I not my Rouquayrol reservoir, which can furnish it at need? A tap is all that is required. Besides, M. Aronnax, you must see yourself that, during our submarine hunt, we can spend but little air and but few balls."

"But it seems to me that in this twilight, and in the midst of this fluid, which is very dense compared with the atmosphere, shots could not go far, nor easily prove mortal."

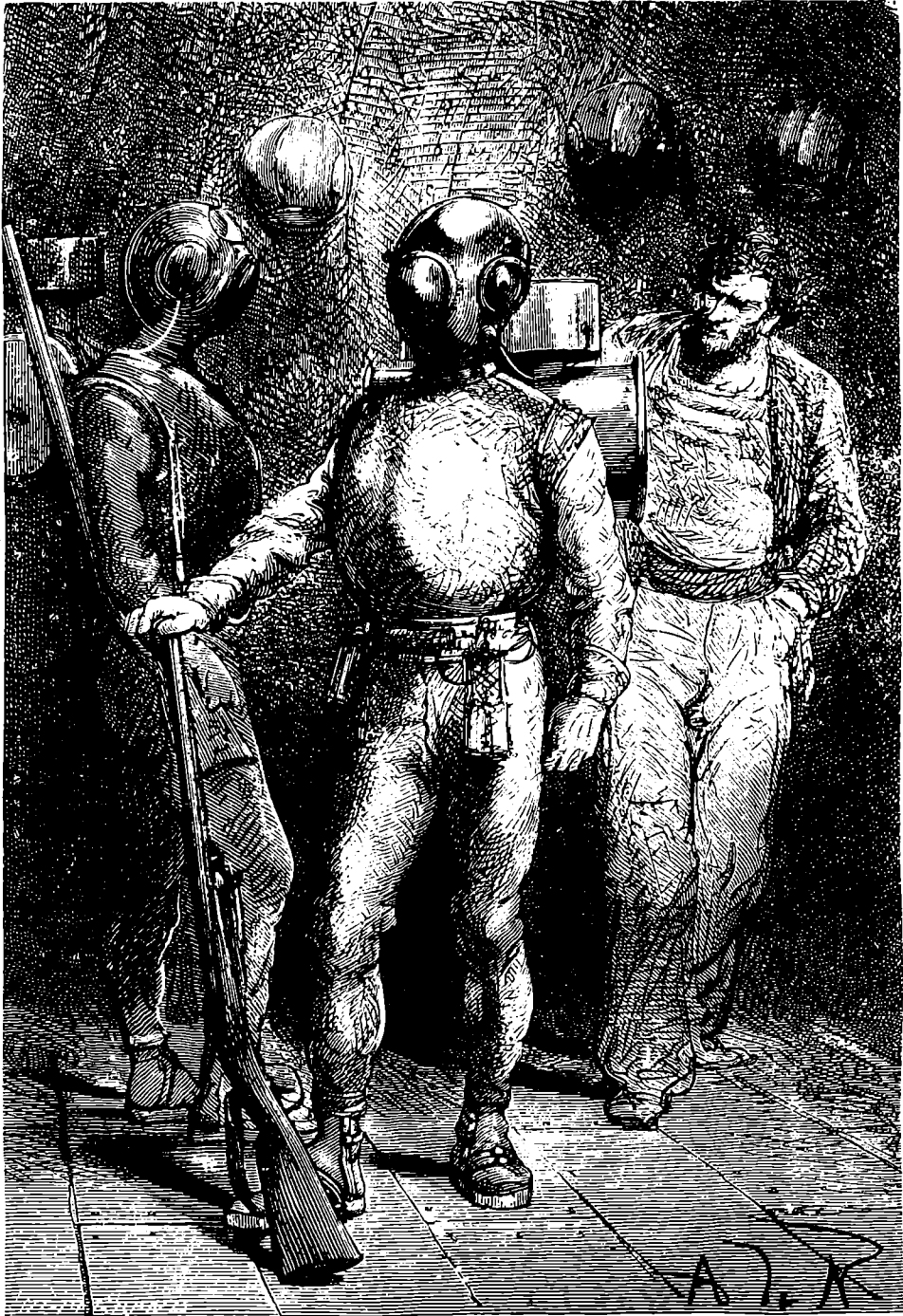
"Sir, on the contrary, with this gun every blow is mortal; and however lightly the animal is touched, it falls as if struck by a thunder-bolt."

"Why?"

"Because the balls sent by this gun are not ordinary balls, but little cases of glass (invented by Leniebroek, an Austrian chemist), of which I have a large supply. These glass cases are covered with a case of steel, and weighted with a pellet of lead; they are real Leyden bottles, into which the electricity is forced to a very high tension. With the slightest shock they are discharged, and the animal, however strong it may be, falls dead. I must tell you that these cases are size number four, and that the charge for an ordinary gun would be ten."

"I will argue no longer," I replied, rising from the table; "I have nothing left me but to take my gun. At all events, I will go where you go."

Captain Nemo then led me aft; and in passing before Ned and Conseil's cabin, I called my two companions, who followed immediately. We then came to a kind of cell near the machinery-room, in which we were to put on our walking-dress.



“ I set out ”

Twenty Thousand Leagues Under the Sea

CHAPTER XV

A WALK ON THE BOTTOM OF THE SEA

THIS cell was, to speak correctly, the arsenal and wardrobe of the *Nautilus*. A dozen diving apparatuses hung from the partition, waiting our use.

Ned Land, on seeing them, showed evident repugnance to dress himself in one.

"But, my worthy Ned, the forests of the Island of Crespo are nothing but submarine forests."

"Good!" said the disappointed harpooner, who saw his dreams of fresh meat fade away.

"And you, M. Aronnax, are you going to dress yourself in those clothes?"

"There is no alternative, Master Ned."

"As you please, sir," replied the harpooner, shrugging his shoulders; "but as for me, unless I am forced, I will never get into one."

"No one will force you, Master Ned," said Captain Nemo.

"Is Conseil going to risk it?" asked Ned.

"I follow my master wherever he goes," replied Conseil.

At the Captain's call two of the ship's crew came to help us to dress in these heavy and impervious clothes, made of india-rubber without seam, and constructed expressly to resist considerable pressure. One would have thought it a suit of armour, both supple and resisting. This suit formed trousers and waistcoat. The trousers were finished off with thick boots, weighted with heavy leaden soles. The texture of the waistcoat was held together by bands of copper, which crossed the chest, protecting it from the great pressure of the water, and leaving the lungs free to act; the sleeves ended in gloves, which in no way restrained the movement of the hands. There was a vast difference noticeable between these consummate apparatuses and the old cork breastplates, jackets, and other contrivances in vogue during the eighteenth century.

Captain Nemo and one of his companions (a sort of Hercules, who must have possessed great strength), Conseil, and myself, were soon enveloped in the dresses. There remained nothing more to be done but to enclose our heads in the metal box. But before proceeding to this operation, I asked the Captain's permission to examine the guns we were to carry.

One of the *Nautilus* men gave me a simple gun, the butt end of which, made of steel hollow in the centre, was rather large. It served as a reservoir for compressed air, which a valve, worked by a spring, allowed to escape into a metal tube. A box of projectiles, in a groove in the thickness of the butt end, contained about twenty of these electric balls, which, by means of a spring, were forced into the barrel of the gun. As soon as one shot was fired, another was ready.

"Captain Nemo," said I, "this arm is perfect, and easily handled; I only ask to be allowed to try it. But how shall we gain the bottom of the sea?"

"At this moment, Professor, the *Nautilus* is stranded in five fathoms, and we have nothing to do but to start."

"But how shall we get off?"

"You shall see."

Captain Nemo thrust his head into the helmet, Conseil and I did the same, not without hearing an ironical "Good sport!" from the Canadian. The upper part of our dress terminated in a copper collar, upon which was screwed the helmet. Three holes, protected by thick glass, allowed us to see in all directions, by simply turning our head in the interior of the headress. As soon as it was in position, the Rouquayrol apparatus on our backs began to act; and, for my part, I could breathe with ease.

With the Ruhmkorff lamp hanging from my belt, and the gun in my hand, I was ready to set out. But to speak the truth, imprisoned in these heavy garments, and glued to the deck by my leaden soles, it was impossible for me to take a step.

But this state of things was provided for. I felt myself being pushed into a little room contiguous to the wardrobe-room. My companions followed, towed along in the same way. I heard a water-tight door, furnished with stopper-plates, close upon us, and we were wrapped in profound darkness.

After some minutes, a loud hissing was heard. I felt the cold mount from my feet to my chest. Evidently from some part of the vessel they had, by means of a tap, given entrance to the water, which was invading us,



A walk under the waters.

and with which the room was soon filled. A second door cut in the side of the *Nautilus* then opened. We saw a faint light. In another instant our feet trod the bottom of the sea.

And now, how can I retrace the impression left upon me by that walk under the waters? Words are impotent to relate such wonders! Captain Nemo walked in front, his companion followed some steps behind. Conseil and I remained near each other, as if an exchange of words had been possible through our metallic cases. I no longer felt the weight of my clothing, or of my shoes, of my reservoir of air, or my thick helmet, in the midst of which my head rattled like an almond in its shell.

The light, which lit the soil thirty feet below the surface of the ocean, astonished me by its power. The solar rays shone through the watery mass easily, and dissipated all colour, and I clearly distinguished objects at a distance of a hundred and fifty yards. Beyond that the tints darkened into fine gradations of ultramarine, and faded into vague obscurity. Truly this water which surrounded me was but another air denser than the terrestrial atmosphere, but almost as transparent. Above me was the calm surface of the sea. We were walking on fine even sand, not wrinkled, as on a flat shore, which retains the impression of the billows. This dazzling carpet, really a reflector, repelled the rays of the sun with wonderful intensity, which accounted for the vibration which penetrated every atom of liquid. Shall I be believed when I say that, at the depth of thirty feet, I could see as if I was in broad daylight?

For a quarter of an hour I trod on this sand, sown with the impalpable dust of shells. The hull of the *Nautilus*, resembling a long shoal, disappeared by degrees; but its lantern, when darkness should overtake us in the waters, would help to guide us on board by its distinct rays.

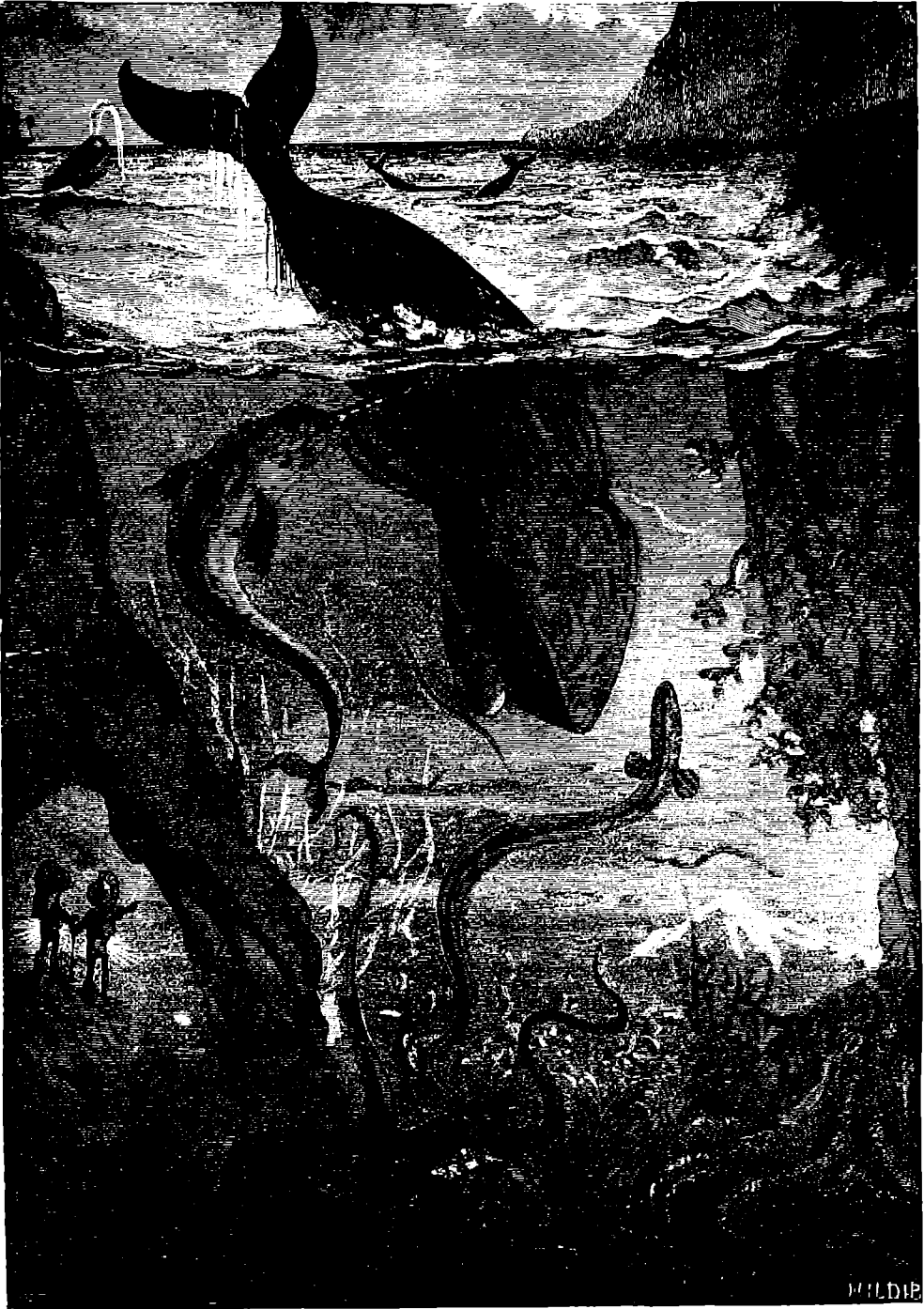
Soon forms of objects outlined in the distance were discernible. I recognised magnificent rocks, hung with a tapestry of zoophytes of the most beautiful kind, and I was at first struck by the peculiar effect of this medium.

It was then ten in the morning; the rays of the sun struck the surface of the waves at rather an oblique angle, and at the touch of their light, decomposed by refraction as through a prism, flowers, rocks, plants, shells, and polypi were shaded at the edges by the seven solar colours. It was marvellous, a feast for the eyes, this complication of coloured tints, a perfect kaleidoscope of green, yellow, orange, violet, indigo, and blue; in one word,

the whole palette of an enthusiastic colourist! Why could I not communicate to Conseil the lively sensations which were mounting to my brain, and rival him in expressions of admiration? For aught I knew, Captain Nemo and his companion might be able to exchange thoughts by means of signs previously agreed upon. So, for want of better, I talked to myself; I declaimed in the copper box which covered my head, thereby expending more air in vain words than was perhaps expedient.

Various kinds of isis, clusters of pure tuft-coral, prickly fungi, and anemones, formed a brilliant garden of flowers, enamelled with prophytae, decked with their collarettes of blue tentacles, sea-stars studding the sandy bottom, together with asterophytions like fine lace embroidered by the hands of naiads, whose festoons were waved by the gentle undulations caused by our walk. It was a real grief to me to crush under my feet the brilliant specimens of molluscs which strewed the ground by thousands, of hammerheads, donaciae (veritable bounding shells), of staircases, and red helmet-shells, angel-wings, and many others produced by this inexhaustible ocean. But we were bound to walk, so we went on, whilst above our heads waved shoals of physalides leaving their tentacles to float in their train, medusae whose umbrellas of opal or rose-pink, scalloped with a band of blue, sheltered us from the rays of the sun and fiery pelagiae, which, in the darkness, would have strewn our path with phosphorescent light.

All these wonders I saw in the space of a quarter of a mile, scarcely stopping, and following Captain Nemo, who beckoned me on by signs. Soon the nature of the soil changed; to the sandy plain succeeded an extent of slimy mud, which the Americans call "ooze," composed of equal parts of silicious and calcareous shells. We then travelled over a plain of sea-weed of wild and luxuriant vegetation. This sward was of close texture, and soft to the feet, and rivalled the softest carpet woven by the hand of man. But whilst verdure was spread at our feet, it did not abandon our heads. A light network of marine plants, of that inexhaustible family of seaweeds of which more than two thousand kinds are known, grew on the surface of the water. I saw long ribbons of fucus floating, some globular, others tuberous; laurenaciae and cladostephi of most delicate foliage, and some rhodomenia palmatae, resembling the fan of a cactus. I noticed that the green plants kept nearer the top of the sea, whilst the red were at a greater depth, leaving to the black or brown



Exploring under the sea.

hydrophytes the care of forming gardens and parterres in the remote beds of the ocean.

We had quitted the *Nautilus* about an hour and a half. It was near noon; I knew by the perpendicularity of the sun's rays, which were no longer refracted. The magical colours disappeared by degrees, and the shades of emerald and sapphire were effaced. We walked with a regular step, which rang upon the ground with astonishing intensity; the slightest noise was transmitted with a quickness to which the ear is unaccustomed on the earth; indeed, water is a better conductor of sound than air, in the ratio of four to one. At this period the earth sloped downwards; the

light took a uniform tint. We were at a depth of a hundred and five yards and twenty inches, undergoing a pressure of six atmospheres.

At this depth I could still see the rays of the sun, though feebly; to their intense brilliancy had succeeded a reddish twilight, the lowest state between day and night; but we could still see well enough; it was not necessary to resort to the Ruhmkorff apparatus as yet. At this moment Captain Nemo stopped; he waited till I joined him, and then pointed to an obscure mass, looming in the shadow, at a short distance.

"It is the forest of the Island of Crespo," thought I;—and I was not mistaken.

Twenty Thousand Leagues Under the Sea

CHAPTER XVI

A SUBMARINE FOREST

WE had at last arrived on the borders of this forest, doubtless one of the finest of Captain Nemo's immense domains. He looked upon it as his own, and considered he had the same right over it that the first men had in the first days of the world. And, indeed, who would have disputed with him the possession of this submarine property? What other hardier pioneer would come, hatchet in hand, to cut down the dark copses?

This forest was composed of large tree-plants; and the moment we penetrated under its vast arcades, I was struck by the singular position of their branches—a position I had not yet observed.

Not a herb which carpeted the ground, not a branch which clothed the trees, was either broken or bent, nor did they extend horizontally; all stretched up to the surface of the ocean. Not a filament, not a ribbon, however thin they might be, but kept as straight as a rod of iron. The fuci and lianas grew in rigid perpendicular lines, due to the density of the element which had produced them. Motionless, yet, when bent to one side by the hand, they directly resumed their former position. Truly it was the region of perpendicularity!

I soon accustomed myself to this fantastic position, as well as to the comparative darkness which surrounded us. The soil of the forest seemed covered with sharp blocks, difficult to avoid. The submarine flora struck me as being very perfect, and richer even than it would have been in the arctic or tropical zones, where these productions are not so plentiful. But for some minutes I involuntarily confounded the genera, taking zoophytes for hydrophytes, animals for plants; and who would not have been mistaken? The fauna and the flora are too closely allied in this submarine world.

These plants are self-propagated, and the principle of their existence is in the water, which upholds and nourishes them. The greater number, instead of leaves, shoot forth blades of capricious shapes, comprised within a scale of colours;—pink, carmine, green, olive, fawn, and brown. I saw there (but not dried up, as our specimens of the *Nautilus* are) pavonari spread like a fan, as if to catch the

breeze; scarlet ceramies, whose laminaries extended their edible shoots of fern-shaped nereocysti, which grow to a height of fifteen feet; clusters of acetabuli, whose stems increase in size upwards; and numbers of other marine plants, all devoid of flowers!

“Curious anomaly, fantastic element!” said an ingenious naturalist, “in which the animal kingdom blossoms, and the vegetable does not!”

Under these numerous shrubs (as large as trees of the temperate zone), and under their damp shadow, were massed together real bushes of living flowers, hedges of zoophytes, on which blossomed some zebraeandrinae, with crooked grooves, some yellow caryophylliae; and, to complete the allusion, the fish-flies flew from branch to branch like a swarm of humming-birds, whilst yellow lepisacomthi, with bristling jaws, dactylopteri, and monocentrids rose at our feet like a flight of snipes.

In about an hour Captain Nemo gave the signal to halt. I, for my part, was not sorry, and we stretched ourselves under an arbour of alariae, the long thin blades of which stood up like arrows.

This short rest seemed delicious to me; there was nothing wanting but the charm of conversation; but, impossible to speak, impossible to answer, I only put my great copper head to Conseil's. I saw the worthy fellow's eyes glistening with delight, and to show his satisfaction, he shook himself in his breastplate of air, in the most comical way in the world.

After four hours of this walking I was surprised not to find myself dreadfully hungry. How to account for this state of the stomach I could not tell. But instead I felt an insurmountable desire to sleep, which happens to all divers. And my eyes soon closed behind the thick glasses, and I fell into a heavy slumber, which the movement alone had prevented before. Captain Nemo and his robust companion, stretched in the clear crystal, set us the example.

How long I remained buried in this drowsiness. I cannot judge; but, when I woke, the sun seemed sinking towards the horizon. Captain Nemo had already risen, and I was

beginning to stretch my limbs, when an unexpected apparition brought me briskly to my feet.

A few steps off, a monstrous sea-spider, about thirty-eight inches high, was watching me with squinting eyes, ready to spring upon me. Though my diver's dress was thick enough to defend me from the bite of this animal, I could not help shuddering with horror. Conseil and the sailor of the *Nautilus* awoke at this moment. Captain Nemo pointed out the hideous crustacean, which a blow from the butt end of the gun knocked over, and I saw the horrible claws of the monster writhe in terrible convulsions. This accident reminded me that other animals more to be feared might haunt these obscure depths, against whose attacks my diving-dress would not protect me. I had never thought of it before, but I now resolved to be upon my guard. Indeed, I thought that this halt would mark the termination of our walk; but I was mistaken, for, instead of returning to the *Nautilus*, Captain Nemo continued his bold excursion. The ground was still on the incline, its declivity seemed to be getting greater, and to be leading us to greater depths. It must have been about three o'clock when we reached a narrow valley, between high perpendicular walls, situated about seventy-five fathoms deep. Thanks to the perfection of our apparatus, we were forty-five fathoms below the limit which nature seems to have imposed on man as to his submarine excursions.

I say seventy-five fathoms, though I had no instrument by which to judge the distance. But I knew that even in the clearest waters, the solar rays could not penetrate further. And accordingly the darkness deepened. At ten paces not an object was visible. I was groping my way, when I suddenly saw a brilliant white light. Captain Nemo had just put his electric apparatus into use; his companion did the same, and Conseil and I followed their example. By turning a screw I established a communication between the wire and the spiral glass, and the sea, lit by our four lanterns, was illuminated for a circle of thirty-six yards.

Captain Nemo was still plunging into the dark depths of the forest, whose trees were getting scarcer at every step. I noticed that vegetable life disappeared sooner than animal life. The medusae had already abandoned the arid soil, from which a great number of animals, zoophytes, articulata, molluscs, and fishes, still obtained sustenance.

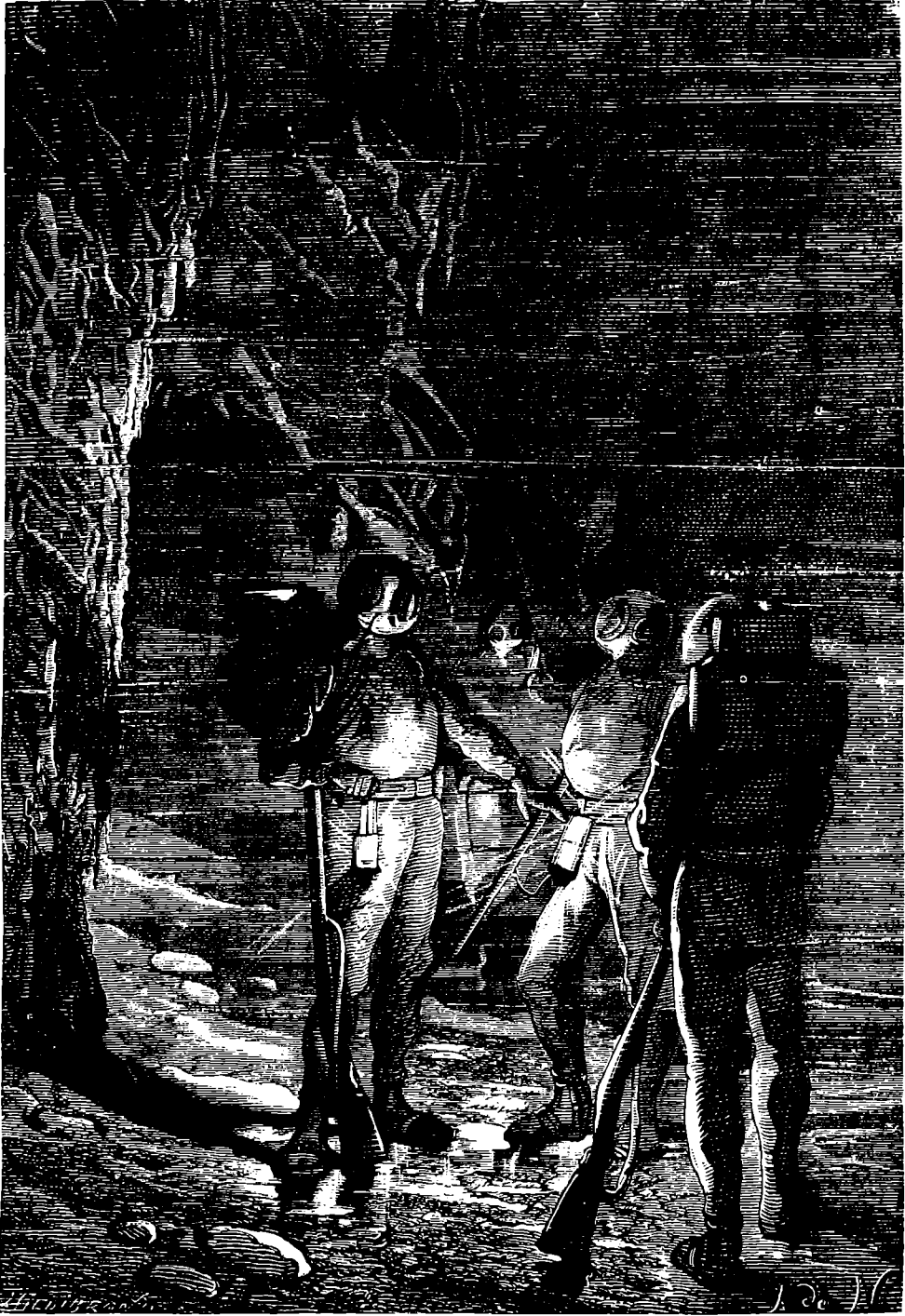
As we walked, I thought the light of our

Ruhmkorff apparatus could not fail to draw some inhabitant from its dark couch. But if they did approach us, they at least kept at a respectful distance from the hunters. Several times I saw Captain Nemo stop, put his gun to his shoulder, and after some moments drop it and walk on. At last, after about four hours, this marvellous excursion came to an end. A wall of superb rocks, in an imposing mass, rose before us, a heap of gigantic blocks, an enormous steep granite shore, forming dark grottos, but which presented no practicable slope; it was the prop of the Island of Crespo. It was the earth! Captain Nemo stopped suddenly. A gesture of his brought us all to a halt; and however desirous I might be to scale the wall, I was obliged to stop. Here ended Captain Nemo's domains. And he would not go beyond them. Further on was a portion of the globe he might not trample upon.

The return began. Captain Nemo had returned to the head of his little band, directing their course without hesitation. I thought we were not following the same road to return to the *Nautilus*. The new road was very steep, and consequently very painful. We approached the surface of the sea rapidly. But this return to the upper strata was not so sudden as to cause relief from the pressure too rapidly, which might have produced serious disorder in our organisation, and brought on internal lesions, so fatal to divers. Very soon light reappeared and grew, and the sun being low on the horizon, the refraction edged the different objects with a spectral ring. At ten yards and a half deep, we walked amidst a shoal of little fishes of all kinds, more numerous than the birds of the air, and also more agile; but no aquatic game worthy of a shot had as yet met our gaze, when at that moment I saw the Captain shoulder his gun quickly, and follow a moving object into the shrubs. He fired;—I heard a slight hissing, and a creature fell stunned at some distance from us. It was a magnificent sea-otter, an enhydrus, the only exclusively marine quadruped. This otter was five feet long, and must have been very valuable. Its skin, chestnut-brown above, and silvery underneath, would have made one of those beautiful furs so sought after in the Russian and Chinese markets; the fineness and the lustre of its coat would certainly fetch £80. I admired this curious mammal, with its rounded head ornamented with short ears, its round eyes, and white whiskers like those of a cat, with webbed feet and nails, and tufted tail. This precious animal, hunted and tracked by fishermen, has



A monstrous sea-spider.



“The prop of the Island of Crespo.”



“A large bird . . . approached, hovering over us.”

now become very rare, and taken refuge chiefly in the northern parts of the Pacific, or probably its race would soon become extinct.

Captain Nemo's companion took the beast, threw it over his shoulder, and we continued our journey. For one hour a plain of sand lay stretched before us. Sometimes it rose to within two yards and some inches of the surface of the water. I then saw our image clearly reflected, drawn inversely, and above us appeared an identical group reflecting our movements and our actions; in a word, like us in every point, except that they walked with their heads downward and their feet in the air.

Another effect I noticed, which was the passage of thick clouds which formed and vanished rapidly; but on reflection I understood that these seeming clouds were due to the varying thickness of the reeds at the bottom, and I could even see the fleecy foam which their broken tops multiplied on the water, and the shadows of large birds passing above our heads, whose rapid flight I could discern on the surface of the sea.

On this occasion, I was witness to one of the finest gun-shots which ever made the nerves of a hunter thrill. A large bird of great breadth of wing, clearly visible, approached, hovering over us. Captain Nemo's companion shouldered his gun and fired, when it was only a few yards above the waves. The creature fell stunned, and the force of its fall brought it within the reach of the dexterous hunter's grasp. It was an albatross of the finest kind.

Our march had not been interrupted by this incident. For two hours we followed these sandy plains, then fields of algae very disagreeable to cross. Candidly, I could do no more when I saw a glimmer of light, which, for a half mile, broke the darkness of the waters. It was the lantern of the *Nautilus*. Before twenty minutes were over we should be on board, and I should be able to breathe with ease, for it seemed that my reservoir supplied air very deficient in oxygen. But I did not reckon on an accidental meeting, which

delayed our arrival for some time.

I had remained some steps behind, when I presently saw Captain Nemo coming hurriedly towards me. With his strong hand he bent me to the ground, his companion doing the same to Conseil. At first I knew not what to think of this sudden attack, but I was soon reassured by seeing the Captain lie down beside me, and remain immovable.

I was stretched on the ground, just under shelter of a bush of algae, when raising my head, I saw some enormous mass, casting phosphorescent gleams, pass blusteringly by.

My blood froze in my veins as I recognised two formidable sharks which threatened us. It was a couple of tintoreas, terrible creatures, with enormous tails and a dull glassy stare, the phosphorescent matter ejected from holes pierced around the muzzle. Monstrous brutes! which would crush a whole man in their iron jaws. I did not know whether Conseil stopped to classify them; for my part, I noticed their silver bellies, and their huge mouths bristling with teeth, from a very unscientific point of view, and more as a possible victim than as a naturalist.

Happily the voracious creatures do not see well. They passed without seeing us, brushing us with their brownish fins, and we escaped by a miracle from a danger certainly greater than meeting a tiger full-face in the forest. Half an hour after, guided by the electric light, we reached the *Nautilus*. The outside door had been left open, and Captain Nemo closed it as soon as we had entered the first cell. He then pressed a knob. I heard the pumps working in the midst of the vessel, I felt the water sinking from around me, and in a few moments the cell was entirely empty. The inside door then opened, and we entered the vestry.

There our diving-dress was taken off, not without some trouble; and, fairly worn out from want of food and sleep, I returned to my room, in great wonder at this surprising excursion at the bottom of the sea.

Twenty Thousand Leagues Under the Sea

CHAPTER XVII

FOUR THOUSAND LEAGUES UNDER THE PACIFIC

THE next morning, the 18th of November, I had quite recovered from my fatigues of the day before, and I went up on to the platform, just as the second lieutenant was uttering his daily phrase.

I was admiring the magnificent aspect of the ocean when Captain Nemo appeared. He did not seem to be aware of my presence, and began a series of astronomical observations. Then, when he had finished, he went and leant on the cage of the watch-light, and gazed abstractedly on the ocean. In the meantime, a number of the sailors of the *Nautilus*, all strong and healthy men, had come up on to the platform. They came to draw up the nets that had been laid all night. These sailors were evidently of different nations, although the European type was visible in all of them. I recognised some unmistakable Irishmen, Frenchmen, some Slaves, and a Greek or a Candiote. They were civil, and only used that odd language among themselves, the origin of which I could not guess, neither could I question them.

The nets were hauled in. They were a large kind of "chaluts," like those on the Normandy coasts, great pockets that the waves and a chain fixed in the smaller meshes, kept open. These pockets, drawn by iron poles, swept through the water, and gathered in everything in its way. That day they brought up curious specimens from these productive coasts,—fishing-frogs that, from their comical movements, have acquired the name of buffoons; black commersons, furnished with antennae; trigger-fish, encircled with red bands; orthroriscisci, with very subtle venom; some olive-coloured lampreys; macrorhynchi, covered with silvery scales; trichiuri, the electric power of which is equal to that of the gymnotus and cramp-fish; scaly notopteri, with transverse brown bands; greenish cod; several varieties of gobies, &c.; also some larger fish; a caranx with a prominent head a yard long; several fine bonitos, streaked with blue and silver; and three splendid tunnies, which, in spite of the swiftness of their motion, had not escaped the net.

I reckoned that the haul had brought in more than nine hundred-weight of fish. It was

a fine haul, but not to be wondered at. Indeed, the nets are let down for several hours, and enclose in their meshes an infinite variety. We had no lack of excellent food, and the rapidity of the *Nautilus* and the attraction of the electric light could always renew our supply. These several productions of the sea were immediately lowered through the panel to the steward's room, some to be eaten fresh, and others pickled.

The fishing ended, the provision of air renewed, I thought that the *Nautilus* was about to continue its submarine excursion, and was preparing to return to my room, when, without further preamble, the Captain turned to me, saying—

"Professor, is not this ocean gifted with real life. It has its tempers and its gentle moods. Yesterday it slept as we did, and now it has woken after a quiet night. Look!" he continued, "it wakes under the caresses of the sun. It is going to renew its diurnal existence. It is an interesting study to watch the play of its organisation. It has a pulse, arteries, spasms; and I agree with the learned Maury, who discovered in it a circulation as real as the circulation of blood in animals.

"Yes, the ocean has indeed circulation, and to promote it, the Creator has caused things to multiply in it—caloric, salt, and animalculae."

When Captain Nemo spoke thus, he seemed altogether changed, and aroused an extraordinary emotion in me.

"Also," he added, "true existence is there; and I can imagine the foundations of nautical towns, clusters of submarine houses, which, like the *Nautilus*, would ascend every morning to breathe at the surface of the water, free towns, independent cities. Yet who knows whether some despot"—

Captain Nemo finished his sentence with a violent gesture. Then, addressing me as if to chase away some sorrowful thought—

"M. Aronnax," he asked, "do you know the depth of the ocean?"

"I only know, Captain, what the principal soundings have taught us."

"Could you tell me them, so that I can suit them to my purpose?"

"These are some," I replied, "that I

remember. If I am not mistaken, a depth of 8000 yards has been found in the North Atlantic, and 2500 yards in the Mediterranean. The most remarkable soundings have been made in the South Atlantic, near the 35th parallel, and they gave 12,000 yards, 14,000 yards, and 15,000 yards. So sum up all, it is reckoned that if the bottom of the sea were levelled, its mean depth would be about one and three quarter leagues."

"Well, Professor," replied the Captain, "we shall show you better than that I hope. As to the mean depth of this part of the Pacific, I tell you it is only 4000 yards."

Having said this, Captain Nemo went towards the panel, and disappeared down the ladder. I followed him, and went into the large drawing-room. The screw was immediately put in motion, and the log gave twenty miles an hour.

During the days and weeks that passed, Captain Nemo was very sparing of his visits. I seldom saw him. The lieutenant pricked the ship's course regularly on the chart, so I could always tell exactly the route of the *Nautilus*.

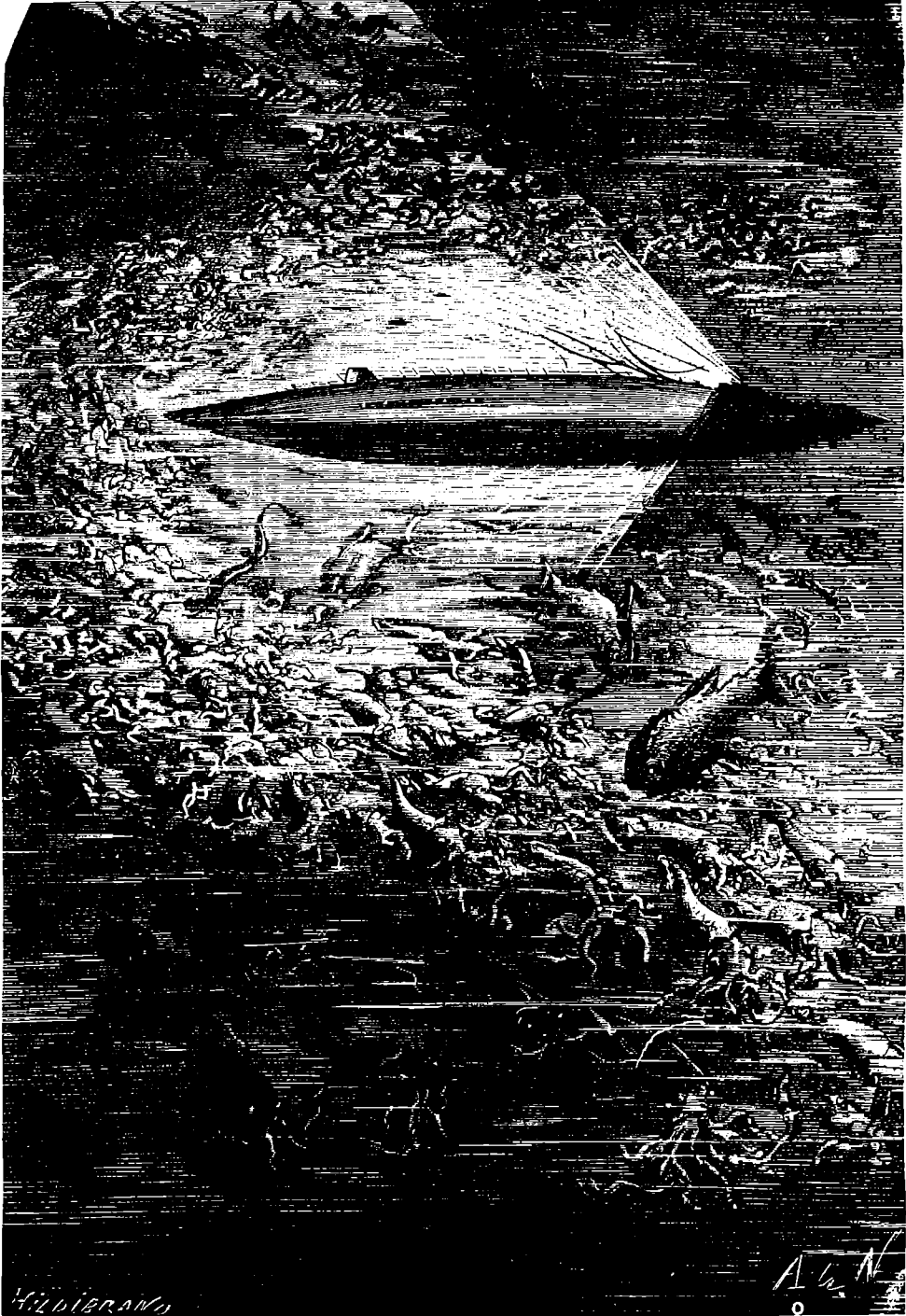
Nearly every day, for some time, the panels of the drawing-room were opened, and we were never tired of penetrating the mysteries of the submarine world.

The general direction of the *Nautilus* was south-east, and it kept between 100 and 150 yards of depth. One day, however, I do not know why, being drawn diagonally by means of the inclined planes, it touched the bed of the sea. The thermometer indicated a temperature of 4.25 (cent.); a temperature that at this depth seemed common to all latitudes.

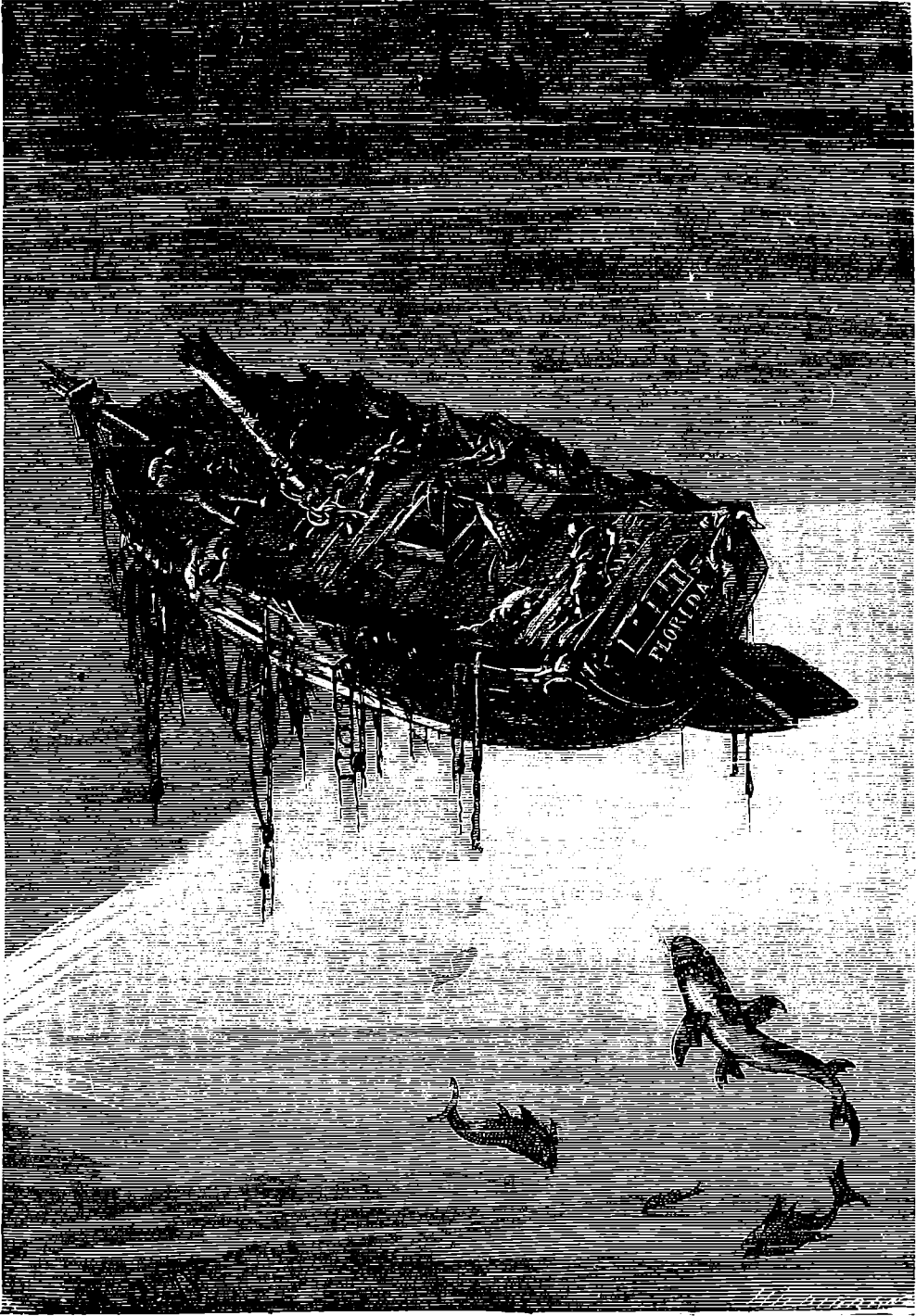
At three o'clock in the morning of the 26th of November, the *Nautilus* crossed the tropic of Cancer at 172° longitude. On the 27th instant it sighted the Sandwich Islands, where Cook died, February 14, 1779. We had then gone 4860 leagues from our starting-point. In the morning, when I went on the platform, I saw, two miles to windward, Hawaii, the largest of the seven islands that form the group. I saw clearly the cultivated ranges, and the several mountain chains that run parallel with the side, and the volcanoes that overtop Mouna-Rea, which rise 5000 yards above the level of the sea. Besides other things the nets brought up, were several flabellariae and graceful polypi, that are peculiar to that part of the ocean. The direction of the *Nautilus* was still to the southeast. It crossed the equator December 1, in 142° longitude; and on the 4th of the same month, after crossing rapidly and without anything particular occurring, we

sighted the Marquesas group. I saw, three miles off, at 8° 57' latitude south, and 139° 32' west longitude, Martin's peak in Nouka-Hiva, the largest of the group that belongs to France. I only saw the woody mountains against the horizon, because Captain Nemo did not wish to bring the ship to the wind. There the nets brought up beautiful specimens of fish; choryphenes, with azure fins and tails like gold, the flesh of which is unrivalled; holo-gymnoses, nearly destitute of scales, but of exquisite flavour; ostorhyncs, with bony jaws, and yellow-tinged thasards, as good as bonitos; all fish that would be of use to us. After leaving these charming islands protected by the French flag, from the 4th to the 11th of December the *Nautilus* sailed over about 2000 miles. This navigation was remarkable for the meeting with an immense shoal of calmars, near neighbours to the cuttle. The French fishermen call them *hornets*: they belong to the cephalopod class, and to the dibranchial family, that comprehends the cuttles and the argonauts. These animals were particularly studied by students of antiquity, and they furnished numerous metaphors to the popular orators, as well as excellent dishes for the tables of the rich citizens, if one can believe Athenaeus, a Greek doctor, who lived before Galen. It was during the night of the 9th or 10th of December that the *Nautilus* came across this shoal of molluscs, that are peculiarly nocturnal. One could count them by millions. The emigrate from the temperate to the warmer zones, following the track of herrings and sardines. We watched them through the thick crystal panes, swimming down the wind with great rapidity, moving by means of their locomotive tube, pursuing fish and molluscs, eating the little ones, eaten by the big ones, and tossing about in indescribable confusion the ten arms that nature has placed on their heads like a crest of pneumatic serpents. The *Nautilus*, in spite of its speed, sailed for several hours in the midst of these animals, and its nets brought in an enormous quantity, among which I recognised the nine species that D'Orbigny classed for the Pacific. One saw, while crossing, that the sea displays the most wonderful sights. They were in endless variety. The scene changed continually, and we were called upon not only to contemplate the works of the Creator in the midst of the liquid element, but to penetrate the awful mysteries of the ocean.

During the daytime of the 11th of December, I was busy reading in the large drawing-room. Ned Land and Conseil watched the luminous



“One could count the calmars by millions.”



The wreck of the *Florida*.

water through the half-open panels. The *Nautilus* was immovable. While its reservoirs were filled, it kept at a depth of 1000 yards, a region rarely visited in the ocean, and in which large fish were seldom seen.

I was then reading a charming book by Jean Macé, "The Slaves of the Stomach," and I was learning some valuable lessons from it, when Conseil interrupted me.

"Will master come here a moment?" he said, in a curious voice.

"What is the matter, Conseil?"

"I want master to look."

I rose, went and leaned on my elbows before the panes and watched.

In a full electric light, an enormous black mass, quite immovable, was suspended in the midst of the waters. I watched it attentively, seeking to find out the nature of this gigantic cetacean. But a sudden thought crossed my mind. "A vessel!" I said, half aloud.

"Yes," replied the Canadian, "a disabled ship that has sunk perpendicularly."

Ned Land was right; we were close to a vessel of which the tattered shrouds still hung from their chains. The keel seemed to be in good order, and it had been wrecked at most some few hours. Three stumps of masts, broken off about two feet above the bridge, showed that the vessel had had to sacrifice its masts. But, lying on its side, it had filled, and it was heeling over to port. This skeleton of

what it had once been, was a sad spectacle as it lay lost under the waves, but sadder still was the sight of the bridge, where some corpses, bound with ropes, were still lying. I counted five;—four men, one of whom was standing at the helm, and a woman standing by the poop, holding an infant in her arms. She was quite young. I could distinguish her features, which the water had not decomposed, by the brilliant light from the *Nautilus*. In one despairing effort, she had raised her infant above her head, poor little thing! whose arms encircled its mother's neck. The attitude of the four sailors was frightful, distorted as they were by their convulsive movements, whilst making a last effort to free themselves from the cords that bound them to the vessel. The steersman alone, calm, with a grave, clear face, his grey hair glued to his forehead, and his hand clutching the wheel of the helm, seemed even then to be guiding the three broken masts through the depths of the ocean.

What a scene! We were dumb; our hearts beat fast before this shipwreck, taken as it were from life, and photographed in its last moments. And I saw already, coming towards it with hungry eyes, enormous sharks, attracted by the human flesh.

However the *Nautilus*, turning, went round the submerged vessel, and in one instant I read on the stern—"The Florida, Sunderland."

Twenty Thousand Leagues Under the Sea

CHAPTER XVIII

VANIKORO

THIS terrible spectacle was the forerunner of the series of maritime catastrophes that the *Nautilus* was destined to meet with in its route. As long as it went through more frequented waters, we often saw the hulls of shipwrecked vessels that were rotting in the depths, and deeper down, cannons, bullets, anchors, chains, and a thousand other iron materials eaten up by rust. However, on the 11th of December, we sighted the Pomotou Islands, the old "dangerous group" of Bougainville, that extend over a space of 500 leagues at E.S.E. to W.N.W., from the Island Ducie to that of Lazareff. This group covers an area of 370 square leagues, and it is formed of sixty groups of islands, among which the Gambier group is remarkable, over which France exercises sway. These are coral islands, slowly raised, but continuous, created by the daily work of polypi. Then this new island will be joined later on to the neighbouring groups, and a fifth continent will stretch from New Zealand and New Caledonia, and from thence to the Marquesas.

One day, when I was suggesting this theory to Captain Nemo, he replied coldly—

"The earth does not want new continents, but new men."

Chance had conducted the *Nautilus* towards the island of Clermont-Tonnere, one of the most curious of the group, that was discovered in 1822 by Captain Bell of the *Minerva*. I could study now the madreporal system, to which are due the islands in this ocean.

Madrepores (which must not be mistaken for corals) have a tissue lined with a calcareous crust, and the modifications of its structure have induced M. Milne Edwards, my worthy master, to class them into five sections. The animalculae that the marine polypus secretes live by millions at the bottom of their cells. Their calcareous deposits become rocks, reefs, and large and small islands. Here they form a ring, surrounding a little inland lake, that communicates with the sea by means of gaps. There they make barriers of reefs like those on the coasts of New Caledonia and the various Pomoton islands. In other places, like those at Reunion and at Maurice, they raise fringed reefs, high, straight walls, near which the

depth of the ocean is considerable.

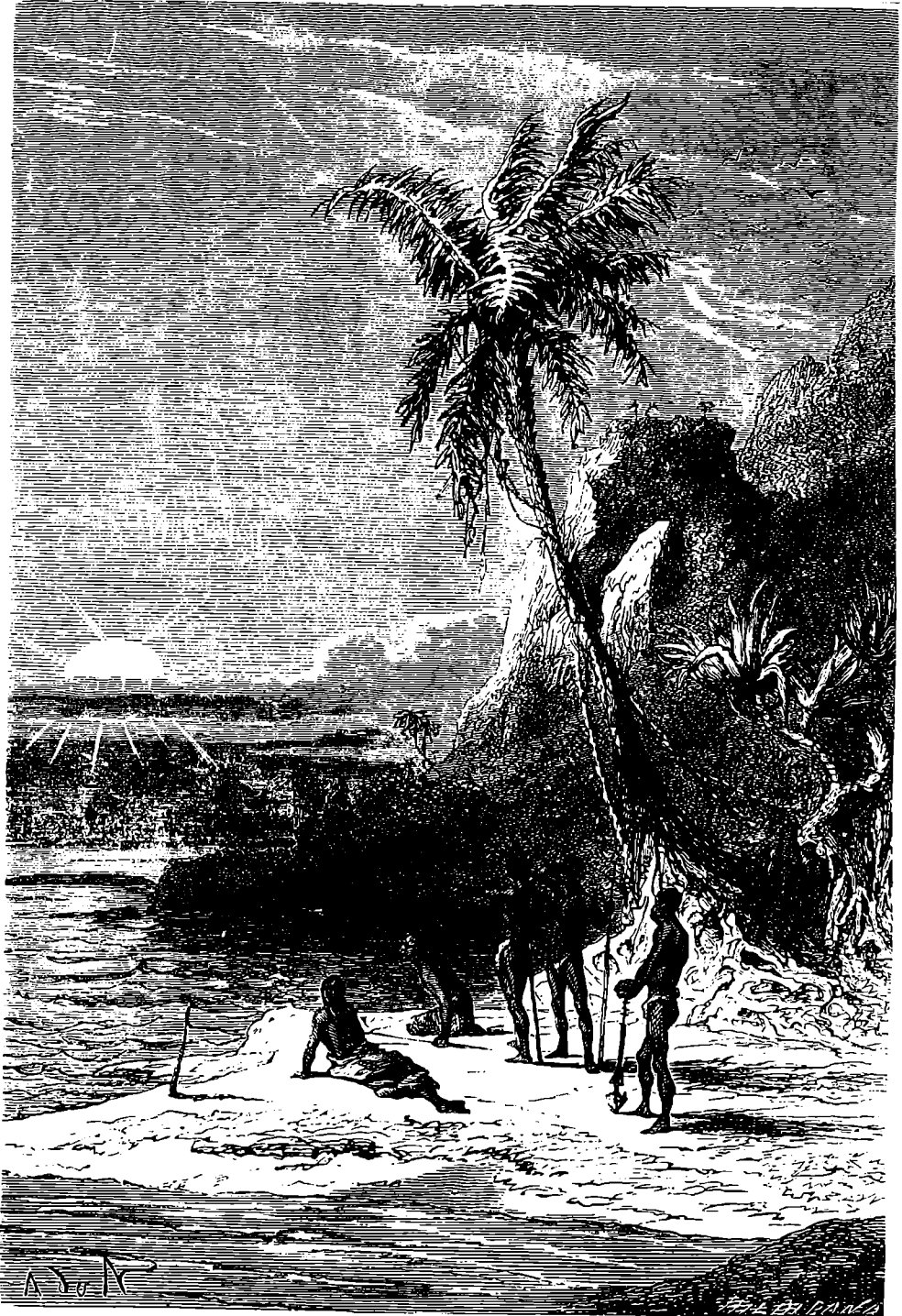
Some cable-lengths off the shores of the Island of Clermont, I admired the gigantic work accomplished by these microscopical workers. These walls are specially the work of those madrepores known as milleporas, porites, madrepores, and astraeas. These polypi are found particularly in the rough beds of the sea, near the surface; and consequently it is from the upper part that they begin their operations in which they bury themselves by degrees with the debris of the secretions that support them. Such is, at least, Darwin's theory, who thus explains the formation of the *atolls*, a superior theory (to my mind) to that given of the foundation of the madreporical works, summits of mountains or volcanoes, that are submerged some feet below the level of the sea.

I could observe closely these curious walls, for perpendicularly they were more than 300 yards deep, and our electric sheets lighted up this calcareous matter brilliantly. Replying to a question Conseil asked me as to the time these colossal barriers took to be raised, I astonished him much by telling him that learned men reckoned it about the eighth of an inch in a hundred years.

Towards evening Clermont-Tonnerre was lost in the distance, and the route of the *Nautilus* was sensibly changed. After having crossed the tropic of Capricorn in 135° longitude, it sailed W.N.W., making again for the tropical zone. Although the summer sun was very strong, we did not suffer from heat, for at fifteen or twenty fathoms below the surface, the temperature did not rise above from ten to twelve degrees.

On December 15, we left to the east the bewitching group of the Societies and the graceful Tahiti, queen of the Pacific. I saw in the morning, some miles to the windward, the elevated summits of the island. These waters furnished our table with excellent fish, mackerel, bonitos, and albigores, and some varieties of a sea-serpent called munirophis.

On the 25th of December the *Nautilus* sailed into the midst of the New Hebrides, discovered by Quiros in 1606, and that Bougainville explored in 1768, and to which Cook gave its



The Island of Vanikoro.

present name in 1773. This group is composed principally of nine large islands, that form a band of 120 leagues N.N.S. to S.S.W., between 15° and 2° south latitude, and 164° and 168° longitude. We passed tolerably near to the Island of Aurou, that at noon looked like a mass of green woods, surmounted by a peak of great height.

That day being Christmas Day, Ned Land seemed to regret sorely the non-celebration of "Christmas," the family fête of which Protestants are so fond. I had not seen Captain Nemo for a week, when, on the morning of the 27th, he came into the large drawing-room, always seeming as if he had seen you five minutes before. I was busily tracing the route of the *Nautilus* on the planisphere. The Captain came up to me, put his finger on one spot on the chart, and said this single word—"Vanikoro."

The effect was magical! it was the name of the islands on which La Perouse had been lost! I rose suddenly.

"The *Nautilus* has brought us to Vanikoro?" I asked.

"Yes, Professor," said the Captain.

"And I can visit the celebrated islands where the *Boussole* and the *Astrolabe* struck?"

"If you like, Professor."

"When shall we be there?"

"We are there now."

Followed by Captain Nemo, I went up on to the platform, and greedily scanned the horizon.

To the N.E. two volcanic islands emerged of unequal size, surrounded by a coral reef that measured forty miles in circumference. We were close to Vanikoro, really the one to which Dumont d'Urville gave the name of Isle de la Recherche, and exactly facing the little harbour of Vanou, situated in 16° 4' south latitude, and 164° 32' east longitude. The earth seemed covered with verdure from the shore to the summits in the interior, that were crowned by Mount Kapogo, 476 feet high. The *Nautilus*, having passed the outer belt of rocks by a narrow strait, found itself among breakers where the sea was from thirty to forty fathoms deep. Under the verdant shade of some mangroves I perceived some savages, who appeared greatly surprised at our approach. In the long black body, moving between wind and water, did they not see some formidable cetacean that they regarded with suspicion?

Just then Captain Nemo asked me what I knew about the wreck of La Perouse.

"Only what every one knows, Captain," I

replied.

"And could you tell me what every one knows about it?" he inquired, ironically.

"Easily."

I related to him all that the last works of Dumont d'Urville had made known—works from which the following is a brief account.

La Perouse, and his second, Captain de Langle, were sent by Louis XVI., in 1785, on a voyage of circumnavigation. They embarked in the corvettes the *Boussole* and the *Astrolabe*, neither of which were again heard of. In 1791, the French Government, justly uneasy as to the fate of these two sloops, manned two large merchantmen, the *Recherche* and the *Esperance*, which left Brest the 28th of September, under the command of Bruni d'Entrecasteaux.

Two months after, they learned from Bowen, commander of the *Albemarle*, that the debris of shipwrecked vessels had been seen on the coasts of New Georgia. But D'Entrecasteaux, ignoring this communication—rather uncertain, besides—directed his course towards the Admiralty Isles, mentioned in a report of Captain Hunter's as being the place where La Perouse was wrecked.

They sought in vain. The *Esperance* and the *Recherche* passed before Vanikoro without stopping there, and in fact, this voyage was most disastrous, as it cost D'Entrecasteaux his life, and those of two of his lieutenants, besides several of his crew.

Captain Dillon, a shrewd old Pacific sailor, was the first to find unmistakable traces of the wrecks. On the 15th of May 1824, his vessel, the *St Patrick*, passed close to Tikopia, one of the New Hebrides. There a Lascar came alongside in a canoe, sold him the handle of a sword in silver, that bore the print of characters engraved on the hilt. The Lascar pretended that six years before, during a stay at Vanikoro, he had seen two Europeans that belonged to some vessels that had run aground on the reefs some years ago.

Dillon guessed that he meant La Perouse, whose disappearance had troubled the whole world. He tried to get on to Vanikoro, where, according to the Lascar, he would find numerous debris of the wreck, but winds and tide prevented him.

Dillon returned to Calcutta. There he interested the Asiatic Society and the Indian Company in his discovery. A vessel, to which was given the name of the *Recherche*, was put at his disposal, and he set out, January 23, 1827, accompanied by a French agent.

The *Recherche*, after touching at several

points in the Pacific, cast anchor before Vanikoro, July 7, 1827, in that same harbour of Vanou where the *Nautilus* was at this time.

There it collected numerous relics of the wreck—iron utensils, anchors, pulley-strops, swivel-guns, an 18lb.-shot, fragments of astronomical instruments, a piece of crown-work, and a bronze clock, bearing this inscription—“*Bazin m'a fait*,” the mark of the foundry of the arsenal at Brest about 1785. There could be no further doubt.

Dillon, having made all inquiries, stayed in the unlucky place till October. Then he quitted Vanikoro, and directed his course towards New Zealand; put into Calcutta, April 7, 1828, and returned to France, where he was warmly welcomed by Charles X.

But at the same time, without knowing Dillon's movements, Dumont d'Urville had already set out to find the scene of the wreck. And they had learned from a whaler that some medals and a cross of St Louis had been found in the hands of some savages of Louisiade and New Caledonia. Dumont d'Urville, commander of the *Astrolabe*, had then sailed, and two months after Dillon had left Vanikoro, he put into Hobart Town. There he learned the results of Dillon's inquiries, and found that a certain James Hobbs, second lieutenant of the *Union* of Calcutta, after landing on an island situated 8° 18' south latitude, and 156° 30' east longitude, had seen some iron bars and red stuffs used by the natives of these parts. Dumont d'Urville, much perplexed, and not knowing how to credit the reports of low-class journals, decided to follow Dillon's track.

On the 10th of February 1828, the *Astrolabe* appeared off Tikopia, and took as guide and interpreter a deserter found on the island; made his way to Vanikoro, sighted it on the 12th inst., lay among the reefs until the 14th, and not until the 20th did he cast anchor within the barrier in the harbour of Vanou.

On the 23rd, several officers went round the island, and brought back some unimportant trifles. The natives, adopting a system of denials and evasions, refused to take them to the unlucky place. This ambiguous conduct led them to believe that the natives had ill-treated the castaways, and indeed they seemed to fear that Dumont d'Urville had come to avenge La Perouse and his unfortunate crew.

However, on the 26th, appeased by some presents, and understanding that they had no reprisals to fear, they lead M. Jacquireot to the scene of the wreck.

There, in three or four fathoms of water, between the reefs of Pacou and Vanou, lay

anchors, cannons, pigs of lead and iron, embedded in the limy concretions. The large boat and the whaler belonging to the *Astrolabe* were sent to this place, and, not without some difficulty, their crews hauled up an anchor weighing 1800 lbs., a brass gun, some pigs of iron, and two copper swivel-guns.

Dumont d'Urville, questioning the natives, learned, too, that La Perouse, after losing both his vessels on the reefs of this island, had constructed a smaller boat, only to be lost a second time. Where?—no one knew.

But the French Government, fearing that Dumont d'Urville was not acquainted with Dillon's movements, had sent the sloop *Bayonnaise*, commanded by Legoarrant de Tromelin, to Vanikoro, which had been stationed on the west coast of America. The *Bayonnaise* cast her anchor before Vanikoro some months after the departure of the *Astrolabe*, but found no new document; but stated that the savages had respected the monument to La Perouse. That is the substance of what I told to Captain Nemo.

“So,” he said, “no one knows now where the third vessel perished that was constructed by the castaways on the island of Vanikoro?”

“No one knows.”

Captain Nemo said nothing, but signed to me to follow him into the large saloon. The *Nautilus* sank several yards below the waves, and the panels were opened.

I hastened to the aperture, and under the crustations of coral, covered with fungi, syphonules, alcyons, madrepores, through myriads of charming fish—girelles, glyphisidri, pompherides, diacopes, and holocentres—I recognised certain debris that the drags had not been able to tear up—iron stirrups, anchors, cannons, bullets, capstan fittings, the stem of a ship, all objects clearly proving the wreck of some vessel, and now carpeted with living flowers. While I was looking on this desolate scene, Captain Nemo said, in a sad voice—

“Commander La Perouse set out December 7, 1785, with his vessels *La Bousolle* and the *Astrolabe*. He first cast anchor at Botany Bay, visited the Friendly Isles, New Caledonia, then directed his course towards Santa Cruz, and put into Namouka, one of the Hapai group. Then his vessels struck on the unknown reefs of Vanikoro. The *Bousolle*, which went first, ran aground on the southerly coast. The *Astrolabe* went to its help, and ran aground too. The first vessel was destroyed almost immediately. The second, stranded under the wind, resisted some days. The natives made the



“Captain Nemo showed me a tin-plate box.”

castaways welcome. They installed themselves in the island, and constructed a smaller boat with the debris of the two large ones. Some sailors stayed willingly at Vanikoro; the others, weak and ill, set out with La Perouse. They directed their course towards the Solomon Isles, and there perished, with everything, on the westerly coast of the chief island of the group, between Capes Deception and Satisfaction.”

“How do you know that?”

“By this, that I found on the spot where was the last wreck.”

Captain Nemo showed me a tin-plate box, stamped with the French arms, and corroded by the salt water. He opened it, and I saw a bundle of papers, yellow but still readable.

They were the instructions of the naval minister to Commander La Perouse, annotated in the margin in Louis XVI.’s handwriting.

“Ah! it is a fine death for a sailor!” said Captain Nemo, at last. “A coral tomb makes a quiet grave; and I trust that I and my comrades will find no other.”

Twenty Thousand Leagues Under the Sea

CHAPTER XIX

TORRES STRAITS

DURING the night of the 27th or 28th of December, the *Nautilus* left the shores of Vanikoro with great speed. Her course was south-westerly, and in three days she had gone over the 750 leagues that separated it from La Perouse's group and the south-east point of Papua.

Early on the 1st of January 1863, Conseil joined me on the platform.

"Master, will you permit me to wish you a happy new year?"

"What! Conseil; exactly as if I was at Paris in my study at the Jardin des Plantes? Well, I accept your good wishes, and thank you for them. Only, I will ask you what you mean by a 'Happy new year,' under our circumstances? Do you mean the year that will bring us to the end of our imprisonment, or the year that sees us continue this strange voyage?"

"Really, I do not know how to answer, master. We are sure to see curious things, and for the last two months we have not had time for ennui. The last marvel is always the most astonishing; and if we continue this progression, I do not know how it will end. It is my opinion that we shall never again see the like. I think, then, with no offence to master, that a happy year would be one in which we could see everything."

On January 2, we had made 11,340 miles, or 5250 French leagues, since our starting-point in the Japan Seas. Before the ship's head stretched the dangerous shores of the coral sea, on the north-east coast of Australia. Our boat lay along some miles from the redoubtable bank on which Cook's vessel was lost, June 10, 1770. The boat in which Cook was struck on a rock, and if it did not sink, it was owing to a piece of the coral that was broken by the shock, and fixed itself in the broken keel.

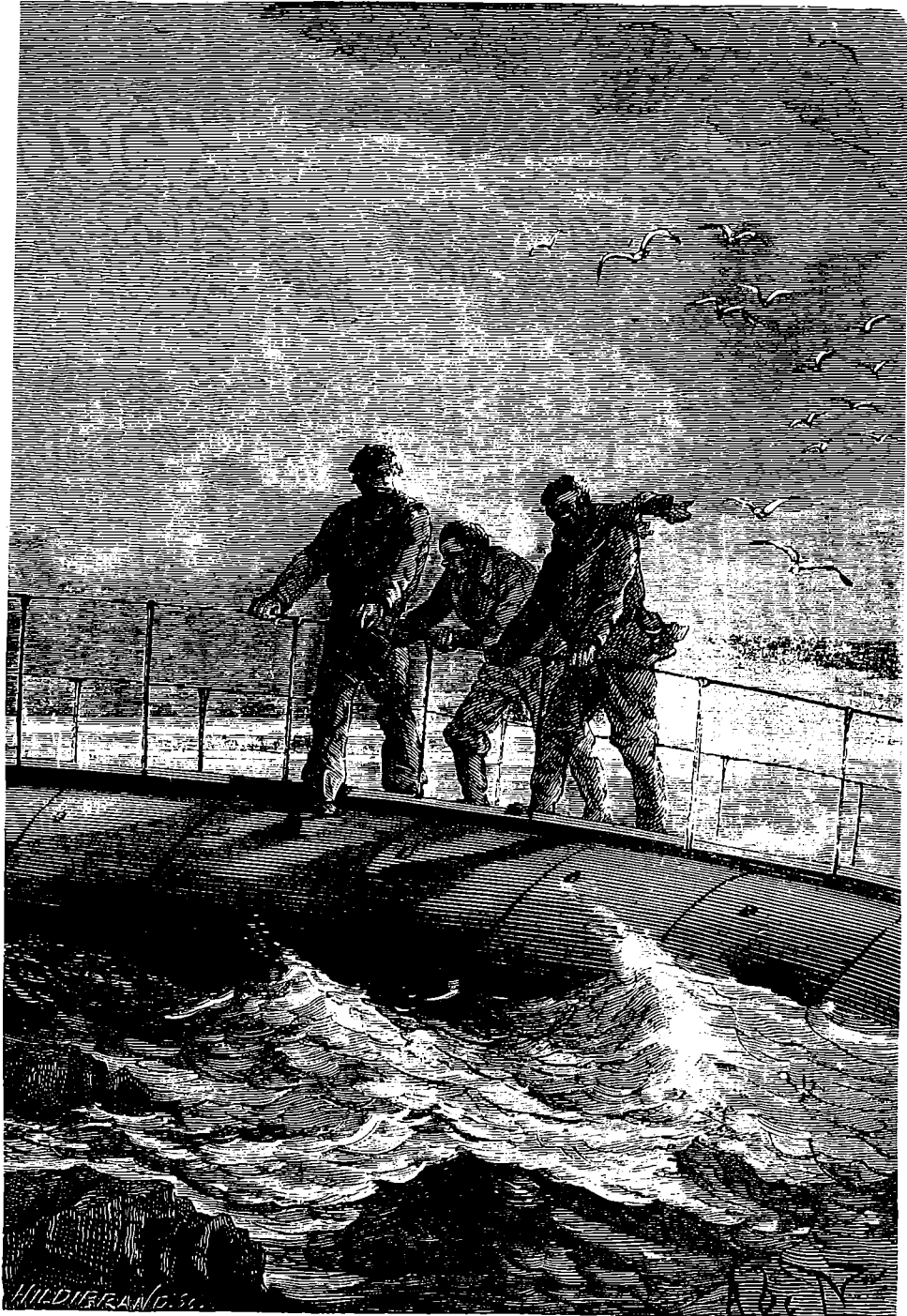
I had wished to visit the reef, 360 leagues long, against which the sea, always rough, broke with great violence, with a noise like thunder. But just then the inclined planes drew the *Nautilus* down to a great depth, and I could see nothing of the high coral walls. I had to content myself with the different specimens of fish brought up by the nets. I remarked, among others, some germons, a species of

mackerel as large as a tunny, with bluish sides, and striped with transverse bands, that disappear with the animal's life. These fish followed us in shoals, and furnished us with very delicate food. We took also a large number of gilthead, about one and a half inches long, tasting like dorset; and flying pyrapeds like submarine swallows, which, in dark nights, light alternately the air and water with their phosphorescent light. Among the molluscs and zoophytes, I found in the meshes of the net several species of alcyonarians, echini, hammers, spurs, dials, cerites, and hyalleae. The flora was represented by beautiful floating sea-weeds, laminariae, and macrocystes, impregnated with the mucilage that transudes through their pores; and among which I gathered an admirable *Nemastoma Gelinariois*, that was classed among the natural curiosities of the museum.

Two days after crossing the coral sea, January 4, we sighted the Papuan coasts. On this occasion, Captain Nemo informed me that his intention was to get into the Indian Ocean by the Strait of Torres. His communication ended there.

The Torres Straits are nearly thirty-four leagues wide; but they are obstructed by an innumerable quantity of islands, islets, breakers, and rocks, that make its navigation almost impracticable; so that Captain Nemo took all needful precautions to cross them. The *Nautilus*, floating betwixt wind and water, went at a moderate pace. Her screw, like a cetacean's tail, beat the waves slowly.

Profiting by this, I and my two companions went up on to the deserted platform. Before us was the steersman's cage, and I expected that Captain Nemo was there directing the course of the *Nautilus*. I had before me the excellent charts of the Strait of Torres made out by the hydrographical engineer Vincendon Dumoulin. These and Captain King's are the best charts that clear the intricacies of this strait, and I consulted them attentively. Round the *Nautilus* the sea dashed furiously. The course of the waves, that went from south-east to north-west at the rate of two and a half miles, broke on the coral that showed itself here and there.



The *Nautilus* in danger.

"This is a bad sea!" remarked Ned Land.

"Detestable indeed, and one that does not suit a boat like the *Nautilus*."

"The captain must be very sure of his route, for I see there pieces of coral that would do for its keel if it only touched them slightly."

Indeed the situation was dangerous, but the *Nautilus* seemed to slide like magic off these rocks. It did not follow the routes of the *Astrolabe* and the *Zélée* exactly, for they proved fatal to Dumont d'Urville. It bore more northwards, coasted the Island of Murray, and came back to the south-west towards Cumberland Passage. I thought it was going to pass it by, when, going back to north-west, it went through a large quantity of islands and islets little known, towards the Island Sound and Canal Mauvais.

I wondered if Captain Nemo, foolishly imprudent, would steer his vessel into that pass where Dumont d'Urville's two corvettes touched; when, swerving again, and cutting straight through to the west, he steered for the Island of Gilboa.

It was then three in the afternoon. The tide began to recede, being quite full. The *Nautilus* approached the island, that I still saw, with its remarkable border of screw-pines. He stood off it at about two miles distant. Suddenly a shock overthrew me. The *Nautilus* just touched a rock, and stayed immovable, laying lightly to port side.

When I rose, I perceived Captain Nemo and his lieutenant on the platform. They were examining the situation of the vessel, and exchanging words in their incomprehensible dialect.

She was situated thus:—Two miles, on the starboard side, appeared Gilboa, stretching from north to west like an immense arm. Towards the south and east some coral showed itself, left by the ebb. We had run aground, and in one of those seas where the tides are middling,—a sorry matter for the floating of the *Nautilus*. However, the vessel had not suffered, for her keel was solidly joined. But if she could neither glide off nor move, she ran the risk of being for ever fastened to these rocks, and then Captain Nemo's submarine vessel would be done for.

I was reflecting thus, when the Captain, cool and calm, always master of himself, approached me.

"An accident?" I asked.

"No; an incident."

"But an incident that will oblige you perhaps to become an inhabitant of this land from which you flee?"

Captain Nemo looked at me curiously, and made a negative gesture, as much as to say that nothing would force him to set foot on *terra firma* again. Then he said—

"Besides, M. Aronnax, the *Nautilus* is not lost; it will carry you yet into the midst of the marvels of the ocean. Our voyage is only begun, and I do not wish to be deprived so soon of the honour of your company."

"However, Captain Nemo," I replied, without noticing the ironical turn of his phrase, "the *Nautilus* ran aground in open sea. Now the tides are not strong in the Pacific; and if you cannot lighten the *Nautilus*, I do not see how it be reinflated."

"The tides are not strong in the Pacific: you are right there, Professor; but in Torres Straits, one finds still a difference of a yard and a half between the level of high and low seas. To-day is January 4, and in five days the moon will be full. Now, I shall be very much astonished if that complaisant satellite does not raise these masses of water sufficiently, and render me a service that I should be indebted to her for."

Having said this, Captain Nemo, followed by his lieutenant, re-descended to the interior of the *Nautilus*. As to the vessel, it moved not, and was immovable, as if the coralline polypi had already walled it up with their indestructible cement.

"Well, sir?" said Ned Land, who came up to me after the departure of the Captain.

"Well, friend Ned, we will wait patiently for the tide on the 9th instant; for it appears that the moon will have the goodness to put it off again."

"Really?"

"Really."

"And this Captain is not going to cast anchor at all, since the tide will suffice?" said Conseil, simply.

The Canadian looked at Conseil, then shrugged his shoulders.

"Sir, you may believe me when I tell you that this piece of iron will navigate neither on nor under the sea again; it is only fit to be sold for its weight. I think, therefore, that the time has come to part company with Captain Nemo."

"Friend Ned, I do not despair of this stout *Nautilus*, as you do; and in four days we shall know what to hold to on the Pacific tides. Besides, flight might be possible if we were in sight of the English or Provençal coasts; but on the Papuan shores, it is another thing; and it will be time enough to come to that extremity if the *Nautilus* does not recover itself

again, which I look upon as a grave event.”

“But do they know, at least, how to act circumspectly? There is an island; on that island there are trees; under those trees, terrestrial animals, bearers of cutlets and roast-beef, to which I would willingly give a trial.”

“In this, friend Ned is right,” said Conseil, “and I agree with him. Could not master obtain permission from his friend Captain Nemo to put us on land, if only so as not to lose the habit of treading on the solid parts of our planet?”

“I can ask him, but he will refuse.”

“Will master risk it?” asked Conseil, “and we shall know how to rely upon the Captain’s amiability.”

To my great surprise Captain Nemo gave me the permission I asked for, and he gave it very agreeably, without even exacting from me a promise to return to the vessel; but flight across New Guinea might be very perilous, and I should not have counselled Ned Land to attempt it. Better to be a prisoner on board the *Nautilus* than to fall into the hands of the natives.

At eight o’clock, armed with guns and hatchets, we got off the *Nautilus*. The sea was pretty calm; a slight breeze blew on land. Conseil and I rowing, we sped along quickly, and Ned steered in the straight passage that the breakers left between them. The boat was well handled, and moved rapidly.

Ned Land could not restrain his joy. He was like a prisoner that had escaped from prison,

and knew not that it was necessary to re-enter it.

“Meat! We are going to eat some meat; and what meat!” he replied. “Real game! no, bread, indeed.”

“I do not say that fish is not good; we must not abuse it; but a piece of fresh venison, grilled on live coals, will agreeably vary our ordinary course.”

“Gourmand!” said Conseil, “he makes my mouth water.”

“It remains to be seen,” I said, “if these forests are full of game, and if the game is not such as will hunt the hunter himself.”

“Well said, M. Aronnax,” replied the Canadian, whose teeth seemed sharpened like the edge of a hatchet; “but I will eat tiger—loin of tiger—if there is no other quadruped on this island.”

“Friend Ned is uneasy about it,” said Conseil.

“Whatever it may be,” continued Ned Land, “every animal with four paws without feathers, or with two paws without feathers, will be saluted by my first shot.”

“Very well! Master Land’s imprudences are beginning.”

“Never fear, M. Aronnax,” replied the Canadian; “I do not want twenty-five minutes to offer you a dish of my sort.”

At half-past eight the *Nautilus* boat ran softly aground, on a heavy sand, after having happily passed the coral reef that surrounds the Island of Gilboa.

Twenty Thousand Leagues Under the Sea

CHAPTER XX

A FEW DAYS ON LAND

I WAS much impressed on touching land. Ned Land tried the soil with his feet, as if to take possession of it. However, it was only two months before that we had become, according to Captain Nemo, "passengers on board the *Nautilus*," but in reality, prisoners of its commander.

In a few minutes we were within musket-shot of the coast. The soil was almost entirely madreporical, but certain beds of dried-up torrents, strewn with debris of granite, showed that this island was of the primary formation. The whole horizon was hidden behind a beautiful curtain of forests. Enormous trees, the trunks of which attained a height of 200 feet, were tied to each other by garlands of bindweed, real natural hammocks, which a light breeze rocked. They were mimosas, ficuses, casuarinae, teks, hibisci, and palm-trees, mingled together in profusion; and under the shelter of their verdant vault grew orchids, leguminous plants, and ferns.

But without noticing all these beautiful specimens of Papuan flora, the Canadian abandoned the agreeable for the useful. He discovered a cocoa-tree, beat down some of the fruit, broke them, and we drunk the milk and ate the nut, with a satisfaction that protested against the ordinary food on the *Nautilus*.

"Excellent!" said Ned Land.

"Exquisite!" replied Conseil.

"And I do not think," said the Canadian, "that he would object to our introducing a cargo of cocoa-nuts on board."

"I do not think he would, but he would not taste them."

"So much the worse for him," said Conseil.

"And so much the better for us," replied Ned Land. "There will be more for us."

"One word only, Master Land," I said to the harpooner, who was beginning to ravage another cocoa-nut tree. "Cocoa-nuts are good things, but before filling the canoe with them, it would be wise to reconnoitre and see if the island does not produce some substance not less useful. Fresh vegetables would be welcome on board the *Nautilus*."

"Master is right," replied Conseil; "and I propose to reserve three places in our vessel,

one for fruits, the other for vegetables, and the third for the venison, of which I have not yet seen the smallest specimen."

"Conseil, we must not despair," said the Canadian.

"Let us continue," I returned, "and lie in wait. Although the island seems uninhabited, it might still contain some individuals that would be less hard than we on the nature of game."

"Ho! ho!" said Ned Land, moving his jaws significantly.

"Well, Ned!" cried Conseil.

"My word!" returned the Canadian, "I begin to understand the charms of anthropophagy."

"Ned! Ned! what are you saying? You, a man-eater? I should not feel safe with you, especially as I share your cabin. I might perhaps wake one day to find myself half devoured."

"Friend Conseil, I like you much, but not enough to eat you unnecessarily."

"I would not trust you," replied Conseil. "But enough. We must absolutely bring down some game to satisfy this cannibal, or else one of these fine mornings, master will find only pieces of his servant to serve him."

While we were talking thus, we were penetrating the sombre arches of the forest, and for two hours we surveyed it in all directions.

Chance rewarded our search for eatable vegetables, and one of the most useful products of the tropical zones furnished us with precious food that we missed on board. I would speak of the bread fruit-tree, very abundant in the island of Gilboa; and I remarked chiefly the variety destitute of seeds, which bears in Malaya the name of "rima."

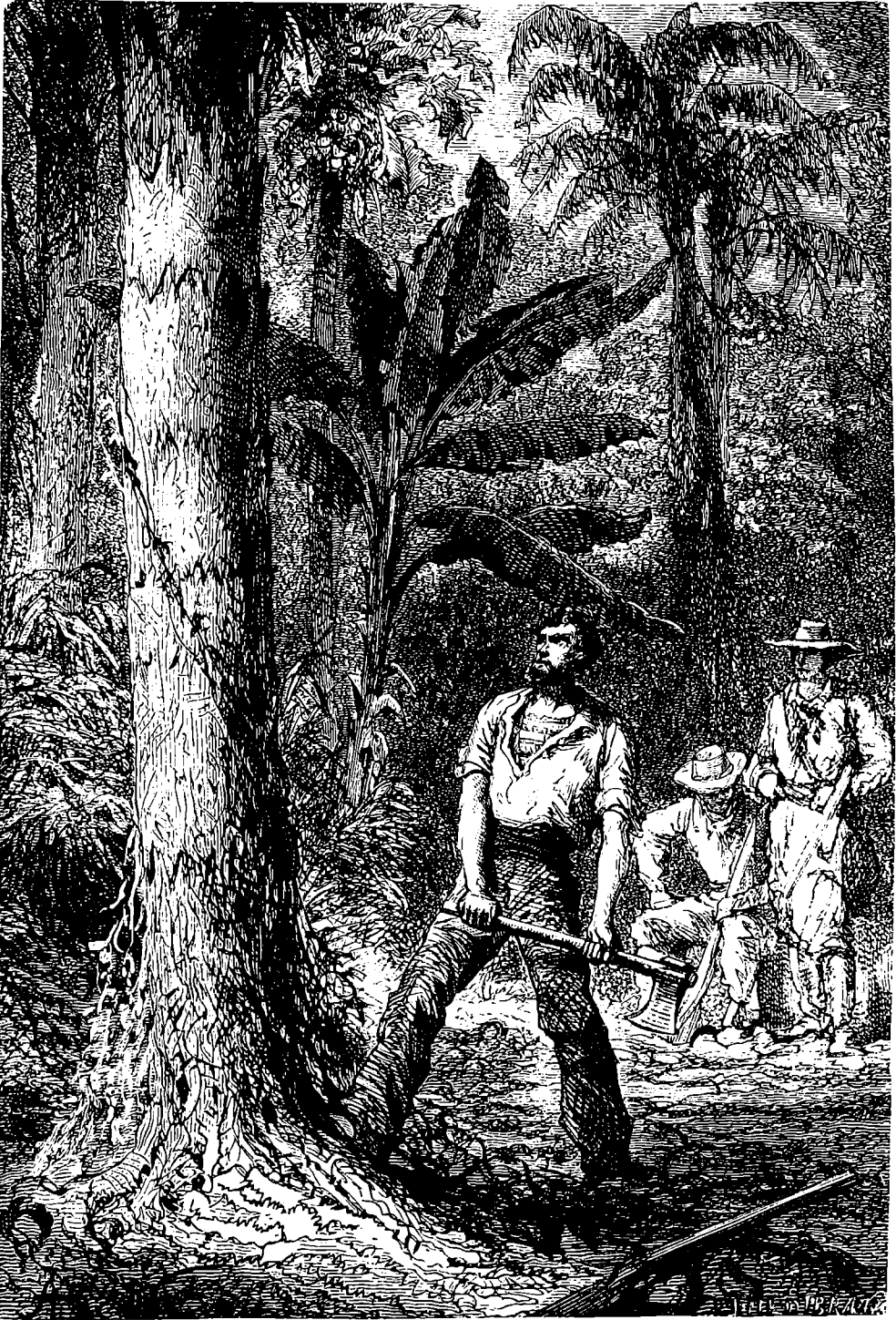
Ned Land knew these fruits well. He had already eaten many during his numerous voyages, and he knew how to prepare the eatable substance. Moreover, the sight of them excited him, and he could contain himself no longer.

"Master," he said, "I shall die if I do not taste a little of this bread-fruit pie."

"Taste it, friend Ned—taste it as you want. We are here to make experiments—make them."



“The whole horizon was hidden behind a beautiful curtain of forests.”



“We completed our collection by a raid upon the cabbage-palms.”

"It won't take long," said the Canadian.

And provided with a lentil, he lighted a fire of dead wood, that crackled joyously. During this time, Conseil and I chose the best fruits of the artocarpus. Some had not then attained a sufficient degree of maturity; and their thick skin covered a white but rather fibrous pulp. Others, the greater number yellow and gelatinous, waited only to be picked.

These fruits enclosed no kernel. Conseil brought a dozen to Ned Land, who placed them on a coal-fire, after having cut them in thick slices, and while doing this repeating—

"You will see, master, how good this bread is. More so when one has been deprived of it so long. It is not even bread," added he, "but a delicate pastry. You have eaten none, master?"

"No, Ned."

"Very well, prepare yourself for a juicy thing. If you do not come for more, I am no longer the king of harpooners."

After some minutes, the part of the fruits that was exposed to the fire was completely roasted. The interior looked like a white paste, a sort of soft crumb, the flavour of which was like that of an artichoke.

It must be confessed this bread was excellent, and I ate of it with great relish.

"What time is it now?" asked the Canadian.

"Two o'clock at least," replied Conseil.

"How time flies on firm ground!" sighed Ned Land.

"Let us be off," replied Conseil.

We returned through the forest, and completed our collection by a raid upon the cabbage-palms, that we gathered from the tops of the trees, little beans that I recognised as the "abrou" of the Malays, and yams of a superior quality.

We were loaded when we reached the boat. But Ned Land did not find his provision sufficient. Fate, however, favoured us. Just as we were pushing off, he perceived several trees, from twenty-five to thirty feet high, a species of palm-tree. These trees, as valuable as the artocarpus, justly are reckoned among the most useful products of Malaya.

At last, at five o'clock in the evening, loaded with our riches, we quitted the shore, and half an hour after we hailed the *Nautilus*. No one appeared on our arrival. The enormous iron-plated cylinder seemed deserted. The provisions embarked, I descended to my chamber, and after supper slept soundly.

The next day, January 6, nothing new on board. Not a sound inside, not a sign of life. The boat rested along the edge, in the same

place in which we had left it. We resolved to return to the island. Ned Land hoped to be more fortunate than on the day before with regard to the hunt, and wished to visit another part of the forest.

At dawn we set off. The boat, carried on by the waves that flowed to shore, reached the island in a few minutes.

We landed, and thinking that it was better to give in to the Canadian, we followed Ned Land, whose long limbs threatened to distance us. He wound up the coast towards the west: then, fording some torrents, he gained the high plain that was bordered with admirable forests. Some kingfishers were rambling along the water-courses, but they would not let themselves be approached. Their circumspection proved to me that these birds knew what to expect from bipeds of our species, and I concluded that, if the island was not inhabited, at least human being occasionally frequented it.

After crossing a rather large prairie, we arrived at the skirts of a little wood that was enlivened by the songs and flight of a large number of birds.

"There are only birds," said Conseil.

"But they are eatable," replied the harpooner.

"I do not agree with you, friend Ned, for I see only parrots there."

"Friend Conseil," said Ned, gravely, "the parrot is like pheasant to those who have nothing else."

"And," I added, "this bird, suitably prepared, is worth knife and fork."

Indeed, under the thick foliage of this wood, a world of parrots were flying from branch to branch, only needing a careful education to speak the human language. For the moment, they were chattering with parrots of all colours, and grave cockatoos, who seemed to meditate upon some philosophical problem, whilst brilliant red lorries passed like a piece of bunting carried away by the breeze; papuans, with the finest azure colours, and in all a variety of winged things most charming to behold, but few eatable.

However, a bird peculiar to these lands, and which has never passed the limits of the Arrow and Papuan islands, was wanting in this collection. But fortune reserved it for me before long.

After passing through a moderately thick copse, we found a plain obstructed with bushes. I saw then those magnificent birds, the disposition of whose long feathers obliges them to fly against the wind. Their undulating

flight, graceful aerial curves, and the shading of their colours, attracted and charmed one's looks. I had no trouble in recognising them.

"Birds of Paradise!" I exclaimed.

The Malays, who carry on a great trade in these birds with the Chinese, have several means that we could not employ for taking them. Sometimes they put snares at the top of high trees that the birds of Paradise prefer to frequent. Sometimes they catch them with a viscous birdlime that paralyses their movements. They even go so far as to poison the fountains that the birds generally drink from. But we were obliged to fire at them during flight, which gave us few chances to bring them down; and indeed, we vainly exhausted one half of our ammunition.

About eleven o'clock in the morning, the first range of mountains that form the centre of the island was traversed, and we had killed nothing. Hunger drove us on. The hunters had relied on the products of the chase, and they were wrong. Happily Conseil, to his great surprise, made a double shot and secured breakfast. He brought down a white pigeon and a wood-pigeon, which, cleverly plucked and suspended from a skewer, was roasted before a red fire of dead wood. Whilst these interesting birds were cooking, Ned prepared the fruit of the artocarpus. Then the wood-pigeons were devoured to the bones, and declared excellent. The nutmeg, with which they are in the habit of stuffing their crops, flavours their flesh and renders it delicious eating.

"Now, Ned, what do you miss now?"

"Some four-footed game, M. Aronnax. All these pigeons are only side-dishes, and trifles; and until I have killed an animal with cutlets, I shall not be content."

"Nor I, Ned, if I do not catch a bird of Paradise."

"Let us continue hunting," replied Conseil. "Let us go towards the sea. We have arrived at the first declivities of the mountains, and I think we had better regain the region of forests."

That was sensible advice, and was followed out. After walking for one hour, we had attained a forest of sago-trees. Some inoffensive serpents glided away from us. The birds of Paradise fled at our approach, and truly I despaired of getting near one, when Conseil, who was walking in front, suddenly bent down, uttered a triumphal cry, and came back to me bringing a magnificent specimen.

"Ah! bravo, Conseil!"

"Master is very good."

"No, my boy; you have made an excellent stroke. Take one of these living birds, and carry it in your hand."

"If master will examine it, he will see that I have not deserved great merit."

"Why, Conseil?"

"Because this bird is as drunk as a quail."

"Drunk!"

"Yes, sir; drunk with the nutmegs that it devoured under the nutmeg-tree, under which I found it. See, friend Ned, see the monstrous effects of intemperance!"

"By jove!" exclaimed the Canadian, "because I have drunk gin for two months, you must needs reproach me!"

However, I examined the curious bird. Conseil was right. The bird, drunk with the juice, was quite powerless. It could not fly; it could hardly walk.

This bird belonged to the most beautiful of the eight species that are found in Papua and in the neighbouring islands. It was the "large emerald bird, the most rare kind." It measured three feet in length. Its head was comparatively small, its eyes placed near the opening of the beak, and also small. But the shades of colour were beautiful, having a yellow beak, brown feet and claws, nut-coloured wings with purple tips, pale yellow at the back of the neck and head, and emerald colour at the throat, chestnut on the breast and belly. Two horned downy nets rose from below the tail, that prolonged the long light feathers of admirable fineness, and they completed the whole of this marvellous bird, that the natives have poetically named the "bird of the sun."

But if my wishes were satisfied by the possession of the bird of paradise, the Canadian's were not yet. Happily about two o'clock Ned Land brought down a magnificent hog, from the brood of those the native call "bari-outang." The animal came in time for us to procure real quadruped meat, and he was well received. Ned Land was very proud of his shot. The hog, hit by the electric ball, fell stone dead. The Canadian skinned and cleaned it properly, after having taken half-a-dozen cutlets, destined to furnish us with a grilled repast in the evening. Then the hunt was resumed, which was still more marked by Ned and Conseil's exploits.

Indeed, the two friends, beating the bushes, roused a herd of kangaroos, that fled and bounded along on their elastic paws. But these animals did not take flight so rapidly but what the electric capsule could stop their course.

"Ah, Professor!" cried Ned Land, who was



“Conseil suddenly bent down, uttered a triumphal cry, and came back, bringing a magnificent specimen.”



A slaughter of kangaroos.

carried away by the delights of the chase, "what excellent game, and stewed too! What a supply for the *Nautilus!* two! three! five down! And to think that we shall eat that flesh, and that the idiots on board shall not have a crumb!"

I think that, in the excess of his joy, the Canadian, if he had not talked so much, would have killed them all. But he contented himself with a single dozen of these interesting marsupians. These animals were small. They were a species of those "kangaroo rabbits" that live habitually in the hollows of trees, and whose speed is extreme; but they are moderately fat, and furnish, at least, estimable food. We were very satisfied with the results of the hunt. Happy Ned proposed to return to this enchanting island the next day, for he wished to depopulate it of all the eatable quadrupeds. But he reckoned without his host.

At six o'clock in the evening we had regained the shore, our boat was moored to

the usual place. The *Nautilus*, like a long rock, emerged from the waves two miles from the beach. Ned Land, without waiting, occupied himself about the important dinner business. He understood all about cooking well. The "barioutang," grilled on the coals, soon scented the air with a delicious odour.

Indeed, the dinner was excellent. Two wood-pigeons completed this extraordinary *menu*. The sago pasty, the artocarpus bread, some mangoes, half-a-dozen pine-apples, and the liquor fermented from some cocoa-nuts, overjoyed us. I even think that my worthy companions' ideas had not all the plainness desirable.

"Suppose we do not return to the *Nautilus* this evening?" said Conseil.

"Suppose we never return?" added Ned Land.

Just then a stone fell at our feet, and cut short the harpooner's proposition.

Twenty Thousand Leagues Under the Sea

CHAPTER XXI

CAPTAIN NEMO'S THUNDERBOLT

WE looked at the edge of the forest without rising, my hand stopping in the action of putting it to my mouth, Ned Land's completing its office.

"Stones do not fall from the sky," remarked Conseil, "or they would merit the name of aerolites."

A second stone, carefully aimed, that made a savoury pigeon's leg fall from Conseil's hand, gave still more weight to his observation. We all three arose, shouldered our guns, and were ready to reply to any attack.

"Are they apes?" cried Ned Land.

"Very nearly—they are savages."

"To the boat!" I said, hurrying to the sea.

It was indeed necessary to beat a retreat, for about twenty natives armed with bows and slings, appeared on the skirts of a cove that masked the horizon to the right, hardly a hundred steps from us.

Our boat was moored about sixty feet from us. The savages approached us, not running, but making hostile demonstrations. Stones and arrows fell thickly.

Ned Land had not wished to leave his provisions; and, in spite of his imminent danger, his pig on one side, and kangaroos on the other, he went tolerably fast. In two minutes we were on the shore. To load the boat with provisions and arms, to push it out to sea, and ship the oars, was the work of an instant. We had not gone two cables' lengths, when a hundred savages, howling and gesticulating, entered the water up to their waists. I watched to see if their apparition would attract some men from the *Nautilus* on to the platform. But no. The enormous machine, lying off, was absolutely deserted.

Twenty minutes later we were on board. The panels were open. After making the boat fast, we entered into the interior of the *Nautilus*.

I descended to the drawing-room, from whence I heard some chords. Captain Nemo was there, being over his organ, and plunged in a musical ecstasy.

"Captain!"

He did not hear me.

"Captain!" I said again, touching his hand.

He shuddered, and turning round, said, "Ah! it is you, Professor? Well, have you had

a good hunt, have you botanised successfully?"

"Yes, Captain; but we have unfortunately brought a troop of bipeds, whose vicinity troubles me."

"What bipeds?"

"Savages."

"Savages!" he echoed, ironically. "So you are astonished, Professor, at having set foot on a strange land and finding savages? Savages! where are there not any? Besides, are they worse than others, these whom you call savages?"

"But, Captain"—

"How many have you counted?"

"A hundred at least."

"M. Aronnax," replied Captain Nemo, placing his fingers on the organ stops, "when all the natives of Papua are assembled on this shore, the *Nautilus* will have nothing to fear from their attacks."

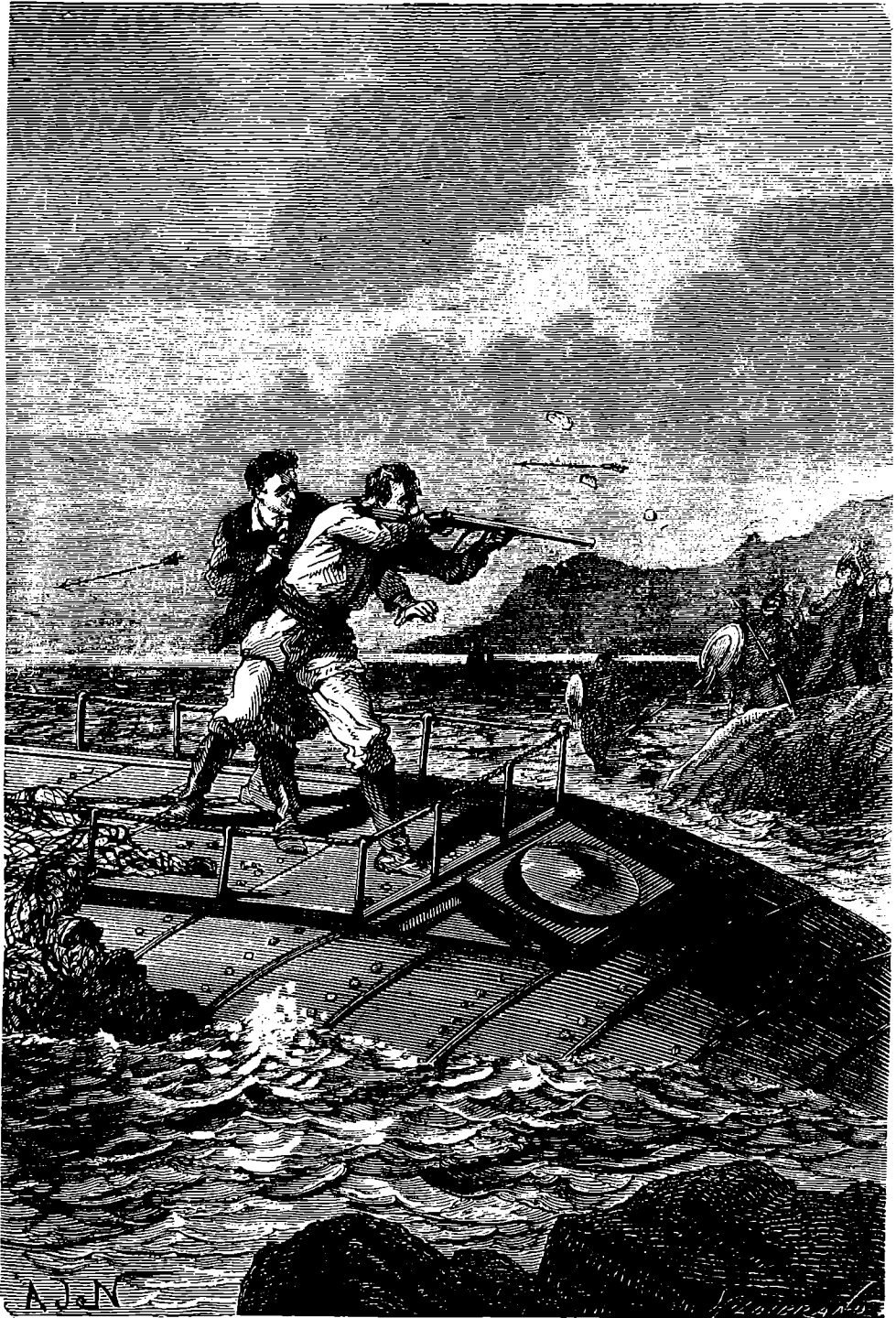
The Captain's fingers were then running over the keys of the instrument, and I remarked that he touched only the black keys, which gave to his melodies an essentially Scotch character. Soon he had forgotten my presence, and had plunged into a reverie that I did not disturb. I went up again on to the platform:—night had already fallen; for, in this low latitude, the sun sets rapidly and without twilight. I could only see the island indistinctly; but the numerous fires, lighted on the beach, showed that the natives did not think of leaving it. I was alone for several hours, sometimes thinking of the natives,—but without any dread of them, for the imperturbable confidence of the Captain was catching,—sometimes forgetting them to admire the splendours of the night in the tropics. My remembrances went to France, in the train of those zodiacal stars that would shine in some hours' time. The moon shone in the midst of the constellations of the zenith.

The night slipped away without any mischance, the islanders frightened no doubt at the sight of a monster aground in the bay. The panels were open, and would have offered an easy access to the interior of the *Nautilus*.

At six o'clock in the morning of the 8th January, I went up on to the platform. The



“One of these chiefs, rather near to the *Nautilus*, examined it attentively.”



“Conseil took up his gun, and aimed at a savage who was poising his sling at ten yards from him.”

dawn was breaking. The island soon showed itself through the dissipating fogs, first the shore, then the summits.

The natives were there, more numerous than on the day before—500 or 600 perhaps—some of them, profiting by the low water, had come on to the coral, at less than two cable-lengths from the *Nautilus*. I distinguished them easily; they were true Papuans, with athletic figures, men of good race, large high foreheads, large, but not broad and flat, and white teeth. Their woolly hair, with a reddish tinge, showed off on their black shining bodies like those of the Nubians. From the lobes of their ears, cut and distended, hung chaplets of bones. Most of these savages were naked. Amongst them, I remarked some women, dressed from the hips to knees in quite a crinoline of herbs, that sustained a vegetable waistband. Some chiefs had ornamented their necks with a crescent and collars of glass beads, red and white; nearly all were armed with bows, arrows, and shields, and carried on their shoulders a sort of net containing those round stones which they cast from their slings with great skill. One of these chiefs, rather near to the *Nautilus*, examined it attentively. He was, perhaps, a "mado" of high rank, for he was draped in a mast of banana leaves, notched round the edges, and set off with brilliant colours.

I could easily have knocked down this native, who was within a short length; but I thought that it was better to wait for real hostile demonstrations. Between Europeans and savages, it is proper for the Europeans to parry sharply, not to attack.

During low water the natives roamed about near the *Nautilus*, but were not troublesome; I heard them frequently repeat the word "Assai," and by their gestures I understood that they invited me to go on land, an invitation that I declined.

So that, on that day, the boat did not push off, to the great displeasure of Master Land, who could not complete his provisions.

This adroit Canadian employed his time in preparing the viands and meat that he had brought off the island. As for the savages, they returned to the shore about eleven o'clock in the morning, as soon as the coral tops began to disappear under the rising tide; but I saw their numbers had increased considerably on the shore. Probably they came from the neighbouring islands, or very likely from Papua. However, I had not seen a single native canoe. Having nothing better to do, I thought of dragging these beautiful limpid waters, under which I saw a profusion of shells, zoophytes,

and marine plants. Moreover, it was the last day that the *Nautilus* would pass in these parts, if it float in open sea the next day, according to Captain Nemo's promise.

I therefore called Conseil, who brought me a little light drag, very like those for the oyster fishery. Now to work! For two hours we fished unceasingly, but without bringing up any rarities. The drag was filled with midas-ears, harps, melames, and particularly the most beautiful hammers I have ever seen. We also brought up some holothurias, pearl-oysters, and a dozen little turtles, that were reserved for the pantry on board.

But just when I expected it least, I put my hand on a wonder, I might say a natural deformity, very rarely met with. Conseil was just dragging, and his net came up filled with divers ordinary shells, when, all at once, he saw me plunge my arm quickly into the net, to draw out a shell, and heard me utter a conchological cry, that is to say, the most piercing cry that human throat can utter.

"What is the matter, sir?" he asked, in surprise; "has master been bitten?"

"No, my boy; but I would willingly have given a finger for my discovery."

"What discovery?"

"This shell," I said, holding up the object of my triumph.

"It is simply an olive porphyry, genus olive, order of the pectinibranchidae, class of gasteropods, sub-class of mollusca."

"Yes, Conseil; but instead of being rolled from right to left, this olive turns from left to right."

"Is it possible?"

"Yes, my boy; it is a left shell."

Shells are all right-handed with rare exceptions; and, when by chance their spiral is left, amateurs are ready to pay their weight in gold.

Conseil and I were absorbed in the contemplation of our treasure, and I was promising myself to enrich the museum with it, when a stone unfortunately thrown by a native, struck against, and broke the precious object in Conseil's hand. I uttered a cry of despair! Conseil took up his gun, and aimed at a savage who was poisoning his sling at ten yards from him. I would have stopped him, but his blow took effect, and broke the bracelet of amulets which encircled the arm of the savage.

"Conseil!" cried I "Conseil!"

"Well, sir! do you not see that the cannibal has commenced the attack."

"A shell is not worth the life of a man," said I.

"Ah! the scoundrel!" cried Conseil; "I would rather he had broken my shoulder!"

Conseil was in earnest, but I was not of his opinion. However the situation had changed some minutes before, and we were not perceived. A score of canoes surrounded the *Nautilus*. These canoes, scooped out of the trunk of a tree, long, narrow, well adapted for speed, were balanced by means of a long bamboo pole, which floated on the water. They were managed by skilful half-naked paddlers and I watched their advance with some uneasiness. It was evident that these Papuans had already had dealings with the Europeans, and knew their ships. But this long iron cylinder anchored in the bay, without masts or chimney, what could they think of it? Nothing good, for at first they kept at a respectful distance. However, seeing it motionless, by degrees they took courage, and sought to familiarise themselves with it. Now, this familiarity was precisely what it was necessary to avoid. Our arms, which were noiseless, could only produce a moderate effect on the savages, who have little respect for aught but blustering things. The thunderbolt without the reverberations of thunder would frighten man but little, though the danger lies in the lightning, not in the noise.

At this moment the canoes approached the *Nautilus*, and a shower of arrows alighted on her.

I went down to the saloon, but found no one there. I ventured to knock at the door that opened into the Captain's room. "Come in," was the answer.

I entered, and found Captain Nemo deep in algebraical calculations of x and other quantities.

"I am disturbing you," said I, for courtesy sake.

"That is true, M. Aronnax," replied the Captain; "but I think you have serious reasons for wishing to see me?"

"Very grave ones; the natives are surrounding us in their canoes, and in a few minutes we shall certainly be attacked by many hundreds of savages."

"Ah!" said Captain Nemo, quietly, "they are come with their canoes?"

"Yes, sir."

"Well, sir, we must close the hatches."

"Exactly, and I came to say to you"—

"Nothing can be more simple," said Captain Nemo. And pressing an electric button, he transmitted an order to the ship's crew.

"It is all done, sir," said he, after some

moments. "The pinnace is ready, and the hatches are closed. You do not fear, I imagine, that these gentlemen could stave in walls on which the balls of your frigate have had no effect?"

"No, Captain; but a danger still exists."

"What is that, sir?"

"It is that to-morrow, at about this hour, we must open the hatches to renew the air of the *Nautilus*. Now, if, at this moment, the Papuans should occupy the platform, I do not see how you could prevent them from entering."

"Then, sir, you suppose that they will board us?"

"I am certain of it."

"Well, sir, let them come. I see no reason for hindering them. After all, these Papuans are poor creatures, and I am unwilling that my visit to the Island of Gueberoa should cost the life of a single one of these wretches."

Upon that I was going away; but Captain Nemo detained me, and asked me to sit down by him. He questioned me with interest about our excursions on shore, and our hunting; and seemed not to understand the craving for meat that possessed the Canadian. Then the conversation turned on various subjects, and without being more communicative, Captain Nemo showed himself more amiable.

Amongst other things, we happened to speak of the situation of the *Nautilus*, run aground in exactly the same spot in this strait where Dumont d'Urville was nearly lost. Apropos of this—

"This D'Urville was one of your great sailors," said the Captain, to me, "one of your most intelligent navigators. He is the Captain Cook of you Frenchmen. Unfortunate man of science, after having braved the icebergs of the south pole, the coral reefs of Oceania, the cannibals of the Pacific, to perish miserably in a railway train! If this energetic man could have reflected during the last moments of his life, what must have been uppermost in his last thoughts, do you suppose?"

So speaking, Captain Nemo seemed moved, and his emotion gave me a better opinion of him. Then, chart in hand, we reviewed the travels of the French navigator, his voyages of circumnavigation, his double detention at the south pole, which led to the discovery of Adelaide and Louis Philippe, and fixing the hydrographical bearings of the principal islands of Oceania.

"That which your D'Urville has done on the surface of the seas," said Captain Nemo,



“The first native who placed his hand on the staircase, struck from behind by some invisible force, fled, uttering the most fearful cries.”

"that have I done under them, and more easily, more completely than he. The *Astrolabe* and the *Zelia*, incessantly tossed about by the hurricanes, could not be worth the *Nautilus*, quiet repository of labour that she is, truly motionless in the midst of the waters."

"To-morrow," added the Captain, rising, "to-morrow, at twenty minutes to three P.M., the *Nautilus* shall float, and leave the Strait of Torres uninjured."

Having curtly pronounced these words, Captain Nemo bowed slightly. This was to dismiss me, and I went back to my room.

There I found Conseil, who wished to know the result of my interview with the Captain.

"My boy," said I, "when I feigned to believe that his *Nautilus* was threatened by the natives of Papua, the Captain answered me very sarcastically. I have but one thing to say to you: Have confidence in him, and go to sleep in peace."

"Have you no need of my services, sir?"

"No, my friend. What is Ned Land doing?"

"If you will excuse me, sir," answered Conseil, "friend Ned is busy making a kangaroo-pie, which will be a marvel."

I remained alone, and went to bed, but slept indifferently. I heard the noise of the savages, who stamped on the platform uttering deafening cries. The night passed thus, without disturbing the ordinary repose of the crew. The presence of these cannibals affected them no more than the soldiers of a masked battery care for the ants that crawl over its front.

At six in the morning I rose. The hatches had not been opened. The inner air was not renewed, but the reservoirs, filled ready for any emergency, were now resorted to, and discharged several cubic feet of oxygen into the exhausted atmosphere of the *Nautilus*.

I worked in my room till noon, without having seen Captain Nemo, even for an instant. On board no preparations for departure were visible.

I waited still some time, then went into the large saloon. The clock marked half-past two. In ten minutes it would be high-tide: and, if Captain Nemo had not made a rash promise, the *Nautilus* would be immediately detached. If not, many months would pass ere she could leave her bed of coral.

However, some warning vibrations began to be felt in the vessel. I heard the keel grating against the rough calcareous bottom of the coral reef.

At five-and-twenty minutes to three, Captain Nemo appeared in the saloon.

"We are going to start," said he.

"Ah!" replied I.

"I have given the order to open the hatches."

"And the Papuans?"

"The Papuans?" answered Captain Nemo, slightly shrugging his shoulders.

"Will they not come inside the *Nautilus*?"

"How?"

"Only by leaping over the hatches you have opened."

"M. Aronnax," quietly answered Captain Nemo, "they will not enter the hatches of the *Nautilus* in that way, even if they were open."

I looked at the Captain.

"You do not understand?" said he.

"Hardly."

"Well, come and you will see."

I directed my steps towards the central staircase. There Ned Land and Conseil were slyly watching some of the ship's crew, who were opening the hatches, while cries of rage and fearful vociferations resounded outside.

The port lids were pulled down outside. Twenty horrible faces appeared. But the first native who placed his hand on the stair-rail, struck from behind by some invisible force, I know not what, fled, uttering the most fearful cries, and making the wildest contortions.

Ten of his companions followed him. They met with the same fate.

Conseil was in ecstasy. Ned Land, carried away by his violent instincts, rushed on to the staircase. But the moment he seized the rail with both hands, he, in his turn, was overthrown.

"I am struck by a thunderbolt," cried he, with an oath.

This explained all. It was no rail, but a metallic cable, charged with electricity from the deck, communicating with the platform. Whoever touched it felt a powerful shock—and this shock would have been mortal, if Captain Nemo had discharged into the conductor the whole force of the current. It might truly be said that between his assailants and himself he had stretched a network of electricity which none could pass with impunity.

Meanwhile, the exasperated Papuans had beaten a retreat, paralysed with terror. As for us, half laughing, we consoled and rubbed the unfortunate Ned Land, who swore like one possessed.

But, at this moment, the *Nautilus*, raised by the last waves of the tide, quitted her coral bed exactly at the fortieth minute fixed by the Captain. Her screw swept the waters slowly

and majestically. Her speed increased ocean, she quitted safe and sound the gradually, and sailing on the surface of the dangerous passes of the Straits of Torres.

Twenty Thousand Leagues Under the Sea

CHAPTER XXII

“AEGRI SOMNIA”

THE following day, 10th January, the *Nautilus* continued her course between two seas, but with such remarkable speed that I could not estimate it at less than thirty-five miles an hour. The rapidity of her screw was such that I could neither follow nor count its evolutions. When I reflected that this marvellous electric agent, after having afforded motion, heat, and light to the *Nautilus*, still protected her from outward attack, and transformed her into an ark of safety, which no profane hand might touch without being thunderstricken, my admiration was unbounded, and from the structure it extended to the engineer who had called it into existence.

Our course was directed to the west, and on 11th January we doubled Cape Wessel, situated in 135° longitude, and 10° north latitude, which forms the east point of the Gulf of Carpentaria. The reefs were still numerous, but more equalised, and marked on the chart with extreme precision. The *Nautilus* easily avoided the breakers of Money to port, and the Victoria reefs to starboard, placed at 130° longitude, and on the tenth parallel which we strictly followed.

On the 13th January, Captain Nemo arrived in the Sea of Timor, and recognised the island of that name in 122° longitude.

From this point, the direction of the *Nautilus* inclined towards the south-west. Her head was set for the Indian Ocean. Where would the fancy of Captain Nemo carry us next? Would he return to the coast of Asia? or would he approach again the shores of Europe? Improbable conjectures both, for a man who fled from inhabited continents. Then, would he descend to the south? Was he going to double the Cape of Good Hope, then Cape Horn, and finally go as far as the antarctic pole? Would he come back at last to the Pacific, where his *Nautilus* could sail free and independently? Time would show.

After having skirted the sands of Cartier, of Hibernia, Seringapatam, and Scott, last efforts of the solid against the liquid element, on the 14th January we lost sight of land altogether. The speed of the *Nautilus* was considerably abated, and, with irregular

course, she sometimes swam in the bosom of the waters, sometimes floated on their surface.

During this period of the voyage, Captain Nemo made some interesting experiments on the varied temperature of the sea, in different beds. Under ordinary conditions, these observations are made by means of rather complicated instruments, and with somewhat doubtful results, by means of thermometrical sounding-leads, the glasses often breaking under the pressure of the water, or an apparatus grounded on the variations of the resistance of metals to the electric currents. Results so obtained could not be correctly calculated. On the contrary, Captain Nemo went himself to test the temperature in the depths of the sea, and his thermometer, placed in communication with the different sheets of water, gave him the required degree immediately and accurately.

It was thus that, either by overloading her reservoirs, or by descending obliquely by means of her inclined planes, the *Nautilus* successively attained the depth of three, four, five, seven, nine, and ten thousand yards, and the definite result of this experience was, that the sea preserved an average temperature of four degrees and a half, at a depth of five thousand fathoms, under all latitudes.

On the 16th January, the *Nautilus* seemed becalmed, only a few yards beneath the surface of the waves. Her electric apparatus remained inactive, and her motionless screw left her to drift at the mercy of the currents. I supposed that the crew was occupied with interior repairs, rendered necessary by the violence of the mechanical movements of the machine.

My companions and I then witnessed a curious spectacle. The hatches of the saloon were open, and as the beacon-light of the *Nautilus* was not in action, a dim obscurity reigned in the midst of the waters. I observed the state of the sea under these conditions, and the largest fish appeared to me no more than scarcely defined shadows, when the *Nautilus* found herself suddenly transported into full light. I thought at first that the beacon had been lighted, and was casting its electric radiance into the liquid mass. I was mistaken,

and after a rapid survey, perceived my error.

The *Nautilus* floated in the midst of a phosphorescent bed, which, in this obscurity, became quite dazzling. It was produced by myriads of luminous animalculae, whose brilliancy was increased as they glided over the metallic hull of the vessel. I was surprised by lightning in the midst of these luminous sheets, as though they had been rivulets of lead melted in an ardent furnace, or metallic masses brought to a white heat, so that, by force of contrast, certain portions of light appeared to cast a shade in the midst of the general ignition, from which all shade seemed banished. No; this was not the calm irradiation of our ordinary lightning. There was unusual life and vigour; this was truly living light!

In reality, it was an infinite agglomeration of coloured infusoria, of veritable globules of diaphanous jelly, provided with a thread-like tentacle, and of which as many as twenty-five thousand have been counted in less than two cubic half-inches of water; and their light was increased by the glimmering peculiar to the medusae, starfish, aurelia, and other phosphorescent zoophytes, impregnated by the grease of the organic matter decomposed by the sea, and, perhaps, the mucus secreted by the fish.

During several hours the *Nautilus* floated in these brilliant waves, and our admiration increased as we watched the marine monsters disporting themselves like salamanders. I saw there, in the midst of this fire that burns not, the swift and elegant porpoise (the indefatigable clown of the ocean), and some swordfish, ten feet long, those prophetic heralds of the hurricane, whose formidable sword would now and then strike the glass of the saloon. Then appeared the smaller fish, the variegated balista, the leaping mackerel, wolf-thorntails, and a hundred others which striped the luminous atmosphere as they swam. This dazzling spectacle was enchanting! Perhaps some atmospheric condition increased the intensity of this phenomenon. Perhaps some storm agitated the surface of the waves. But, at this depth of some yards, the *Nautilus* was unmoved by its fury, and reposed peacefully in still water.

So we progressed, incessantly charmed by some new marvel. Conseil arranged and classed his zoophytes, his articulata, his molluscs, his fishes. The days passed rapidly away, and I took no account of them. Ned, according to habit, tried to vary the diet on board. Like snails, we were fixed to our shells, and I declare it is easy to lead a snail's life.

Thus, this life seemed easy and natural, and we thought no longer of the life we led on land; but something happened to recall us to the strangeness of our situation.

On the 18th of January, the *Nautilus* was in 105° longitude and 15° south latitude. The weather was threatening, the sea rough and rolling. There was a strong east wind. The barometer, which had been going down for some days, foreboded a coming storm. I went up on to the platform just as the second lieutenant was taking the measure of the horary angles, and waited, according to habit, till the daily phrase was said. But, on this day, it was exchanged for another phrase not less incomprehensible. Almost directly, I saw Captain Nemo appear, with a glass, looking towards the horizon.

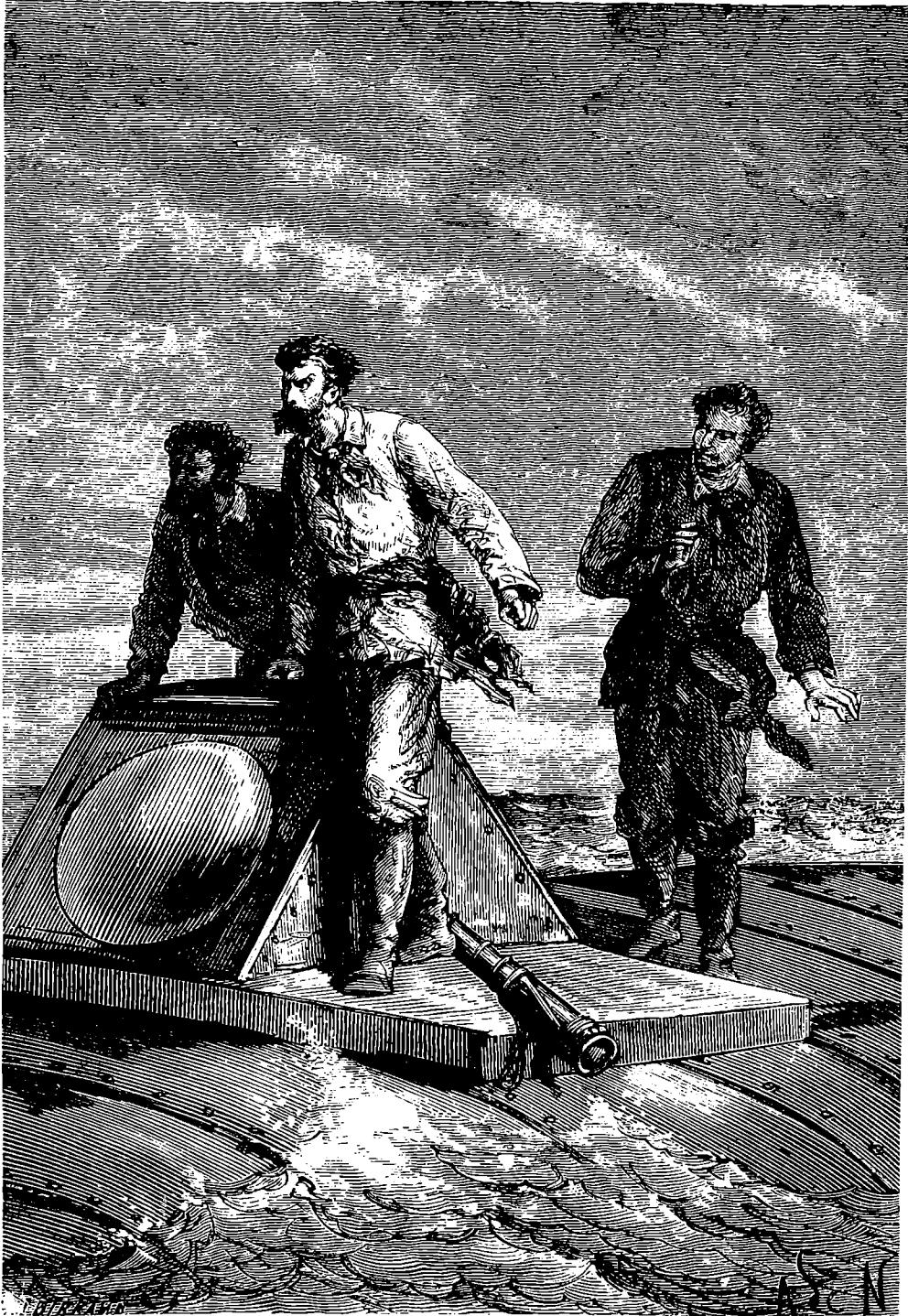
For some minutes he was immovable, without taking his eye off the point of observation. Then he lowered his glass, and exchanged a few words with his lieutenant. The latter seemed to be a victim to some emotion that he tried in vain to repress. Captain Nemo, having more command over himself, was cool. He seemed, too, to be making some objections, to which the lieutenant replied by formal assurances. At least I concluded so by the difference of their tones and gestures. For myself, I had looked carefully in the direction indicated without seeing anything. The sky and water were lost in the clear line of the horizon.

However, Captain Nemo walked from one end of the platform to the other, without looking at me, perhaps without seeing me. His step was firm, but less regular than usual. He stopped sometimes, crossed his arms, and observed the sea. What could he be looking for on that immense expanse?

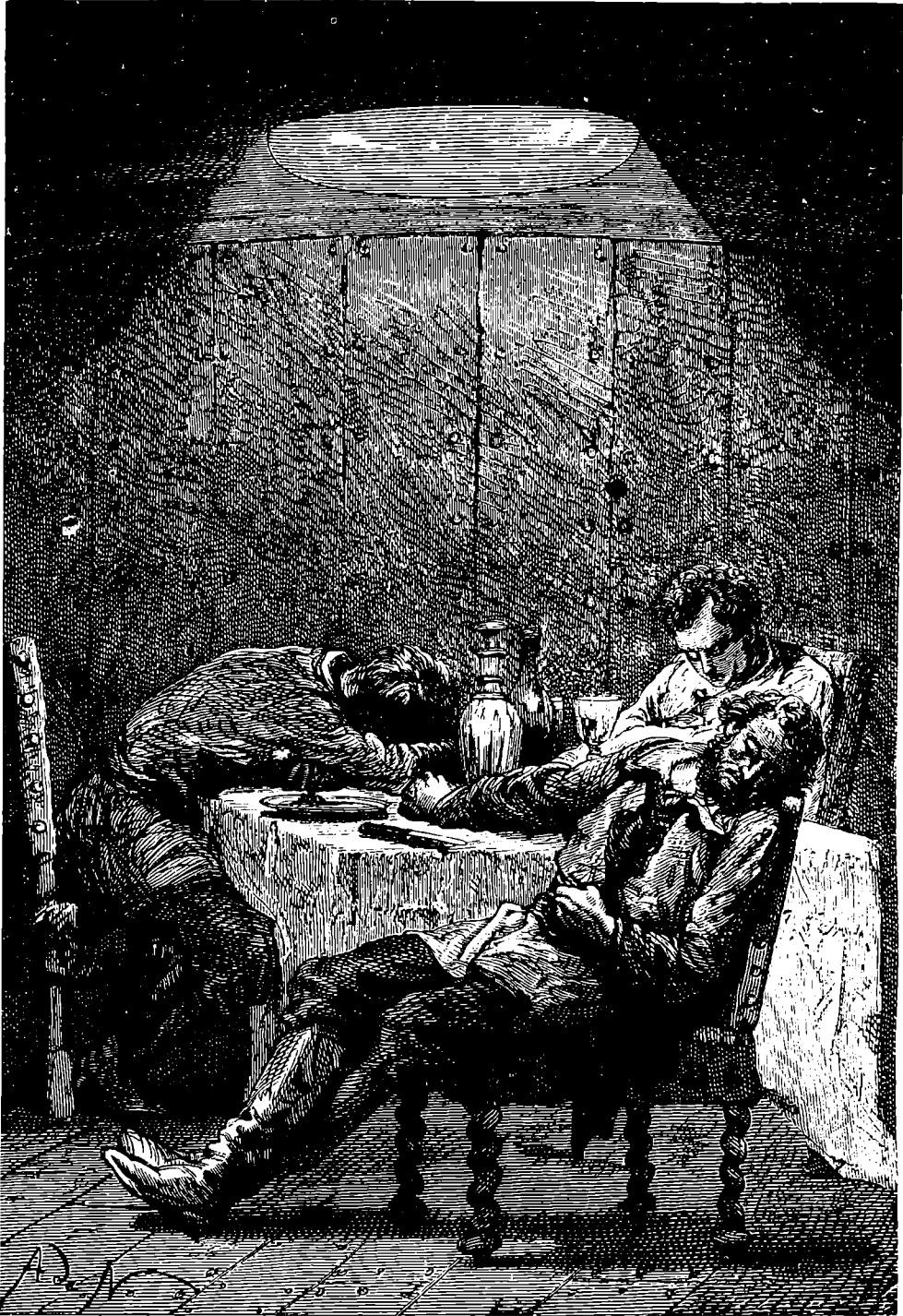
The *Nautilus* was then some hundreds of miles from the nearest coast.

The lieutenant had taken up the glass, and examined the horizon steadfastly, going and coming, stamping his foot and showing more nervous agitation than his superior officer. Besides, this mystery must necessarily be solved, and before long; for, upon an order from Captain Nemo, the engine increasing its propelling power, made the screw turn more rapidly.

Just then, the lieutenant drew the Captain's attention again. The latter stopped walking and directed his glass towards the place indicated. He looked long. I felt very much puzzled, and descended to the drawing-room, and took out an excellent telescope that I generally used. Then leaning on the cage of the



“His eye was steadily fixed upon the impenetrable point of the horizon.”



“Evidently soporific substances had been mixed with the food we had just taken.”

watch-light, that jutted out from the front of the platform, set myself to look over all the line of the sky and sea.

But my eye was no sooner applied to the glass, than it was quickly snatched out of my hands.

I turned round. Captain Nemo was before me, but I did not know him. His face was transfigured. His eyes flashed sullenly, his teeth were set; his stiff body, clenched fists, and head shrunk between his shoulders, betrayed the violent agitation that pervaded his whole frame. He did not move. My glass, fallen from his hands, had rolled at his feet.

Had I unwittingly provoked this fit of anger? Did this incomprehensible person imagine that I had discovered some forbidden secret? No; I was not the object of this hatred, for he was not looking at me, his eye was steadily fixed upon the impenetrable point of the horizon. At last Captain Nemo recovered himself. His agitation subsided. He addressed some words in a foreign language to his lieutenant, then turned to me. "M. Aronnax," he said, in rather an imperious tone, "I require you to keep one of the conditions that bind you to me."

"What is it, Captain?"

"You must be confined, with your companions, until I think fit to release you."

"You are the master," I replied, looking steadily at him. "But may I ask you one question?"

"None, sir."

There was no resisting this imperious command, it would have been useless. I went down to the cabin occupied by Ned Land and Conseil, and told them the Captain's determination. You may judge how this communication was received by the Canadian.

But there was no time for altercation. Four of the crew waited at the door, and conducted us to that cell where we had passed our first night on board the *Nautilus*.

Ned Land would have remonstrated, but the door was shut upon him.

"Will master tell us what this means?" asked Conseil.

I told my companions what had passed. They were as much astonished as I, and equally at a loss how to account for it.

Meanwhile, I was absorbed in my own

reflections, and could think of nothing but the strange fear depicted in the Captain's countenance. I was utterly at a loss to account for it, when my cogitations were disturbed by these words from Ned Land—

"Hallo! breakfast is ready."

And indeed the table was laid. Evidently Captain Nemo had given this order at the same time that he had hastened the speed of the *Nautilus*.

"Will master permit me to make a recommendation?" asked Conseil.

"Yes, my boy."

"Well, it is that master breakfasts. It is prudent, for we do not know what may happen."

"You are right, Conseil."

"Unfortunately," said Ned Land, "they have only given us the ship's fare."

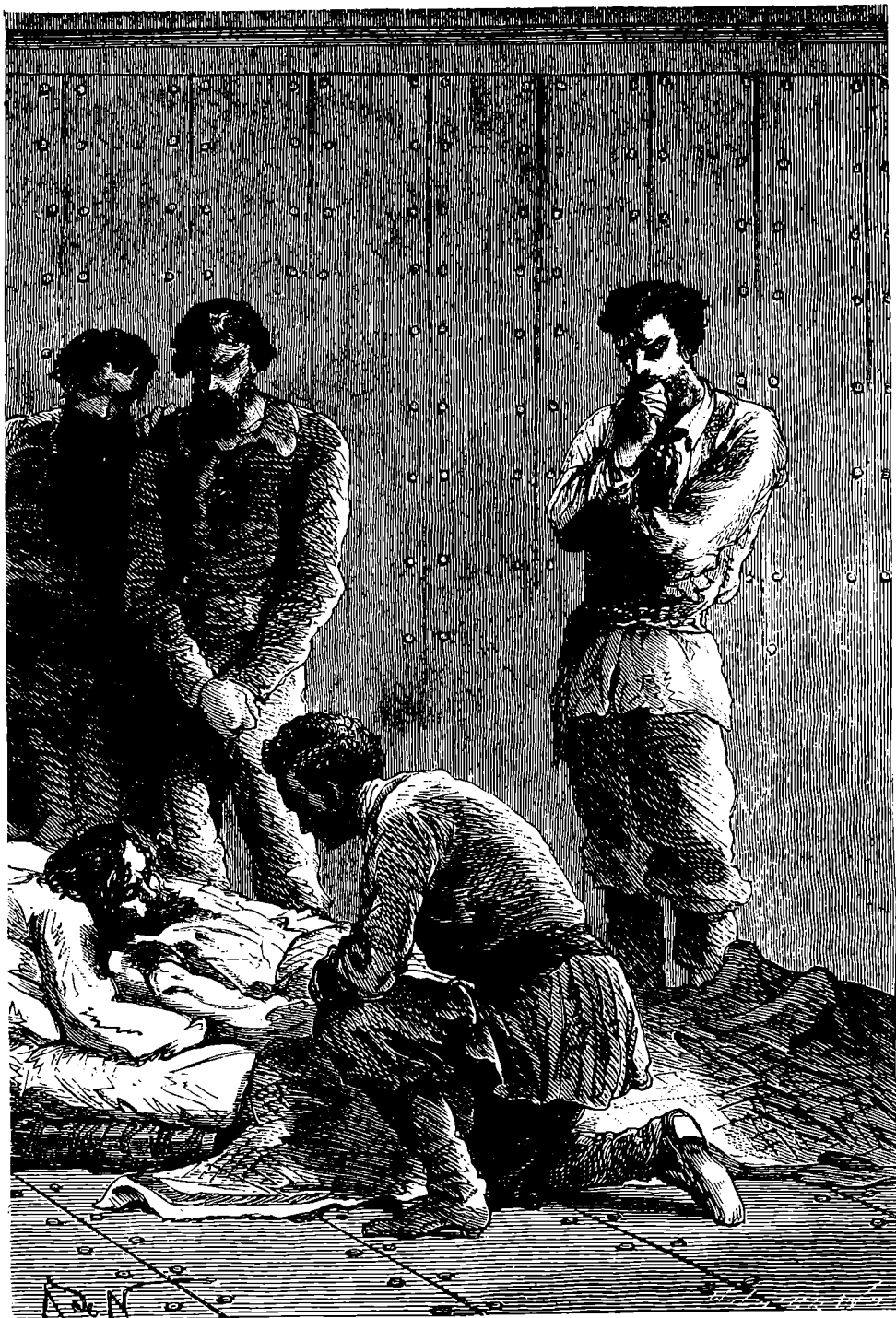
"Friend Ned," asked Conseil, "what would you have said if the breakfast had been entirely forgotten?"

This argument cut short the harpooners' recriminations.

We sat down to table. The meal was eaten in silence.

Just then, the luminous globe that lighted the cell went out, and left us in total darkness. Ned Land was soon asleep, and what astonished me was that Conseil went off into a heavy sleep. I was thinking what could have caused his irresistible drowsiness, when I felt my brain becoming stupefied. In spite of my efforts to keep my eyes open, they would close. A painful suspicion seized me. Evidently soporific substances had been mixed with the food we had just taken. Imprisonment was not enough to conceal Captain Nemo's projects from us, sleep was more necessary.

I then heard the panels shut. The undulations of the sea, which caused a slight rolling motion, ceased. Had the *Nautilus* quitted the surface of the ocean? Had it gone back to the motionless bed of water. I tried to resist sleep. It was impossible. My breathing grew weak. I felt a mortal cold freeze my stiffened and half-paralysed limbs. My eyelids, like leaden caps, fell over my eyes. I could not raise them; a morbid sleep, full of hallucinations, bereft me of my being. Then the visions disappeared, and left me in complete insensibility.



“There, on a bed, lay a man about forty years of age.”

Twenty Thousand Leagues Under the Sea

CHAPTER XXIII

THE CORAL KINGDOM

THE next day I woke with my head singularly clear. To my great surprise I was in my own room. My companions, no doubt, had been reinstated in their cabin, without having perceived it any more than I. Of what had passed during the night they were as ignorant as I was, and to penetrate this mystery I only reckoned upon the chances of the future.

I then thought of quitting my room. Was I free again or a prisoner? Quite free. I opened the door, went to the half-deck, went up the central stairs. The panels, shut the evening before, were open. I went on to the platform.

Ned Land and Conseil waited there for me. I questioned them; they knew nothing. Lost in a heavy sleep in which they had been totally unconscious, they had been astonished at finding themselves in their cabin.

As for the *Nautilus*, it seemed quiet and mysterious as ever. It floated on the surface of the waves at a moderate pace. Nothing seemed changed on board.

The second lieutenant then came on to the platform, and gave the usual order below.

As for Captain Nemo, he did not appear.

Of the people on board, I only saw the impassive steward, who served me with his usual dumb regularity.

About two o'clock, I was in the drawing-room, busied in arranging my notes, when the Captain opened the door and appeared. I bowed. He made a slight inclination in return, without speaking. I resumed my work, hoping that he would perhaps give me some explanation of the events of the preceding night. He made none. I looked at him. He seemed fatigued; his heavy eyes had not been refreshed by sleep; his face looked very sorrowful. He walked to and fro, sat down and got up again, took up a chance book, put it down, consulted his instruments without taking his habitual notes, and seemed restless and uneasy. At last, he came up to me, and said—

“Are you a doctor, M. Aronnax?”

I so little expected such a question, that I stared some time at him without answering.

“Are you a doctor?” he repeated. “Several of your colleagues have studied medicine.”

“Well,” said I, “I am a doctor and resident surgeon to the hospital. I practised several

years before entering the museum.”

“Very well, sir.”

My answer had evidently satisfied the Captain. But not knowing what he would say next, I waited for other questions, reserving my answers according to circumstances.

“M. Aronnax, will you consent to prescribe for one of my men?” he asked.

“Is he ill?”

“Yes.”

“I am ready to follow you.”

“Come then.”

I own my heart beat, I do not know why. I saw a certain connection between the illness of one of the crew and the events of the day before; and this mystery interested me at least as much as the sick man.

Captain Nemo conducted me to the poop of the *Nautilus*, and took me into a cabin situated near the sailors' quarters.

There, on a bed, lay a man about forty years of age, with a resolute expression of countenance, a true type of an Anglo-Saxon.

I leant over him. He was not only ill, he was wounded. His head, swathed in bandages covered with blood, lay on a pillow. I undid the bandages, and the wounded man looked at me with his large eyes and gave no sign of pain as I did it. It was a horrible wound. The skull, shattered by some deadly weapon, left the brain exposed, which was much injured. Clots of blood had formed in the bruised and broken mass, in colour like the dregs of wine.

There was both contusion and suffusion of the brain. His breathing was slow, and some spasmodic movements of the muscles agitated his face. I felt his pulse. It was intermittent. The extremities of the body were growing cold already, and I saw death must inevitably ensue. After dressing the unfortunate man's wounds, I readjusted the bandages on his head, and turned to Captain Nemo.

“What caused this wound?” I asked.

“What does it signify?” he replied, evasively. “A shock has broken one of the levers of the engine, which struck myself. But your opinion as to his state?”

I hesitated before giving it.

“You may speak,” said the Captain. “This man does not understand French.”

I gave a last look at the wounded man.

"He will be dead in two hours."

"Can nothing save him?"

"Nothing."

Captain Nemo's hand contracted, and some tears glistened in his eyes, which I thought incapable of shedding any.

For some moments I still watched the dying man, whose life ebbed slowly. His pallor increased under the electric light that was shed over his death-bed. I looked at his intelligent forehead, furrowed with premature wrinkles, produced probably by misfortune and sorrow. I tried to learn the secret of his life from the last words that escaped his lips.

"You can go now, M. Aronnax," said the Captain.

I left him in the dying man's cabin, and returned to my room much affected by this scene. During the whole day, I was haunted by uncomfortable suspicions, and at night I slept badly, and, between my broken dreams, I fancied I heard distant sighs like the notes of a funeral psalm. Were they the prayers of the dead; murmured in that language that I could not understand?

The next morning I went on to the bridge. Captain Nemo was there before me. As soon as he perceived me he came to me.

"Professor, will it be convenient to you to make a submarine excursion to-day?"

"With my companions?" I asked.

"If they like."

"We obey your orders, Captain."

"Will you be so good then as to put on your cork-jackets?"

It was not a question of dead or dying. I rejoined Ned Land and Conseil, and told them of Captain Nemo's proposition. Conseil hastened to accept it, and this time the Canadian seemed quite willing to follow our example.

It was eight o'clock in the morning. At half-past eight we were equipped for this new excursion, and provided with two contrivances for light and breathing. The double door was open; and accompanied by Captain Nemo, who was followed by a dozen of the crew, we set foot, at a depth of about thirty feet, on the solid bottom on which the *Nautilus* rested.

A slight declivity ended in an uneven bottom, at fifteen fathoms depth. This bottom differed entirely from the one I had visited on my first excursion under the waters of the Pacific Ocean. Here, there was no fine sand, no submarine prairies, no sea-forest. I immediately recognised that marvellous region in which, on that day, the Captain did the

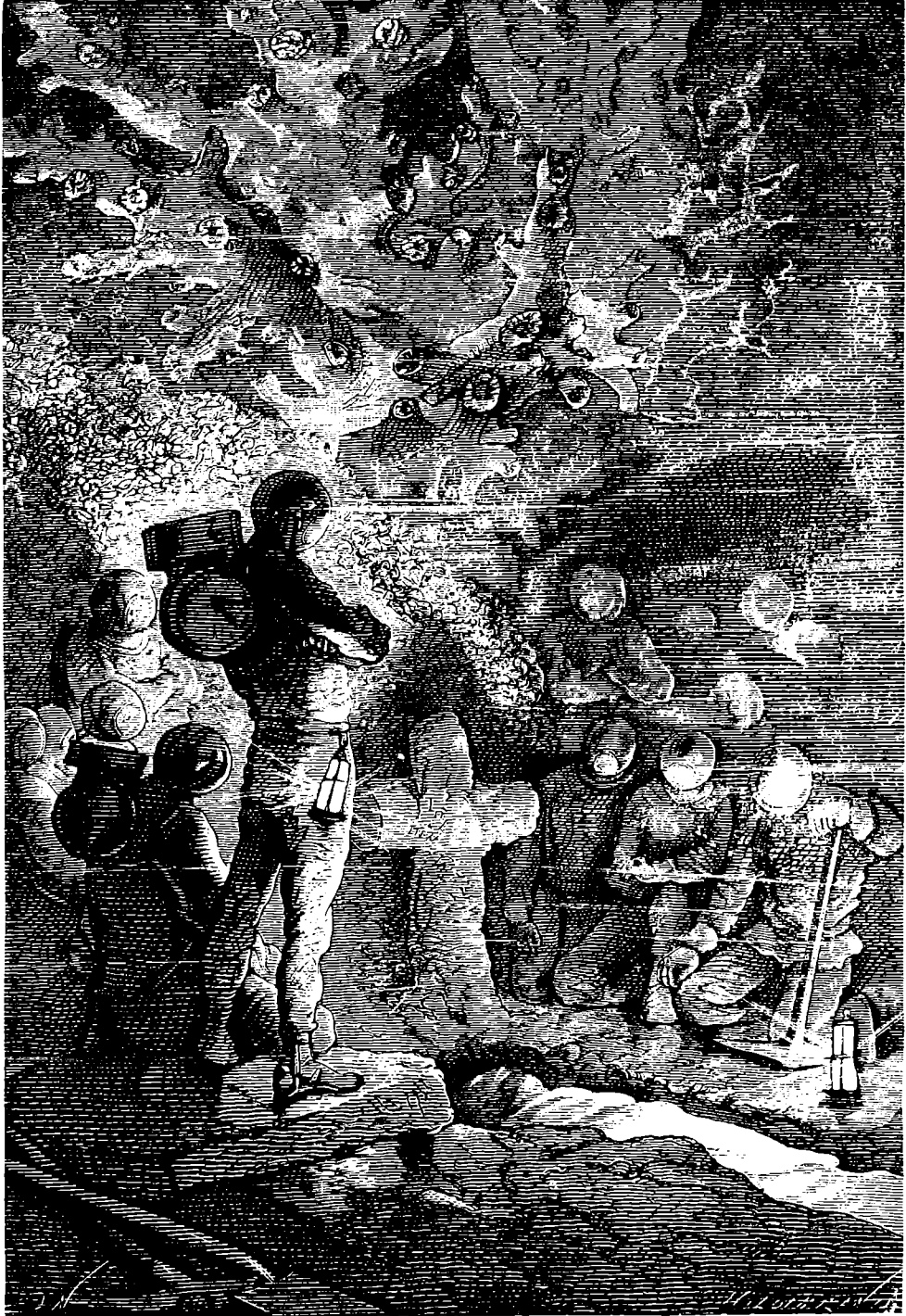
honours to us. It was the coral kingdom. In the zoophyte branch and in the alcyon class I noticed the gorgoneae, the isidiae, and the corollariae.

The light produced a thousand charming varieties, playing in the midst of the branches that were so vividly coloured. I seemed to see the membranous and cylindrical tubes tremble beneath the undulation of the waters. I was tempted to gather their fresh petals, ornamented with delicate tentacles, some just blown, the others budding, while small fish, swimming swiftly, touched them slightly, like flights of birds. But if my hand approached these living flowers, these animated sensitive plants, the whole colony took alarm. The white petals re-entered their red cases, the flowers faded as I looked, and the bush changed into a block of stony knobs.

Chance had thrown me just by the most precious specimens of this zoophyte. This coral was more valuable than that found in the Mediterranean, on the coasts of France, Italy, and Barbary. Its tints justified the poetical names of "Flower of Blood," and "Froth of Blood," that trade has given to its most beautiful productions. Coral is sold for £20 per ounce; and in this place, the watery beds would make the fortunes of a company of coral-divers. This precious matter, often confused with other polypi, formed then the inextricable plots called "macciota," and on which I noticed several beautiful specimens of pink coral.

But soon the bushes contract, and the arborisations increase. Real petrified thickets, long joists of fantastic architecture, were disclosed before us. Captain Nemo placed himself under a dark gallery, where by a slight declivity we reached a depth of 100 yards. The light from our lamps produced sometimes magical effects, following the rough outlines of the natural arches, and pendants disposed like lustres, that were tipped with points of fire. Between the coralline shrubs I noticed other polypi not less curious, melites, and irises with articulated ramifications, also some tufts of coral, some green, others red, like seaweed incrustated in their calcareous salts, that naturalists, after long discussion, have definitely classed in the vegetable kingdom. But following the remark of a thinking man, "there is perhaps the real point where life rises obscurely from the sleep of a stone, without detaching itself from the rough point of departure."

At last, after walking two hours, we had attained a depth of about 300 yards, that is to



A coral cemetery.

say, the extreme limit on which coral begins to form. But there was no isolated bush, nor modest brushwood, at the bottom of lofty trees. It was an immense forest of large mineral vegetations, enormous petrified trees, united by garlands of elegant plumarias, sea-bindweed, all adorned with clouds and reflections. We passed freely under their high branches, lost in the shade of the waves, while at our feet, tubipores, meandrines, stars, fungi, and caryophyllidae formed a carpet of flowers sown with dazzling gems. What an indescribable spectacle!

Captain Nemo had stopped. I and my companions halted, and turning round, I saw his men were forming a semicircle round their chief. Watching attentively, I observed that four of them carried on their shoulders an object of an oblong shape.

We occupied, in this place, the centre of a vast glade surrounded by the lofty foliage of the submarine forest. Our lamps threw over this place a sort of clear twilight that singularly elongated the shadows on the ground. At the end of the glade the darkness increased, and was only relieved by little sparks reflected by the points of coral.

Ned Land and Conseil were near me. We watched, and I thought I was going to witness a strange scene. On observing the ground, I saw that it was raised in certain places by slight excrescences encrusted with limy deposits, and disposed with a regularity that betrayed the hand of man.

In the midst of the glade, on a pedestal of rocks roughly piled up, stood a cross of coral, that extended its long arms that one might have thought were made of petrified blood.

Upon a sign from Captain Nemo, one of the men advanced; and at some feet from the cross, he began to dig a hole with a pickaxe that he took from his belt. I understood all! This glade was a cemetery, this hole a tomb, this oblong object the body of the man who had died in the night! The Captain and his men had come to bury their companion in this general resting-place, at the bottom of this

inaccessible ocean!

The grave was being dug slowly; the fish fled on all sides while their retreat was being thus disturbed; I heard the strokes of the pickaxe, which sparkled when it hit upon some flint lost at the bottom of the waters. The hole was soon large and deep enough to receive the body. Then the bearers approached; the body, enveloped in a tissue of white byssus, was lowered into the damp grave. Captain Nemo, with his arms crossed on his breast, and all the friends of him who had loved them, knelt in prayer.

The grave was then filled in with the rubbish taken from the ground, which formed a slight mound. When this was done, Captain Nemo and his men rose; then, approaching the grave, they knelt again, and all extended their hands in sign of a last adieu. Then the funeral procession returned to the *Nautilus*, passing under the arches of the forest, in the midst of thickets, along the coral bushes, and still on the ascent. At last the fires on board appeared, and their luminous track guided us to the *Nautilus*. At one o'clock we had returned.

As soon as I had changed my clothes, I went up on to the platform, and, a prey to conflicting emotions, I sat down near the binnacle. Captain Nemo joined me. I rose and said to him—

“So, as I said he would, this man died in the night?”

“Yes, M. Aronnax.”

“And he rests now, near his companions, in the coral cemetery?”

“Yes, forgotten by all else, but not by us. We dug the grave, and the polypi undertake to seal our dead for eternity.” And burying his face quickly in his hands, he tried in vain to suppress a sob. Then he added—“Our peaceful cemetery is there, some hundred feet below the surface of the waves.”

“Your dead sleep quietly, at least, Captain, out of the reach of sharks.”

“Yes, sir, of sharks and *men*,” gravely replied the Captain.

Part II

Twenty Thousand Leagues Under the Sea

CHAPTER I

THE INDIAN OCEAN

WE now come to the second part of our journey under the sea. The first ended with the moving scene in the coral cemetery, which left such a deep impression on my mind. Thus, in the midst of this great sea, Captain Nemo's life was passing even to his grave, which he had prepared in one of its deepest abysses. There, not one of the ocean's monsters could trouble the last sleep of the crew of the *Nautilus*, of those friends riveted to each other in death as in life. "Nor any man either," had added the Captain. Still the same fierce, implacable defiance towards human society!

I could no longer content myself with the hypothesis which satisfied Conseil.

That worthy fellow persisted in seeing in the Commander of the *Nautilus* one of those unknown savants who return mankind contempt for indifference. For him, he was a misunderstood genius, who, tired of earth's deceptions, had taken refuge in this inaccessible medium, where he might follow his instincts freely. To my mind, this hypothesis explained but one side of Captain Nemo's character.

Indeed, the mystery of that last night, during which we had been chained in prison, the sleep, and the precautions so violently taken by the Captain of snatching from my eyes the glass I had raised to sweep the horizon, the mortal wound of the man, due to an unaccountable shock of the *Nautilus*, all put me on a new track. No; Captain Nemo was not satisfied with shunning man. His formidable apparatus not only suited his instinct of freedom, but, perhaps, also the design of some terrible retaliation.

At this moment, nothing is clear to me; I catch but a glimpse of light amidst all the darkness, and I must confine myself to writing as events shall dictate.

That day, the 24th of January 1868, at noon, the second officer came to take the altitude of the sun. I mounted the platform, lit a cigar, and watched the operation. It seemed to me that the man did not understand French; for several times I made remarks in a loud voice, which must have drawn from him some involuntary sign of attention, if he had understood them; but he remained undisturbed and dumb.

As he was taking observations with the sextant, one of the sailors of the *Nautilus* (the strong man who had accompanied us on our first submarine excursion to the Island of Crespo) came to clean the glasses of the lantern. I examined the fittings of the apparatus, the strength of which was increased a hundredfold by lenticular rings, placed similar to those in a lighthouse, and which projected their brilliance in a horizontal plane. The electric lamp was combined in such a way as to give its most powerful light. Indeed, it was produced in *vacuo*, which insured both its steadiness and its intensity. This vacuum economised the graphite points, between which the luminous arc was developed,—an important point of economy for Captain Nemo, who could not easily have replaced them; and under these conditions their waste was imperceptible. When the *Nautilus* was ready to continue its submarine journey, I went down to the saloon. The panels were closed, and the course marked direct west.

We were furrowing the waters of the Indian Ocean, a vast liquid plain, with a surface of 1,200,000,000 of acres, and whose waters are so clear and transparent, that any one leaning over them would turn giddy. The *Nautilus* usually floated between fifty and a hundred fathoms deep. We went on so for some days. To any one but myself, who had a great love for the sea, the hours would have seemed long and monotonous; but the daily walks on the platform, when I steeped myself in the reviving air of the ocean, the sight of the rich waters through the windows of the saloon, the books in the library, the compiling of my memoirs, took up all my time, and left me not a moment of ennui or weariness.

For some days we saw a great number of aquatic birds, seamews or gulls. Some were cleverly killed, and, prepared in a certain way, made very acceptable water-game. Amongst large winged birds, carried a long distance from all lands, and resting upon the waves from the fatigue of their flight, I saw some magnificent albatrosses, uttering discordant cries like the braying of an ass, and birds belonging to the family of the longipennates. The family of the totipalmates was represented



“I saw some magnificent albatrosses.”

by the sea-swallows, which caught the fish from the surface, and by numerous phaetons, or lepturi; amongst others, the phaeton with red lines, as large as a pigeon, whose white plumage, tinted with pink, shows off to advantage the blackness of its wings.

As to the fish, they always provoked our admiration when we surprised the secrets of their aquatic life through the open panels. I saw many kinds which I never before had a chance of observing.

I shall notice chiefly ostracions peculiar to the Red Sea, the Indian Ocean, and that part which washes the coast of tropical America. These fishes, like the tortoise, the armadillo, the sea hedgehog, and the crustacea, are protected by a breastplate which is neither chalky nor stony, but real bone. In some it takes the form of a solid triangle, in others of a solid quadrangle. Amongst the triangular I saw some an inch and a half in length, with wholesome flesh and a delicious flavour; they are brown at the tail, and yellow at the fins, and I recommend their introduction into fresh water, to which a certain number of sea-fish easily accustom themselves. I would also mention quadrangular ostracions, having on the back four large tubercles; some dotted over with white spots on the lower part of the body, and which may be tamed like birds; trigons provided with spikes formed by the lengthening of their bony shell, and which, from their strange gruntings, are called "sea-pigs;" also dromedaries with large humps in the shape of a cone, whose flesh is very tough and leathery.

I now borrow from the daily notes of Master Conseil. "Certain fish of the genus petrodon peculiar to those seas, with red backs and white chests, which are distinguished by three rows of longitudinal filaments; and some electrical, seven inches long, decked in the liveliest colours. Then, as specimens of other kinds, some ovoides, resembling an egg of a dark brown colour, marked with white bands, and without tails; diodons, real sea-porcupines, furnished with spikes, and capable of swelling in such a way as to look like cushions bristling with darts; hippocampi, common to every ocean; some pegasi with lengthened snouts, which their pectoral fins, being much elongated and formed in the shape of wings, allow, if not to fly, at least to shoot into the air; pigeon spatulae, with tails covered with many rings of shell; macrognathi with long jaws, an excellent fish, nine inches long, and bright with most agreeable colours; pale-coloured calliomores, with rugged heads; and plenty of chaetodons, with long and tubular

muzzles, which kill insects by shooting them, as from an air-gun, with a single drop of water. These we may call the fly-catchers of the seas.

"In the eighty-ninth genus of fishes, classed by Lacépède, belonging to the second lower class of bony, characterised by opercules and bronchial membranes, I remarked the scorpaena, the head of which is furnished with spikes, and which has but one dorsal fin; these creatures are covered, or not, with little shells, according to the subclass to which they belong. The second subclass gives us specimens of didactyles fourteen or fifteen inches in length, with yellow rays, and heads of a most fantastic appearance. As to the first subclass, it gives several specimens of that singular-looking fish appropriately called a "sea-frog," with large head, sometimes pierced with holes, sometimes swollen with protuberances, bristling with spikes, and covered with tubercles; it has irregular and hideous horns; its body and tail are covered with callosities; its sting makes a dangerous wound; it is both repugnant and horrible to look at."

From the 21st to the 23rd of January the *Nautilus* went at the rate of two hundred and fifty leagues in twenty-four hours, being five hundred and forty miles, or twenty-two miles an hour. If we recognised so many different varieties of fish, it was because, attracted by the electric light, they tried to follow us; the greater part, however, were soon distanced by our speed, though some kept their place in the waters of the *Nautilus* for a time. The morning of the 24th, in 12° 5' south latitude, and 94° 33' longitude, we observed Keeling Island, a madreporic formation, planted with magnificent cocoas, and which had been visited by Mr Darwin and Captain Fitzroy. The *Nautilus* skirted the shores of this desert island for a little distance. Its nets brought up numerous specimens of polypi, and curious shells of mollusca. Some precious productions of the species of delphinulae enriched the treasures of Captain Nemo, to which I added an *astraea punctifera*, a kind of parasite polypus often found fixed to a shell. Soon Keeling Island disappeared from the horizon, and our course was directed to the north-west in the direction of the Indian Peninsula.

From Keeling Island our course was slower and more variable, often taking us into great depths. Several times they made use of the inclined planes, which certain internal levers placed obliquely to the waterline. In that way we went about two miles, but without ever obtaining the greatest depths of the Indian



A shoal of Argonauts.

Sea, which soundings of seven thousand fathoms have never reached. As to the temperature of the lower strata, the thermometer invariably indicated 4° above zero. I only observed that, in the upper regions, the water was always colder in the high levels than at the surface of the sea.

On the 25th of January, the ocean was entirely deserted; the *Nautilus* passed the day on the surface, beating the waves with its powerful screw, and making them rebound to a great height. Who under such circumstances would not have taken it for a gigantic cetacean? Three parts of this day I spent on the platform. I watched the sea. Nothing on the horizon, till about four o'clock a steamer running west on our counter. Her masts were visible for an instant, but she could not see the *Nautilus*, being too low in the water. I fancied this steamer belonged to the P.O. Company, which runs from Ceylon to Sydney, touching at King George's Point and Melbourne.

At five o'clock in the evening, before that fleeting twilight which binds night to day in tropical zones, Conseil and I were astonished by a curious spectacle.

It was a shoal of argonauts travelling along on the surface of the ocean. We could count several hundreds. They belonged to the tubercle kind which are peculiar to the Indian seas.

These graceful molluscs moved backwards by means of their locomotive tube, through which they propelled the water already drawn in. Of their eight tentacles, six were elongated, and stretched out floating on the water, whilst the other two, rolled up flat, were spread to the wind like a light sail. I saw their spiral-shaped and fluted shells, which Cuvier justly compares to an elegant skiff. A boat indeed! It bears the creature which secretes it without its adhering to it.

For nearly an hour the *Nautilus* floated in the midst of this shoal of molluscs, then I know not what sudden fright they took. But as if at a signal every sail was furled, the arms folded, the body drawn in, the shells turned over, changing their centre of gravity, and the whole fleet disappeared under the waves. Never did the ships of a squadron manoeuvre with more unity.

At that moment night fell suddenly, and the reeds, scarcely raised by the breeze, lay peaceably under the sides of the *Nautilus*.

The next day, 26th of January, we cut the equator at the eighty-second meridian, and entered the northern hemisphere. During the day, a formidable troop of sharks accom-

panied us, terrible creatures, which multiply in these seas, and make them very dangerous. They were "cestracio philippi" sharks, with brown backs and whitish bellies, armed with eleven rows of teeth—eyed sharks—their throat being marked with a large black spot surrounded with white like an eye. There were also some Isabella sharks, with rounded snouts marked with dark spots. These powerful creatures often hurled themselves at the windows of the saloon with such violence as to make us feel very insecure. At such times Ned Land was no longer master of himself. He wanted to go to the surface and harpoon the monsters, particularly certain smooth-hound sharks, whose mouth is studded with teeth like a mosaic; and large tiger-sharks nearly six yards long, the last named of which seemed to excite him more particularly. But the *Nautilus*, accelerating her speed, easily left the most rapid of them behind.

The 27th of January, at the entrance of the vast Bay of Bengal, we met repeatedly a forbidding spectacle, dead bodies floating on the surface of the water. They were the dead of the Indian villages, carried by the Ganges to the level of the sea, and which the vultures, the only undertakers of the country, had not been able to devour. But the sharks did not fail to help them at their funeral work.

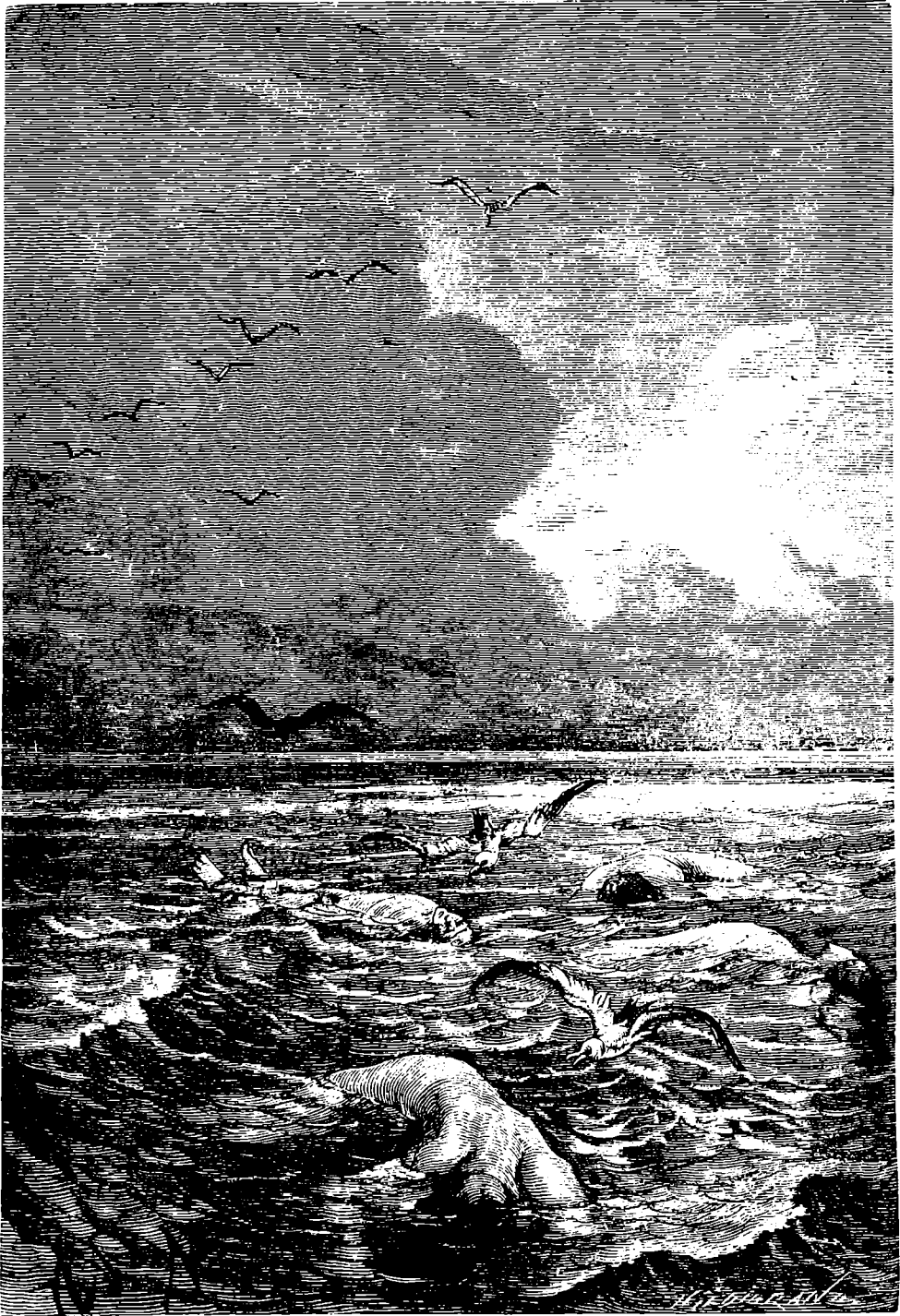
About seven o'clock in the evening, the *Nautilus*, half immersed, was sailing in a sea of milk. At first sight the ocean seemed lactified. Was it the effect of the lunar rays? No; for the moon, scarcely two days old, was still lying hidden under the horizon in the rays of the sun. The whole sky, though lit by the sidereal rays, seemed black by contrast with the whiteness of the waters.

Conseil could not believe his eyes, and questioned me as to the cause of this strange phenomenon. Happily I was able to answer him.

"It is called a milk sea," I explained, "a large extent of white wavelets often to be seen on the coasts of Amboyna, and in these parts of the sea."

"But, sir," said Conseil, "can you tell me what causes such an effect? for I suppose the water is not really turned into milk."

"No, my boy; and the whiteness which surprises you is caused only by the presence of myriads of infusoria, a sort of luminous little worm, gelatinous and without colour, of the thickness of a hair, and whose length is not more than the 7/1000 of an inch. These insects adhere to one another sometimes for several leagues."



“A forbidding spectacle.”

“Several leagues!” exclaimed Conseil.

“Yes, my boy; and you need not try to compute the number of these infusoria. You will not be able; for, if I am not mistaken, ships have floated on these milk seas for more than forty miles.”

Towards midnight the sea suddenly resumed its usual colour; but behind us, even to the limits of the horizon, the sky reflected the whitened waves, and for a long time seemed impregnated with the vague glimmerings of an aurora borealis.

Twenty Thousand Leagues Under the Sea

CHAPTER II

A NOVEL PROPOSAL OF CAPTAIN NEMO'S

ON the 28th of February, when at noon the *Nautilus* came to the surface of the sea, in 9° 4' north latitude, there was land in sight about eight miles to westward. The first thing I noticed was a range of mountains about two thousand feet high, the shapes of which were most capricious. On taking the bearings, I knew that we were nearing the Island of Ceylon, the pearl which hangs from the lobe of the Indian Peninsula.

Captain Nemo and his second appeared at this moment. The Captain glanced at the map. Then, turning to me, said—

"The Island of Ceylon, noted for its pearl-fisheries. would you like to visit one of them, M. Aronnax?"

"Certainly, Captain."

"Well, the thing is easy. Though if we see the fisheries, we shall not see the fishermen. The annual exportation has not yet begun. Never mind, I will give orders to make for the Gulf of Manaar, where we shall arrive in the night."

The Captain said something to his second, who immediately went out. Soon the *Nautilus* returned to her native element, and the manometer showed that she was about thirty feet deep.

"Well, sir," said Captain Nemo, "you and your companions shall visit the Bank of Manaar, and if by chance some fisherman should be there, we shall see him at work."

"Agreed, Captain!"

"By the by, M. Aronnax, you are not afraid of sharks?"

"Sharks!" exclaimed I.

This question seemed a very hard one.

"Well?" continued Captain Nemo.

"I admit, Captain, that I am not yet very familiar with that kind of fish."

"We are accustomed to them," replied Captain Nemo, "and in time you will be too. However, we shall be armed, and on the road we may be able to hunt some of the tribe. It is interesting. So, till to-morrow, sir, and early."

This said in a careless tone, Captain Nemo left the saloon. Now, if you were invited to hunt the bear in the mountains of Switzerland, what would you say? "Very well! to-morrow we will go and hunt the bear." If you were

asked to hunt the lion in the plains of Atlas, or the tiger in the Indian jungles, what would you say? "Ha! ha! it seems we are going to hunt the tiger or the lion!" But when you are invited to hunt the shark in its natural element, you would perhaps reflect before accepting the invitation. As for myself, I passed my hand over my forehead, on which stood large drops of cold perspiration. "Let us reflect," said I, "and take our time. Hunting otters in submarine forests, as we did in the Island of Crespo, will pass; but going up and down at the bottom of the sea, where one is almost certain to meet sharks, is quite another thing! I know well that in certain countries, particularly in the Andaman Islands, the negroes never hesitate to attack them with a dagger in one hand and a running noose in the other; but I also know that few who affront those creatures ever return alive. However, I am not a negro, and, if I were, I think a little hesitation in this case would not be ill-timed."

At this moment, Conseil and the Canadian entered, quite composed, and even joyous. They knew not what awaited them.

"Faith, sir," said Ned Land, "your Captain Nemo—the devil take him!—has just made us a very pleasant offer."

"Ah!" said I, "you know?"

"If agreeable to you, sir," interrupted Conseil, "the Commander of the *Nautilus* has invited us to visit the magnificent Ceylon fisheries to-morrow, in your company; he did it kindly, and behaved like a real gentleman."

"He said nothing more?"

"Nothing more, sir, except that he had already spoken to you of this little walk."

"Sir," said Conseil, "would you give us some details of the pearl-fishery?"

"As to the fishing itself," I asked, "or the incidents, which?"

"On the fishing," replied the Canadian; "before entering upon the ground, it is as well to know something about it."

"Very well; sit down, my friends, and I will teach you."

Ned and Conseil seated themselves on an ottoman, and the first thing the Canadian asked was—

"Sir, what is a pearl?"

"My worthy Ned," I answered, "to the poet, a pearl is a tear of the sea; to the Orientals, it is a drop of dew solidified; to the ladies, it is a jewel of an oblong shape, of a brilliancy of mother-of-pearl substance, which they wear on their fingers, their necks, or their ears; for the chemist, it is a mixture of phosphate and carbonate of lime, with a little gelatine; and lastly, for naturalists, it is simply a morbid secretion of the organ that produces the mother-of-pearl amongst certain bivalves."

"Branch of mollusca," said Conseil, "class of acephali, order of testacea."

"Precisely so, my learned Conseil; and, amongst these testacea, the earshell, the tridacnae, the turbot, in a word, all those which secrete mother-of-pearl, that is, the blue, bluish, violet, or white substance which lines the interior of their shells, are capable of producing pearls."

"Mussels too?" asked the Canadian.

"Yes, mussels of certain waters in Scotland, Wales, Ireland, Saxony, Bohemia, and France."

"Good! For the future I shall pay attention," replied the Canadian.

"But," I continued, "the particular mollusc which secretes the pearl is the *pearl-oyster*, the *meleagrina margaritifera*, that precious pintadine. The pearl is nothing but a nacreous formation, deposited in a globular form, either adhering to the oyster-shell, or buried in the folds of the creature. On the shell it is fast; in the flesh it is loose; but always has for a kernel a small hard substance, may be a barren egg, may be a grain of sand, around which the pearly matter deposits itself year after year successively, and by thin concentric layers."

"Are many pearls found in the same oyster?" asked Conseil.

"Yes, my boy. There are some pintadines a perfect casket. One oyster has been mentioned, though I allow myself to doubt it, as having contained no less than a hundred and fifty sharks."

"A hundred and fifty sharks!" exclaimed Ned Land.

"Did I say sharks?" said I, hurriedly. "I meant to say a hundred and fifty pearls. Sharks would not be sense."

"Certainly not," said Conseil; "but will you tell us now by what means they extract these pearls?"

"They proceed in various ways. When they adhere to the shell, the fishermen often pull them off with pincers; but the most common way is to lay the pintadines on mats of the

seaweed which covers the banks. Thus they die in the open air; and at the end of ten days they are in a forward state of decomposition. They are then plunged into large reservoirs of sea-water; then they are opened and washed. Now begins the double work of the sorters. First they separate the layers of pearl, known in commerce by the name of bastard whites and bastard blacks, which are delivered in boxes of two hundred and fifty and three hundred pounds each. Then they take the parenchyma of the oyster, boil it, and pass it through a sieve in order to extract the very smallest pearls."

"The price of these pearls varies according to their size?" asked Conseil.

"Not only according to their size," I answered, "but also according to their shape, their *water* (that is, their colour), and their lustre; that is, that bright and diapered sparkle which makes them so charming to the eye. The most beautiful are called virgin pearls or paragons. They are formed alone in the tissue of the mollusc, are white, often opaque, and sometimes have the transparency of an opal; they are generally round or oval. The round are made into bracelets, the oval into pendants; and, being more precious, are sold singly. Those adhering to the shell of the oyster are more irregular in shape, and are sold by weight. Lastly, in a lower order are classed those small pearls known under the name of seed-pearls; they are sold by measure, and are especially used in embroidery for church ornaments."

"But," said Conseil, "is this pearl-fishery dangerous?"

"No," I answered, quickly; "particularly if certain precautions are taken."

"What does one risk in such a calling?" said Ned Land; "the swallowing of some mouthfuls of sea-water?"

"As you say, Ned. By the by," said I, trying to take Captain Nemo's careless tone, "are you afraid of sharks, brave Ned?"

"I!" replied the Canadian; "a harpooner by profession? It is my trade to make light of them."

"But," said I, "it is not a question of fishing for them with an iron swivel, hoisting them into the vessel, cutting off their tails with a blow of a chopper, ripping them up, and throwing their heart into the sea!"

"Then, it is a question of"—

"Precisely."

"In the water?"

"In the water."

"Faith, with a good harpoon! You know,

Twenty Thousand Leagues Under The Sea

CHAPTER III.

A PEARL OF TEN MILLIONS

THE next morning at four o'clock I was awakened by the steward, whom Captain Nemo had placed at my service. I rose hurriedly, dressed, and went into the saloon.

Captain Nemo was awaiting me.

"M. Aronnax," said he, "are you ready to start?"

"I am ready."

"Then, please to follow me."

"And my companions, Captain?"

"They have been told, and are waiting."

"Are we not to put on our diver's dresses?" asked I.

"Not yet. I have not allowed the *Nautilus* to come too near this coast, and we are some distance from the Manaar Bank; but the boat is ready, and will take us to the exact point of disembarking, which will save us a long way. It carries our diving apparatus, which we will put on when we begin our submarine journey."

Captain Nemo conducted me to the central staircase, which led on to the platform. Ned and Conseil were already there, delighted at the idea of the "pleasure party" which was preparing. Five sailors from the *Nautilus*, with their oars, waited in the boat, which had been made fast against the side.

The night was still dark. Layers of clouds covered the sky, allowing but few stars to be seen. I looked on the side where the land lay, and saw nothing but a dark line enclosing three parts of the horizon, from south-west to north-west. The *Nautilus*, having returned during the night up the western coast of Ceylon, was now west of the bay, or rather gulf, formed by the mainland and the island of Manaar. There, under the dark waters, stretched the pintadine bank, an inexhaustible field of pearls, the length of which is more than twenty miles.

Captain Nemo, Ned Land, Conseil, and I, took our places in the stern of the boat. The master went to the tiller; his four companions leaned on their oars, the painter was cast off, and we sheered off.

The boat went towards the south; the oarsmen did not hurry. I noticed that their strokes, strong in the water, only followed each other every ten seconds, according to the method generally adopted in the navy. Whilst the craft

was running by its own velocity, the liquid drops struck the dark depths of the waves crisply like spats of melted lead. A little billow, spreading wide, gave a slight roll to the boat, and some samphire reeds flapped before it.

We were silent. What was Captain Nemo thinking of? Perhaps of the land he was approaching, and which he found too near to him, contrary to the Canadian's opinion, who thought it too far off. As to Conseil, he was merely there from curiosity.

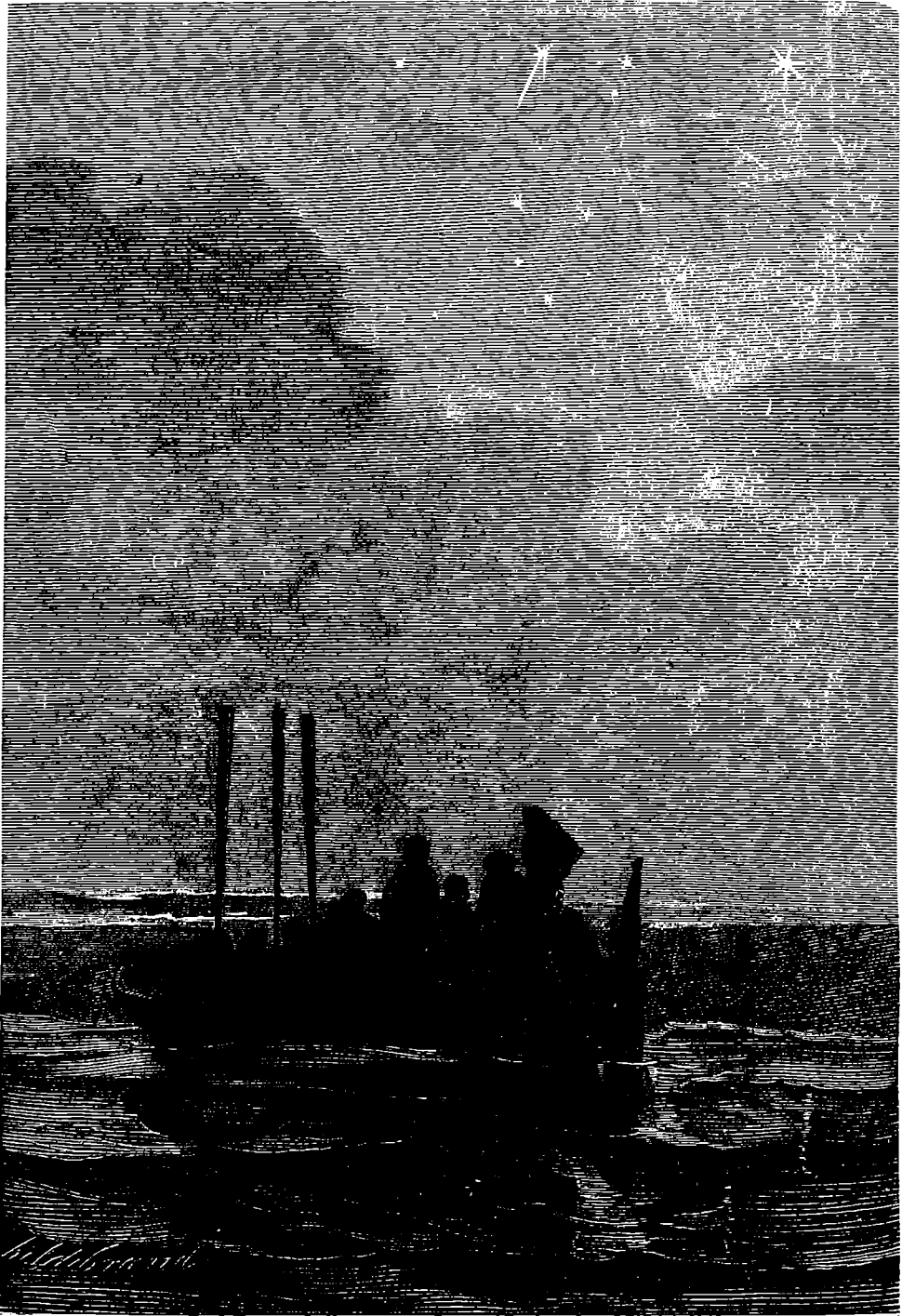
About half-past five, the first tints on the horizon showed the upper line of coast more distinctly. Flat enough in the east, it rose a little to the south. Five miles still lay between us, and it was indistinct owing to the mist on the water. At six o'clock it became suddenly daylight, with that rapidity peculiar to tropical regions, which know neither dawn nor twilight. The solar rays pierced the curtain of clouds, piled up on the eastern horizon, and the radiant orb rose rapidly. I saw land distinctly, with a few trees scattered here and there. The boat neared Manaar Island, which was rounded to the south. Captain Nemo rose from his seat and watched the sea.

At a sign from him the anchor was dropped, but the chain scarcely ran, for it was little more than a yard deep, and this spot was one of the highest points of the bank of pintadines.

"Here we are, M. Aronnax," said Captain Nemo. "You see that enclosed bay? Here, in a month, will be assembled the numerous fishing-boats of the exporters, and these are the waters their divers will ransack so boldly. Happily, this bay is well situated for that kind of fishing. It is sheltered from the strongest winds; the sea is never very rough here, which makes it favourable for the diver's work. We will now put on our dresses, and begin our walk."

I did not answer, and while watching the suspected waves, began with the help of the sailors to put on my heavy sea-dress. Captain Nemo and my companions were also dressing. None of the *Nautilus* men were to accompany us on this new excursion.

Soon we were enveloped to the throat in india-rubber clothing; the air apparatus fixed to our backs by braces. As to the Ruhmkorff



“Captain Nemo, Ned Land, Conseil, and I, took our place in the stern of the boat.”



“Ned Land was brandishing an enormous harpoon.”

apparatus, there was no necessity for it. Before putting my head into the copper cap, I had asked the question of the Captain.

"They would be useless," he replied. "We are going to no great depth, and the solar rays will be enough to light our walk. Besides, it would not be prudent to carry the electric light in these waters; its brilliancy might attract some of the dangerous inhabitants of the coast most inopportunistly."

As Captain Nemo pronounced these words, I turned to Conseil and Ned Land. But my two friends had already encased their heads in the metal cap, and they could neither hear nor answer.

One last question remained to ask of Captain Nemo.

"And our arms?" asked I; "our guns?"

"Guns! what for? Do not mountaineers attack the bear with a dagger in their hand, and is not steel surer than lead? Here is a strong blade; put it in your belt, and we start."

I looked at my companions; they were armed like us, and, more than that, Ned Land was brandishing an enormous harpoon, which he had placed in the boat before leaving the *Nautilus*.

Then, following the Captain's example, I allowed myself to be dressed in the heavy copper helmet, and our reservoirs of air were at once in activity. An instant after we were landed, one after the other, in about two yards of water upon an even sand. Captain Nemo made a sign with his hand, and we followed him by a gentle declivity till we disappeared under the waves.

Over our feet, like coveys of snipe in a bog, rose shoals of fish, of the genus monoptera, which have no other fins but their tail. I recognised the Javanese, a real serpent two and a half feet long, of a livid colour underneath, and which might easily be mistaken for a conger eel if it was not for the golden stripes on its sides. In the genus stromateus, whose bodies are very flat and oval, I saw some of the most brilliant colours, carrying their dorsal fin like a scythe; an excellent eating fish, which, dried and pickled, is known by the name of *Karawade*; then some tranquebars, belonging to the genus apsiphoroides, whose body is covered with a shell cuirass of eight longitudinal plates.

The heightening sun lit the mass of waters more and more. The soil changed by degrees. To the fine sand succeeded a perfect causeway of boulders, covered with a carpet of molluscs and zoophytes. Amongst the specimens of these branches I noticed some placenae, with

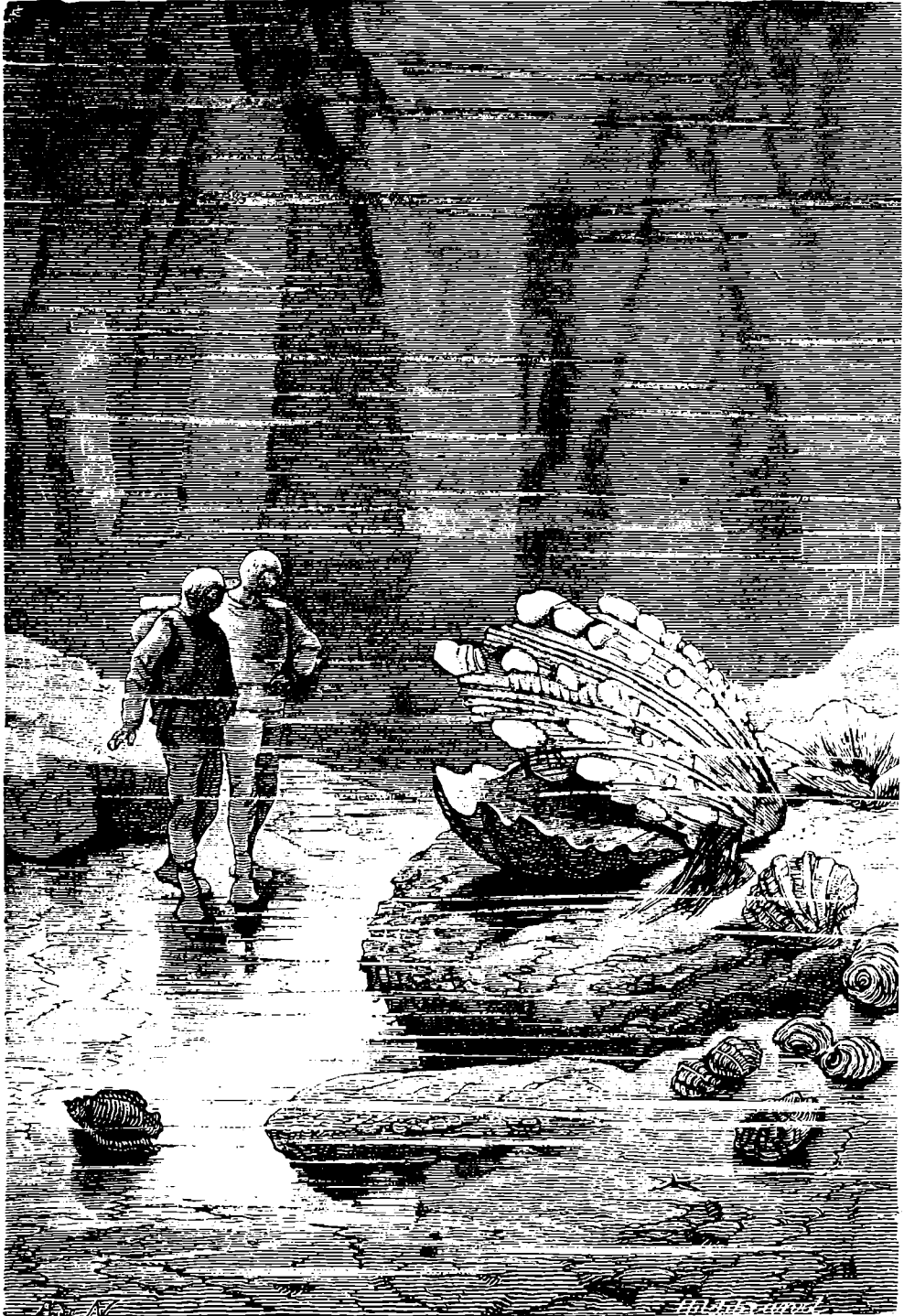
thin unequal shells, a kind of ostracion peculiar to the Red Sea and the Indian Ocean; some orange lucinae with rounded shells; rock-fish three feet and a half long, which raised themselves under the waves like hands ready to seize one. There were also some panopyres, slightly luminous; and lastly, some oculines, like magnificent fans, forming one of the richest vegetations of these seas.

In the midst of these living plants, and under the arbours of the hydrophytes, were layers of clumsy articulates, particularly some raninae, whose carapace formed a slightly rounded triangle; and some horrible looking parthenopes.

At about seven o'clock we found ourselves at last surveying the oyster-banks, on which the pearl-oysters are reproduced by millions.

Captain Nemo pointed with his hand to the enormous heap of oysters; and I could well understand that this mine was inexhaustible, for Nature's creative power is far beyond man's instinct of destruction. Ned Land, faithful to his instinct, hastened to fill a net which he carried by his side with some of the finest specimens. But we could not stop. We must follow the Captain, who seemed to guide himself by paths known only to himself. The ground was sensibly rising, and sometimes, on holding up my arm, it was above the surface of the sea. Then the level of the bank would sink capriciously. Often we rounded high rocks scarping into pyramids. In their dark fractures huge crustacea, perched upon their high claws like some war-machine, watched us with fixed eyes, and under our feet crawled various kinds of annelides.

At this moment there opened before us a large grotto, dug in a picturesque heap of rocks, and carpeted with all the thick warp of the submarine flora. At first it seemed very dark to me. The solar rays seemed to be extinguished by successive gradations, until its vague transparency became nothing more than drowned light. Captain Nemo entered; we followed. My eyes soon accustomed themselves to this relative state of darkness. I could distinguish the arches springing capriciously from natural pillars, standing broad upon their granite base, like the heavy columns of Tuscan architecture. Why had our incomprehensible guide led us to the bottom of this submarine crypt? I was soon to know. After descending a rather sharp declivity, our feet trod the bottom of a kind of circular pit. There Captain Nemo stopped, and with his hand indicated an object I had not yet perceived. It was an oyster of extraordinary dimensions, a



“An oyster of extraordinary dimensions.”

gigantic tridacne, a goblet which could have contained a whole lake of holy water, a basin the breadth of which was more than two yards and a half, and consequently larger than that ornamenting the saloon of the *Nautilus*. I approached this extraordinary mollusc. It adhered by its byssus to a table of granite, and there, isolated, it developed itself in the calm waters of the grotto. I estimated the weight of this tridacne at 600 pounds. Such an oyster would contain thirty pounds of meat; and one must have the stomach of a Gargantua, to demolish some dozens of them.

Captain Nemo was evidently acquainted with the existence of this bivalve, and seemed to have a particular motive in verifying the actual state of this tridacne. The shells were a little open; the Captain came near and put his dagger between to prevent them from closing; then with his hand he raised the membrane with its fringed edges, which formed a cloak for the creature. There, between the folded plaits, I saw a loose pearl, whose size equalled that of a cocoa-nut. Its globular shape, perfect clearness, and admirable lustre made it altogether a jewel of inestimable value. Carried away by my curiosity I stretched out my hand to seize it, weight it, and touch it; but the Captain stopped me, made a sign of refusal, and quickly withdrew his dagger, and the two shells closed suddenly. I then understood Captain Nemo's intention. In leaving this pearl hidden in the mantle of the tridacne, he was allowing it to grow slowly. Each year the secretions of the mollusc would add new concentric circles. I estimated its value at £500,000 at least.

After ten minutes Captain Nemo stopped suddenly. I thought he had halted previously to returning. No; by a gesture he bade us crouch beside him in a deep fracture of the rock, his hand pointed to one part of the liquid mass, which I watched attentively.

About five yards from me a shadow appeared, and sank to the ground. The disquieting idea of sharks shot through my mind, but I was mistaken; and once again it was not a monster of the ocean that we had anything to do with.

It was a man, a living man, an Indian, a fisherman, a poor devil who, I suppose, had come to glean before the harvest. I could see the bottom of his canoe anchored some feet above his head. He dived and went up successively. A stone held between his feet, cut in the shape of a sugar loaf, whilst a rope fastened him to his boat, helped him to descend more rapidly. This was all his

apparatus. Reaching the bottom about five yards deep, he went on his knees and filled his bag with oysters picked up at random. Then he went up, emptied it, pulled up his stone, and began the operation once more, which lasted thirty seconds.

The diver did not see us. The shadow of the rock hid us from sight. And how should this poor Indian ever dream that men, beings like himself, should be there under the water watching his movements, and losing no detail of the fishing? Several times he went up in this way, and dived again. He did not carry away more than ten at each plunge, for he was obliged to pull them from the bank to which they adhered by means of their strong byssus. And how many of those oysters for which he risked his life had no pearl in them! I watched him closely, his manoeuvres were regular; and, for the space of half an hour, no danger appeared to threaten him.

I was beginning to accustom myself to the sight of this interesting fishing, when suddenly, as the Indian was on the ground, I saw him make a gesture of terror, rise, and make a spring to return to the surface of the sea.

I understood his dread. A gigantic shadow appeared just above the unfortunate diver. It was a shark of enormous size advancing diagonally, his eyes on fire, and his jaws open. I was mute with horror, and unable to move.

The voracious creature shot towards the Indian, who threw himself on one side in order to avoid the shark's fins; but not its tail, for it struck his chest, and stretched him on the ground.

This scene lasted but a few seconds: the shark returned, and, turning on his back, prepared himself for cutting the Indian in two, when I saw Captain Nemo rise suddenly, and then, dagger in hand, walk straight to the monster, ready to fight face to face with him. The very moment the shark was going to snap the unhappy fisherman in two, he perceived his new adversary, and turning over, made straight towards him.

I can still see Captain Nemo's position. Holding himself well together, he waited for the shark with admirable coolness; and, when it rushed at him, threw himself on one side with wonderful quickness, avoiding the shock, and burying his dagger deep into its side. But it was not all over. A terrible combat ensued.

The shark had seemed to roar, if I might say so. The blood rushed in torrents from its wound. The sea was dyed red, and through the opaque liquid I could distinguish nothing more. Nothing more until the moment when,



"A terrible combat ensued."

like lightning, I saw the undaunted Captain hanging on to one of the creature's fins, struggling, as it were, hand to hand with the monster, and dealing successive blows at his enemy, yet still unable to give a decisive one.

The shark's struggles agitated the water with such fury that the rocking threatened to upset me.

I wanted to go to the Captain's assistance, but, nailed to the spot with horror, I could not stir.

I saw the haggard eye; I saw the different phases of the fight. The Captain fell to the earth, upset by the enormous mass which leant upon him. The shark's jaws opened wide, like a pair of factory shears, and it would have been all over with the Captain; but, quick as thought, harpoon in hand, Ned Land rushed towards the shark and struck it with its sharp point.

The waves were impregnated with a mass of blood. They rocked under the shark's movements, which beat them with indescribable fury. Ned Land had not missed his aim. It was the monster's death-rattle. Struck to the heart, it struggled in dreadful convulsions, the shock of which overthrew Conseil.

But Ned Land had disentangled the Captain, who, getting up without any wound, went straight to the Indian, quickly cut the cord which held him to his stone, took him in his arms, and, with a sharp blow of his heel, mounted to the surface.

We all three followed in a few seconds, saved by a miracle, and reached the fisherman's boat.

Captain Nemo's first care was to recall the unfortunate man to life again. I did not think he could succeed. I hoped so, for the poor creature's immersion was not long; but the blow from the shark's tail might have been his death-blow.

Happily, with the Captain's and Conseil's sharp friction, I saw consciousness return by degrees. He opened his eyes. What was his surprise, his terror even, at seeing four great copper heads leaning over him! And, above all, what must he have thought when Captain Nemo, drawing from the pocket of his dress a bag of pearls, placed it in his hand! This munificent charity from the man of the waters to the poor Cingalese was accepted with a trembling hand. His wondering eyes showed that he knew not to what superhuman beings

he owed both fortune and life.

At a sign from the Captain we regained the bank, and following the road already traversed, came in about half an hour to the anchor which held the canoe of the *Nautilus* to the earth.

Once on board, we each, with the help of the sailors, got rid of the heavy copper helmet.

Captain Nemo's first word was to the Canadian.

"Thank you, Master Land," said he.

"It was in revenge, Captain," replied Ned Land. "I owed you that."

A ghastly smile passed across the Captain's lips, and that was all.

"To the *Nautilus*," said he.

The boat flew over the waves. Some minutes after, we met the shark's dead body floating. By the black marking of the extremity of its fins, I recognised the terrible melanopteron of the Indian Seas, of the species of shark properly so called. It was more than twenty-five feet long; its enormous mouth occupied one-third of its body. It was an adult, as was known by its six rows of teeth placed in an isosceles triangle in the upper jaw.

Conseil looked at it with scientific interest, and I am sure that he placed it, and not without reason, in the cartilaginous class, of the chondropterygian order, with fixed gills, of the selacian family, in the genus of the sharks.

Whilst I was contemplating this inert mass, a dozen of these voracious beasts appeared round the boat; and, without noticing us, threw themselves upon the dead body and fought with one another for the pieces.

At half-past eight we were again on board the *Nautilus*. There I reflected on the incidents which had taken place in our excursion to the Manaar Bank.

Two conclusions I must inevitably draw from it—one bearing upon the unparalleled courage of Captain Nemo, the other upon his devotion to a human being, a representative of that race from which he fled beneath the sea. Whatever he might say, this strange man had not yet succeeded in entirely crushing his heart.

When I made this observation to him, he answered in a slightly moved tone—

"That Indian sir, is an inhabitant of an oppressed country; and I am still, and shall be, to my last breath, one of them!"

Twenty Thousand Leagues Under the Sea

CHAPTER IV

THE RED SEA

IN the course of the day of the 29th of January, the Island of Ceylon disappeared under the horizon, and the *Nautilus*, at a speed of twenty miles an hour, slid into the labyrinth of canals which separate the Maldives from the Laccadives. It coasted even the Island of Kiltan, a land originally madreporic, discovered by Vasco de Gama in 1499, and one of the nineteen principal islands of the Laccadive Archipelago, situated between 10° and 14° 30' north latitude, and 69° 50' 72" east longitude.

We had made 16,220 miles, or 7500 (French) leagues from our starting-point in the Japanese Seas.

The next day (30th January), when the *Nautilus* went to the surface of the ocean, there was no land in sight. Its course was N.N.E., in the direction of the Sea of Oman, between Arabia and the Indian Peninsula, which serves as an outlet to the Persian Gulf. It was evidently a block without any possible egress. Where was Captain Nemo taking us to? I could not say. This, however, did not satisfy the Canadian, who that day came to me asking where we were going.

"We are going where our Captain's fancy takes us, Master Ned."

"His fancy cannot take us far, then," said the Canadian. "The Persian Gulf has no outlet: and if we do go in, it will not be long before we are out again."

"Very well, then, we will come out again, Master Land; and if, after the Persian Gulf, the *Nautilus* would like to visit the Red Sea, the Straits of Bab-el-mandeb are there to give us entrance."

"I need not tell you, sir," said Ned Land, "that the Red Sea is as much closed as the Gulf, as the Isthmus of Suez is not yet cut; and if it was, a boat as mysterious as ours would not risk itself in a canal cut with sluices. And again, the Red Sea is not the road to take us back to Europe."

"But I never said we were going back to Europe."

"What do you suppose, then?"

"I suppose that, after visiting the curious coasts of Arabia and Egypt, the *Nautilus* will go down the Indian Ocean again, perhaps cross the Channel of Mozambique, perhaps

off the Mascarenhas, so as to gain the Cape of Good Hope."

"And once at the Cape of Good Hope?" asked the Canadian, with peculiar emphasis.

"Well, we shall penetrate into that Atlantic which we do not yet know. Ah! friend Ned, you are getting tired of this journey under the sea; you are surfeited with the incessantly varying spectacle of submarine wonders. For my part, I shall be sorry to see the end of a voyage which it is given to so few men to make."

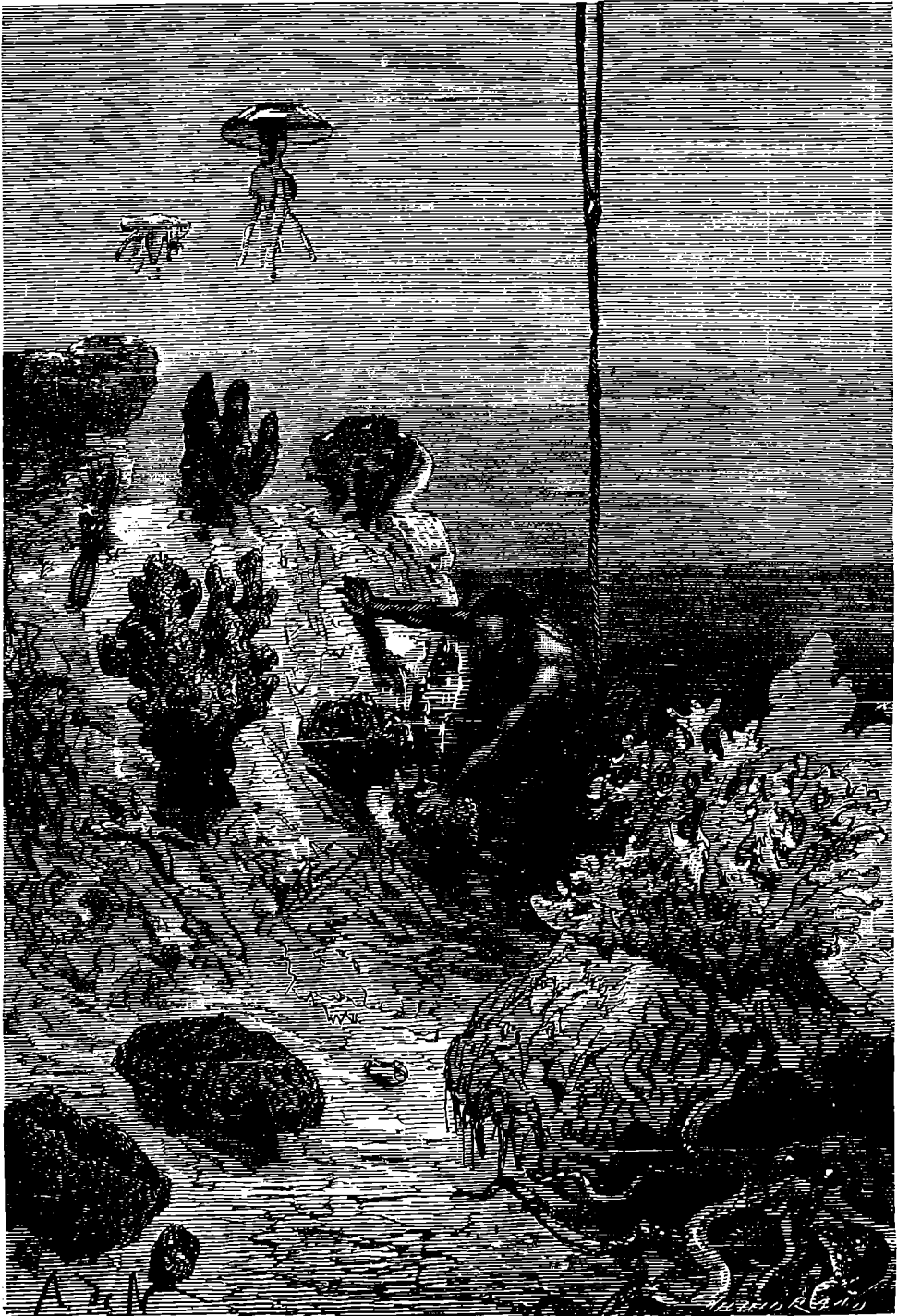
For four days, till the 3rd of February, the *Nautilus* scoured the Sea of Oman, at various speeds and at various depths. It seemed to go at random, as if hesitating as to which road it should follow, but we never passed the Tropic of Cancer.

In quitting this sea we sighted Muscat for an instant, one of the most important towns of the country of Oman. I admired its strange aspect, surrounded by black rocks upon which its white houses and forts stood in relief. I saw the rounded domes of its mosques, the elegant points of its minarets, its fresh and verdant terraces. But it was only a vision! the *Nautilus* soon sank under the waves of that part of the sea.

We passed along the Arabian coast of Mahrah and Hadramaut, for a distance of six miles, its undulating line of mountains being occasionally relieved by some ancient ruin. The 5th of February we at last entered the Gulf of Aden, a perfect funnel introduced into the neck of Bab-el-mandeb, through which the Indian waters entered the Red Sea.

The 6th of February, the *Nautilus* floated in sight of Aden, perched upon a promontory which a narrow isthmus joins to the mainland, a kind of inaccessible Gibraltar, the fortifications of which were rebuilt by the English after taking possession in 1839. I caught a glimpse of the octagon minarets of this town, which was at one time, according to the historian Edrisi, the richest commercial magazine on the coast.

I certainly thought that Captain Nemo, arrived at this point, would back out again; but I was mistaken, for he did no such thing, much to my surprise.



“There grew sponges of all shapes.”

The next day, the 7th of February, we entered the Straits of Bab-el-mandeb, the name of which, in the Arab tongue, means "The gate of tears."

To twenty miles in breadth, it is only thirty-two in length. And for the *Nautilus*, starting at full-speed, the crossing was scarcely the work of an hour. But I saw nothing, not even the Island of Perim, with which the British Government has fortified the position of Aden. There were too many English or French steamers of the line of Suez to Bombay, Calcutta to Melbourne, and from Bourbon to the Mauritius, furrowing this narrow passage, for the *Nautilus* to venture to show itself. So it remained prudently below. At last, about noon, we were in the waters of the Red Sea.

I would not even seek to understand the caprice which had decided Captain Nemo upon entering the gulf. But I quite approved of the *Nautilus* entering it. Its speed was lessened: sometimes it kept on the surface, sometimes it dived to avoid a vessel, and thus I was able to observe the upper and lower parts of this curious sea.

The 8th of February, from the first dawn of day, Mocha came in sight, now a ruined town, whose walls would fall at a gun-shot, yet which shelters here and there some verdant date-trees; once an important city, containing six public markets, and twenty-six mosques, and whose walls, defended by fourteen forts, formed a girdle of two miles in circumference.

The *Nautilus* then approached the African shore, where the depth of the sea was greater. There, between two waters clear as crystal, through the open panels we were allowed to contemplate the beautiful bushes of brilliant coral, and large blocks of rock clothed with a splendid fur of green algae and fuci. What an indescribable spectacle, and what variety of sites and landscapes along these sandbanks and volcanic islands which bound the Lybian coast! But where these shrubs appeared in all their beauty was on the eastern coast, which the *Nautilus* soon gained. It was on the coast of Tehama, for there not only did this display of zoophytes flourish beneath the level of the sea, but they also formed picturesque interlacings which unfolded themselves about sixty feet above the surface, more capricious but less highly coloured than those whose freshness was kept up by the vital power of the waters.

What charming hours I passed thus at the window of the saloon! What new specimens of submarine flora and fauna did I admire under the brightness of our electric lantern!

There grew sponges of all shapes, pediculated, foliated, globular, and digital. They certainly justified the names of baskets, cups, distaffs, elk's-horns, lion's-feet, peacock's-tails, and Neptune's-gloves, which have been given to them by the fishermen, greater poets than the savants.

Other zoophytes which multiply near the sponges consist principally of medusae of a most elegant kind. The molluscs were represented by varieties of the calmar (which, according to Orbigny, are peculiar to the Red Sea); and reptiles by the virgata turtle, of the genus of chelonias, which furnished a wholesome and delicate food for our table.

As to the fish, they were abundant, and often remarkable. The following are those which the nets of the *Nautilus* brought more frequently on board:—

Rays of a red-brick colour, with bodies marked with blue spots, and easily recognisable by their double spikes; some superb caranxes, marked with seven transverse bands of jet-black, blue and yellow fins, and gold and silver scales; mullets with yellow heads; gobies, and a thousand other species, common to the ocean which we had just traversed.

The 9th of February, the *Nautilus* floated in the broadest part of the Red Sea, which is comprised between Souakin, on the west coast, and Koomfidah, on the east coast, with a diameter of ninety miles.

That day at noon, after the bearings were taken, Captain Nemo mounted the platform, where I happened to be, and I was determined not to let him go down again without at least pressing him regarding his ulterior projects. As soon as he saw me he approached, and graciously offered me a cigar.

"Well, sir, does this Red Sea please you? Have you sufficiently observed the wonders it covers, its fishes, its zoophytes, its parterres of sponges, and its forests of coral? Did you catch a glimpse of the towns on its borders?"

"Yes, Captain Nemo," I replied; "and the *Nautilus* is wonderfully fitted for such a study. Ah! it is an intelligent boat!"

"Yes, sir, intelligent and invulnerable. It fears neither the terrible tempests of the Red Sea, nor its currents, nor its sandbanks."

"Certainly," said I, "this sea is quoted as one of the worst, and in the time of the ancients, if I am not mistaken, its reputation was detestable."

"Detestable, M. Aronnax. The Greek and Latin historians do not speak favourably of it, and Strabo says it is very dangerous during the Etesian winds, and in the rainy season. The

Arabian Edrisi portrays it under the name of the Gulf of Colzoum, and relates that vessels perished there in great numbers on the sand-banks, and that no one would risk sailing in the night. It is, he pretends, a sea-subject to fearful hurricanes, strewn with inhospitable islands, and 'which offers nothing good either on its surface or in its depths.' Such, too, is the opinion of Arrian, Agatharcides, and Artemidorus."

"One may see," I replied, "that these historians never sailed on board the *Nautilus*."

"Just so," replied the Captain, smiling; "and in that respect moderns are not more advanced than the ancients. It required many ages to find out the mechanical power of steam. Who knows if, in another hundred years, we may not see a second *Nautilus*? Progress is slow, M. Aronnax."

"It is true," I answered; "your boat is at least a century before its time, perhaps an era. What a misfortune that the secret of such an invention should die with its inventor!"

Captain Nemo did not reply. After some minutes' silence he continued—

"You were speaking of the opinions of ancient historians upon the dangerous navigation of the Red Sea."

"It is true," said I; "but were not their fears exaggerated?"

"Yes and no, M. Aronnax," replied Captain Nemo, who seemed to know the Red Sea by heart. "That which is no longer dangerous for a modern vessel, well rigged, strongly built, and master of its own course, thanks to obedient steam, offered all sorts of perils to the ships of the ancients. Picture to yourself those first navigators venturing in ships made of planks sown with the cords of the palm-tree, saturated with the grease of the sea-dog, and covered with powdered resin! They had not even instruments wherewith to take their bearings, and they went by guess amongst currents of which they scarcely knew anything. Under such conditions shipwrecks were, and must have been, numerous. But in our time, steamers running between Suez and the South Seas have nothing more to fear from the fury of this gulf, in spite of contrary trade-winds. The captain and passengers do not prepare for their departure by offering propitiatory sacrifices: and, on their return, they no longer go ornamented with wreaths and gilt fillets to thank the gods in the neighbouring temple."

"I agree with you," said I; "and steam seems to have killed all gratitude in the hearts of sailors. But, Captain, since you seem to

have especially studied this sea, can you tell me the origin of its name?"

"There exist several explanations on the subject, M. Aronnax. Would you like to know the opinion of a chronicler of the fourteenth century?"

"Willingly."

"This fanciful writer pretends that its name was given to it after the passage of the Israelites, when Pharaoh perished in the waves which closed at the voice of Moses."

"A poet's explanation, Captain Nemo," I replied; "but I cannot content myself with that. I ask you for your personal opinion."

"Here it is, M. Aronnax. According to my idea, we must see in this appellation of the Red Sea a translation of the Hebrew word 'Edom'; and if the ancients gave it that name, it was on account of the particular colour of its waters."

"But up to this time I have seen nothing but transparent waves and without any particular colour."

"Very likely; but as we advance to the bottom of the gulf, you will see this singular appearance. I remember seeing the Bay of Tor entirely red, like a sea of blood."

"And you attribute this colour to the presence of a microscopic seaweed?"

"Yes; it is a mucilaginous purple matter, produced by the restless little plants known by the name of trichodesmia, and of which it requires 40,000 to occupy the space of a square .04 of an inch. Perhaps we shall meet some when we get to Tor."

"So, Captain Nemo, it is not the first time you have overrun the Red Sea on board the *Nautilus*?"

"No, sir."

"As you spoke a while ago of the passage of the Israelites, and of the catastrophe to the Egyptians, I will ask whether you have met with traces under the water of this great historical fact?"

"No, sir; and for a very good reason."

"What is it?"

"It is, that the spot where Moses and his people passed is now so blocked up with sand, that the camels can barely bathe their legs there. You can well understand that there would not be water enough for my *Nautilus*."

"And the spot?" I asked.

"The spot is situated a little above the Isthmus of Suez, in the arm which formerly made a deep estuary, when the Red Sea extended to the Salt Lakes. Now, whether this passage were miraculous or not, the Israelites, nevertheless, crossed there to reach the Promised Land, and Pharaoh's army perished

precisely on that spot; and I think that excavations made in the middle of the sand would bring to light a large number of arms and instruments of Egyptian origin."

"That is evident," I replied; "and for the sake of archaeologists let us hope that these excavations will be made sooner or later, when new towns are established on the isthmus, after the construction of the Suez Canal; a canal, however, very useless to a vessel like the *Nautilus*."

"Very likely; but useful to the whole world," said Captain Nemo. "The ancients well understood the utility of a communication between the Red Sea and the Mediterranean for their commercial affairs: but they did not think of digging a canal direct, and took the Nile as an intermediate. Very probably the canal which united the Nile to the Red Sea was begun by Sesostris, if we may believe tradition. One thing is certain, that in the year 615 before Jesus Christ, Necos undertook the works of an alimentary canal to the waters of the Nile, across the plain of Egypt, looking towards Arabia. It took four days to go up this canal, and it was so wide that two triremes could go abreast. It was carried on by Darius, the son of Hystaspes, and probably finished by Ptolemy II. Strabo saw it navigated; but its decline from the point of departure, near Bubastes, to the Red Sea was so slight, that it was only navigable for a few months in the year. This canal answered all commercial purposes to the age of Antoninus, when it was abandoned and blocked up with sand. Restored by order of the Caliph Omar, it was definitively destroyed in 761 or 762 by Caliph Al-Mansor, who wished to prevent the arrival of provisions to Mohammed-ben-Abdallah, who had revolted against him. During the expedition into Egypt, your General Bonaparte discovered traces of the works in the Desert of Suez; and surprised by the tide, he nearly perished before regaining Hadjaroth, at the very place where Moses had encamped three thousand years before him."

"Well, Captain, what the ancients dared not undertake, this junction between the two seas, which will shorten the road from Cadiz to India, M. Lesseps has succeeded in doing; and before long he will have changed Africa into an immense island."

"Yes, M. Aronnax; you have the right to be proud of your countryman. Such a man brings more honour to a nation than great captains. He began, like so many others, with disgust and rebuffs; but he has triumphed, for he has the genius of will. And it is sad to think that a work like that, which ought to have been an

international work, and which would have sufficed to make a reign illustrious, should have succeeded by the energy of one man. All honour to M. Lesseps!"

"Yes, honour to the great citizen!" I replied, surprised by the manner in which Captain Nemo had just spoken.

"Unfortunately," he continued, "I cannot take you through the Suez Canal; but you will be able to see the long jetty of Port Said after to-morrow, when we shall be in the Mediterranean."

"The Mediterranean!" I exclaimed.

"Yes, sir; does that astonish you?"

"What astonishes me is to think that we shall be there the day after to-morrow."

"Indeed?"

"Yes, Captain, although by this time I ought to have accustomed myself to be surprised at nothing since I have been on board your boat."

"But the cause of this surprise?"

"Well! it is the fearful speed you will have to put on the *Nautilus*, if the day after to-morrow she is to be in the Mediterranean, having made the round of Africa, and doubled the Cape of Good Hope!"

"Who told you that she would make the round of Africa, and double the Cape of Good Hope, sir?"

"Well, unless the *Nautilus* sails on dry land, and passes above the isthmus"—

"Or beneath it, M. Aronnax."

"Beneath it?"

"Certainly," replied Captain Nemo, quietly. "A long time ago Nature made under this tongue of land what man has this day made on its surface."

"What! such a passage exists?"

"Yes; a subterranean passage, which I have named the Arabian Tunnel. It takes us beneath Suez, and opens into the Gulf of Pelusium."

"But this isthmus is composed of nothing but quicksands?"

"To a certain depth. But at fifty-five yards only, there is a solid layer of rock."

"Did you discover this passage by chance?" I asked, more and more surprised.

"Chance and reasoning, sir; and by reasoning even more than by chance. Not only does this passage exist, but I have profited by it several times. Without that I should not have ventured this day into the impassable Red Sea. I noticed that in the Red Sea and in the Mediterranean there existed a certain number of fishes of a kind perfectly identical—ophidia, fiatoles, girelles, and exocoeti. Certain of that fact, I asked myself was it

possible that there was no communication between the two seas? If there was, the subterranean current must necessarily run from the Red Sea to the Mediterranean, from the sole cause of difference of level. I caught a large number of fishes in the neighbourhood of Suez. I passed a copper ring through their tails, and threw them back into the sea. Some

months later, on the coast of Syria, I caught some of my fish ornamented with the ring. Thus the communication between the two was proved. I then sought for it with my *Nautilus*; I discovered it, ventured into it, and before long, sir, you too will have passed through my Arabian tunnel!"

Twenty Thousand Leagues Under the Sea

CHAPTER V

THE ARABIAN TUNNEL

THAT same evening, in 21° 30' north latitude, the *Nautilus* floated on the surface of the sea, approaching the Arabian coast. I saw Djeddah, the most important counting-house of Egypt, Syria, Turkey, and India. I distinguished clearly enough its buildings, the vessels anchored at the quays, and those whose draught of water obliged them to anchor in the roads. The sun, rather low on the horizon, struck full on the houses of the town, bringing out their whiteness. Outside, some wooden cabins, and some made of reeds, showed the quarter inhabited by the Bedouins. Soon Djeddah was shut out from view by the shadows of night, and the *Nautilus* found herself under water slightly phosphorescent.

The next day, the 10th of February, we sighted several ships running to windward. The *Nautilus* returned to its submarine navigation; but at noon, when her bearings were taken, the sea being deserted, she rose again to her waterline.

Accompanied by Ned and Conseil, I seated myself on the platform. The coast on the eastern side looked like a mass faintly printed upon a damp fog.

We were leaning on the sides of the pinnace, talking of one thing and another, when Ned Land, stretching out his hand towards a spot on the sea, said—

“Do you see anything there, sir?”

“No, Ned,” I replied; “but I have not your eyes, you know.”

“Look well,” said Ned, “there, on the star-board beam, about the height of the lantern! Do you not see a mass which seems to move?”

“Certainly,” said I, after close attention; “I see something like a long black body on the top of the water.”

And certainly before long the black object was not more than a mile from us. It looked like a great sandbank deposited in the open sea. It was a gigantic dugong!

Ned Land looked eagerly. His eyes shone with covetousness at the sight of the animal. His hand seemed ready to harpoon it. One would have thought he was awaiting the moment to throw himself into the sea, and attack it in its element.

At this instant Captain Nemo appeared on

the platform. He saw the dugong, understood the Canadian's attitude, and addressing him, said—

“If you held a harpoon just now, Master Land, would it not burn your hand?”

“Just so, sir.”

“And you would not be sorry to go back, for one day, to your trade of a fisherman, and to add this cetacean to the list of those you have already killed?”

“I should not, sir,”

“Well, you can try.”

“Thank you, sir,” said Ned Land, his eyes flaming.

“Only,” continued the Captain, “I advise you for your own sake not to miss the creature.”

“Is the dugong dangerous to attack?” I asked, in spite of the Canadian's shrug of the shoulders.

“Yes,” replied the Captain; “sometimes the animal turns upon its assailants and overturns their boat. But for Master Land, this danger is not to be feared. His eye is prompt, his arm sure.”

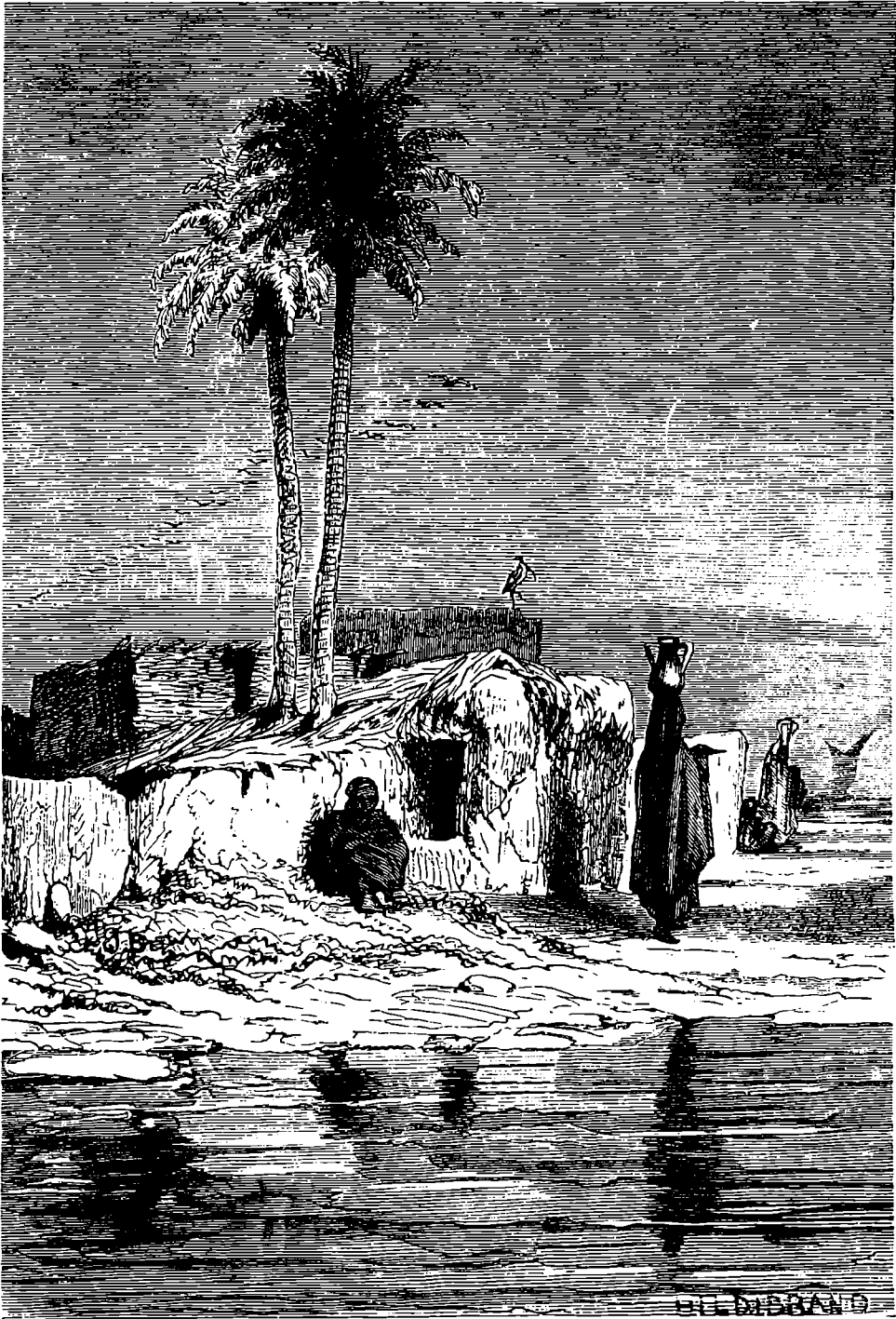
At this moment seven men of the crew, mute and immovable as ever, mounted the platform. One carried a harpoon and a line similar to those employed in catching whales. The pinnace was lifted from the bridge, pulled from its socket, and let down into the sea. Six oarsmen took their seats, and the coxswain went to the tiller. Ned, Conseil, and I went to the back of the boat.

“You are not coming, Captain?” I asked.

“No, sir; but I wish you good sport.”

The boat put off, and lifted by the six rowers, drew rapidly towards the dugong, which floated about two miles from the *Nautilus*.

Arrived some cables' length from cetacean, the speed slackened, and the oars dipped noiselessly into the quiet waters. Ned Land, harpoon in hand, stood in the fore part of the boat. The harpoon used for striking the whale is generally attached to a very long cord, which runs out rapidly as the wounded creature draws it after him. But here the cord was not more than ten fathoms long, and the extremity was attached to a small barrel, which, by



“Outside, some wooden cabins showed the quarters inhabited by the Bedouins.”



“Ned Land, stretching out his hand, said, ‘Do you see anything there, sir?’”

floating, was to show the course the dugong took under the water.

I stood, and carefully watched the Canadian's adversary. This dugong, which also bears the name of the halicore, closely resembles the manatee; its oblong body terminated in a lengthened tail, and its lateral fins in perfect fingers. Its difference from the manatee consisted in its upper jaw, which was armed with two long and pointed teeth, which formed on each side diverging tusks.

This dugong, which Ned Land was preparing to attack, was of colossal dimensions; it was more than seven yards long. It did not move, and seemed to be sleeping on the waves, which circumstance made it easier to capture.

The boat approached within six yards of the animal. The oars rested on the rowlocks. I half rose. Ned Land, his body thrown a little back, brandished the harpoon in his experienced hand.

Suddenly a hissing noise was heard, and the dugong disappeared. The harpoon, although thrown with great force, had apparently only struck the water.

"Curse it!" exclaimed the Canadian, furiously; "I have missed it!"

"No," said I; "the creature is wounded—look at the blood; but your weapon has not stuck in his body."

"My harpoon! my harpoon!" cried Ned Land.

The sailors rowed on, and the coxswain made for the floating barrel. The harpoon regained, we followed in pursuit of the animal.

The latter came now and then to the surface to breathe. Its wound had not weakened it, for it shot onwards with great rapidity.

The boat, rowed by strong arms, flew on its track. Several times it approached within some few yards, and the Canadian was ready to strike, but the dugong made off with a sudden plunge, and it was impossible to reach it.

Imagine the passion which excited impatient Ned Land! He hurled at the unfortunate creature the most energetic expletives in the English tongue. For my part, I was only vexed to see the dugong escape all our attacks.

We pursued it without relaxation for an hour, and I began to think it would prove difficult to capture, when the animal, possessed with the perverse idea of vengeance, of which he had cause to repent, turned upon the pinnace and assailed us in its turn.

This manoeuvre did not escape the Canadian.

"Look out!" he cried.

The coxswain said some words in his out-

landish tongue, doubtless warning the men to keep on their guard.

The dugong came within twenty feet of the boat, stopped, sniffed the air briskly with its large nostrils (not pierced at the extremity, but in the upper part of its muzzle). Then taking a spring he threw himself upon us.

The pinnace could not avoid the shock, and half upset, shipped at least two tons of water; which had to be emptied; but thanks to the coxswain, we caught it sideways, not full front, so we were not quite overturned. While Ned Land, clinging to the bows, belaboured the gigantic animal with blows from his harpoon, the creature's teeth were buried in the gunwhale, and it lifted the whole thing out of the water, as a lion does a roebuck. We were upset over one another, and I know not how the adventure would have ended, if the Canadian, still enraged with the beast, had not struck it to the heart.

I heard its teeth grind on the iron plate, and the dugong disappeared, carrying the harpoon with him. But the barrel soon returned to the surface, and shortly after the body of the animal, turned on its back. The boat came up with it, took it in tow, and made straight for the *Nautilus*.

It required tackle of enormous strength to hoist the dugong on to the platform. It weighed 10,000 lbs.

The next day, February 11th, the larder of the *Nautilus* was enriched by some more delicate game. A flight of sea-swallows rested on the *Nautilus*. It was a species of the *Sterna nilotica*, peculiar to Egypt; its beak is black, head grey and pointed, the eye surrounded by white spots, the back, wings, and tail of a greyish colour, the belly and throat white, and claws red. They also took some dozen of Nile ducks, a wild bird of high flavour, its throat and upper part of the head white with black spots.

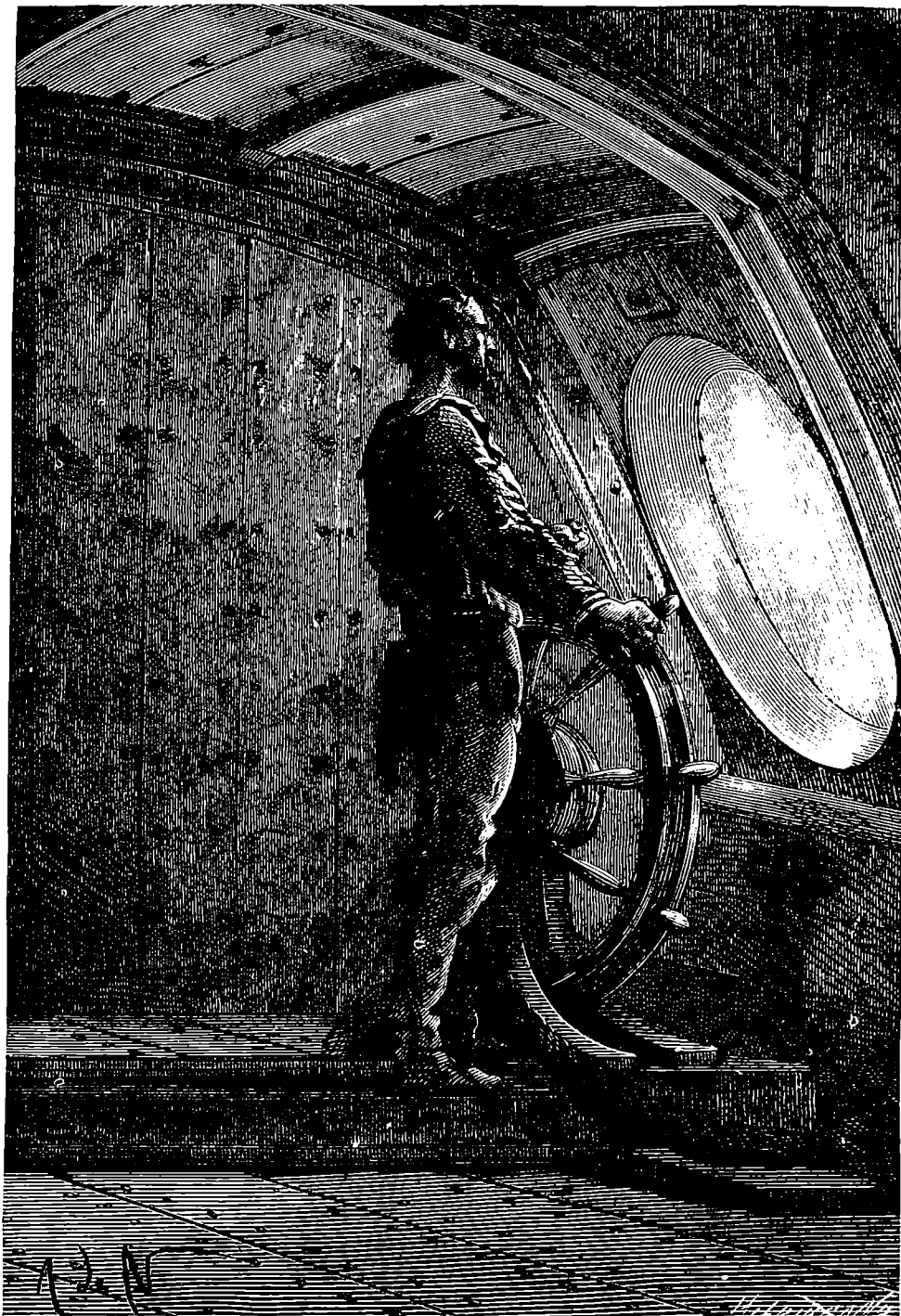
About five o'clock in the evening we sighted to the north the Cape of Ras-Mohammed. This cape forms the extremity of Arabia Petraea, comprised between the Gulf of Suez and the Gulf of Acabah.

The *Nautilus* penetrated into the Straits of Jubal, which leads to the Gulf of Suez. I distinctly saw a high mountain, towering between the two gulfs of Ras-Mohammed. It was Mount Horeb, that Sinai at the top of which Moses saw God face to face.

At six o'clock the *Nautilus*, sometimes floating, sometimes immersed, passed some distance from Tor, situated at the end of the bay, the waters of which seemed tinted with



“Ned Land, his body thrown a little back, brandished the harpoon in his experienced hand.”



Captain Nemo at the helm.

red, an observation already made by Captain Nemo. Then night fell in the midst of a heavy silence, sometimes broken by the cries of the pelican and other night-birds, and the noise of the waves breaking upon the shore, chafing against the rocks, or the panting of some far-off steamer beating the waters of the Gulf with its noisy paddles.

From eight to nine o'clock the *Nautilus* remained some fathoms under the water. According to my calculation we must have been very near Suez. Through the panel of the saloon I saw the bottom of the rocks brilliantly lit up by our electric lamp. We seemed to be leaving the Straits behind us more and more.

At a quarter-past nine, the vessel having returned to the surface, I mounted the platform. Most impatient to pass through Captain Nemo's tunnel, I could not stay in one place, so came to breathe the fresh night-air.

Soon in the shadow I saw a pale light, half discoloured by the fog, shining about a mile from us.

"A floating lighthouse!" said some one near me.

I turned, and saw the Captain.

"It is the floating light of Suez," he continued. "It will not be long before we gain the entrance of the tunnel."

"The entrance cannot be easy?"

"No, sir; and for that reason I am accustomed to go into the steersman's cage, and myself direct our course. And now if you will go down, M. Aronnax, the *Nautilus* is going under the waves, and will not return to the surface until we have passed through the Arabian Tunnel."

Captain Nemo led me towards the central staircase; half-way down he opened a door, traversed the upper deck, and landed in the pilot's cage, which it may be remembered rose at the extremity of the platform. It was a cabin measuring six feet square, very much like that occupied by the pilot on the steamboats of the Mississippi or Hudson. In the midst worked a wheel, placed vertically, and caught to the tiller-rope, which ran to the back of the *Nautilus*. Four light-ports with lenticular glasses, let in a groove in the partition of the cabin, allowed the man at the wheel to see in all directions.

This cabin was dark; but soon my eyes accustomed themselves to the obscurity, and I

perceived the pilot, a strong man, with his hands resting on the spokes of the wheel. Outside, the sea appeared vividly lit up by the lantern, which shed its rays from the back of the cabin to the other extremity of the platform.

"Now," said Captain Nemo, "let us try to make our passage."

Electric wires connected the pilot's cage with the machinery room, and from there the Captain could communicate simultaneously to his *Nautilus* the direction and the speed. He pressed a metal knob, and at once the speed of the screw diminished.

I looked in silence at the high straight wall we were running by at this moment, the immovable base of a massive sandy coast. We followed it thus for an hour only some few yards off.

Captain Nemo did not take his eye from the knob, suspended by its two concentric circles in the cabin. At a simple gesture, the pilot modified the course of the *Nautilus* every instant.

I had placed myself at the port-scuttle, and saw some magnificent substructures of coral, zoophytes, seaweed, and fucus, agitating their enormous claws, which stretched out from the fissures of the rock.

At a quarter-past ten, the Captain himself took the helm. A large gallery, black and deep, opened before us. The *Nautilus* went boldly into it. A strange roaring was heard round its sides. It was the waters of the Red Sea, which the incline of the tunnel precipitated violently towards the Mediterranean. The *Nautilus* went with the torrent, rapid as an arrow, in spite of the efforts of the machinery, which, in order to offer more effective resistance, beat the waves with reversed screw.

On the walls of the narrow passage I could see nothing but brilliant rays, straight lines, furrows of fire, traced by the great speed, under the brilliant electric light. My heart beat fast.

At thirty-five minutes past ten, Captain Nemo quitted the helm; and, turning to me, said—

"The Mediterranean!"

In less than twenty minutes, the *Nautilus*, carried along by the torrent, had passed through the Isthmus of Suez.

Twenty Thousand Leagues Under the Sea

CHAPTER VI

THE GRECIAN ARCHIPELAGO

THE next day, the 12th of February, at the dawn of day, the *Nautilus* rose to the surface. I hastened on to the platform. Three miles to the south the dim outline of Pelusium was to be seen. A torrent had carried us from one sea to the other. About seven o'clock Ned and Conseil joined me.

"Well, Sir Naturalist," said the Canadian, in a slightly jovial tone, "and the Mediterranean?"

"We are floating on its surface, friend Ned."

"What!" said Conseil, "this very night."

"Yes, this very night; in a few minutes we have passed this impassable isthmus."

"I do not believe it," replied the Canadian.

"Then you are wrong, Master Land," I continued; "this low coast which rounds off to the south is the Egyptian coast. And you, who have such good eyes, Ned, you can see the jetty of Port Said stretching into the sea."

The Canadian looked attentively.

"Certainly you are right, sir, and your Captain is a first-rate man. We are in the Mediterranean. Good! Now, if you please, let us talk of our own little affair, but so that no one hears us."

I saw what the Canadian wanted, and, in any case, I thought it better to let him talk, as he wished it; so we all three went and sat down near the lantern, where we were less exposed to the spray of the blades.

"Now, Ned, we listen; what have you to tell us?"

"What I have to tell you is very simple. We are in Europe; and before Captain Nemo's caprices drag us once more to the bottom of the Polar Seas, or lead us into Oceania, I ask to leave the *Nautilus*."

I wished in no way to shackle the liberty of my companion, but I certainly felt no desire to leave Captain Nemo.

Thanks to him, and thanks to his apparatus, I was each day nearer the completion of my submarine studies; and I was re-writing my book of submarine depths in its very element. Should I ever again have such an opportunity of observing the wonders of the ocean? No, certainly not! And I could not bring myself to the idea of abandoning the *Nautilus* before the

cycle of investigation was accomplished.

"Friend Ned, answer me frankly, are you tired of being on board? Are you sorry that destiny has thrown us into Captain Nemo's hands?"

The Canadian remained some moments without answering. Then crossing his arms, he said—

"Frankly, I do not regret this journey under the seas. I shall be glad to have made it; but now that it is made, let us have done with it. That is my idea."

"It will come to an end, Ned."

"Where and when?"

"Where I do not know—when I cannot say; or rather, I suppose it will end when these seas have nothing more to teach us."

"Then what do you hope for?" demanded the Canadian.

"That circumstances may occur as well six months hence as now by which we may and ought to profit."

"Oh!" said Ned Land, "and where shall we be in six months, if you please, Sir Naturalist?"

"Perhaps in China; you know the *Nautilus* is a rapid traveller. It goes through water as swallows through the air, or as an express on the land. It does not fear frequented seas; who can say that it may not beat the coasts of France, England, or America, on which flight may be attempted as advantageously as here."

"M. Aronnax," replied the Canadian, "your arguments are rotten at the foundation. You speak in the future, 'We shall be there! we shall be here!' I speak in the present, 'We are here, and we must profit by it.'"

Ned Land's logic pressed me hard, and I felt myself beaten on that ground. I knew not what argument would now tell in my favour.

"Sir," continued Ned, "let us suppose an impossibility; if Captain Nemo should this day offer you your liberty, would you accept it?"

"I do not know," I answered.

"And if," he added, "the offer he made you this day was never to be renewed, would you accept it?"

"Friend Ned, this is my answer. Your reasoning is against me. We must not rely on Captain Nemo's good-will. Common prudence forbids him to set us at liberty. On the other

side, prudence bids us profit by the first opportunity to leave the *Nautilus*."

"Well, M. Aronnax, that is wisely said."

"Only one observation—just one. The occasion must be serious, and our first attempt must succeed; if it fails, we shall never find another, and Captain Nemo will never forgive us."

"All that is true," replied the Canadian. "But your observation applies equally to all attempts at flight, whether in two years' time, or in two days. But the question is still this: If a favourable opportunity presents itself, it must be seized."

"Agreed! and now, Ned, will you tell me what you mean by a favourable opportunity?"

"It will be that which, on a dark night, will bring the *Nautilus* a short distance from some European coast."

"And you will try and save yourself by swimming?"

"Yes, if we were near enough to the bank, and if the vessel was floating at the time. Not if the bank was far away, and the boat was under the water."

"And in that case?"

"In that case, I should seek to make myself master of the pinnacle. I know how it is worked. We must get inside, and the bolts once drawn, we shall come to the surface of the water, without even the pilot, who is in the bows, perceiving our flight."

"Well, Ned, watch for the opportunity; but do not forget that a hitch will ruin us."

"I will not forget, sir."

"And now, Ned, would you like to know what I think of your project?"

"Certainly, M. Aronnax."

"Well, I think—I do not say I hope—I think that this favourable opportunity will never present itself."

"Why not?"

"Because Captain Nemo cannot hide from himself that we have not given up all hope of regaining our liberty, and he will be on his guard, above all, in the seas, and in the sight of European coasts."

"We shall see," replied Ned Land, shaking his head determinedly.

"And now, Ned Land," I added, "let us stop here. Not another word on the subject. The day that you are ready, come and let us know, and we will follow you. I rely entirely upon you."

Thus ended a conversation which, at no very distant time, led to such grave results. I must say here that facts seemed to confirm my foresight, to the Canadian's great despair. Did

Captain Nemo distrust us in these frequented seas? or did he only wish to hide himself from the numerous vessels, of all nations, which ploughed the Mediterranean? I could not tell; but we were oftener between waters, and far from the coast. Or, if the *Nautilus* did emerge, nothing was to be seen but the pilot's cage; and sometimes it went to great depths, for, between the Grecian Archipelago and Asia Minor, we could not touch the bottom by more than a thousand fathoms.

Thus I only knew we were near the Island of Carpathos, one of the Sporades, by Captain Nemo reciting these lines from Virgil—

"Est in Carpathio Neptuni gurgite vates,
Caeruleus Proteus,"

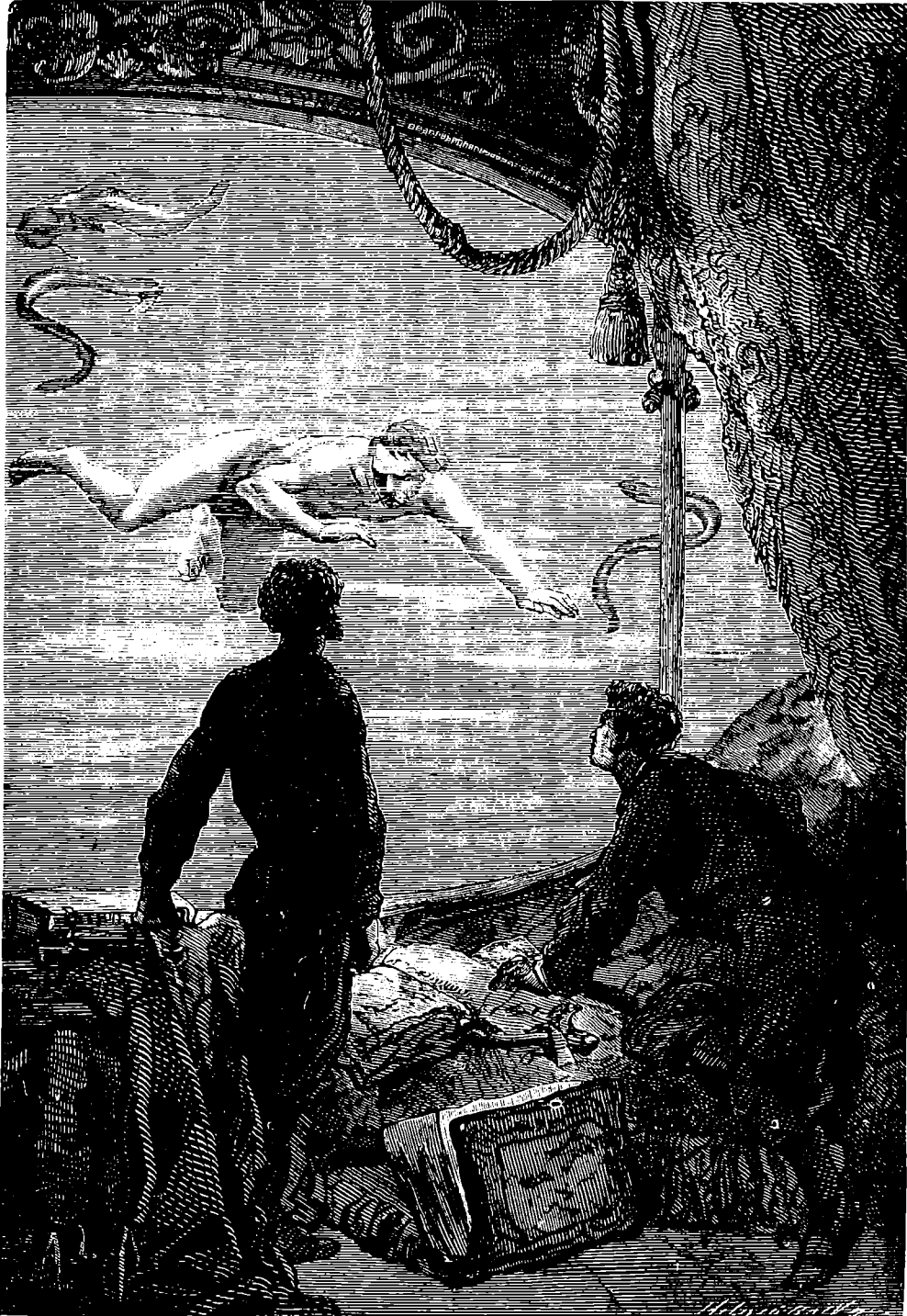
as he pointed to a spot on the planisphere.

It was indeed the ancient abode of Proteus, the old shepherd of Neptune's flocks, now the Island of Scarpanto, situated between Rhodes and Crete. I saw nothing but the granite base through the glass panels of the saloon.

The next day, the 14th of February, I resolved to employ some hours in studying the fishes of the Archipelago; but for some reason or other, the panels remained hermetically sealed. Upon taking the course of the *Nautilus* I found that we were going towards Candia, the ancient Isle of Crete. At the time I embarked on the *Abraham Lincoln*, the whole of this island had risen in insurrection against the despotism of the Turks. But how the insurgents had fared since that time I was absolutely ignorant, and it was not Captain Nemo, deprived of all land communications, who could tell me.

I made no allusion to this event when that night I found myself alone with him in the saloon. Besides, he seemed to be taciturn and preoccupied. Then, contrary to his custom, he ordered both panels to be opened, and going from one to the other, observed the mass of waters attentively. To what end I could not guess; so, on my side, I employed my time in studying the fish passing before my eyes.

Amongst others, I remarked some gobies, mentioned by Aristotle, and commonly known by the name of sea-braches, which are more particularly met with in the salt waters lying near the Delta of the Nile. Near them rolled some sea-bream, half phosphorescent, a kind of sparus, which the Egyptians ranked amongst their sacred animals, whose arrival in the waters of their river announced a fertile overflow, and was celebrated by religious ceremonies. I also noticed some cheilines



“A man shipwrecked! He must be saved at any price.”



“At that moment the Captain opened a sort of strong box which held a great many ingots of gold.”

about nine inches long, a bony fish with transparent shell, whose livid colour is mixed with red spots; they are great eaters of marine vegetation, which gives them an exquisite flavour. These cheilines were much sought after by the epicures of ancient Rome; the inside, dressed with the soft roe of the lamprey, peacocks' brains, and tongues of the phenicoptera, composed that divine dish of which Vitellius was so enamoured.

Another inhabitant of these seas drew my attention, and led my mind back to recollections of antiquity. It was the remora, that fastens on to the shark's belly. This little fish, according to the ancients, hooking on to the ship's bottom, could stop its movements; and one of them, by keeping back Antony's ship during the battle of Actium, helped Augusta to gain the victory. On how little hangs the destiny of nations! I observed some fine anthia, which belong to the order of lutjans, a fish held sacred by the Greeks, who attributed to them the power of hunting the marine monsters from waters they frequented. Their name signifies *flower*, and they justify their appellation by their shaded colours, their shades comprising the whole gamut of reds, from the paleness of the rose to the brightness of the ruby, and the fugitive tints that clouded their dorsal fin. My eyes could not leave these wonders of the sea, when they were suddenly struck by an unexpected apparition.

In the midst of the waters a man appeared, a diver, carrying at his belt a leathern purse. It was not a body abandoned to the waves; it was a living man, swimming with a strong hand, disappearing occasionally to take breath at the surface.

I turned towards Captain Nemo, and in an agitated voice exclaimed—

“A man shipwrecked! He must be saved at any price!”

The Captain did not answer me, but came and leaned against the panel.

The man had approached, and with his face flattened against the glass, was looking at us.

To my great amazement, Captain Nemo signed to him. The diver answered with his hand, mounted immediately to the surface of the water, and did not appear again.

“Do not be uncomfortable,” said Captain Nemo. “It is Nicholas of Cape Matapan, surnamed Pesca. He is well-known in all the Cyclades. A bold diver! water is his element, and he lives more in it than on land, going continually from one island to another, even as far as Crete.”

“You know him, Captain?”

“Why not, M. Aronnax?”

Saying which, Captain Nemo went towards a piece of furniture standing near the left panel of the saloon. Near this piece of furniture, I saw a chest bound with iron, on the cover of which was a copper plate, bearing the cypher of the *Nautilus* with its device.

At that moment, the Captain, without noticing my presence, opened the piece of furniture, a sort of strong box, which held a great many ingots.

They were ingots of gold. From whence came this precious metal, which represented an enormous sum? Where did the Captain gather this gold from? and what was he going to do with it?

I did not say one word. I looked. Captain Nemo took the ingots one by one, and arranged them methodically in the chest, which he filled entirely. I estimated the contents at more than 4000 lbs. weight of gold, that is to say, nearly £200,000.

The chest was securely fastened, and the Captain wrote an address on the lid, in characters which must have belonged to Modern Greece.

This done, Captain Nemo pressed a knob, the wire of which communicated with the quarters of the crew. Four men appeared, and, not without some trouble, pushed the chest out of the saloon. Then I heard them hoisting it up the iron staircase by means of pulleys.

At that moment, Captain Nemo turned to me.

“And you were saying, sir?” said he.

“I was saying nothing, Captain.”

“The, sir, if you will allow me, I will wish you good-night.”

Whereupon he turned and left the saloon.

I returned to my room much troubled, as one may believe. I vainly tried to sleep,—I sought the connecting link between the apparition of the diver and the chest filled with gold. Soon, I felt by certain movements of pitching and tossing, that the *Nautilus* was leaving the depths and returning to the surface.

Then I heard steps upon the platform; and I knew they were unfastening the pinnace, and launching it upon the waves. For one instant it struck the side of the *Nautilus*, then all noise ceased.

Two hours after, the same noise, the same going and coming was renewed; the boat was hoisted on board, replaced in its socket, and the *Nautilus* again plunged under the waves.

So these millions had been transported to their address. To what point of the Continent?

Who was Captain Nemo's correspondent?

The next day, I related to Conseil and the Canadian the events of the night, which had excited by curiosity to the highest degree. My companions were not less surprised than myself.

"But where does he take his millions to?" asked Ned Land.

To that there was no possible answer. I returned to the saloon after having breakfast, and set to work. Till five o'clock in the evening, I employed myself in arranging my notes. At that moment—(ought I to attribute it to some peculiar idiosyncrasy),—I felt so great a heat that I was obliged to take off my coat of byssus! It was strange, for we were not under low latitudes; and even then, the *Nautilus*, submerged as it was, ought to experience no change of temperature. I looked at the manometer; it showed a depth of sixty feet, to which atmospheric heat could never attain.

I continued my work, but the temperature rose to such a pitch as to be intolerable.

"Could there be fire on board?" I asked myself.

I was leaving the saloon, when Captain Nemo entered; he approached the thermometer, consulted it, and turning to me, said—

"Forty-two degrees."

"I have noticed it, Captain," I replied; "and if it gets much hotter we cannot bear it."

"Oh! sir, it will not get hotter if we do not wish it."

"You can reduce it as you please, then?"

"No; but I can go further from the stove which produces it."

"It is outward then!"

"Certainly; we are floating in a current of boiling water."

"Is it possible!" I exclaimed.

"Look."

The panels opened, and I saw the sea entirely white all round. A sulphurous smoke was curling amid the waves, which boiled like water in a copper. I placed my hand on one of the panes of glass, but the heat was so great that I quickly took it off again.

"Where are we?" I asked.

"Near the Island of Santorin, sir," replied the Captain, "and just in the canal which separates Nea Kamenni from Pali Kamenni. I wished to give you a sight of the curious spectacle of a submarine eruption."

"I thought," said I, "that the formation of these new islands was ended."

"Nothing is ever ended in the volcanic parts of the sea," replied Captain Nemo; "and the globe is always being worked by subterranean

fires. Already, in the nineteenth year of our era, according to Cassiodorus and Pliny, a new island, Theia (the divine), appeared in the very place where these islets have recently been formed. They they sank under the waves, to rise again in the year 69, when they again subsided. Since that time to our days, the Plutonian work has been suspended. But, on the 3rd of February 1866, a new island, which they named George Island, emerged from the midst of the sulphurous vapour near Nea Kamenni, and settled again the 6th of the same month. Seven days after, the 13th of February, the Island of Aphroessa appeared, leaving between Nea Kamenni and itself a canal ten yards broad. I was in these seas when the phenomenon occurred, and I was able therefore to observe all the different phases. The Island of Aphoroessa, of round form, measured 300 feet in diameter, and thirty feet in height. It was composed of black and vitreous lava, mixed with fragments of felspar. And lastly, on the 10th of March, a smaller island, called Reka, showed itself near Nea Kamenni, and since then, these three have joined together, forming but one and the same island."

"And the canal in which we are at this moment?" I asked.

"Here it is," replied Captain Nemo, showing me a map of the Archipelago. "You see I have marked the new islands."

I returned to the glass. The *Nautilus* was no longer moving, the heat was becoming unbearable. The sea, which till now had been white, was red, owing to the presence of salts of iron. In spite of the ship's being hermetically sealed, an insupportable smell of sulphur filled the saloon, and the brilliancy of the electricity was entirely extinguished by bright scarlet flames. I was in a bath, I was choking, I was broiled.

"We can remain no longer in this boiling water," said I to the Captain.

"It would not be prudent," replied the impassive Captain Nemo.

An order was given; the *Nautilus* tacked about and left the furnace it could not brave with impunity. A quarter of an hour after we were breathing fresh air on the surface. The thought then struck me that, if Ned Land had chosen this part of the sea for our flight, we should never have come alive out of this sea of fire.

The next day, the 16th of February, we left the basin which, between Rhodes and Alexandria, is reckoned about 1500 fathoms in depth, and the *Nautilus*, passing some distance

from Cerigo, quitted the Grecian Archipelago, after having doubled Cape Matapan.

Twenty Thousand Leagues Under the Sea

CHAPTER VII

THE MEDITERRANEAN IN FORTY-EIGHT HOURS

THE Mediterranean, the blue sea *par excellence*, "the great sea" of the Hebrews, "the sea" of the Greeks, the "mare nostrum" of the Romans, bordered by orange-trees, aloes, cacti, and sea-pines; embalmed with the perfume of the myrtle, surrounded by rude mountains, saturated with pure and transparent air, but incessantly worked by underground fires, a perfect battlefield in which Neptune and Pluto still dispute the empire of the world!

It is upon these banks, and on these waters, says Michelet, that man is renewed in one of the most powerful climates of the globe. But, beautiful as it was, I could only take a rapid glance at the basin whose superficial area is two million of square yards. Even Captain Nemo's knowledge was lost to me, for this enigmatical person did not appear once during our passage at full speed. I estimated the course which the *Nautilus* took under the waves of the sea at about six hundred leagues, and it was accomplished in forty-eight hours. Starting on the morning of the 16th of February from the shores of Greece, we had crossed the Straits of Gibraltar by sunrise on the 18th.

It was plain to me that this Mediterranean, enclosed in the midst of those countries which he wished to avoid, was distasteful to Captain Nemo. Those waves and those breezes brought back too many remembrances, if not too many regrets. Here he had no longer that independence and that liberty of gait which he had when in the open seas, and his *Nautilus* felt itself cramped between the close shores of Africa and Europe.

Our speed was now twenty-five miles an hour. It may be well understood that Ned Land, to his great disgust, was obliged to renounce his intended flight. He could not launch the pinnace, going at the rate of twelve or thirteen yards every second. To quit the *Nautilus* under such conditions would be as bad as jumping from a train going at full speed—an imprudent thing, to say the least of it. Besides, our vessel only mounted to the surface of the waves at night to renew its stock of air; it was steered entirely by the compass and the log.

I saw no more of the interior of this Mediterranean than a traveller by express train perceives of the landscape which flies before his eyes; that is to say, the distant horizon, and not the nearer objects which pass like a flash of lightning.

In the midst of the mass of waters brightly lit up by the electric light, glided some of those lampreys, more than a yard long, common to almost every climate. Some of the oxyrhynchi, a kind of ray five feet broad, with white belly and grey spotted back, spread out like a large shawl carried along by the current. Other rays passed so quickly that I could not see if they deserved the name of eagles which was given to them by the ancient Greeks, or the qualification of rats, toads, and bats, with which modern fishermen have loaded them. A few milander sharks, twelve feet long, and much feared by divers, struggled amongst them. Sea-foxes eight feet long, endowed with wonderful fineness of scent, appeared like large blue shadows. Some dorades of the shark kind, some of which measured seven feet and a half, showed themselves in their dress of blue and silver, encircled by small bands which struck sharply against the sombre tints of their fins, a fish consecrated to Venus, the eyes of which are encased in a socket of gold, a precious species, friend of all waters, fresh or salt, an inhabitant of rivers, lakes, and oceans, living in all climates, and bearing all temperatures; a race belonging to the geological era of the earth, and which has preserved all the beauty of its first days. Magnificent sturgeons, nine or ten yards long, creatures of great speed, striking the panes of glass with their strong tails, displayed their bluish backs with small brown spots; they resembled the sharks, but are not equal to them in strength, and are to be met with in all seas. But of all the diverse inhabitants of the Mediterranean, those I observed to the greatest advantage, when the *Nautilus* approached the surface, belonged to the sixty-third genus of bony fish. They were a kind of tunny, with bluish black backs, and silvery breastplates, whose dorsal fins threw out sparkles of gold. They are said to follow in the wake of vessels whose refreshing shade they seek from the fire of a tropical sky, and



Scene in the Mediterranean.



Scene in the Adriatic.

they did not belie the saying, for they accompanied the *Nautilus* as they did in former times the vessel of La Perouse. For many a long hour they struggled to keep up with our vessel. I was never tired of admiring these creatures really built for speed,—their small heads, their bodies lithe and cigar-shaped, which in some were more than three yards long, their pectoral fins and forked tail endowed with remarkable strength. They swam in a triangle, like certain flocks of birds, whose rapidity they equalled, and of which the ancients used to say that they understood geometry and strategy. But still they do not escape the pursuit of the Provençals, who esteem them as highly as the inhabitants of the Propontis and of Italy used to do; and these precious, but blind and foolhardy creatures, perish by millions in the nets of the Marseillaise.

With regard to the species of fish common to the Atlantic and the Mediterranean, the giddy speed of the *Nautilus* prevented me from observing them with any degree of accuracy.

As to marine mammals, I thought, in passing the entrance of the Adriatic, that I saw two or three cachalots, furnished with one dorsal fin, of the genus *physetera*, some dolphins of the genus *globicephali*, peculiar to the Mediterranean, the back part of the head being marked like a zebra with small lines; also, a dozen of seals, with white bellies and black hair, known by the name of *monks*, and which really have the air of a Dominican; they are about three yards in length.

As to zoophytes, for some instants I was able to admire a beautiful orange galeolaria, which had fastened itself to the port panel; it held on by a long filament, and was divided into an infinity of branches, terminated by the finest lace which could ever have been woven by the rivals of Arachne herself. Unfortunately, I could not take this admirable specimen; and doubtless no other Mediterranean zoophyte would have offered itself to my observation, if, on the night of the 16th, the *Nautilus* had not, singularly enough, slackened its speed, under the following circumstances.

We were then passing between Sicily and the coast of Tunis. In the narrow space between Cape Bon and the Straits of Messina, the bottom of the sea rose almost suddenly. There was a perfect bank, on which there was not more than nine fathoms of water, whilst on either side the depth was ninety fathoms.

The *Nautilus* had to manoeuvre very carefully so as not to strike against this submarine barrier.

I showed Conseil, on the map of the Mediterranean, the spot occupied by this reef.

“But if you please, sir,” observed Conseil, “it is like a real isthmus joining Europe to Africa.”

“Yes, my boy, it forms a perfect bar to the Straits of Lybia, and the soundings of Smith have proved that in former times the continents between Cape Boco and Cape Furina were joined.

“I can well believe it,” said Conseil.

“I will add,” I continued, “that a similar barrier exists between Gibraltar and Ceuta, which in geological times formed the entire Mediterranean.”

“What if some volcanic burst should one day raise these two barriers above the waves?”

“It is not probable, Conseil.”

“Well, but allow me to finish, please, sir; if this phenomenon should take place, it will be troublesome for M. Lesseps, who has taken so much pains to pierce the isthmus.”

“I agree with you; but I repeat, Conseil, this phenomenon will never happen. The violence of subterranean force is ever diminishing. Volcanoes, so plentiful in the first days of the world, are being extinguished by degrees; the internal heat is weakened, the temperature of the lower strata of the globe is lowered by a perceptible quantity every century to the detriment of our globe, for its heat is its life.

“But the sun?”

“The sun is not sufficient, Conseil. Can it give heat to a dead body?”

“Not that I know of.”

“Well, my friend, this earth will one day be that cold corpse; it will become uninhabitable and uninhabited like the moon, which has long since lost all its vital heat.”

“In how many centuries?”

“In some hundreds of thousands of years, my boy.”

“Then,” said Conseil, “we shall have time to finish our journey, that is, if Ned Land does not interfere with it.”

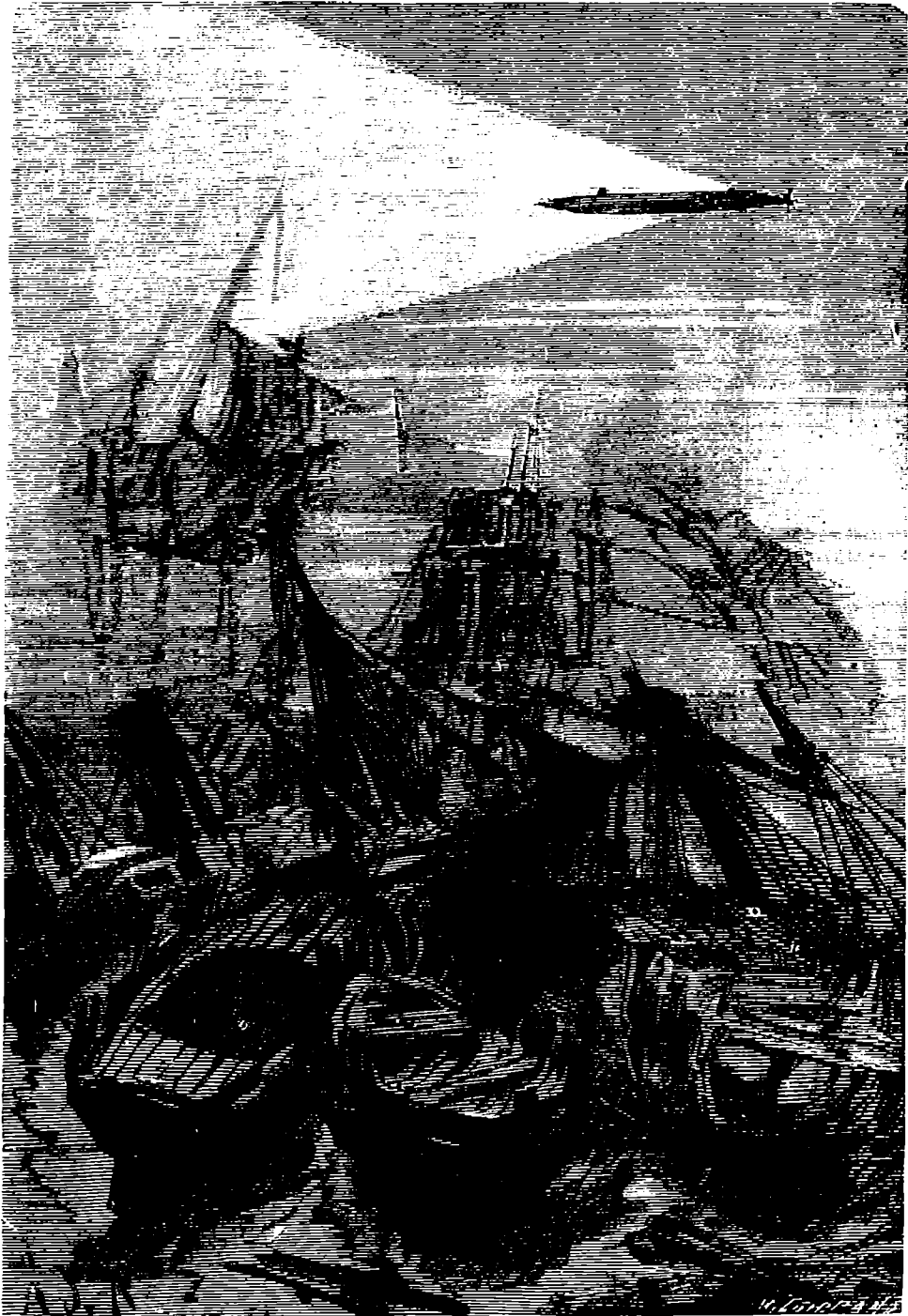
And Conseil, reassured, returned to the study of the bank, which the *Nautilus* was skirting at a moderate speed.

There, beneath the rocky and volcanic bottom, lay outspread a living flora of sponges and reddish cydippes, which emitted a slight phosphorescent light, commonly known by the name of sea-cucumbers; and walking comatulæ more than a yard long, the purple of which completely coloured the water around.

The *Nautilus* having now passed the high bank in the Lybian Straits, returned to the



“For one instant I caught a glimpse of the beautiful ruins of the temple of Hercules.”



“The *Nautilus* returned to the deep waters and its accustomed speed.”

deep waters and its accustomed speed.

From that time no more molluscs, no more articulates, no more zoophytes; barely a few large fish passing like shadows.

During the night of the 16th and 17th February, we had entered the second Mediterranean basin, the greatest depth of which was 1450 fathoms. The *Nautilus*, by the action of its screw, slid down the inclined planes, and buried itself in the lowest depths of the sea.

On the 18th of February, about three o'clock in the morning, we were at the entrance of the Straits of Gibraltar. There once existed two currents: an upper one, long since recognised, which conveys the waters of the ocean into the basin of the Mediterranean; and a lower counter-current, which reasoning has now shown to exist. Indeed, the volume of

water in the Mediterranean, incessantly added to by the waves of the Atlantic, and by rivers falling into it, would each year raise the level of this sea, for its evaporation is not sufficient to restore the equilibrium. As it is not so, we must necessarily admit the existence of an under-current, which empties into the basin of the Atlantic, through the Straits of Gibraltar, the surplus waters of the Mediterranean. A fact, indeed; and it was this counter-current by which the *Nautilus* profited. It advanced rapidly by the narrow pass. For one instant I caught a glimpse of the beautiful ruins of the temple of Hercules, buried in the ground, according to Pliny, and with the low island which supports it; and a few minutes later we were floating on the Atlantic.

Twenty Thousand Leagues Under the Sea

CHAPTER VIII

VIGO BAY

THE Atlantic! a vast sheet of water, whose superficial area covers twenty-five millions of square miles, the length of which is nine thousand miles, with a mean breadth of two thousand seven hundred,—an ocean whose parallel winding shores embrace an immense circumference, watered by the largest rivers of the world, the St Lawrence, the Mississippi, the Amazon, the Plata, the Orinoco, the Niger, the Senegal, the Elbe, the Loire, and the Rhine, which carry water from the most civilised, as well as from the most savage countries! Magnificent field of water, incessantly ploughed by vessels of every nation, sheltered by the flags of every nation, and which terminates in those two terrible points so dreaded by mariners, Cape Horn, and the Cape of Tempests!

The *Nautilus* was piercing the water with its sharp spur, after having accomplished nearly ten thousand leagues in three months and a half, a distance greater than the great circle of the earth. Where were we going now? and what was reserved for the future? The *Nautilus*, leaving the Straits of Gibraltar, had gone far out. It returned to the surface of the waves, and our daily walks on the platform were restored to us.

I mounted at once, accompanied by Ned Land and Conseil. At a distance of about twelve miles, Cape St Vincent was dimly to be seen, forming the south-western point of the Spanish peninsula. A strong southerly gale was blowing. The sea was swollen and billowy; it made the *Nautilus* rock violently. It was almost impossible to keep one's footing on the platform, which the heavy rolls of the sea beat over every instant. So we descended after inhaling some mouthfuls of fresh air.

I returned to my room, Conseil to his cabin; but the Canadian, with a preoccupied air, followed me. Our rapid passage across the Mediterranean had not allowed him to put his project into execution, and he could not help showing his disappointment. When the door of my room was shut, he sat down and looked at me silently.

"Friend Ned," said I, "I understand you; but you cannot reproach yourself. To have attempted to leave the *Nautilus* under the

circumstances would have been folly."

Ned Land did not answer; his compressed lips, and frowning brow, showed with him the violent possession this fixed idea had taken of his mind.

"Let us see," I continued; "we need not despair yet. We are going up the coast of Portugal again; France and England are not far off, where we can easily find refuge. Now, if the *Nautilus*, on leaving the Straits of Gibraltar, had gone to the south, if it had carried us towards regions where there were no continents, I should share your uneasiness. But we know now that Captain Nemo does not fly from civilised seas, and in some days I think you can act with security."

Ned Land still looked at me fixedly; at length his fixed lips parted, and he said, "It is for to-night."

I drew myself up suddenly. I was, I admit, little prepared for this communication. I wanted to answer the Canadian, but words would not come.

"We agreed to wait for an opportunity," continued Ned Land, "and the opportunity has arrived. This night we shall be but a few miles from the Spanish coast. It is cloudy. The wind blows freely. I have your word, M. Aronnax, and I rely upon you."

As I was still silent, the Canadian approached me.

"To-night, at nine o'clock," said he. "I have warned Conseil. At that moment, Captain Nemo will be shut up in his room, probably in bed. Neither the engineers nor the ship's crew can see us. Conseil and I will gain the central staircase, and you, M. Aronnax, will remain in the library, two steps from us, waiting my signal. The oars, the mast, and the sail, are in the canoe. I have even succeeded in getting in some provisions. I have procured an English wrench, to unfasten the bolts which attach it to the shell of the *Nautilus*. So all is ready, till to-night."

"The sea is bad."

"That I allow," replied the Canadian; "but we must risk that. Liberty is worth paying for; besides, the boat is strong, and a few miles with a fair wind to carry us, is no great thing. Who knows but by to-morrow we may be a

hundred leagues away? Let circumstances only favour us, and by ten or eleven o'clock we shall have landed on some spot of *terra firma*, alive or dead. But adieu now till to-night."

With these words the Canadian withdrew, leaving me almost dumb. I had imagined that, the chance gone, I should have time to reflect and discuss the matter. My obstinate companion had given me no time; and, after all, what could I have said to him? Ned Land was perfectly right. There was almost the opportunity to profit by. Could I retract my word, and take upon myself the responsibility of compromising the future of my companions? Tomorrow Captain Nemo might take us far from all land.

At that moment a rather loud hissing told me that the reservoirs were filling, and that the *Nautilus* was sinking under the waves of the Atlantic.

A sad day I passed, between the desire of regaining my liberty of action, and of abandoning the wonderful *Nautilus*, and leaving my submarine studies incomplete.

What dreadful hours I passed thus! sometimes seeing myself and companions safely landed, sometimes wishing, in spite of my reason, that some unforeseen circumstances would prevent the realisation of Ned Land's project.

Twice I went to the saloon. I wished to consult the compass. I wished to see if the direction the *Nautilus* was taking was bringing us nearer or taking us farther from the coast. But no; the *Nautilus* kept in Portuguese waters.

I must therefore take my part, and prepare for flight. My luggage was not heavy; my notes nothing more.

As to Captain Nemo, I asked myself what he would think of our escape; what trouble, what wrong it might cause him, and what he might do in case of its discovery or failure. Certainly I had no cause to complain of him; on the contrary, never was hospitality freer than his. In leaving him I could not be taxed with ingratitude. No oath bound us to him. It was on the strength of circumstances he relied, and not upon our word, to fix us for ever.

I had not seen the Captain since our visit to the Island of Santorin. Would chance bring me to his presence before our departure? I wished it, and I feared it at the same time. I listened if I could hear him walking in the room contiguous to mine. No sound reached my ear. I felt an unbearable uneasiness. This day of waiting seemed eternal. Hours struck too slowly to keep pace with my impatience.

My dinner was served in my room as usual. I ate but little, I was too preoccupied. I left the table at seven o'clock. A hundred and twenty minutes (I counted them) still separated me from the moment in which I was to join Ned Land. My agitation redoubled. My pulse beat violently. I could not remain quiet. I went and came, hoping to calm my troubled spirit by constant movement. The idea of failure in our bold enterprise was the least painful of my anxieties; but the thought of seeing our project discovered before leaving the *Nautilus*, of being brought before Captain Nemo, irritated, or (what was worse) saddened at my desertion, made my heart beat.

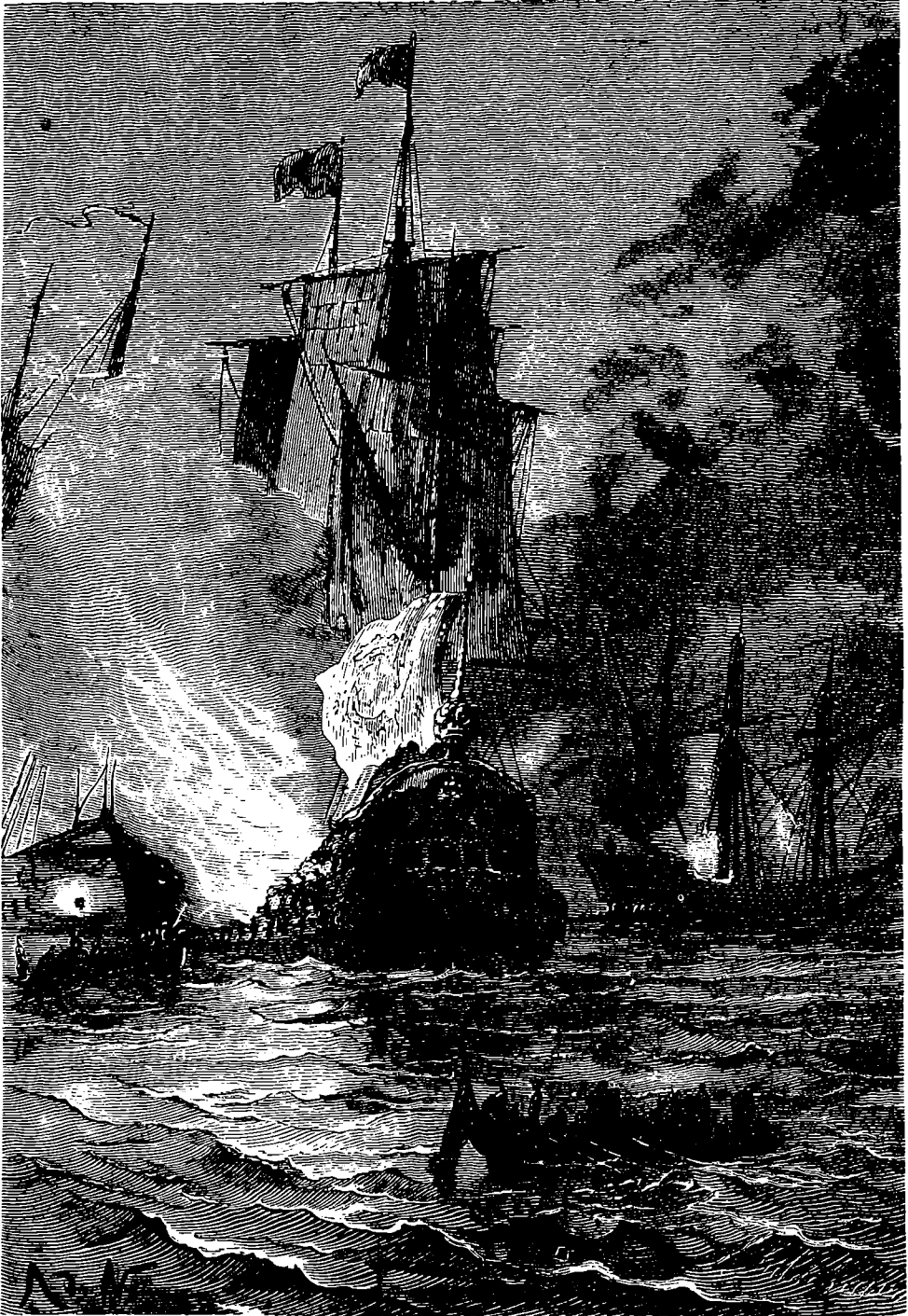
I wanted to see the saloon for the last time. I descended the stairs, and arrived in the museum where I had passed so many useful and agreeable hours. I looked at all its riches, all its treasures, like a man on the eve of an eternal exile, who was leaving never to return. These wonders of Nature, these masterpieces of Art, amongst which, for so many days, my life had been concentrated, I was going to abandon them for ever! I should like to have taken a last look through the windows of the saloon into the waters of the Atlantic: but the panels were hermetically closed, and a cloak of steel separated me from that ocean which I had not yet explored.

In passing through the saloon, I came near the door, let into the angle, which opened into the Captain's room. To my great surprise, this door was ajar. I drew back, involuntarily. If Captain Nemo should be in his room, he could see me. But, hearing no noise, I drew nearer. The room was deserted. I pushed open the door, and took some steps forward. Still the same monk-like severity of aspect.

Suddenly the clock struck eight. The first beat of the hammer on the bell awoke me from my dreams. I trembled as if an invisible eye had plunged into my most secret thoughts, and I hurried from the room.

There my eye fell upon the compass. Our course was still north. The log indicated moderate speed, the manometer a depth of about sixty feet.

I returned to my room, clothed myself warmly—sea boots, an otterskin cap, a great coat of byssus, lined with sealskin; I was ready, I was waiting. The vibration of the screw alone broke the deep silence which reigned on board. I listened attentively. Would no loud voice suddenly inform me that Ned Land had been surprised in his projected flight? A mortal dread hung over me, and I vainly tried to regain my accustomed coolness.



“The admiral burned and scuttled every galleon.”

At a few minutes to nine, I put my ear to the Captain's door. No noise. I left my room and returned to the saloon, which was half in obscurity, but deserted.

I opened the door communicating with the library. The same insufficient light, the same solitude. I placed myself near the door leading to the central staircase, and there waited for Ned Land's signal.

At that moment the trembling of the screw sensibly diminished, then it stopped entirely. The silence was now only disturbed by the beatings of my own heart. Suddenly a slight shock was felt; and I knew that the *Nautilus* had stopped at the bottom of the ocean. My uneasiness increased. The Canadian's signal did not come. I felt inclined to join Ned Land and beg of him to put off his attempt. I felt that we were not sailing under our usual conditions.

At this moment the door of the large saloon opened, and Captain Nemo appeared. He saw me, and, without further preamble, began in an amiable tone of voice—

"Ah, sir! I have been looking for you. Do you know the history of Spain?"

Now, one might know the history of one's own country by heart; but in the condition I was at the time, with troubled mind and head quite lost, I could not have said a word of it.

"Well," continued Captain Nemo, "you heard by question? Do you know the history of Spain?"

"Very slightly," I answered.

"Well, here are learned men having to learn," said the captain. "Come, sit down, and I will tell you a curious episode in this history.—Sir, listen well," said he; "this history will interest you on one side, for it will answer a question which doubtless you have not been able to solve."

"I listen, Captain," said I, not knowing what my interlocutor was driving at, and asking myself if this incident was bearing on our projected flight.

"Sir, if you have no objection, we will go back to 1702. You cannot be ignorant that your king, Louis XIV., thinking that the gesture of a potentate was sufficient to bring the Pyrenees under his yoke, had imposed the Duke of Anjou, his grandson, on the Spaniards. This prince reigned more or less badly under the name of Philip V., and had a strong party against him abroad. Indeed, the preceding year, the royal houses of Holland, Austria, and England, had concluded a treaty of alliance at the Hague, with the intention of plucking the crown of Spain from the head of

Philip V., and placing it on that of an archduke to whom they prematurely gave the title of Charles III.

"Spain must resist this coalition; but she was almost entirely unprovided with either soldiers or sailors. However, money would not fail them, provided that their galleons, laden with gold and silver from America, once entered their ports. And about the end of 1702 they expected a rich convoy which France was escorting with a fleet of twenty-three vessels, commanded by Admiral Château-Renaud, for the ships of the coalition were already beating the Atlantic. This convoy was to go to Cadiz, but the Admiral, hearing that an English fleet was cruising in those waters, resolved to make for a French port.

"The Spanish commanders of the convoy objected to this decision. They wanted to be taken to a Spanish port, and if not to Cadiz, into Vigo Bay, situated on the north-West coast of Spain, and which was not blocked.

"Admiral Château-Renaud had the rashness to obey this injunction, and the galleons entered Vigo Bay.

"Unfortunately, it formed an open road which could not be defended in any way. They must therefore hasten to unload the galleons before the arrival of the combined fleet; and time would not have failed them had not a miserable question of rivalry suddenly arisen.

"You are following the chain of events?" asked Captain Nemo.

"Perfectly," said I, not knowing the end proposed by this historical lesson.

"I will continue. This is what passed. The merchants of Cadiz had a privilege by which they had the right of receiving all merchandise coming from the West Indies. Now, to disembark these ingots at the port of Vigo, was depriving them of their rights. They complained at Madrid, and obtained the consent of the weak-minded Philip that the convoy, without discharging its cargo, should remain sequestered in the roads of Vigo until the enemy had disappeared.

"But whilst coming to this decision, on the 22nd of October 1702, the English vessels arrived in Vigo Bay, when Admiral Château-Renaud, in spite of inferior forces, fought bravely. But seeing that the treasure must fall into the enemy's hands, he burnt and scuttled every galleon, which went to the bottom with their immense riches."

Captain Nemo stopped. I admit I could not yet see why this history should interest me.

"Well?" I asked.

"Well, M. Aronnax," replied Captain



“From these cases escaped ingots of gold and silver, cascades of piastres and precious stones.”

Nemo, "we are in that Vigo Bay; and it rests with yourself whether you will penetrate its mysteries."

The captain rose, telling me to follow him. I had had time to recover. I obeyed. The saloon was dark, but through the transparent glass the waves were sparkling. I looked.

For half a mile around the *Nautilus*, the waters seemed bathed in electric light. The sandy bottom was clean and bright. Some of the ship's crew in their diving dresses were clearing away half rotten barrels and empty cases from the midst of the blackened wrecks. From these cases and from these barrels escaped ingots of gold and silver, cascades of piastres and jewels. The sand was heaped up with them. Laden with their precious booty the men returned to the *Nautilus*, disposed of their burden, and went back to this inexhaustible fishery of gold and silver.

I understood now. This was the scene of the battle of the 22nd of October 1702. Here on this very spot the galleons laden for the Spanish Government had sunk. Here Captain Nemo came, according to his wants, to pack up those millions with which he burdened the *Nautilus*. It was for him and him alone America had given up her precious metals. He was heir direct, without any one to share, in those treasures torn from the Incas and from the conquered of Ferdinand Cortez.

"Did you know, sir," he asked, smiling, "that the sea contained such riches?"

"I knew," I answered, "that they value the money held in suspension in these waters at two millions."

"Doubtless; but to extract this money the expense would be greater than the profit. Here, on the contrary, I have but to pick up what man has lost,—and not only in Vigo Bay, but in a thousand other spots where shipwrecks have happened, and which are marked on my submarine map. Can you understand now the source of the millions I am worth?"

"I understand, Captain. But allow me to tell

you that in exploring Vigo Bay you have only been beforehand with a rival society."

"And which?"

"A society which has received from the Spanish Government the privilege of seeking these buried galleons. The shareholders are led on by the allurements of an enormous bounty, for they value these rich shipwrecks at five hundred millions."

"Five hundred millions they were," answered Captain Nemo, "but they are no longer."

"Just so," said I; "and a warning to those shareholders would be an act of charity. But who knows if it would be well received? What gamblers usually regret above all is less the loss of their money, than of their foolish hopes. After all, I pity them less than the thousands of unfortunates to whom so much riches well-distributed would have been profitable, whilst for them they will be for ever barren."

I had no sooner expressed this regret, than I felt that it must have wounded Captain Nemo.

"Barren!" he exclaimed, with animation. "Do you think then, sir, that these riches are lost because I gather them? Is it for myself alone, according to your idea, that I take the trouble to collect these treasures? Who told you that I did not make a good use of it? Do you think I am ignorant that there are suffering beings and oppressed races on this earth, miserable creatures to console, victims to avenge? Do you not understand?"

Captain Nemo stopped at these last words, regretting perhaps that he had spoken so much. But I had guessed that whatever the motive which had forced him to seek independence under the sea, it had left him still a man, that his heart still beat for the sufferings of humanity, and that his immense charity was for oppressed races as well as individuals. And I then understood for whom those millions were destined, which were forwarded by Captain Nemo when the *Nautilus* was cruising in the waters of Crete.

Twenty Thousand Leagues Under the Sea

CHAPTER IX

A VANISHED CONTINENT

THE next morning, the 19th of February, I saw the Canadian enter my room. I expected this visit. He looked very disappointed.

"Well, sir?" said he.

"Well, Ned, fortune was against us yesterday."

"Yes; that Captain must needs stop exactly at the hour we intended leaving his vessel."

"Yes, Ned, he had business at his bankers."

"His bankers!"

"Or rather his banking-house; by that I mean the ocean, where his riches are safer than in the chests of the State."

I then related to the Canadian the incidents of the preceding night, hoping to bring him back to the idea of not abandoning the Captain; but my recital had no other result than an energetically expressed regret from Ned, that he had not been able to take a walk on the battle-field of Vigo on his own account.

"However," said he, "all is not ended. It is only a blow of the harpoon lost. Another time we must succeed; and to-night, if necessary"—

"In what direction is the *Nautilus* going?" I asked.

"I do not know," replied Ned.

"Well, at noon we shall see the point."

The Canadian returned to Conseil. As soon as I was dressed, I went into the saloon. The compass was not reassuring. The course of the *Nautilus* was S.S.W. We were turning our backs on Europe.

I waited with some impatience till the ship's place was pricked on the chart. At about half-past eleven the reservoirs were emptied, and our vessel rose to the surface of the ocean. I rushed towards the platform. Ned Land had preceded me. No more land in sight. Nothing but an immense sea. Some sails on the horizon, doubtless those going to San Roque in search of favourable winds for doubling the Cape of Good Hope. The weather was cloudy. A gale of wind was preparing. Ned raved, and tried to pierce the cloudy horizon. He still hoped that behind all that fog stretched the land he so longed for.

At noon the sun showed itself for an instant. The second profited by this brightness to take its height. Then the sea becoming more

billowy, we descended, and the panel closed.

An hour after, upon consulting the chart, I saw the position of the *Nautilus* was marked at 16° 17' longitude, and 33° 22' latitude, at 150 leagues from the nearest coast. There was no means of flight, and I leave you to imagine the rage of the Canadian, when I informed him of our situation.

For myself, I was not particularly sorry. I felt lightened of the load which had oppressed me, and was able to return with some degree of calmness to my accustomed work.

That night, about eleven o'clock, I received a most unexpected visit from Captain Nemo. He asked me very graciously if I felt fatigued from my watch of the preceding night. I answered in the negative.

"Then, M. Aronnax, I propose a curious excursion."

"Propose, Captain?"

"You have hitherto only visited the submarine depths by daylight, under the brightness of the sun. Would it suit you to see them in the darkness of the night?"

"Most willingly."

"I warn you, the way will be tiring. We shall have far to walk, and must climb a mountain. The roads are not well kept."

"What you say, Captain, only heightens my curiosity; I am ready to follow you."

"Come then, sir, we will put on our diving dresses."

Arrived at the robing-room, I saw that neither of my companions nor any of the ship's crew were to follow us on this excursion. Captain Nemo had not even proposed my taking with me either Ned or Conseil.

In a few moments we had put on our diving dresses; they placed on our backs the reservoirs, abundantly filled with air, but no electric lamps were prepared. I called the Captain's attention to the fact.

"They will be useless," he replied.

I thought I had not heard aright, but I could not repeat my observation, for the Captain's head had already disappeared in its metal case. I finished harnessing myself, I felt them put an iron-pointed stick into my hand, and some minutes later, after going through the usual form, we set foot on the bottom of the

Atlantic, at a depth of 150 fathoms. Midnight was near. The waters were profoundly dark, but Captain Nemo pointed out in the distance a reddish spot, a sort of large light shining brilliantly, about two miles from the *Nautilus*. What this fire might be, what could feed it, why and how it lit up the liquid mass, I could not say. In any case, it did light our way, vaguely, it is true, but I soon accustomed myself to the peculiar darkness, and I understood, under such circumstances, the uselessness of the Rumhkorff apparatus.

As we advanced, I heard a kind of pattering above my head. The noise redoubling, sometimes producing a continual shower, I soon understood the cause. It was rain falling violently, and crisping the surface of the waves. Instinctively the thought flashed across my mind that I should be wet through! By the water! in the midst of the water! I could not help laughing at the odd idea. But indeed, in the thick diving dress, the liquid element is no longer felt, and one only seems to be in an atmosphere somewhat denser than the terrestrial atmosphere. Nothing more.

After half an hour's walk the soil became stony. Medusae, microscopic crustacea, and pennatules lit it slightly with their phosphorescent gleam. I caught a glimpse of pieces of stone covered with millions of zoophytes, and masses of seaweed. My feet often slipped upon this viscous carpet of seaweed, and without my iron-tipped stick I should have fallen more than once. In turning round, I could still see the whitish lantern of the *Nautilus* beginning to pale in the distance.

But the rosy light which guided us increased and lit up the horizon. The presence of this fire under water puzzled me in the highest degree. Was it some electric effulgence? Was I going towards a natural phenomenon as yet unknown to the savants of the earth? Or even (for this thought crossed my brain) had the hand of man aught to do with this conflagration? Had he fanned this flame? Was I to meet in these depths companions and friends of Captain Nemo whom he was going to visit, and who, like him, led this strange existence? Should I find down there a whole colony of exiles, who, weary of the miseries of this earth, had sought and found independence in the deep ocean? All these foolish and unreasonable ideas pursued me. And in this condition of mind, over-excited by the succession of wonders continually passing before my eyes, I should not have been surprised to meet at the bottom of the sea one of those submarine towns of which Captain Nemo dreamed.

Our road grew lighter and lighter. The white glimmer came in rays from the summit of a mountain about 800 feet high. But what I saw was simply a reflection, developed by the clearness of the waters. The source of this inexplicable light was a fire on the opposite side of the mountain.

In the midst of this stony maze, furrowing the bottom of the Atlantic, Captain Nemo advanced without hesitation. He knew this dreary road. Doubtless he had often travelled over it, and could not lose himself. I followed him with unshaken confidence. He seemed to me like a genie of the sea; and, as he walked before me, I could not help admiring his stature, which was outlined in black on the luminous horizon.

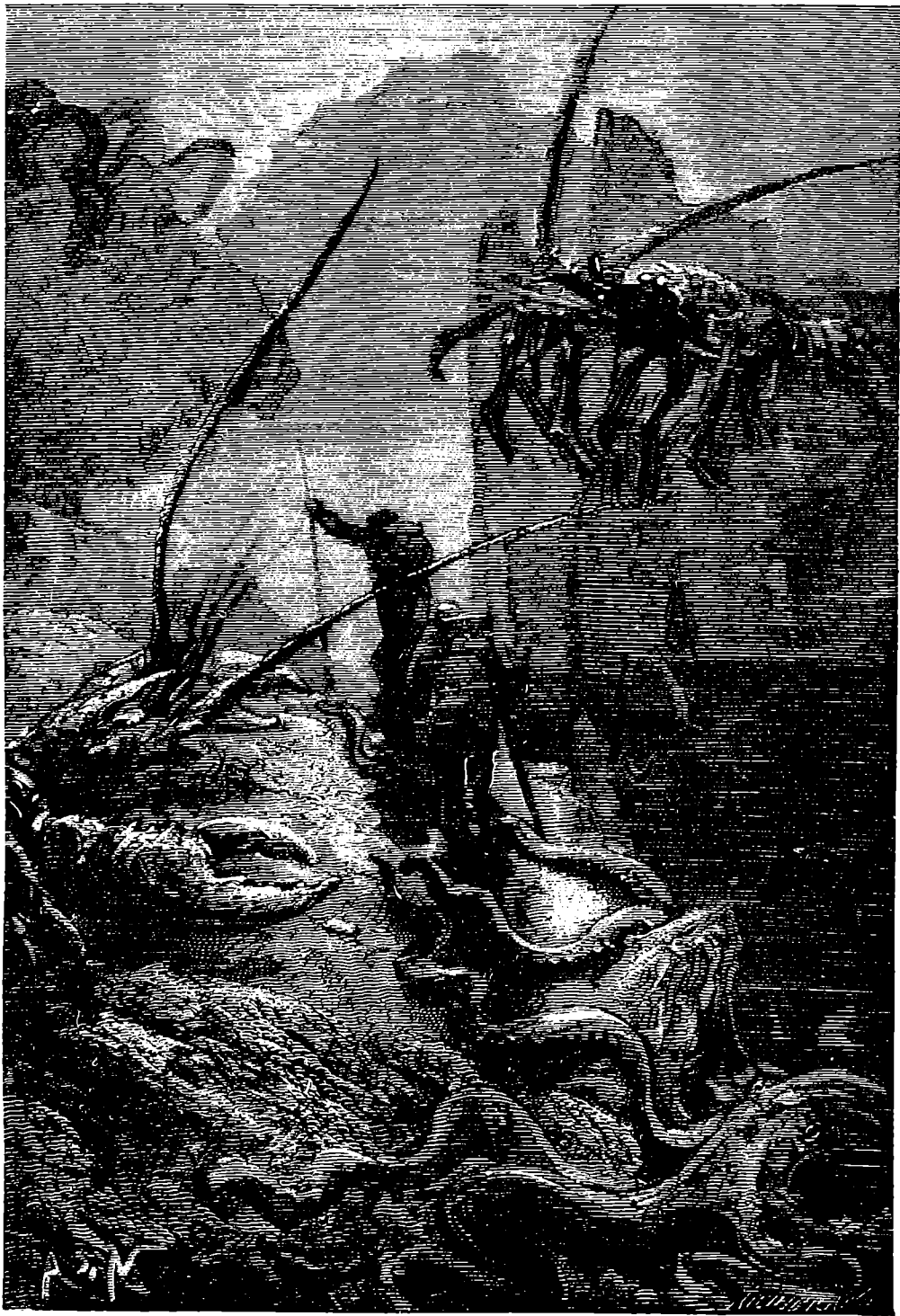
It was one in the morning when we arrived at the first slopes of the mountain; but to gain access to them we must venture through the difficult paths of a vast copse.

Yes; a copse of dead trees, without leaves, without sap, trees petrified by the action of the water, and here and there overtopped by gigantic pines. It was like a coal pit, still standing, holding by the roots to the broken soil, and whose branches, like fine black paper cuttings, showed distinctly on the watery ceiling. Picture to yourself a forest in the Hartz, hanging on to the sides of the mountain, but a forest swallowed up. The paths were encumbered with seaweed and fucus, between which grovelled a whole world of crustacea. I went along, climbing the rocks, striding over extended trunks, breaking the sea bind-weed, which hung from one tree to the other; and frightening the fishes, which flew from branch to branch. Pressing onward, I felt no fatigue. I followed my guide, who was never tired. What a spectacle! how can I express it? how paint the aspect of those woods and rocks in this medium,—their under parts dark and wild, the upper coloured with red tints, by that light which the reflecting powers of the waters doubled? We climbed rocks, which fell directly after with gigantic bounds, and the low growling of an avalanche. To right and left ran long, dark galleries, where sight was lost. Here opened vast glades which the hand of man seemed to have worked; and I sometimes asked myself if some inhabitant of these submarine regions would not suddenly appear to me.

But Captain Nemo was still mounting. I could not stay behind. I followed boldly. My stick gave me good help. A false step would have been dangerous on the narrow passes sloping down to the sides of the gulfs; but I



“A copse of dead trees, petrified by the action of the water.”



Giant lobsters and titanic crabs.

walked with firm step, without feeling any giddiness. Now I jumped a crevice the depth of which would have made me hesitate had it been among the glaciers on the land; now I ventured on the unsteady trunk of a tree, thrown across from one abyss to the other, without looking under my feet, having only eyes to admire the wild sites of this region.

There, monumental rocks, leaning on their regularly cut bases, seemed to defy all laws of equilibrium. From between their stony knees, trees sprang, like a jet under heavy pressure, and upheld others which upheld them. Natural towers, large scarps, cut perpendicularly, like a "curtain," inclined at an angle which the laws of gravitation could never have tolerated in terrestrial regions.

Two hours after quitting the *Nautilus*, we had crossed the lines of trees, and a hundred feet above our heads rose the top of the mountain, which cast a shadow on the brilliant irradiation of the opposite slope. Some petrified shrubs ran fantastically here and there. Fishes got up under our feet like birds in the long grass. The massive rocks were rent with impenetrable fractures, deep grottos, and unfathomable holes, at the bottom of which formidable creatures might be heard moving. My blood curdled when I saw enormous antennae blocking my road, or some frightful claw closing with a noise in the shadow of some cavity. Millions of luminous spots shone brightly in the midst of the darkness. They were the eyes of giant crustacea crouched in their holes; giant lobsters setting themselves up like halberdiers, and moving their claws with the clicking sound of pincers; titanic crabs, pointed like a gun on its carriage; and frightful looking poulps, interweaving their tentacles like a living nest of serpents.

We had now arrived on the first platform, where other surprises awaited me. Before us lay some picturesque ruins, which betrayed the hand of man, and not that of the Creator. There were vast heaps of stone, amongst which might be traced the vague and shadowy forms of castles and temples, clothed with a world of blossoming zoophytes, and over which, instead of ivy, sea-weed and fucus threw a thick vegetable mantle. But what was this portion of the globe which had been swallowed by cataclysms? Who had placed those rocks and stones like cromlechs of pre-historic times? Where was I? Whither had Captain Nemo's fancy hurried me?

I would fain have asked him; not being able to, I stopped him—I seized his arm. But shaking his head, and pointing to the highest

point of the mountain, he seemed to say—

"Come, come along; come hither!"

I followed, and in a few minutes I had climbed to the top, which for a criele of ten yards commanded the whole mass of rock.

I looked down the side we had just climbed. The mountain did not rise more than seven or eight hundred feet above the level of the plain; but on the opposite side it commanded from twice that height the depths of this part of the Atlantic. My eyes ranged far over a large space lit by a violent fulguration. In fact, the mountain was a volcano.

At fifty feet above the peak, in the midst of a rain of stones and scoriae, a large crater was vomiting forth torrents of lava which fell in a cascade of fire into the bosom of the liquid mass. Thus situated, this volcano lit the lower plain like an immense torch, even to the extreme limits of the horizon. I said that the submarine crater threw up lava, but no flames. Flames require the oxygen of the air to feed upon, and cannot be developed under water; but streams of lava, having in themselves the principles of their incandescence, can attain a white heat, fight vigorously against the liquid element, and turn it to vapour by contact.

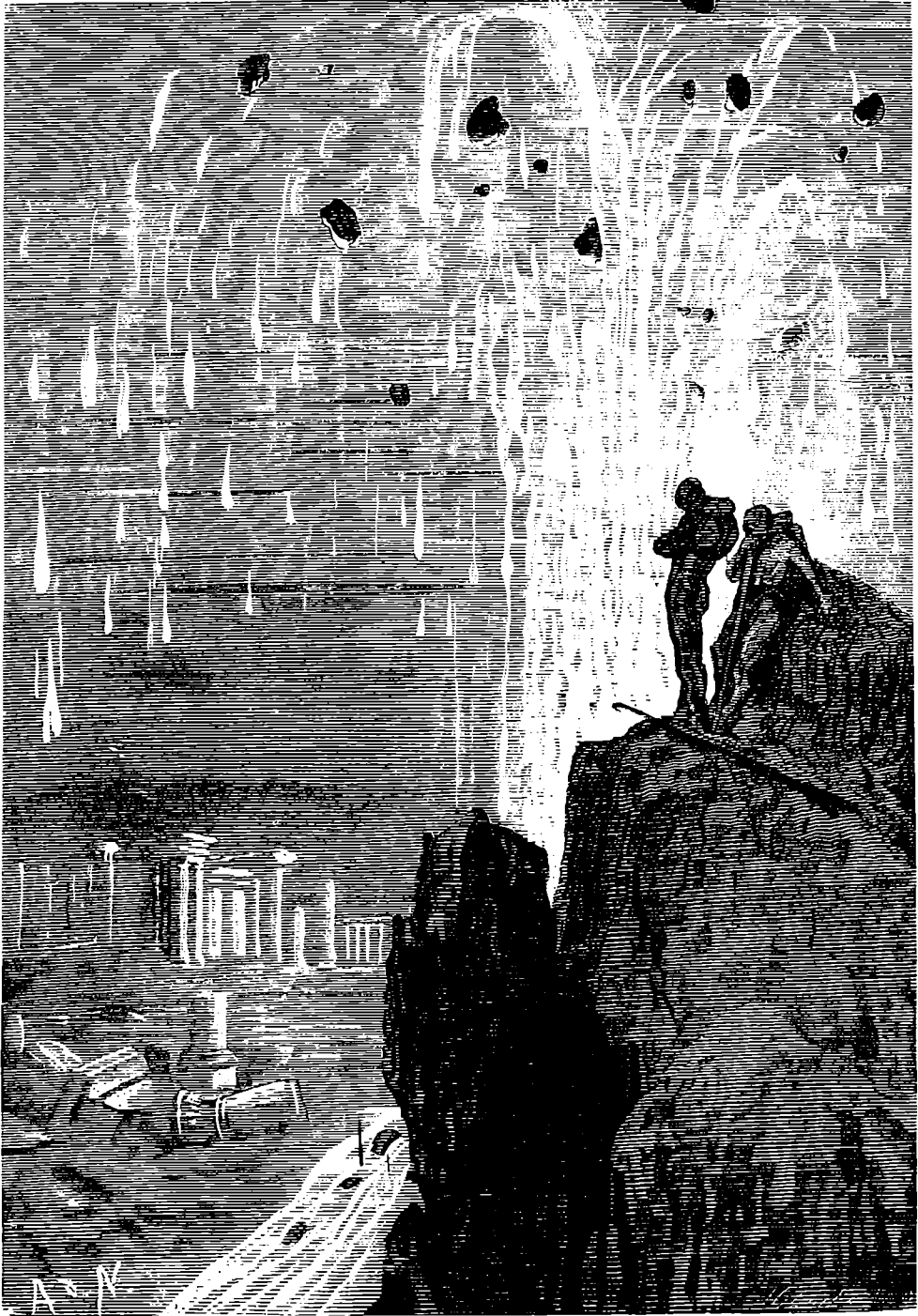
Rapid currents bearing all these gases in diffusion, and torrents of lava, slid to the bottom of the mountain like an eruption of Vesuvius on another Terra del Greco.

There, indeed, under my eyes, ruined, destroyed, lay a town,—its roofs open to the sky, its temples fallen, its arches dislocated, its columns lying on the ground, from which one could still recognise the massive character of Tuscan architecture. Further on, some remains of a gigantic aqueduct; here the high base of an Acropolis, with the floating outline of a Parthenon; there traces of a quay, as if an ancient port had formerly abutted on the borders of the ocean, and disappeared with its merchant vessels and its war-galleys. Further on again, long lines of sunken walls and broad deserted streets—a perfect Pompeii escaped beneath the waters. Such was the sight that Captain Nemo brought before my eyes!

Where was I? Where was I? I must know, at any cost. I tried to speak, but Captain Nemo stopped me by a gesture, and picking up a piece of chalk stone, advanced to a rock of black basalt, and traced the one word—

ATLANTIS

What a light shot through my mind! Atlantis, the ancient Meropis of Theopompus, the Atlantis of Plato, that continent denied by



“There, under my eyes, ruined, destroyed, lay a town.”

Origen, Jamblichus, D'Anville, Malte-Brun, and Humboldt, who placed its disappearance amongst the legendary tales admitted by Posidonius, Pliny, Ammianus Marcellinus, Tertullian, Engel, Buffon, and D'Avezac. I had it there now before my eyes, bearing upon it the unexceptionable testimony of its catastrophe. The region thus engulfed was beyond Europe, Asia, and Lybia, beyond the columns of Hercules, where those powerful people, the Atlantides, lived, against whom the first wars of ancient Greece were waged.

Thus, led by the strangest destiny, I was treading under foot the mountains of this continent, touching with my hand those ruins a thousand generations old, and contemporary with the geological epochs. I was walking on the very spot where the contemporaries of the first man had walked.

Whilst I was trying to fix in my mind every detail of this grand landscape, Captain Nemo remained motionless, as if petrified in mute ecstasy, leaning on a mossy stone. Was he dreaming of those generations long since disappeared? Was he asking them the secret of

human destiny? Was it here this strange man came to steep himself in historical recollections, and live again this ancient life,—he who wanted no modern one? What would I not have given to know his thoughts, to share them, to understand them! We remained for an hour at this place, contemplating the vast plain under the brightness of the lava, which was sometimes wonderfully intense. Rapid tremblings ran along the mountain caused by internal bubblings, deep noises distinctly transmitted through the liquid medium were echoed with majestic grandeur. At this moment the moon appeared through the mass of waters, and threw her pale rays on the buried continent. It was but a gleam, but what an indescribable effect! The Captain rose, cast one last look on the immense plain, and then bade me follow him.

We descended the mountain rapidly, and the mineral forest once passed, I saw the lantern of the *Nautilus* shining like a star. The Captain walked straight to it, and we got on board as the first rays of light whitened the surface of the ocean.

Twenty Thousand Leagues Under the Sea

CHAPTER X

THE SUBMARINE COAL MINES

THE next day, the 20th of February, I awoke very late: the fatigues of the previous night had prolonged my sleep until eleven o'clock. I dressed quickly, and hastened to find the course the *Nautilus* was taking. The instruments showed it to be still towards the south, with a speed of twenty miles an hour, and a depth of fifty fathoms.

The species of fishes here did not differ much from those already noticed. There were rays of giant size, five yards long, and endowed with great muscular strength, which enabled them to shoot above the waves; sharks of many kinds, amongst others, a glaucus of fifteen feet long, with triangular sharp teeth, and whose transparency rendered it almost invisible in the water; brown sagrae; humantins, prism-shaped, and clad with a tuberculous hide; sturgeons, resembling their congeners of the Mediterranean; trumpet syngnathes, a foot and a half long, furnished with greyish bladders, without teeth or tongue, and as supple as snakes.

Amongst bony fish, Conseil noticed some blackish makairas, about three yards long, armed at the upper jaw with a piercing sword; other bright coloured creatures, known in the time of Aristotle by the name of the sea-dragon, which are dangerous to capture on account of the spikes on their back; also some coryphaenes, with brown backs marked with little blue stripes, and surrounded with a gold border; some beautiful dorades; and sword-fish four-and-twenty feet long, swimming in troops, fierce animals, but rather herbivorous than carnivorous.

About four o'clock, the soil, generally composed of a thick mud mixed with petrified wood, changed by degrees, and it became more stony, and seemed strewn with conglomerate and pieces of basalt, with a sprinkling of lava and sulphurous obsidian. I thought that a mountainous region was succeeding the long plains; and accordingly, after a few evolutions of the *Nautilus*, I saw the southerly horizon blocked by a high wall which seemed to close all exit. Its summit evidently passed the level of the ocean. It must be a continent, or at least an island,—one of the Canaries, or of the Cape Verd Islands. The

bearings not being yet taken, perhaps designedly, I was ignorant of our exact position. In any case, such a wall seemed to me to mark the limits of that Atlantis, of which we had in reality passed over only the smallest part.

Much longer should I have remained at the window, admiring the beauties of sea and sky, but the panels closed. At this moment the *Nautilus* arrived at the side of this high perpendicular wall. What it would do, I could not guess. I returned to my room; it no longer moved. I laid myself down with the full intention of waking after a few hours' sleep; but it was eight o'clock the next day when I entered the saloon. I looked at the manometer. It told me that the *Nautilus* was floating on the surface of the ocean. Besides, I heard steps on the platform. I went to the panel. It was open; but, instead of broad daylight, as I expected, I was surrounded by profound darkness. Where were we? Was I mistaken? Was it still night? No; not a star was shining, and night has not that utter darkness.

I knew not what to think, when a voice near me said—

"Is that you, Professor?"

"Ah! Captain," I answered, "where are we?"

"Under ground, sir."

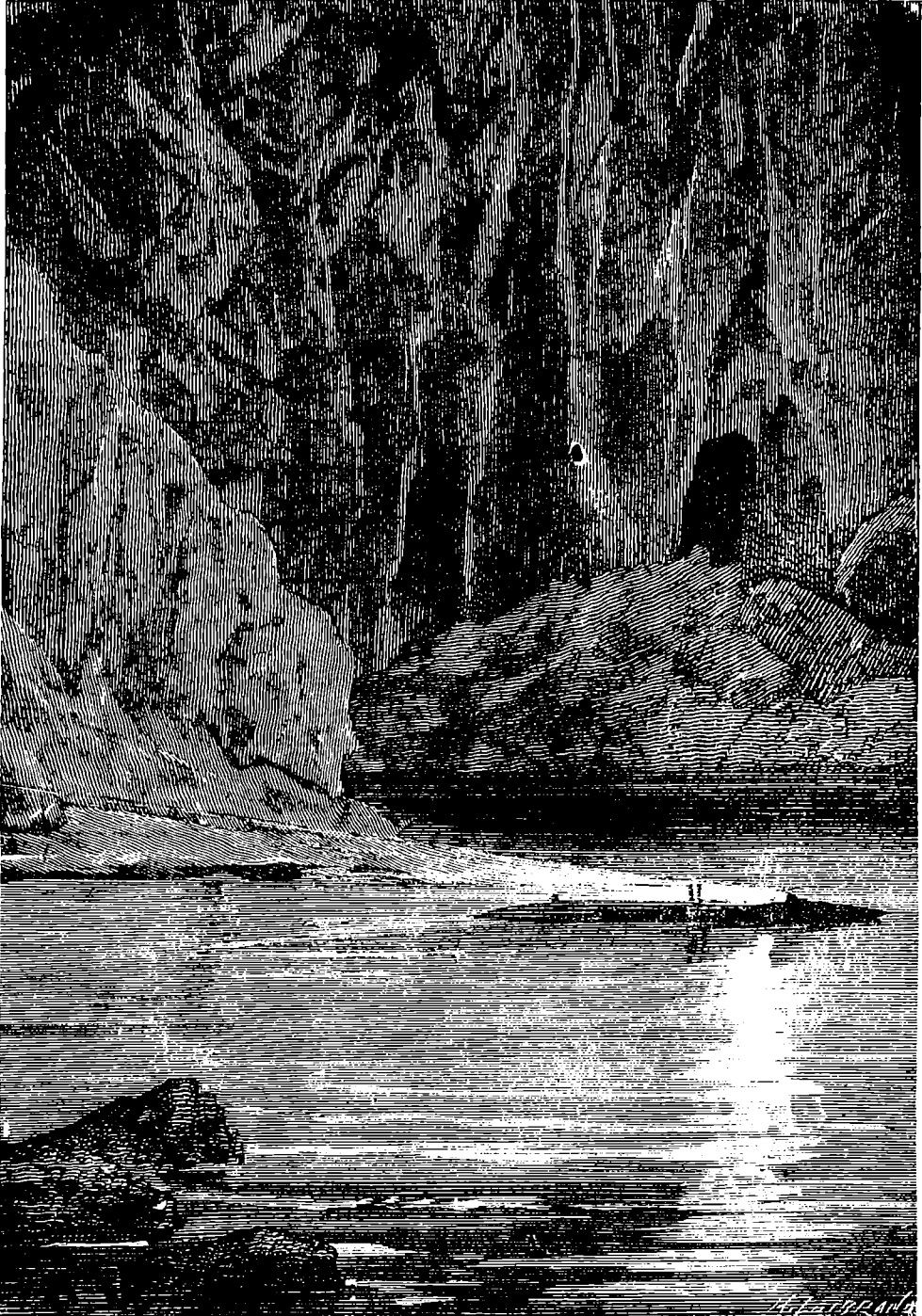
"Under ground!" I exclaimed. "And the *Nautilus* floating still?"

"It always floats."

"But I do not understand."

"Wait a few minutes, our lantern will be lit, and if you like light places, you will be satisfied."

I stood on the platform and waited. The darkness was so complete that I could not even see Captain Nemo; but looking to the zenith, exactly above my head, I seemed to catch an undecided gleam, a kind of twilight filling a circular hole. At this instant the lantern was lit, and its vividness dispelled the faint light. I closed my dazzled eyes for an instant, and then looked again. The *Nautilus* was stationary, floating near a mountain which formed a sort of quay. The lake then supporting it was a lake imprisoned by a circle of walls, measuring two miles in diameter, and six in circumference. Its



“The *Nautilus* was stationary, floating near a mountain which formed a kind of quay.”

level (the manometer showed) could only be the same as the outside level, for there must necessarily be a communication between the lake and the sea. The high partitions, leaning forward on their base, grew into a vaulted roof bearing the shape of an immense funnel turned upside down, the height being about five or six hundred yards. At the summit was a circular orifice, by which I had caught the slight gleam of light, evidently daylight.

"Where are we?" I asked.

"In the very heart of an extinct volcano, the interior of which has been invaded by the sea, after some great convulsion of the earth. Whilst you were sleeping, Professor, the *Nautilus* penetrated to this lagoon by a natural canal, which opens about ten yards beneath the surface of the ocean. This is its harbour of refuge, a sure, commodious, and mysterious one, sheltered from all gales. Show me, if you can, on the coasts of any of your continents or islands, a road which can give such perfect refuge from all storms."

"Certainly," I replied, "you are in safety here, Captain Nemo. Who could reach you in the heart of a volcano? But did I not see an opening at its summit?"

"Yes; its crater, formerly filled with lava, vapour, and flames, and which now gives entrance to the life-giving air we breathe."

"But what is this volcanic mountain?"

"It belongs to one of the numerous islands with which this sea is strewn,—to vessels a simple sandbank,—to us an immense cavern. Chance led me to discover it, and chance served me well."

"But of what use is this refuge, Captain? The *Nautilus* wants no port."

"No, sir; but it wants electricity to make it move, and the wherewithal to make the electricity—sodium to feed the elements, coal from which to get the sodium, and a coal-mine to supply the coal. And exactly on this spot the sea covers entire forests embedded during the geological periods, now mineralised, and transformed into coal; for me they are an inexhaustible mine."

"Your men follow the trade of miners here, then, Captain?"

"Exactly so. These mines extend under the waves like the mines of Newcastle. Here, in their diving dresses, pickaxe and shovel in hand, my men extract the coal, which I do not even ask from the mines of the earth. When I burn this combustible for the manufacture of sodium, the smoke, escaping from the crater of the mountain, gives it the appearance of a still active volcano."

"And we shall see your companion at work?"

"No; not this time at least; for I am in a hurry to continue our submarine tour of the earth. So I shall content myself with drawing from the reserve of sodium I already possess. The time for loading is one day only, and we continue our voyage. So if you wish to go over the cavern, and make the round of the lagoon, you must take advantage of to-day, M. Aronnax."

I thanked the Captain, and went to look for my companions, who had not yet left their cabin. I invited them to follow me without saying where we were. They mounted the platform. Conseil, who was astonished at nothing, seemed to look upon it as quite natural that he should wake under a mountain, after having fallen asleep under the waves. But Ned Land thought of nothing but finding whether the cavern had any exit. After breakfast, about ten o'clock, we went down on to the mountain.

"Here we are, once more on land," said Conseil.

"I do not call this land," said the Canadian. "And besides, we are not on it, but beneath it."

Between the walls of the mountain and the waters of the lake lay a sandy shore, which, at its greatest breadth, measured five hundred feet. On this soil one might easily make the tour of the lake. But the base of the high partitions was stony ground, with volcanic blocks and enormous pumice stones lying in picturesque heaps. All these detached masses, covered with enamel, polished by the action of the subterranean fires, shone resplendent by the light of our electric lantern. The mica dust from the shore, rising under our feet, flew like a cloud of sparks. The bottom now rose sensibly, and we soon arrived at long circuitous slopes, or inclined planes, which took us higher by degrees; but we were obliged to walk carefully among these conglomerates, bound by no cement, the feet slipping on the glassy trachyte, composed of crystal, felspar, and quartz.

The volcanic nature of this enormous excavation was confirmed on all sides, and I pointed it out to my companions.

"Picture to yourselves," said I, "what this crater must have been when filled with boiling lava, and when the level of the incandescent liquid rose to the orifice of the mountain, as though melted on the top of a hot plate."

"I can picture it perfectly," said Conseil. "But, sir, will you tell me why the Great

Architect has suspended operations, and how it is that the furnace is replaced by the quiet waters of the lake?"

"Most probably, Conseil, because some convulsion beneath the ocean produced that very opening which has served as a passage for the *Nautilus*. Then the waters of the Atlantic rushed into the interior of the mountain. There must have been a terrible struggle between the two elements, a struggle which ended in the victory of Neptune. But many ages have run out since then, and the submerged volcano is now a peaceable grotto."

"Very well," replied Ned Land; "I accept the explanation, sir; but, in our own interests, I regret that the opening of which you speak was not made above the level of the sea."

"But, friend Ned," said Conseil, "if the passage had not been under the sea, the *Nautilus* could not have gone through it."

We continued ascending. The steps became more and more perpendicular and narrow. Deep excavations, which we were obliged to cross, cut them here and there; sloping masses had to be turned. We slid upon our knees and crawled along. But Conseil's dexterity and the Canadian's strength surmounted all obstacles. At a height of about thirty-one feet, the nature of the ground changed without becoming more practicable. To the conglomerate and trachyte succeeded black basalt, the first dispread in layers full of bubbles, the latter forming regular prisms, placed like a colonnade supporting the spring of the immense vault, an admirable specimen of natural architecture. Between the blocks of basalt wound long streams of lava, long since grown cold, encrusted with bituminous rays; and in some places there were spread large carpets of sulphur. A more powerful light shone through the upper crater, shedding a vague glimmer over these volcanic depressions for ever buried in the bosom of this extinguished mountain. But our upward march was soon stopped at a height of about two hundred and fifty feet by impassable obstacles. There was a complete vaulted arch overhanging us, and our ascent was changed to a circular walk. At the last change vegetable life began to struggle with the mineral. Some shrubs, and even some trees, grew from the fractures of the walls. I recognised some euphorbias, with the caustic sugar coming from them; heliotropes, quite incapable of justifying their name, sadly drooped their clusters of flowers, both their colour and perfume half gone. Here and there some chrysanthemums grew timidly at the foot of an aloe with long sickly-looking leaves. But

between the streams of lava, I saw some little violets still slightly perfumed, and I admit that I smelt them with delight. Perfume is the soul of the flower, and sea-flowers, those splendid hydrophytes, have no soul.

We had arrived at the foot of some sturdy dragon-trees, which had pushed aside the rocks with their strong roots, when Ned Land exclaimed—

"Ah! sir, a hive! a hive!"

"A hive!" I replied, with a gesture of incredulity.

"Yes, a hive," repeated the Canadian, "and bees humming round it."

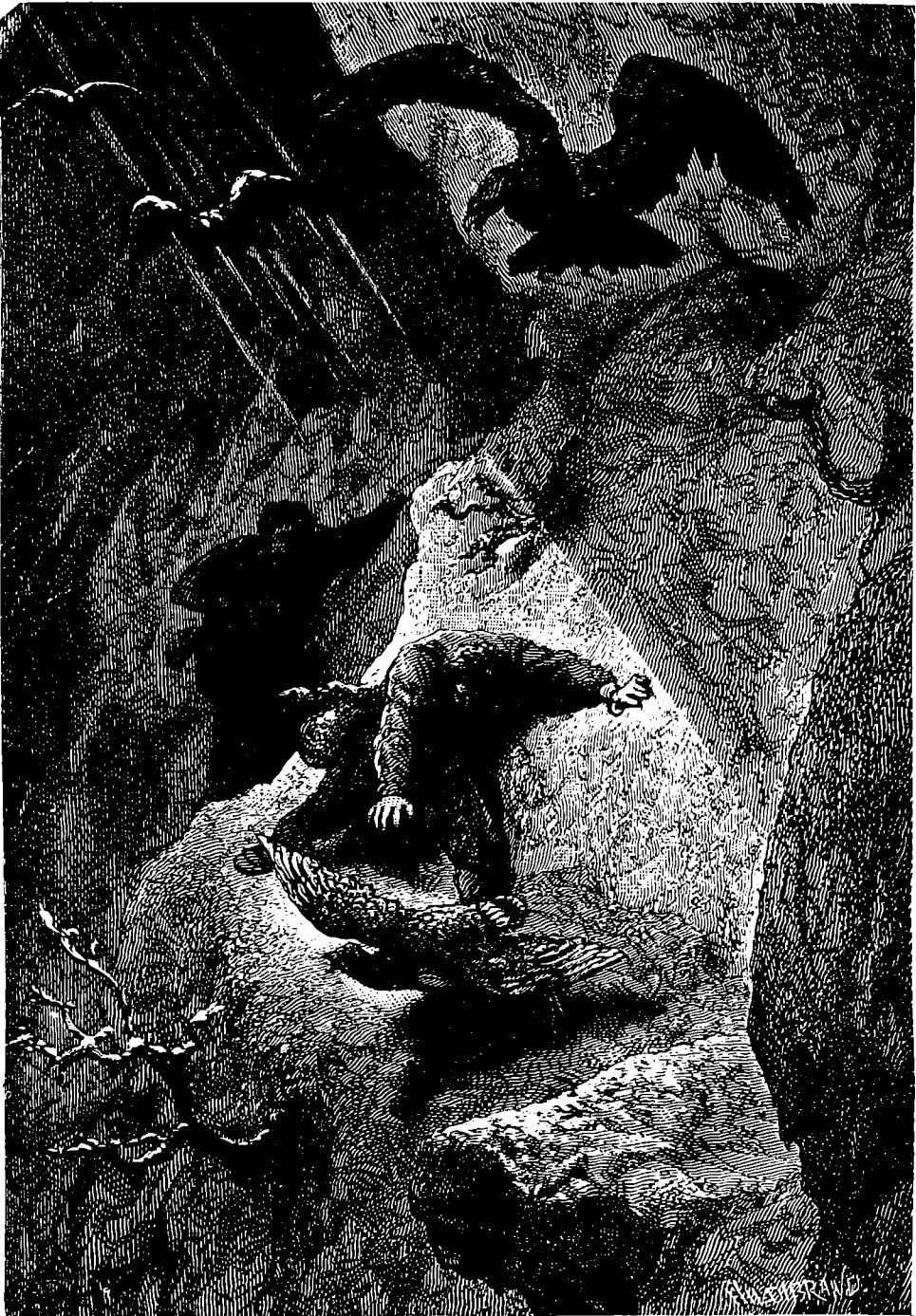
I approached, and was bound to believe my own eyes. There, at a hole bored in one of the dragon-trees, were some thousands of these ingenious insects, so common in all the Canaries, and whose produce is so much esteemed. Naturally enough, the Canadian wished to gather the honey, and I could not well oppose his wish. A quantity of dry leaves, mixed with sulphur, he lit with a spark from his flint, and he began to smoke out the bees. The humming ceased by degrees, and the hive eventually yielded several pounds of the sweetest honey, with which Ned Land filled his haversack.

"When I have mixed this honey with the paste of the artocarpus," said he, "I shall be able to offer you a succulent cake."

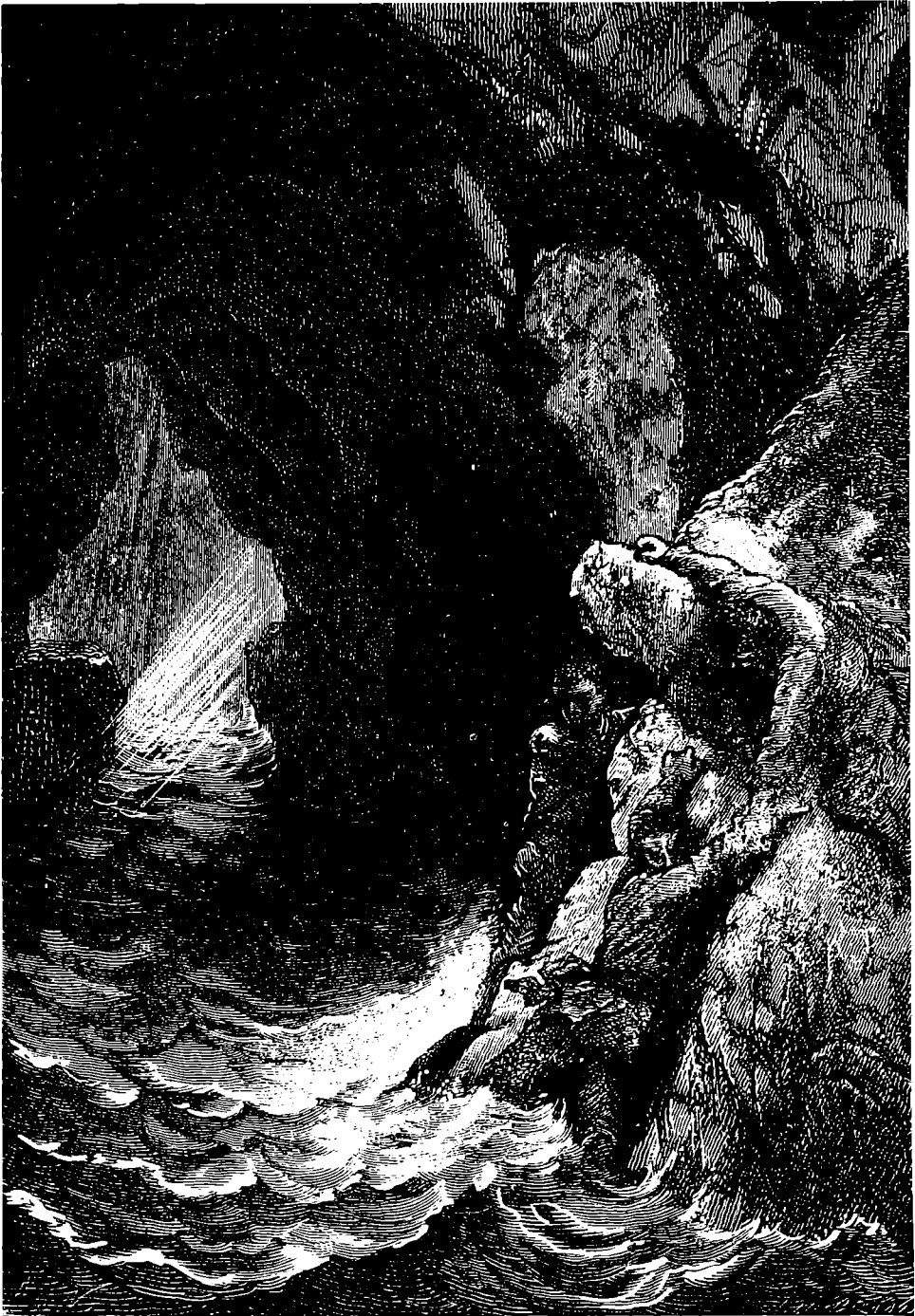
"Upon my word," said Conseil, "it will be gingerbread."

"Never mind the gingerbread," said I; "let us continue our interesting walk."

At every turn of the path we were following, the lake appeared in all its length and breadth. The lantern lit up the whole of its peaceable surface which knew neither ripple nor wave. The *Nautilus* remained perfectly immovable. On the platform, and on the mountain, the ship's crew were working like black shadows clearly carved against the luminous atmosphere. We were now going round the highest crest of the first layers of rock which upheld the roof. I then saw that bees were not the only representatives of the animal kingdom in the interior of this volcano. Birds of prey hovered here and there in the shadows, or fled from their nests on the top of the rocks. There were sparrow-hawks with white breasts, and kestrels, and down the slopes scampered, with their long legs, several fine fat bustards. I leave any one to imagine the covetousness of the Canadian at the sight of this savoury game, and whether he did not regret having no gun. But he did his best to replace the lead by stones, and after several fruitless attempts, he



“He risked his life twenty times before reaching the bird.”



“We were now obliged to descend towards the shore.”

succeeded in wounding a magnificent bird. To say that he risked his life twenty times before reaching it, is but the truth; but he managed so well, that the creature joined the honeycakes in his bag. We were now obliged to descend towards the shore, the crest becoming impracticable. Above us the crater seemed to gape like the mouth of a well. From this place the sky could be clearly seen, and clouds, dissipated by the west wind, leaving behind them, even on the summit of the mountain, their misty remnants—certain proof that they were only moderately high, for the volcano did not rise more than eight hundred feet above the level of the ocean. Half an hour after the Canadian's last exploit we had regained the inner shore. Here the flora was represented by large carpets of marine crystal, a little umbel-

liferous plant very good to pickle, which also bears the name of pierce-stone, and sea-fennel. Conseil gathered some bundles of it. As to the fauna, it might be counted by thousands of crustacea of all sorts, lobsters, crabs, palaemons, spider crabs, chameleon shrimps, and a large number of shells, rockfish and limpets. Three-quarters of an hour later, we had finished our circuitous walk, and were on board. The crew had just finished loading the sodium, and the *Nautilus* could have left that instant. But Captain Nemo gave no order. Did he wish to wait until night, and leave the submarine passage secretly? Perhaps so. Whatever it might be, the next day, the *Nautilus*, having left its port, steered clear of all land at a few yards beneath the waves of the Atlantic.

Twenty Thousand Leagues Under the Sea

CHAPTER XI

THE SARGASSO SEA

THAT day the *Nautilus* crossed a singular part of the Atlantic Ocean. No one can be ignorant of the existence of a current of warm water, known by the name of the Gulf Stream. After leaving the Gulf of Florida, we went in the direction of Spitzbergen. But before entering the Gulf of Mexico, about the forty-fifth degree of north latitude, this current divides into two arms, the principal one going towards the coast of Ireland and Norway, whilst the second bends to the south about the height of the Azores; then, touching the African shore, and describing a lengthened oval, returns to the Antilles. This second arm—it is rather a collar than an arm—surround with its circles of warm water that portion of the cold, quiet, immovable ocean called the Sargasso Sea, a perfect lake in the open Atlantic: it takes no less than three years for the great current to pass round it. Such was the region the *Nautilus* was now visiting, a perfect meadow, a close carpet of seaweed, fucus, and tropical berries, so thick and so compact, that the stem of a vessel could hardly tear its way through it. And Captain Nemo, not wishing to entangle his screw in this herbaceous mass, kept some yards beneath the surface of the waves. The name Sargasso comes from the Spanish word "sargazzo," which signified kelp. This kelp or varech, or berry-plant, is the principal formation of this immense bank. And this is the reason, according to the learned Maury, the author of "The Physical Geography of the Globe," why these hydrophytes unite in the peaceful basin of the Atlantic. The only explanation which can be given, he says, seems to me to result from the experience known to all the world. Place in a vase some fragments of cork or other floating body, and give to the water in the vase a circular movement, the scattered fragments will unite in a group in the centre of the liquid surface, that is to say, in the part least agitated. In the phenomenon we are considering, the Atlantic is the vase, the Gulf Stream the circular current, and the Sargasso Sea the central point at which the floating bodies unite.

I share Maury's opinion, and I was able to study the phenomenon in the very midst, where vessels rarely penetrate. Above us

floated products of all kinds, heaped up among these brownish plants; trunks of trees torn from the Andes or the Rocky Mountains, and floated by the Amazon or the Mississippi; numerous wrecks, remains of keels, or ships' bottoms, side planks stove in, and so weighted with shells and barnacles, that they could not again rise to the surface. And time will one day justify Maury's other opinion, that these substances thus accumulated for ages, will become petrified by the action of the water, and will then form inexhaustible coal-mines—a precious reserve prepared by far-seeing Nature for the moment when men shall have exhausted the mines of continents.

In the midst of this inextricable mass of plants and seaweed, I noticed some charming pink halcyons and actiniae, with their long tentacles trailing after them; medusae, green, red, and blue, and the great rhyostoms of Cuvier, the large umbrella of which was bordered and festooned with violet.

All the day of the 22nd of February we passed in the Sargasso Sea, where such fish as are partial to marine plants and fuci find abundant nourishment. The next, the ocean had returned to its accustomed aspect. From this time for nineteen days, from the 23rd of February to the 12th of March, the *Nautilus* kept in the middle of the Atlantic, carrying us at a constant speed of a hundred leagues in twenty-four hours. Captain Nemo evidently intended accomplishing his submarine programme, and I imagined that he intended, after doubling Cape Horn, to return to the Australian seas of the Pacific. Ned Land had cause for fear. In these large seas, void of islands, we could not attempt to leave the boat. Nor had we any means of opposing Captain Nemo's will. Our only course was to submit; but what we could neither gain by force nor cunning, I liked to think might be obtained by persuasion. This voyage ended, would he not consent to restore our liberty, under an oath never to reveal his existence?—an oath of honour which we should have religiously kept. But we must consider that delicate question with the Captain. But was I free to claim this liberty? Had he not himself said from the beginning, in the firmest

manner, that the secret of his life exacted from him our lasting imprisonment on board the *Nautilus*? And would not my four months' silence appear to him a tacit acceptance of our situation? And would not a return to the subject result in raising suspicions which might be hurtful to our projects, if at some future time a favourable opportunity offered to return to them?

During the nineteen days mentioned above, no incident of any note happened to signalise our voyage. I saw little of the Captain; he was at work. In the library I often found his books left open, especially those on Natural History. My work on submarine depths, conned over by him, was covered with marginal notes, often contradicting my theories and systems; but the Captain contented himself with thus purging my work; it was very rare for him to discuss it with me. Sometimes I heard the melancholy tones of his organ; but only at night, in the midst of the deepest obscurity, when the *Nautilus* slept upon the deserted ocean. During this part of our voyage we sailed whole days on the surface of the waves. The sea seemed abandoned. A few sailing-vessels, on the road to India, were making for the Cape of Good Hope. One day we were followed by the boats of a whaler, who, no doubt, took us for some enormous whale of great price; but Captain Nemo did not wish the worthy fellows to lose their time and trouble, so ended the chase by plunging under the water. Our navigation continued until the 13th of March; that day the *Nautilus* was employed in taking soundings, which greatly interested me. We had then made about 13,000 leagues since our departure from the high seas of the Pacific. The bearings gave us 45° 37' south latitude, and 37° 53' west longitude. It was the same water in which Captain Denham of the *Herald* sounded 7000 fathoms without finding the bottom. There, too, Lieutenant Parker, of the American frigate *Congress*, could not touch the bottom with 15,140 fathoms. Captain Nemo intended seeking the bottom of the ocean by a diagonal sufficiently lengthened by means of lateral planes placed at an angle of forty-five degrees with the water-line of the *Nautilus*. Then the screw set to work at its maximum speed, its four blades beating the waves with indescribable force. Under this powerful pressure the hull of the *Nautilus* quivered like a sonorous chord, and sank regularly under the water.

At 7000 fathoms I saw some blackish tops rising from the midst of the waters; but these summits might belong to high mountains like

the Himalayas or Mount Blanc, even higher; and the depth of the abyss remained incalculable. The *Nautilus* descended still lower, in spite of the great pressure. I felt the steel plates tremble at the fastenings of the bolts; its bars bent, its partitions groaned; the windows of the saloon seemed to curve under the pressure of the waters. And this firm structure would doubtless have yielded, if, as its Captain had said, it had not been capable of resistance like a solid block. In skirting the declivity of these rocks, lost under the water, I still saw some shells, some serpulæ and spinorbes, still living, and some specimens of asteriads. But soon this last representative of animal life disappeared; and at the depth of more than three leagues, the *Nautilus* had passed the limits of submarine existence, even as a balloon does when it rises above the respirable atmosphere. We had attained a depth of 16,000 yards (four leagues), and the sides of the *Nautilus* then bore a pressure of 1600 atmospheres, that is to say, 3200 pounds to each square two-fifths of an inch of its surface.

"What a situation to be in!" I exclaimed. "To overrun these deep regions where man has never trod! Look, Captain, look at these magnificent rocks, these uninhabited grottoes, these lowest receptacles of the globe, where life is no longer possible! What unknown sights are here! Why should we be unable to preserve a remembrance of them?"

"Would you like to carry away more than the remembrance?" said Captain Nemo.

"What do you mean by those words?"

"I mean to say that nothing is easier than to take a photographic view of this submarine region."

I had not time to express my surprise at this new proposition, when, at Captain Nemo's call, an objective was brought into the saloon. Through the widely opened panel, the liquid mass was bright with electricity, which was distributed with such uniformity, that not a shadow, not a gradation, was to be seen in our manufactured light. The *Nautilus* remained motionless, the force of its screw subdued by the inclination of its planes: the instrument was propped on the bottom of the oceanic site, and in a few seconds we had obtained a perfect negative. I here give the positive, from which may be seen those primitive rocks, which have never looked upon the light of heaven; that lowest granite which forms the foundation of the globe; those deep grottoes, woven in the stony mass whose outlines were of such sharpness, and the border lines of which is marked in black, as if done by the brush of some



“I heard the melancholy tones of his organ.”

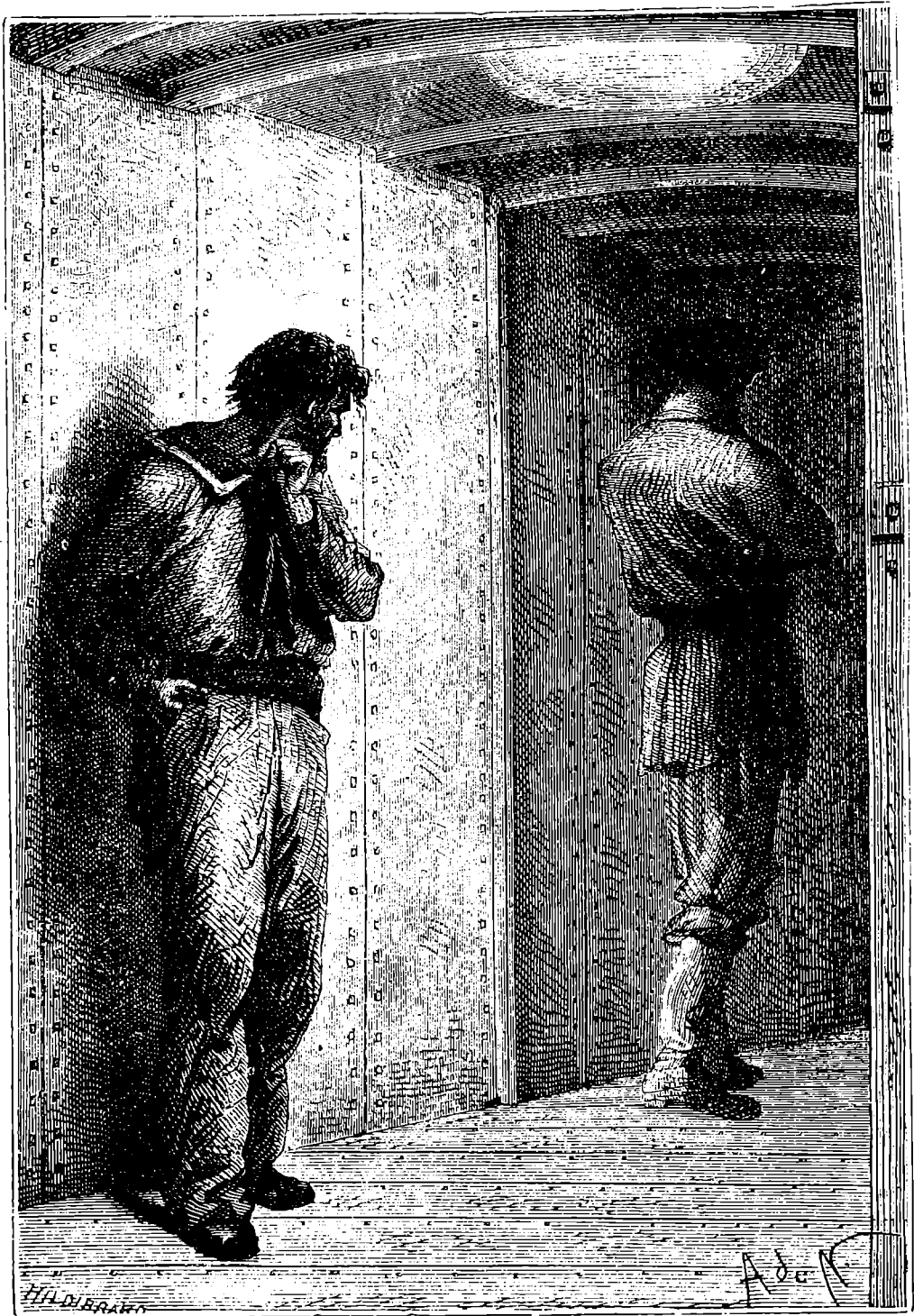
Flemish artist. Beyond that again a horizon of mountains, an admirable undulating line, forming the prospective of the landscape. I cannot describe the effect of these smooth, black, polished rocks, without moss, without a spot, and of strange forms, standing solidly on the sandy carpet, which sparkled under the jets of our electric light.

But the operation being over, Captain Nemo said, "Let us go up; we must not abuse our position, nor expose the *Nautilus* too long to such great pressure."

"Go up again!" I exclaimed.

"Hold well on."

I had not time to understand why the Captain cautioned me thus, when I was thrown forward on to the carpet. At a signal from the Captain, its screw was shipped, and its blades raised vertically; the *Nautilus* shot into the air like a balloon, rising with stunning rapidity, and cutting the mass of waters with a sonorous agitation. Nothing was visible; and in four minutes it had shot through the four leagues which separated it from the ocean, and after emerging like a flying-fish, fell, making the waves rebound to an enormous height.



“When Ned met the Captain, his eyes lit up with suppressed rage.”

Twenty Thousand Leagues Under the Sea

CHAPTER XII

CACHALOTS AND WHALES

DURING the nights of the 13th and 14th of March, the *Nautilus* returned to its southerly course. I fancied that, when on a level with Cape Horn, he would turn the helm westward, in order to beat the Pacific seas, and so complete the tour of the world. He did nothing of the kind, but continued on his way to the southern regions. Where was he going to? To the pole? It was madness! I began to think that the Captain's temerity justified Ned Land's fears. For some time past the Canadian had not spoken to me of his projects of flight; he was less communicative, almost silent. I could see that this lengthened imprisonment was weighing upon him, and I felt that rage was burning within him. When he met the Captain, his eyes lit up with suppressed anger; and I feared that his natural violence would lead him into some extreme. That day, the 14th of March, Conseil and he came to me in my room. I inquired the cause of their visit.

"A simple question to ask you, sir," replied the Canadian.

"Speak, Ned."

"How many men are there on board the *Nautilus*, do you think?"

"I cannot tell, my friend."

"I should say that its working does not require a large crew."

"Certainly, under existing conditions, ten men, at the most, ought to be enough."

"Well, why should there be any more?"

"Why?" I replied, looking fixedly at Ned Land, whose meaning was easy to guess. "Because," I added, "if my surmises are correct, and if I have well understood the Captain's existence, the *Nautilus* is not only a vessel: it is also a place of refuge for those who, like its commander, have broken every tie upon earth."

"Perhaps so," said Conseil; "but, in any case, the *Nautilus* can only contain a certain number of men. Could not you, sir, estimate their maximum?"

"How, Conseil?"

"By calculation; given the size of the vessel, which you know, sir, and consequently the quantity of air it contains, knowing also how much each man expends at a breath, and comparing these results with the fact that the

Nautilus is obliged to go to the surface every twenty-four hours."

Conseil had not finished the sentence before I saw what he was driving at.

"I understand," said I; "but that calculation, though simple enough, can give but a very uncertain result."

"Never mind," said Ned Land, urgently.

"Here it is, then," said I. "In one hour each man consumes the oxygen contained in twenty gallons of air; and in twenty-four, that contained in 480 gallons. We must, therefore, find how many times 480 gallons of air the *Nautilus* contains."

"Just so," said Conseil.

"Or," I continued, "the size of the *Nautilus* being 1500 tons; and one ton holding 200 gallons, it contains 300,000 gallons of air, which, divided by 480, gives a quotient of 625. Which means to say, strictly speaking, that the air contained in the *Nautilus* would suffice for 625 men for twenty-four hours."

"Six hundred and twenty-five!" repeated Ned.

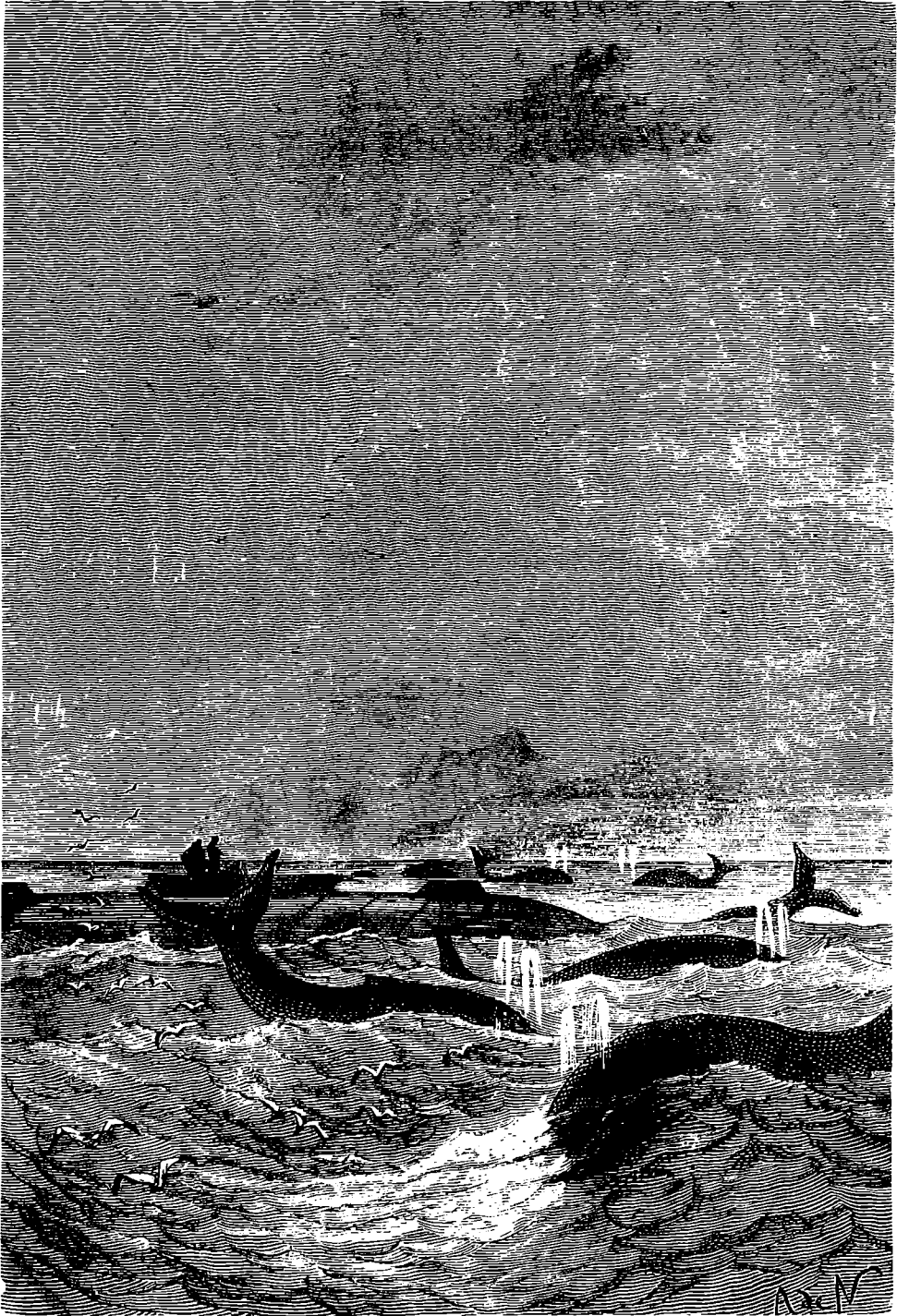
"But remember, that all of us, passengers, sailors, and officers included, would not form a tenth part of that number."

"Still too many for three men," murmured Conseil.

The Canadian shook his head, passed his hand across his forehead, and left the room without answering.

"Will you allow me to make one observation, sir?" said Conseil. "Poor Ned is longing for everything that he cannot have. His past life is always present to him; everything that we are forbidden he regrets. His head is full of old recollections. And we must understand him. What has he to do here? Nothing; he is not learned like you, sir; and has not the same taste for the beauties of the sea that we have. He would risk everything to be able to go once more into a tavern in his own country."

Certainly the monotony on board must seem intolerable to the Canadian, accustomed as he was to a life of liberty and activity. Events were rare which could arouse him to any show of spirit; but that day an event did happen which recalled the bright days of the harpooner. About eleven in the morning,



“The Nautilus fell in with a troop of whales.”

being on the surface of the ocean, the *Nautilus* fell in with a troop of whales—an encounter which did not astonish me, knowing that these creatures, hunted to the death, had taken refuge in high latitudes.

We were seated on the platform, with a quiet sea. The month of October in those latitudes gave us some lovely autumnal days. It was the Canadian—he could not be mistaken—who signalled a whale on the eastern horizon. Looking attentively one might see its black back rise and fall with the waves five miles from the *Nautilus*.

“Ah!” exclaimed Ned Land, “if I was on board a whaler now such a meeting would give me pleasure. It is one of large size. See with what strength its blow-holes throw up columns of air and steam! Confound it, why am I bound to these steel plates?”

“What, Ned,” said I, “you have not forgotten your old ideas of fishing?”

“Can a whale-fisher ever forget his old trade, sir? Can he ever tire of the emotions caused by such a chase?”

“You have never fished in these seas, Ned?”

“Never, sir; in the northern only, and as much in Behring as in Davis Straits.”

“Then the southern whale is still unknown to you. It is the Greenland whale you have hunted up to this time, and that would not risk passing through the warm waters of the equator. Whales are localised, according to their kinds, in certain seas which they never leave. And if one of these creatures went from Behring to Davis Straits, it must be simply because there is a passage from one sea to the other, either on the American or the Asiatic side.”

“In that case, as I have never fished in these seas, I do not know the kind of whale frequenting them.”

“I have told you, Ned.”

“A greater reason for making their acquaintance,” said Conseil.

“Look! look!” exclaimed the Canadian, “they approach; they aggravate me; they know that I cannot get at them!”

Ned stamped his feet. His hand trembled, as he grasped an imaginary harpoon.

“Are these cetacea as large as those of the northern seas?” asked he.

“Very nearly, Ned.”

“Because I have seen large whales, sir, whales measuring a hundred feet. I have even been told that those of Hullamocho and Umgallick, of the Aleutian Islands, are sometimes a hundred and fifty feet long.”

“That seems to me exaggeration. These

creatures are only balaenopterons, provided with dorsal fins; and, like the cachalots, are generally much smaller than the Greenland whale.”

“Ah!” exclaimed the Canadian, whose eyes had never left the ocean, “they are coming nearer; they are in the same water as the *Nautilus*!”

Then returning to the conversation, he said—

“You spoke of the cachalot as a small creature. I have heard of gigantic ones. They are intelligent cetacea. It is said of some that they cover themselves with seaweed and fucus, and then are taken for islands. People encamp upon them, and settle there; light a fire,—

“And build houses,” said Conseil.

“Yes, joker,” said Ned Land. “And one fine day the creature plunges, carrying with it all the inhabitants to the bottom of the sea.”

“Something like the travels of Sinbad the Sailor,” I replied, laughing.

“Ah!” suddenly exclaimed Ned Land, “it is not one whale; there are ten,—there are twenty,—it is a whole troop! And I not able to do anything! hand and feet tied!”

“But, friend Ned,” said Conseil, “why do you not ask Captain Nemo’s permission to chase them?”

Conseil had not finished his sentence when Ned Land had lowered himself through the panel to seek the Captain. A few minutes afterwards the two appeared together on the platform.

Captain Nemo watched the troop of cetacea playing on the waters about a mile from the *Nautilus*.

“They are southern whales,” said he; “there goes the fortune of a whole fleet of whalers.”

“Well, sir,” asked the Canadian, “can I not chase them, if only to remind me of my old trade of harpooner?”

“And to what purpose?” replied Captain Nemo; “only to destroy! We have nothing to do with whale-oil on board.”

“But, sir,” continued the Canadian, “in the Red Sea you allowed us to follow the dugong.”

“Then it was to procure fresh meat for my crew. Here it would be killing for killing’s sake. I know that is a privilege reserved for man, but I do not approve of such murderous pastime. In destroying the southern whale (like the Greenland whale, an inoffensive creature), your traders do a culpable action, Master Land. They have already depopulated the whole of Baffin’s Bay, and are annihilating a



“They have already depopulated Baffin’s Bay, and are annihilating a class of useful animals.”

class of useful animals. Leave the unfortunate cetacea alone. They have plenty of natural enemies, cachalots, swordfish, and sawfish, without *your* troubling them."

The Captain was right. The barbarous and inconsiderate greed of these fishermen will one day cause the disappearance of the last whale in the ocean. Ned Land whistled "Yankee-doodle" between his teeth, thrust his hands into his pockets, and turned his back upon us. But Captain Nemo watched the troop of cetacea, and addressing me, said—

"I was right in saying that whales had natural enemies enough, without counting man. These will have plenty to do before long. Do you see, M. Aronnax, about eight miles to leeward, those blackish moving points?"

"Yes, Captain," I replied.

"Those are cachalots,—terrible animals, which I have sometimes met in troops of two or three hundred. As to *those*, they are cruel mischievous creatures; they would be right in exterminating them."

The Canadian turned quickly at the last words.

"Well, Captain," said he, "it is still time, in the interest of the whales."

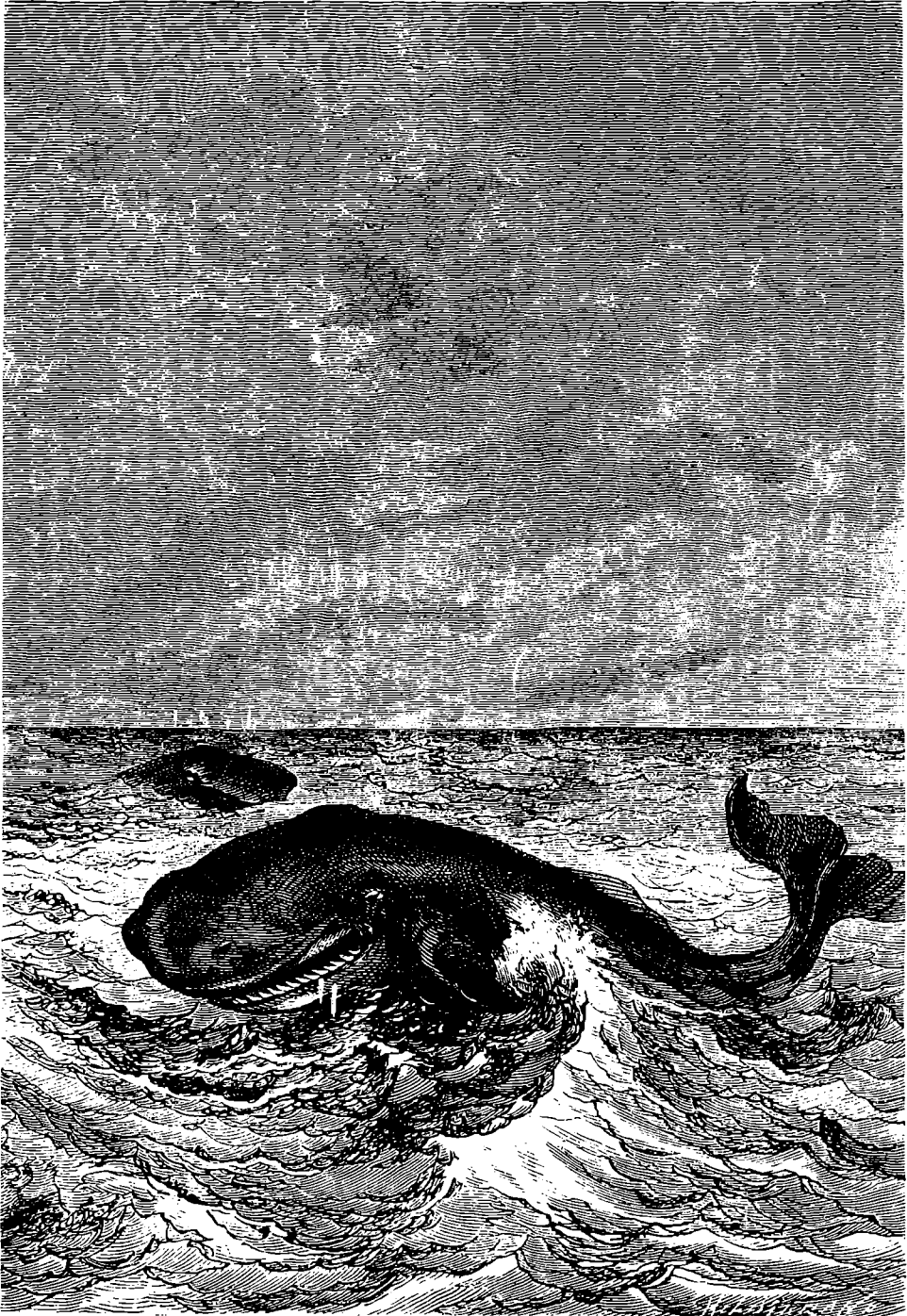
"It is useless to expose one's self, Professor. The *Nautilus* will disperse them. It is armed with a steel spur as good as Master Land's harpoon, I imagine."

The Canadian did not put himself out enough to shrug his shoulders. Attack cetacea with blows of a spur! Who had ever heard of such a thing?

"Wait, M. Aronnax," said Captain Nemo. "We will show you something you have never yet seen. We have no pity for these ferocious creatures. They are nothing but mouth and teeth."

Mouth and teeth! No one could better describe the macrocephalous cachalot, which is sometimes more than seventy-five feet long. Its enormous head occupies one-third of its entire body. Better armed than the whale, whose upper jaw is furnished only with whalebone, it is supplied with twenty-five large tusks, about eight inches long, cylindrical and conical at the top, each weighing two pounds. It is in the upper part of this enormous head, in great cavities divided by cartilages, that is to be found from six to eight hundred pounds of that precious oil called spermaceti. The cachalot is a disagreeable creature, more tadpole than fish, according to Fredol's description. It is badly formed, the whole of its left side being (if we may say it), a "failure," and being only able to see with its right eye. But the formidable troop

was nearing us. They had seen the whales and were preparing to attack them. One could judge beforehand that the cachalots would be victorious, not only because they were better built for attack than their inoffensive adversaries, but also because they could remain longer under water without coming to the surface. There was only just time to go to the help of the whales. The *Nautilus* went under water. Conseil, Ned Land, and I took our places before the window in the saloon, and Captain Nemo joined the pilot in his cage to work his apparatus as an engine of destruction. Soon I felt the beatings of the screw quicken, and our speed increased. The battle between the cachalots and the whales had already begun when the *Nautilus* arrived. They did not at first show any fear at the sight of this new monster joining in the conflict. But they soon had to guard against its blows. What a battle! The *Nautilus* was nothing but a formidable harpoon, brandished by the hand of its captain. It hurled itself against the fleshy mass, passing through from one part to the other, leaving behind it two quivering halves of the animal. It could not feel the formidable blows from their tails upon its sides, nor the shock which it produced itself, much more. One cachalot killed, it ran at the next, tacked on the spot that it might not miss its prey, going forwards and backwards, answering to its helm, plunging when the cetacean dived into the deep waters, coming up with it when it returned to the surface, striking it front or sideways, cutting or tearing in all directions, and at any pace, piercing it with its terrible spur. What carnage! What a noise on the surface of the waves! What sharp hissing, and what snorting peculiar to these enraged animals! In the midst of these waters, generally so peaceful, their tails made perfect billows. For one hour this wholesale massacre continued, from which the cachalots could not escape. Several times ten or twelve united tried to crush the *Nautilus* by their weight. From the window we could see their enormous mouths studded with tusks, and their formidable eyes. Ned Land could not contain himself, he threatened and swore at them. We could feel them clinging to our vessel like dogs worrying a wild boar in a copse. But the *Nautilus*, working its screw, carried them here and there, or to the upper levels of the ocean, without caring for their enormous weight, nor the powerful strain on the vessel. At length, the mass of cachalots broke up, the waves became quiet, and I felt that we were rising to the surface. The panel opened, and we hurried on to the platform. The sea was covered with



“They are nothing but mouth and teeth.”

mutilated bodies. A formidable explosion would not have divided and torn this fleshy mass with more violence. We were floating amid gigantic bodies, bluish on the back and white underneath, covered with enormous protuberances. Some terrified cachalots were flying towards the horizon. The waves were dyed red for several miles, and the *Nautilus* floated in a sea of blood. Captain Nemo joined us.

“Well, Master Land?” said he.

“Well, sir,” replied the Canadian, whose enthusiasm had somewhat calmed; “it is a terrible spectacle, certainly. But I am not a butcher. I am a hunter, and I call this a butchery.”

“It is a massacre of mischievous creatures,” replied the Captain; “and the *Nautilus* is not a butcher’s knife.”

“I like my harpoon better,” said the Canadian.

“Every one to his own,” answered the Captain, looking fixedly at Ned Land.

I feared he would commit some act of violence, which would end in sad consequences. But his anger was turned by the sight of a whale which the *Nautilus* had just come up with. The creature had not quite escaped from the cacha-

lot’s teeth. I recognised the southern whale by its flat head, which is entirely black. Anatomically, it is distinguished from the white whale and the North Cape whale by the seven cervical vertebrae, and it has two more ribs than its congeners. The unfortunate cetacean was lying on its side, riddled with holes from the bites, and quite dead. From its mutilated fin still hung a young whale which it could not save from the massacre. Its open mouth let the water flow in and out, murmuring like the waves breaking on the shore. Captain Nemo steered close to the corpse of the creature. Two of his men mounted its side, and I saw, not without surprise, that they were drawing from its breasts all the milk which they contained, that is to say, about two or three tons. The Captain offered me a cup of the milk, which was still warm. I could not help showing my repugnance to the drink; but he assured me that it was excellent, and not to be distinguished from cow’s milk. I tasted it, and was of his opinion. It was a useful reserve to us, for in the shape of salt butter or cheese it would form an agreeable variety from our ordinary food. From that day I noticed with uneasiness that Ned Land’s ill-will towards Captain Nemo increased, and I resolved to watch the Canadian’s gestures closely.

Twenty Thousand Leagues Under the Sea

CHAPTER XIII

THE ICEBERG

THE *Nautilus* was steadily pursuing its southerly course, following the fiftieth meridian with considerable speed. Did he wish to reach the pole? I did not think so, for every attempt to reach that point had hitherto failed. Again the season was far advanced, for in the antarctic regions, the 13th of March corresponds with the 13th of September of northern regions which begin at the equinoctial season. On the 14th of March I saw floating ice in latitude 55°, merely pale bits of debris from twenty to twenty-five feet long, forming banks over which the sea curled. The *Nautilus* remained on the surface of the ocean. Ned Land, who had fished in the arctic seas, was familiar with its icebergs; but Conseil and I admired them for the first time. In the atmosphere towards the southern horizon stretched a white dazzling band. English whalers have given it the name of "ice blink." However thick the clouds may be, it is always visible, and announces the presence of an ice pack or bank. Accordingly, larger blocks soon appeared, whose brilliancy changed with the caprices of the fog. Some of these masses showed green veins, as if long undulating lines had been traced with sulphate of copper; others resembled enormous amethysts with the light shining through them. Some reflected the light of day upon a thousand crystal facets. Others shaded with vivid calcareous reflections resembled a perfect town of marble. The more we neared the south, the more these floating islands increased both in number and importance.

At the sixtieth degree of latitude, every pass had disappeared. But seeking carefully, Captain Nemo soon found a narrow opening, through which he boldly slipped, knowing, however, that it would close behind him. Thus, guided by this clever hand, the *Nautilus* passed through all the ice with a precision which quite charmed Conseil; icebergs or mountains, ice-fields or smooth plains, seeming to have no limits, drift ice or floating ice packs, or plains broken up, called *Palchs* when they are circular, and streams when they are made up of long strips. The temperature was very low; the thermometer exposed to the air marked two or three degrees below zero, but we were warmly

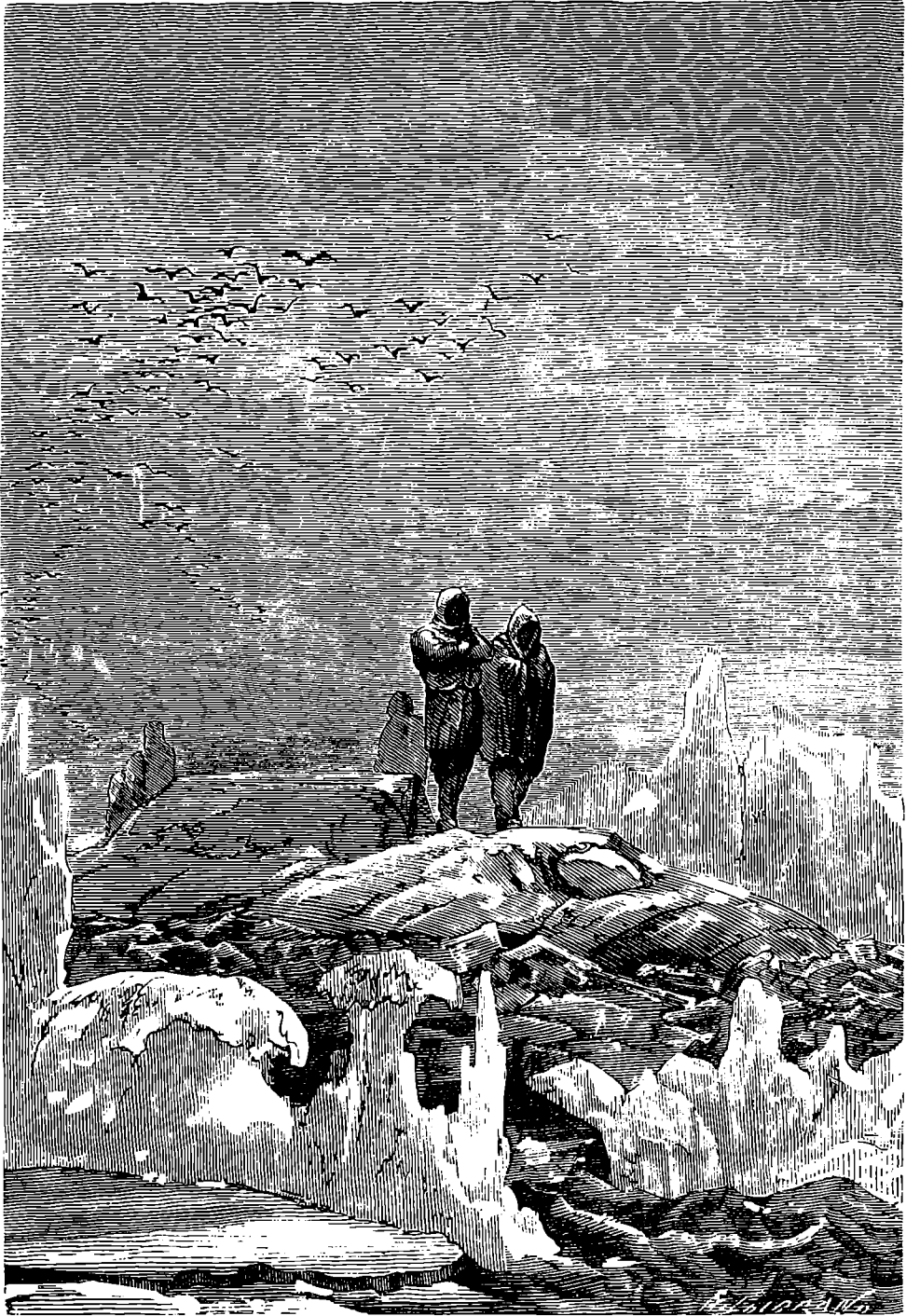
clad with fur, at the expense of the sea-bear and seal. The interior of the *Nautilus*, warmed regularly by its electric apparatus, defied the most intense cold. Besides, it would only have been necessary to go some yards beneath the waves to find a more bearable temperature. Two months earlier we should have had perpetual daylight in these latitudes; but already we had three or four hours night, and by and by there would be six months of darkness in these circumpolar regions. On the 15th of March we were in the latitude of New Shetland and South Orkney. The Captain told me that formerly numerous tribes of seal inhabited them; but that English and American whalers, in their rage for destruction, massacred both old and young; thus where there was once life and animation, they had left silence and death.

About eight o'clock on the morning of the 16th of March, the *Nautilus*, following the fifty-fifth meridian, cut the antarctic polar circle. Ice surrounded us on all sides, and closed the horizon. But Captain Nemo went from one opening to another, still going higher. I cannot express my astonishment at the beauties of these new regions. The ice took most surprising forms. Here the grouping formed an oriental town, with innumerable mosques and minarets; there a fallen city thrown to the earth, as it were, by some convulsion of nature. The whole aspect was constantly changed by the oblique rays of the sun, or lost in the greyish fog amidst hurricanes of snow. Detonations and falls were heard on all sides, great overthrows of icebergs, which altered the whole landscape like a diorama. Often seeing no exit, I thought we were definitively prisoners; but instinct guiding him at the slightest indication, Captain Nemo would discover a new pass. He was never mistaken when he saw the thin threads of bluish water trickling along the ice-fields; and I had no doubt that he had already ventured into the midst of these antarctic seas before. On the 16th of March, however, the ice-fields absolutely blocked our road. It was not the iceberg itself, as yet, but vast fields cemented by the cold. But this obstacle could not stop Captain Nemo: he hurled himself against it with frightful violence.



Mildred

“‘An iceberg,’ said the Canadian to me.”



“In spite of the means employed to break up the ice, the *Nautilus* remained immovable.”

The *Nautilus* entered the brittle mass like a wedge, and split it with frightful crackings. It was the battering ram of the ancients hurled by infinite strength. The ice, thrown high in the air, fell like hail around us. By its own power of impulsion our apparatus made a canal for itself; sometimes carried away by its own impetus it lodged on the ice-field, crushing it with its weight, and sometimes buried beneath it, dividing it by a simple pitching movement, producing large rents in it. Violent gales assailed us at this time, accompanied by thick fogs, through which, from one end of the platform to the other, we could see nothing. The wind blew sharply from all points of the compass, and the snow lay in such hard heaps that we had to break it with blows of a pickaxe. The temperature was always at five degrees below zero; every outward part of the *Nautilus* was covered with ice. A rigged vessel could never have worked its way there, for all the rigging would have been entangled in the blocked-up gorges. A vessel without sails, with electricity for its motive power, and wanting no coal, could alone brave such high latitudes. At length, on the 18th of March, after many useless assaults, the *Nautilus* was positively blocked. It was no longer either streams, packs, or ice-fields, but an interminable and immovable barrier, formed by mountains soldered together.

"An iceberg!" said the Canadian to me.

I knew that to Ned Land, as well as to all other navigators who had preceded us, this was an inevitable obstacle. The sun appearing for an instant at noon, Captain Nemo took an observation as near as possible, which gave our situation at 51° 30' longitude and 67° 39' of south latitude. We had advanced one degree more in this antarctic region. Of the liquid surface of the sea there was no longer a glimpse. Under the spur of the *Nautilus* lay stretched a vast plain, entangled with confused blocks. Here and there sharp points, and slender needles rising to a height of 200 feet; further on a steep shore, hewn as it were with an axe, and clothed with greyish tints; huge mirrors, reflecting a few rays of sunshine, half drowned in the fog. And over this desolate face of Nature a stern silence reigned, scarcely broken by the flapping of the wings of petrels and puffins. Everything was frozen—even the noise. The *Nautilus* was then obliged to stop in its adventurous course amid these fields of ice. In spite of our efforts, in spite of the powerful means employed to break up the ice, the *Nautilus* remained immovable. Generally, when we can proceed no further, we have return

still open to us; but here return was as impossible as advance, for every pass had closed behind us; and for the few moments when we were stationary, we were likely to be entirely blocked, which did, indeed, happen about two o'clock in the afternoon, the fresh ice forming around its sides with astonishing rapidity. I was obliged to admit that Captain Nemo was more than imprudent. I was on the platform at that moment. The Captain had been observing our situation for some time past, when he said to me—

"Well, sir, what do you think of this?"

"I think that we are caught, Captain."

"So, M. Aronnax, you really think that the *Nautilus* cannot disengage itself?"

"With difficulty, Captain; for the season is already too far advanced for you to reckon on the breaking up of the ice."

"Ah! sir," said Captain Nemo, in an ironical tone, "you will always be the same. You see nothing but difficulties and obstacles. I affirm that not only can the *Nautilus* disengage itself, but also that it can go further still."

"Further to the south?" I asked, looking at the Captain.

"Yes, sir; it shall go to the pole."

"To the pole!" I exclaimed, unable to repress a gesture of incredulity.

"Yes," replied the Captain, coldly, "to the antarctic pole,—to that unknown point from whence springs every meridian of the globe. You know whether I can do as I please with the *Nautilus*!"

Yes, I knew that. I knew that this man was bold, even to rashness. But to conquer those obstacles which bristled round the south pole, rendering it more inaccessible than the north, which had not yet been reached by the boldest navigators,—was it not a mad enterprise, one which only a maniac would have conceived? It then came into my head to ask Captain Nemo if he had ever discovered that pole which had never yet been trodden by a human creature?

"No, sir," he replied; "but we will discover it together. Where others have failed, I will not fail. I have never yet led my *Nautilus* so far into southern seas; but, I repeat, it shall go further yet."

"I can well believe you, Captain," said I, in a slightly ironical tone. "I believe you! Let us go ahead! There are no obstacles for us! Let us smash this iceberg! Let us blow it up; and if it resists, let us give the *Nautilus* wings to fly over it!"

"Over it, sir!" said Captain Nemo, quietly; "no, not *over* it, but *under* it!"

"Under it!" I exclaimed, a sudden idea of the

Captain's projects flashing upon my mind. I understood; the wonderful qualities of the *Nautilus* were going to serve us in this super-human enterprise.

"I see we are beginning to understand one another, sir," said the Captain, half smiling. "You begin to see the possibility—I should say the success—of this attempt. That which is impossible for an ordinary vessel, is easy to the *Nautilus*. If a continent lies before the pole, it must stop before the continent; but if, on the contrary, the pole is washed by open sea, it will go even to the pole."

"Certainly," said I, carried away by the Captain's reasoning; "if the surface of the sea is solidified by the ice, the lower depths are free by the providential law which has placed the maximum of density of the waters of the ocean one degree higher than freezing point; and, if I am not mistaken, the portion of this iceberg which is above the water, is as four to one to that which is below."

"Very nearly, sir; for one foot of iceberg above the sea there are three below it. If these ice mountains are not more than 300 feet above the surface, they are not more than 900 beneath. And what are 900 feet to the *Nautilus*?"

"Nothing, sir."

"It could even seek at greater depths that uniform temperature of sea-water, and there brave with impunity the thirty or forty degrees of surface cold."

"Just so, sir—just so," I replied, getting animated.

"The only difficulty," continued Captain Nemo, "is that of remaining several days without renewing our provision of air."

"Is that all? The *Nautilus* has vast reservoirs; we can fill them, and they will supply us with all the oxygen we want."

"Well thought of, M. Aronnax," replied the Captain, smiling. "But not wishing you to accuse me of rashness, I will first give you all my objections."

"Have you any more to make?"

"Only one. It is possible, if the sea exists at the south pole, that it may be covered; and, consequently, we shall be unable to come to the surface."

"Good, sir! but do you forget that the *Nautilus* is armed with a powerful spur, and could we not send it diagonally against these fields of ice, which would open at the shock?"

"Ah! sir, you are full of ideas to-day."

"Besides, Captain," I added, enthusiastically, "why should we not find the sea open at the south pole as well as at the north? The

frozen poles and the poles of the earth do not coincide, either in the southern or in the northern regions; and, until it is proved to the contrary, we may suppose either a continent or an ocean free from ice at these two points of the globe."

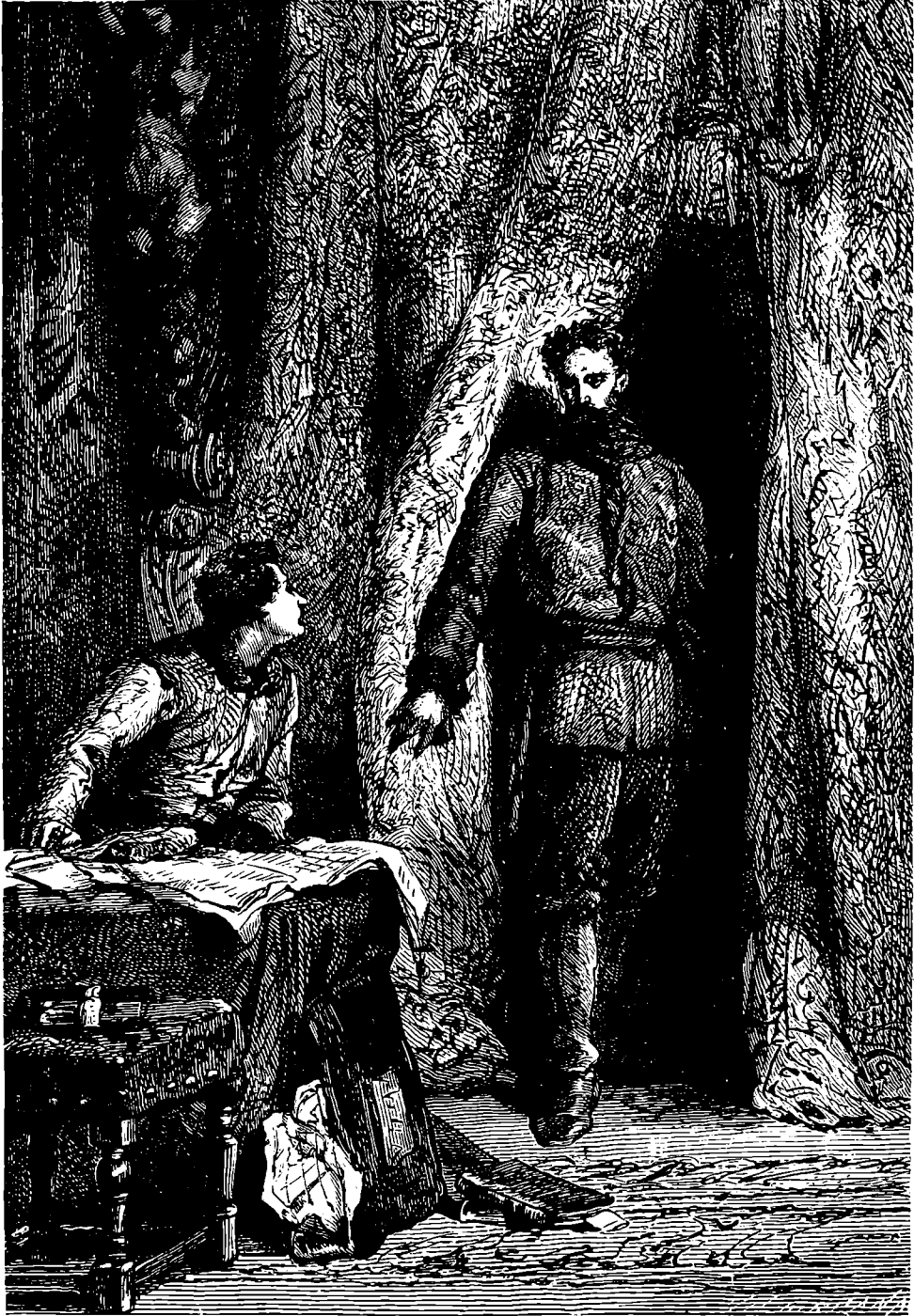
"I think so too, M. Aronnax," replied Captain Nemo. "I only wish you to observe that, after having made so many objections to my project, you are now crushing me with arguments in its favour!"

The preparations for this audacious attempt now began. The powerful pumps of the *Nautilus* were working air into the reservoirs and storing it at high pressure. About four o'clock, Captain Nemo announced the closing of the panels on the platform. I threw one last look at the massive iceberg which we were going to cross. The weather was clear, the atmosphere pure enough, the cold very great, being twelve degrees below zero; but the wind having gone down, this temperature was not so unbearable. About ten men mounted the sides of the *Nautilus*, armed with pickaxes to break the ice around the vessel, which was soon free. The operation was quickly performed, for the fresh ice was still very thin. We all went below. The usual reservoirs were filled with the newly liberated water, and the *Nautilus* soon descended. I had taken my place with Conseil in the saloon; through the open window we could see the lower beds of the Southern Ocean. The thermometer went up, the needle of the compass deviated on the dial. At about 900 feet, as Captain Nemo had foreseen, we were floating beneath the undulating bottom of the iceberg. But the *Nautilus* went lower still—it went to the depth of four hundred fathoms. The temperature of the water at the surface showed twelve degrees, it was now only eleven; we had gained two. I need not say the temperature of the *Nautilus* was raised by its heating apparatus to a much higher degree; every manoeuvre was accomplished with wonderful precision.

"We shall pass it, if you please, sir," said Conseil.

"I believe we shall," I said, in a tone of firm conviction.

In this open sea, the *Nautilus* had taken its course direct to the pole, without leaving the fifty-second meridian. From 67° 30' to 90°, twenty-two degrees and a half of latitude remained to travel; that is, about five hundred leagues. The *Nautilus* kept up a mean speed of twenty-six miles an hour—the speed of an express train. If that was kept up, in forty hours we should reach the pole.



“The door of the saloon opened, and Captain Nemo appeared.”

For a part of the night the novelty of the situation kept us at the window. The sea was lit with the electric lantern; but it was deserted; fishes did not sojourn in these imprisoned waters; they only found there a passage to take them from the antarctic ocean to the open polar sea. Our pace was rapid; we could feel it by the quivering of the long steel body. About two in the morning, I took some hours' repose, and Conseil did the same. In crossing the waist I did not meet Captain Nemo: I supposed him to be in the pilot's cage. The next morning, the 19th of March, I took my post once more in the saloon. The electric log told me that the speed of the *Nautilus* had been slackened. It was then going towards the surface; but prudently emptying its reservoirs very slowly. My heart beat fast. Were we going to emerge and regain the open polar atmosphere? No! A shock told me that the *Nautilus* had struck the bottom of the iceberg, still very thick, judging from the deadened sound. We had indeed "struck," to use a sea expression, but in an inverse sense, and at a thousand feet deep. This would give three thousand feet of ice above us; one thousand being above the water-mark. The iceberg was then higher than at its borders—not a very reassuring fact. Several times that day the *Nautilus* tried again, and every time it struck the wall which lay like a ceiling above it. Sometimes it met with but 900 yards, only 200 of which rose above the surface. It was twice the

height it was when the *Nautilus* had gone under the waves. I carefully noted the different depths, and thus obtained a submarine profile of the cabin as it was developed under the water. That night no change had taken place in our situation. Still ice between four and five hundred yards in depth! It was evidently diminishing, but still what a thickness between us and the surface of the ocean! It was then eight. According to the daily custom on board the *Nautilus*, its air should have been renewed four hours ago; but I did not suffer much, although Captain Nemo had not yet made any demand upon his reserve of oxygen. My sleep was painful that night; hope and fear besieged me by turns: I rose several times. The groping of the *Nautilus* continued. About three in the morning, I noticed that the lower surface of the iceberg was only about fifty feet deep. One hundred and fifty feet now separated us from the surface of the waters. The iceberg was by degrees becoming an ice-field, the mountains a plain. My eyes never left the manometer. We were still rising diagonally to the surface, which sparkled under the electric rays. The iceberg was stretching both above and beneath into lengthening slopes; mile after mile it was getting thinner. At length, at six in the morning of that memorable day, the 19th of March, the door of the saloon opened, and Captain Nemo appeared.

"The sea is open!" was all he said.

Twenty Thousand Leagues Under the Sea

CHAPTER XIV

THE SOUTH POLE

I RUSHED on to the platform. Yes! the open sea, with but a few scattered pieces of ice and moving icebergs;—a long stretch of sea; a world of birds in the air, and myriads of fishes under those waters, which varied from intense blue to olive green, according to the bottom. The thermometer marked three degrees centigrade above zero. It was comparatively spring, shut up as we were behind this iceberg, whose lengthened mass was dimly seen on our northern horizon.

“Are we at the pole?” I asked the Captain, with a beating heart.

“I do not know,” he replied. “At noon I will take our bearings.”

“But will the sun show himself through this fog?” said I, looking at the leaden sky.

“However little it shows, it will be enough,” replied the Captain.

About ten miles south, a solitary island rose to a height of one hundred and four yards. We made for it, but carefully, for the sea might be strewn with banks. One hour afterwards we had reached it, two hours later we had made the round of it. It measured four or five miles in circumference. A narrow canal separated it from a considerable stretch of land, perhaps a continent, for we could not see its limits. The existence of this land seemed to give some colour to Maury’s hypothesis. The ingenious American has remarked, that between the south pole and the sixtieth parallel, the sea is covered with floating ice of enormous size, which is never met with in the North Atlantic. From this fact he has drawn the conclusion that the antarctic circle encloses considerable continents, as icebergs cannot form in open sea, but only on the coasts. According to these calculations, the mass of ice surrounding the southern pole forms a vast cap, the circumference of which must be, at least, 2500 miles. But the *Nautilus*, for fear of running aground, had stopped about three cables’ length from a strand over which reared a superb heap of rocks. The boat was launched; the Captain, two of his men bearing instruments, Conseil, and myself, were in it. It was ten in the morning. I had not seen Ned Land. Doubtless the Canadian did not wish to admit the presence of the south pole. A few strokes of the oar brought

us to the sand, where we ran ashore. Conseil was going to jump on to the land, when I held him back.

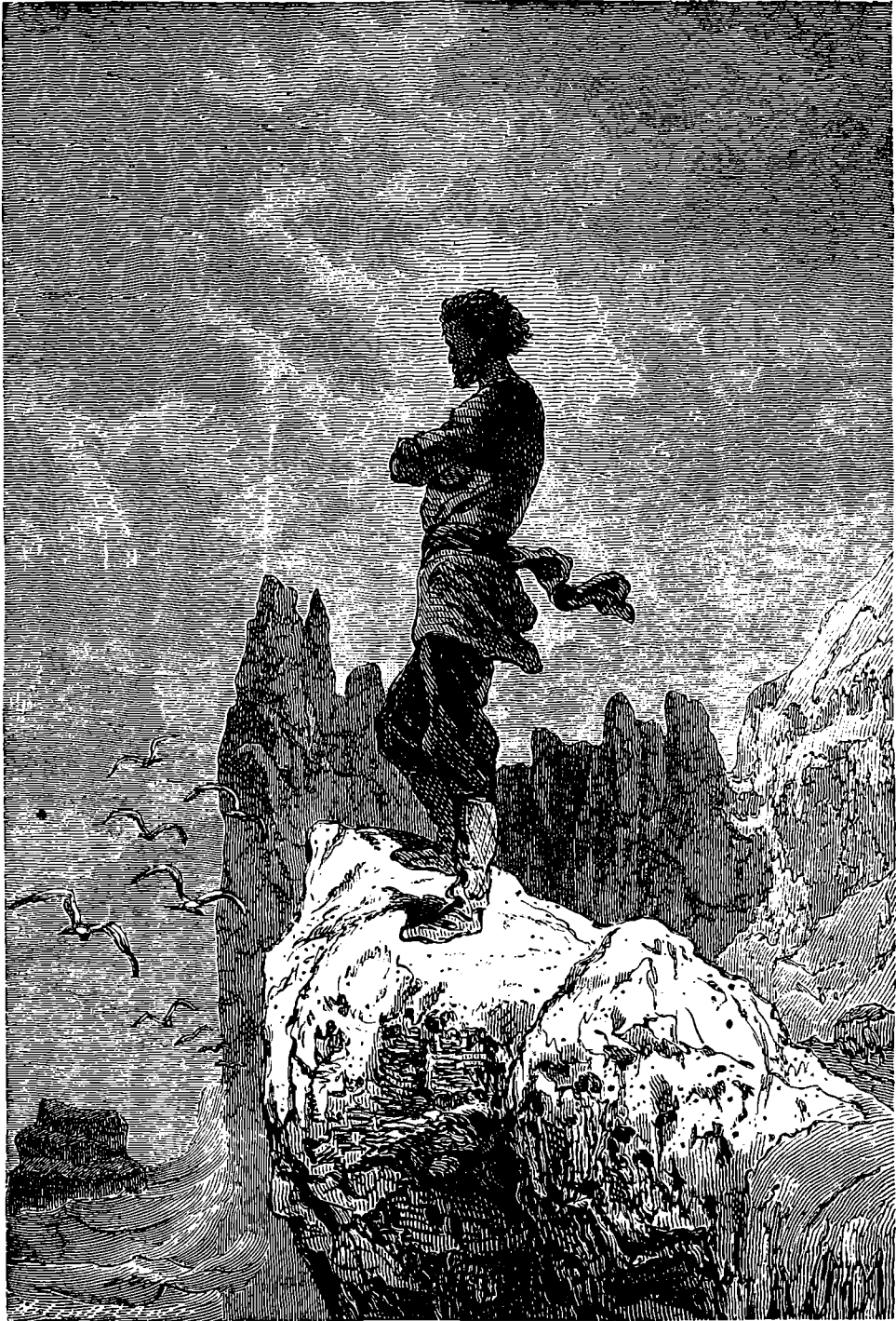
“Sir,” said I to Captain Nemo, “to you belongs the honour of first setting foot on this land.”

“Yes, sir,” said the Captain; “and if I do not hesitate to tread this south pole, it is because, up to this time, no human being has left a trace there.”

Saying this, he jumped lightly on to the sand. His heart beat with emotion. He climbed a rock, sloping to a little promontory, and there, with his arms crossed, mute and motionless, and with an eager look, he seemed to take possession of these southern regions. After five minutes passed in this ecstasy, he turned to us.

“When you like, sir.”

I landed, followed by Conseil, leaving the two men in the boat. For a long way the soil was composed of a reddish, sandy stone, something like crushed brick, scoriae, streams of lava, and pumice stones. One could not mistake its volcanic origin. In some parts, slight curls of smoke emitted a sulphurous smell, proving that the internal fires had lost nothing of their expansive powers, though, having climbed a high acclivity, I could see no volcano for a radius of several miles. We know that in those antarctic countries, James Ross found two craters, the Erebus and Terror, in full activity, on the 167th meridian, latitude 77° 32'. The vegetation of this desolate continent seemed to me much restricted. Some lichens of the species *unsnea melanoxantha* lay upon the black rocks; some microscopic plants, rudimentary diatoms, a kind of cells, placed between two quartz shells; long purple and scarlet fucus, supported on little swimming bladders, which the breaking of the waves brought to the shore. These constituted the meagre flora of this region. The shore was strewn with molluscs, little mussels, limpets, smooth bucards in the shape of a heart, and particularly some clios, with oblong membraneous bodies, the head of which was formed of two rounded lobes. I also saw myriads of northern clios, one and a quarter inches long, of which a whale would swallow a whole world at a mouthful; and some charming pretopods, perfect sea-butterflies,



“The Captain climbed a rock.”



“Thousands of bird fluttered and flew of all kinds.”

animating the waters on the skirts of the shore.

Amongst other zoophytes, there appeared on the high bottoms some coral shrubs, of that kind which, according to James Ross, live in the antarctic seas to the depth of more than 1000 yards. Then there were little kingfishers, belonging to the species *procellaria pelagica*, as well as a large number of asteriads, peculiar to these climates, and starfish studding the soil. But where life abounded most was in the air. There thousands of birds fluttered and flew of all kinds, deafening us with their cries; others crowded the rocks, looking at us as we passed by without fear, and pressing familiarly close by our feet. There were penguins, so agile in the water, that they have been taken for the rapid bonitos, heavy and awkward as they are on the ground; they were uttering harsh cries, a large assembly, sober in gesture, but extravagant in clamour. Amongst the birds I noticed the *chionis*, of the long-legged family, as large as pigeons, white, with a short conical beak, and the eye framed in a red circle. Conseil laid in a stock of them, for these winged creatures, properly prepared, make an agreeable meat. Albatrosses passed in the air (the expanse of their wings being at least four yards and a half), and justly called the vultures of the ocean; some gigantic petrels, and some damiers, a kind of small duck, the under part of whose body is black and white; then there were a whole series of petrels, some whitish, with brown-bordered wings, others blue, peculiar to the antarctic seas, and so oily, as I told Conseil, that the inhabitants of the Ferroe Islands had nothing to do before lighting them, but to put a wick in.

"A little more," said Conseil, "and they would be perfect lamps! After that, we cannot expect Nature to have previously furnished them with wicks!"

About half a mile further on, the soil was riddled with ruff's nests, a sort of laying ground, out of which many birds were issuing. Captain Nemo had some hundreds hunted. They uttered a cry like the braying of an ass, were about the size of a goose, slate colour on the body, white beneath, with a yellow line round their throats; they allowed themselves to be killed with a stone, never trying to escape. But the fog did not lift, and at eleven the sun had not yet shown itself. Its absence made me uneasy. Without it no observations were possible. How then could we decide whether we had reached the pole? When I rejoined Captain Nemo, I found him leaning on a piece of rock, silently watching the sky. He seemed impatient and vexed. But what was to be done? This rash and powerful man could not command the sun

as he did the sea. Noon arrived without the orb of day showing itself for an instant. We could not even tell its position behind the curtain of fog; and soon the fog turned to snow.

"Till to-morrow," said the Captain, quietly, and we returned to the *Nautilus* amid these atmospheric disturbances.

The tempest of snow continued till the next day. It was impossible to remain on the platform. From the saloon, where I was taking notes of incidents happening during this excursion to the polar continent, I could hear the cries of petrels and albatrosses sporting in the midst of this violent storm. The *Nautilus* did not remain motionless, but skirted the coast, advancing ten miles more to the south in the half light left by the sun as it skirted the edge of the horizon. The next day, the 20th of March, the snow had ceased. The cold was a little greater, the thermometer showing two degrees below zero. The fog was rising, and I hoped that that day our observation might be taken. Captain Nemo not having yet appeared, the boat took Conseil and myself to land. The soil was still of the same volcanic nature; everywhere were traces of lava, scoriae, and basalt; but the crater which had vomited them I could not see. Here, as lower down, this continent was alive with myriads of birds. But their rule was now divided with large troops of sea-mammals, looking at us with their soft eyes. There were several kinds of seals, some stretched on the earth, some on flakes of ice, many going in and out of the sea. They did not flee at our approach, never having had anything to do with man; and I reckoned that there were provisions there for hundreds of vessels.

"Sir," said Conseil, "will you tell me the names of these creatures?"

"They are seals and morses."

It was now eight in the morning. Four hours remained to us before the sun could be observed with advantage. I directed our steps towards a vast bay cut in the steep granite shore. There, I can aver that earth and ice were lost to sight by the numbers of sea-mammals covering them, and I involuntarily sought for old Proteus, the mythological shepherd who watched these immense flocks of Neptune. There were more seals than anything else, forming distinct groups, male and female, the father watching over his family, the mother suckling her little ones, some already strong enough to go a few steps. When they wished to change their place, they took little jumps, made by the contraction of their bodies, and helped awkwardly enough by their imperfect fin, which, as with the

lamantin, their congener, forms a perfect forearm. I should say that, in the water, which is their element—the spine of these creatures is flexible—with smooth and close skin, and webbed feet, they swim admirably. In resting on the earth they take the most graceful attitudes. Thus the ancients, observing their soft and expressive looks, which cannot be surpassed by the most beautiful look a woman can give, their clear voluptuous eyes, their charming positions, and the poetry of their manners, metamorphosed them, the male into a triton and the female into a mermaid. I made Conseil notice the considerable development of the lobes of the brain in these interesting cetaceans. No mammal, except man, has such a quantity of cerebral matter; they are also capable of receiving a certain amount of education, are easily domesticated, and I think, with other naturalists, that, if properly taught, they would be of great service as fishing-dogs. The greater part of them slept on the rocks or on the sand. Amongst these seals, properly so called, which have no external ears (in which they differ from the otter, whose ears are prominent), I noticed several varieties of stenorhynchi about three yards long, with a white coat, bulldog heads, armed with teeth in both jaws, four incisors at the top and four at the bottom, and two large canine teeth in the shape of a “fleur de lis.” Amongst them glided sea-elephants, a kind of seal, with short flexible trunks. The giants of this species measured twenty feet round, and ten yards and a half in length; but they did not move as we approached.

“These creatures are not dangerous?” asked Conseil.

“No; not unless you attack them. When they have to defend their young, their rage is terrible, and it is not uncommon for them to break the fishing-boats to pieces.”

“They are quite right,” said Conseil.

“I do not say they are not.”

Two miles further on we were stopped by the promontory which shelters the bay from the southerly winds. Beyond it we heard loud bellowings such as a troop of ruminants would produce.

“Good!” said Conseil; “a concert of bulls!”

“No; a concert of morses.”

“They are fighting!”

“They are either fighting or playing.”

We now began to climb the blackish rocks, amid unforeseen stumbles, and over stones which the ice made slippery. More than once I rolled over at the expense of my loins. Conseil, more prudent or more steady, did not stumble,

and helped me up, saying—

“If, sir, you would have the kindness to take wider steps, you would preserve your equilibrium better.”

Arrived at the upper ridge of the promontory, I saw a vast white plain covered with morses. They were playing amongst themselves, and what we heard were bellowings of pleasure, not of anger.

As I passed near these curious animals, I could examine them leisurely, for they did not move. Their skins were thick and rugged, of a yellowish tint, approaching to red; their hair was short and scant. Some of them were four yards and a quarter long. Quieter, and less timid than their congeners of the north, they did not, like them, place sentinels round the outskirts of their encampment. After examining this city of morses, I began to think of returning. It was eleven o'clock, and if Captain Nemo found the conditions favourable for observations, I wished to be present at the operation. We followed a narrow pathway running along the summit of the steep shore. At half-past eleven we had reached the place where we landed. The boat had run aground bringing the Captain. I saw him standing on a block of basalt, his instruments near him, his eyes fixed on the northern horizon, near which the sun was then describing a lengthened curve. I took my place beside him, and waited without speaking. Noon arrived, and, as before, the sun did not appear. It was a fatality. Observations were still wanting. If not accomplished to-morrow, we must give up all idea of taking any. We were indeed exactly at the 20th of March. To-morrow, the 21st, would be the equinox; the sun would disappear behind the horizon for six months, and with its disappearance the long polar night would begin. Since the September equinox it had emerged from the northern horizon, rising by lengthened spirals up to the 21st of December. At this period, the summer solstice of the northern regions, it had begun to descend; and to-morrow was to shed its last rays upon them. I communicated my fears and observations to Captain Nemo.

“You are right, M. Aronnax,” said he; “if to-morrow I cannot take the altitude of the sun, I shall not be able to do it for six months. But precisely because chance has led me into these seas on the 21st of March, my bearings will be easy to take, if at twelve we can see the sun.”

“Why, Captain?”

“Because then the orb of day describes such lengthened curves, that it is difficult to measure exactly its height above the horizon, and grave errors may be made with instruments.”

"What will you do then?"

"I shall only use my chronometer," replied Captain Nemo. "If to-morrow, the 21st of March, the disc of the sun, allowing for refraction, is exactly cut by the northern horizon, it will show that I am at the south pole."

"Just so," said I. "But this statement is not mathematically correct, because the equinox does not necessarily begin at noon."

"Very likely, sir; but the error will not be a hundred yards, and we do not want more. Till to-morrow then!"

Captain Nemo returned on board. Conseil and I remained to survey the shore, observing and studying until five o'clock. Then I went to bed, not, however, without invoking, like the Indian, the favour of the radiant orb. The next day, the 21st of March, at five in the morning, I mounted the platform. I found Captain Nemo there.

"The weather is lightening a little," said he. "I have some hope. After breakfast we will go on shore, and choose a post for observation."

That point settled, I sought Ned Land. I wanted to take him with me. But the obstinate Canadian refused, and I saw that his taciturnity and his bad humour grew day by day. After all I was not sorry for his obstinacy under the circumstances. Indeed, there were too many seals on shore, and we ought not to lay such temptation in this unreflecting fisherman's way. Breakfast over, we went on shore. The *Nautilus* had gone some miles further up in the night. It was a whole league from the coast, above which reared a sharp peak about five hundred yards high. The boat took with me Captain Nemo, two men of the crew, and the instruments, which consisted of a chronometer, a telescope, and a barometer. While crossing, I saw numerous whales belonging to the three kinds peculiar to the southern seas; the whale, or the English "right whale," which has no dorsal fin; the "humpback," or balaenopter, with reeved chest, and large whitish fins, which, in spite of its name, do not form wings; and the fin-back, of a yellowish brown, the liveliest of all the cetacea. This powerful creature is heard a long way off when he throws to a great height columns of air and vapour, which look like whirlwinds of smoke. These different mammals were disporting themselves in troops in the quiet waters; and I could see that this basin of the antarctic pole served as a place of refuge to the cetacea too closely tracked by the hunters. I also noticed long whitish lines of salpae, a kind of gregarious mollusc, and large medusae floating between

the reeds.

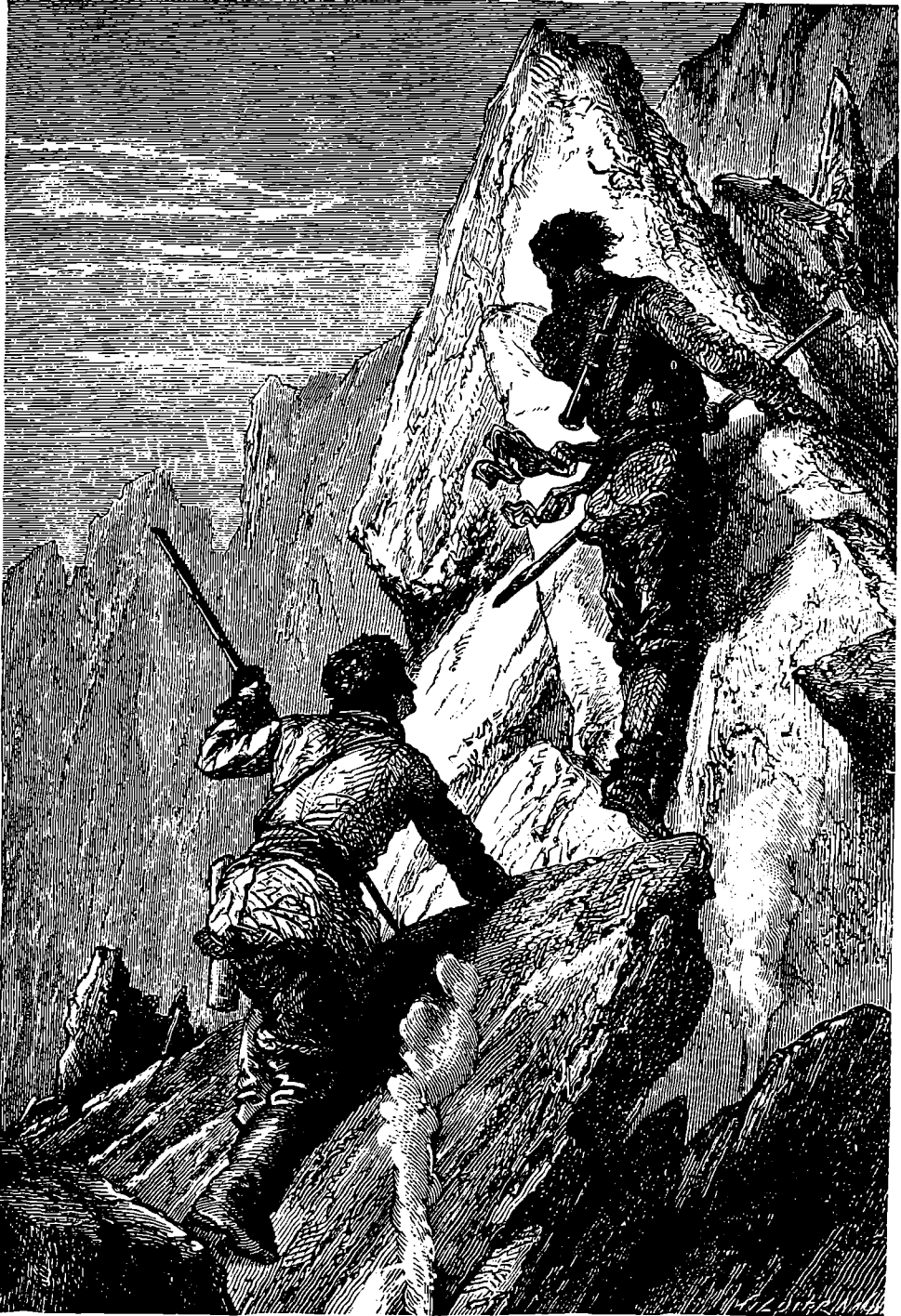
At nine we landed; the sky was brightening, the clouds were flying to the south, and the fog seemed to be leaving the cold surface of the waters. Captain Nemo went towards the peak, which he doubtless meant to be his observatory. It was a painful ascent over the sharp lava and the pumice stones, in an atmosphere often impregnated with a sulphurous smell from the smoking cracks. For a man unaccustomed to walk on land, the Captain climbed the steep slopes with an agility I never saw equalled, and which a hunter would have envied. We were two hours getting to the summit of this peak, which was half porphyry and half basalt. From thence we looked upon a vast sea, which, towards the north, distinctly traced its boundary line upon the sky. At our feet lay fields of dazzling whiteness. Over our heads a pale azure, free from fog. To the north the disc of the sun seemed like a ball of fire, already horned by the cutting of the horizon. From the bosom of the water rose sheaves of liquid jets by hundreds. In the distance lay the *Nautilus* like a cetacean asleep on the water. Behind us, to the south and east, an immense country, and a chaotic heap of rocks and ice, the limits of which were not visible. On arriving at the summit, Captain Nemo carefully took the mean height of the barometer, for he would have to consider that in taking his observations. At a quarter to twelve, the sun, then seen only by refraction, looked like a golden disc shedding its last rays upon this deserted continent, and seas which never man had yet ploughed. Captain Nemo, furnished with a lenticular glass, which, by means of a mirror, corrected the refraction, watched the orb sinking below the horizon by degrees, following a lengthened diagonal. I held the chronometer. My heart beat fast. If the disappearance of the half-disc of the sun coincided with twelve o'clock on the chronometer, we were at the pole itself.

"Twelve!" I exclaimed.

"The South Pole!" replied Captain Nemo, in a grave voice, handing me the glass, which showed the orb cut in exactly equal parts by the horizon.

I looked at the last rays crowning the peak, and the shadows mounting by degrees up its slopes. At that moment Captain Nemo, resting with his hand on my shoulder, said—

"I, Captain Nemo, on this 21st day of March 1868, have reached the south pole on the ninetieth degree; and I take possession of this part of the globe, equal to one-sixth of the known continents."



“It was a painful ascent over the sharp lava and the pumice stones.”



“The Captain exclaimed, ‘Adieu, sun! Disappear, thou radiant orb.’”

“In whose name, Captain?”

“In my own, sir!”

Saying which, Captain Nemo unfurled a black banner, bearing an N in gold quartered on its bunting. Then turning towards the orb of day, whose last rays lapped the horizon of the

sea, he exclaimed—

“Adieu, sun! Disappear, thou radiant orb! rest beneath this open sea, and let a night of six months spread its shadows over my new domains!”

Twenty Thousand Leagues Under the Sea

CHAPTER XV

ACCIDENT OR INCIDENT?

THE next day, the 22nd of March, at six in the morning, preparations for departure were begun. The last gleams of twilight were melting into night. The cold was great; the constellations shone with wonderful intensity. In the zenith glittered that wondrous Southern Cross—the polar bear of antarctic regions. The thermometer showed twelve degrees below zero, and when the wind freshened, it was most biting. Flakes of ice increased on the open water. The sea seemed everywhere alike. Numerous blackish patches spread on the surface, showing the formation of fresh ice. Evidently the southern basin, frozen during the six winter months, was absolutely inaccessible. What became of the whales in that time? Doubtless they went beneath the icebergs, seeking more practicable seas. As to the seals and morses, accustomed to live in a hard climate, they remained on these icy shores. These creatures have the instinct to break holes in the ice-fields, and to keep them open. To these holes they come for breath; when the birds, driven away by the cold, have emigrated to the north, these sea mammals remain sole masters of the polar continent. But the reservoirs were filling with water, and the *Nautilus* was slowly descending. At 1000 feet deep it stopped; its screw beat the waves, and it advanced straight towards the north, at a speed of fifteen miles an hour. Towards night it was already floating under the immense body of the iceberg. At three in the morning I was awakened by a violent shock. I sat up in my bed and listened in the darkness, when I was thrown into the middle of the room. The *Nautilus*, after having struck, had rebounded violently. I groped along the partition, and by the staircase to the saloon, which was lit by the luminous ceiling. The furniture was upset. Fortunately the windows were firmly set, and had held fast. The pictures on the starboard-side, from being no longer vertical, were clinging to the paper, whilst those of the port-side were hanging at least a foot from the wall. The *Nautilus* was lying on its starboard side perfectly motionless. I heard footsteps, and a confusion of voices; but Captain Nemo did not appear. As I was leaving the saloon, Ned Land and Conseil entered.

“What is the matter?” said I, at once.

“I came to ask you, sir,” replied Conseil.

“Confound it!” exclaimed the Canadian, “I know well enough! The *Nautilus* has struck; and judging by the way she lies, I do not think she will right herself as she did the first time in Torres Straits.”

“But,” I asked, “has she at least come to the surface of the sea?”

“We do not know,” said Conseil.

“It is easy to decide,” I answered. I consulted the manometer. To my great surprise it showed a depth of more than 180 fathoms. “What does that mean?” I exclaimed.

“We must ask Captain Nemo,” said Conseil.

“But where shall we find him?” said Ned Land.

“Follow me,” said I, to my companions.

We left the saloon. There was no one in the library. At the centre staircase, by the berths of the ship’s crew, there was no one. I thought that Captain Nemo must be in the pilot’s cage. It was best to wait. We all returned to the saloon. For twenty minutes we remained thus, trying to hear the slightest noise which might be made on board the *Nautilus*, when Captain Nemo entered. He seemed not to see us; his face, generally so impassive, showed signs of uneasiness. He watched the compass silently, then the manometer; and going to the planisphere, placed his finger on a spot representing the southern seas. I would not interrupt him; but, some minutes later, when he turned towards me, I said, using one of his own expressions in the Torres Straits—

“An incident, Captain?”

“No, sir; an accident this time.”

“Serious?”

“Perhaps.”

“Is the danger immediate?”

“No.”

“The *Nautilus* has stranded?”

“Yes.”

“And this has happened—how?”

“From a caprice of nature, not from the ignorance of man. Not a mistake has been made in the working. But we cannot prevent equilibrium from producing its effects. We may brave human laws, but we cannot resist natural ones.”

Captain Nemo had chosen a strange moment for uttering this philosophical reflection. On the whole, his answer helped me little.

"May I ask, sir, the cause of this accident?"

"An enormous block of ice, a whole mountain, has turned over," he replied. "When icebergs are undermined at their base by warmer water or reiterated shocks, their centre of gravity rises, and the whole thing turns over. This is what has happened; one of these blocks, as it fell, struck the *Nautilus*, then, gliding under its hull, raised it with irresistible force, bringing it into beds which are no so thick, where it is lying on its side."

"But can we not get the *Nautilus* off by emptying its reservoirs, that it may regain its equilibrium?"

"That, sir, is being done at this moment. You can hear the pump working. Look at the needle of the manometer; it shows that the *Nautilus* is rising, but the block of ice is rising with it; and, until some obstacle stops its ascending motion, our position cannot be altered."

Indeed, the *Nautilus* still held the same position to starboard; doubtless it would right itself when the block stopped. But at this moment who knows if we may not strike the upper part of the iceberg, and if we may not be frightfully crushed between the two glassy surfaces? I reflected on all the consequences of our position. Captain Nemo never took his eyes off the manometer. Since the fall of the iceberg, the *Nautilus* had risen about a hundred and fifty feet, but it still made the same angle with the perpendicular. Suddenly a slight movement was felt in the hold. Evidently it was righting a little. Things hanging in the saloon were sensibly returning to their normal position. The partitions were nearing the upright. No one spoke. With beating hearts we watched and felt the straightening. The boards became horizontal under our feet. Ten minutes passed.

"At last we have righted!" I exclaimed.

"Yes," said Captain Nemo, going to the door of the saloon.

"But are we floating?" I asked.

"Certainly," he replied; "since the reservoirs are not empty; and, when empty, the *Nautilus* must rise to the surface of the sea."

We were in open sea; but at a distance of about ten yards, on either side of the *Nautilus*, rose a dazzling wall of ice. Above and beneath the same wall. Above, because the lower surface of the iceberg stretched over us like an immense ceiling. Beneath, because the overturned block, having slid by degrees, had found a resting-place on the lateral walls,

which kept it in that position. The *Nautilus* was really imprisoned in a perfect tunnel of ice more than twenty yards in breadth, filled with quiet water. It was easy to get out of it by going either forward or backward, and then make a free passage under the iceberg, some hundreds of yards deeper. The luminous ceiling had been extinguished, but the saloon was still resplendent with intense light. It was the powerful reflection from the glass partition sent violently back to the sheets of the lantern. I cannot describe the effect of the voltaic rays upon the great blocks so capriciously cut; upon every angle, every ridge, every facet was thrown a different light, according to the nature of the veins running through the ice; a dazzling mine of gems, particularly of sapphires, their blue rays crossing with the green of the emerald. Here and there were opal shades of wonderful softness, running through bright spots like diamonds of fire, the brilliancy of which the eye could not bear. The power of the lantern seemed increased a hundredfold, like a lamp through the lenticular plates of a first-class lighthouse.

"How beautiful! how beautiful!" cried Conseil.

"Yes," I said, "it is a wonderful sight. Is it not, Ned?"

"Yes, confound it! Yes," answered Ned Land, "it is superb! I am mad at being obliged to admit it. No one has ever seen anything like it; but the sight may cost us dear. And if I must say all, I think we are seeing here things which God never intended man to see."

Ned was right, it was too beautiful. Suddenly a cry from Conseil made me turn.

"What is it?" I asked.

"Shut your eyes, sir! do not look, sir!" Saying which, Conseil clapped his hands over his eyes.

"But what is the matter, my boy?"

"I am dazzled, blinded."

My eyes turned involuntarily towards the glass, but I could not stand the fire which seemed to devour them. I understood what had happened. The *Nautilus* had put on full speed. All the quiet lustre of the ice-walls was at once changed into flashes of lightning. The fire from these myriads of diamonds was blinding. It required some time to calm our troubled looks. At last the hands were taken down.

"Faith, I should never have believed it," said Conseil.

It was then five in the morning; and at that moment a shock was felt at the bows of the *Nautilus*. I knew that its spur had struck a

block of ice. It must have been a false manoeuvre, for this submarine tunnel, obstructed by blocks, was not very easy navigation. I thought that Captain Nemo, by changing his course, would either turn these obstacles, or else follow the windings of the tunnel. In any case, the road before us could not be entirely blocked. But, contrary to my expectations, the *Nautilus* took a decided retrograde motion.

"We are going backwards?" said Conseil.

"Yes," I replied. "This end of the tunnel can have no egress."

"And then?"

"Then," said I, "the working is easy. We must go back again, and go out at the southern opening. That is all."

In speaking thus, I wished to appear more confident than I really was. But the retrograde motion of the *Nautilus* was increasing; and, reversing the screw, it carried us at great speed.

"It will be a hindrance," said Ned.

"What does it matter, some hours more or less, provided we get out at last?"

"Yes," repeated Ned Land, "provided we do get out at last!"

For a short time I walked from the saloon to the library. My companions were silent. I soon threw myself on an ottoman, and took a book, which my eyes overran mechanically. A quarter of an hour after, Conseil, approaching me, said, "Is what you are reading very interesting, sir?"

"Very interesting!" I replied.

"I should think so, sir. It is your own book you are reading."

"My book?"

And indeed I was holding in my hand the work on the "Great Submarine Depths." I did not even dream of it. I closed the book, and returned to my walk. Ned and Conseil rose to go.

"Stay here, my friends," said I, detaining them. "Let us remain together until we are out of this block."

"As you please, sir," Conseil replied.

Some hours passed. I often looked at the instruments hanging from the partition. The manometer showed that the *Nautilus* kept at a constant depth of more than three hundred yards; the compass still pointed to the south; the log indicated a speed of twenty miles an hour, which, in such a cramped space, was very great. But Captain Nemo knew that he could not hasten too much, and that minutes were worth ages to us. At twenty-five minutes past eight a second shock took place, this time from behind. I turned pale. My companions were close by my side. I seized Conseil's hand. Our looks expressed our feelings better than words. At this moment the Captain entered the saloon. I went up to him.

"Our course is barred southward?" I asked.

"Yes, sir. The iceberg has shifted, and closed every outlet."

"We are blocked up, then?"

"Yes."

Twenty Thousand Leagues Under the Sea

CHAPTER XVI

WANT OF AIR

THUS, around the *Nautilus*, above and below, was an impenetrable wall of ice. We were prisoners to the iceberg. I watched the Captain. His countenance had resumed its habitual imperturbability.

"Gentlemen," he said, calmly, "there are two ways of dying in the circumstances in which we are placed." (This inexplicable person had the air of a mathematical professor lecturing to his pupils.) "The first is to be crushed; the second is to die of suffocation. I do not speak of the possibility of dying of hunger, for the supply of provisions in the *Nautilus* will certainly last longer than we shall. Let us then calculate our chances."

"As to suffocation, Captain," I replied, "that is not to be feared, because our reservoirs are full."

"Just so; but they will only yield two days' supply of air. Now, for thirty-six hours we have been hidden under the water, and already the heavy atmospheres of the *Nautilus* requires renewal. In forty-eight hours our reserve will be exhausted."

"Well, Captain, can we be delivered before forty-eight hours?"

"We will attempt it, at least, by piercing the wall that surrounds us."

"On which side?"

"Sound will tell us. I am going to run the *Nautilus* aground on the lower bank, and my men will attack the iceberg on the side that is least thick."

Captain Nemo went out. Soon I discovered by a hissing noise that the water was entering the reservoirs. The *Nautilus* sank slowly, and rested on the ice at a depth of 350 yards, the depth at which the lower bank was immersed.

"My friends," I said, "our situation is serious, but I rely on your courage and energy."

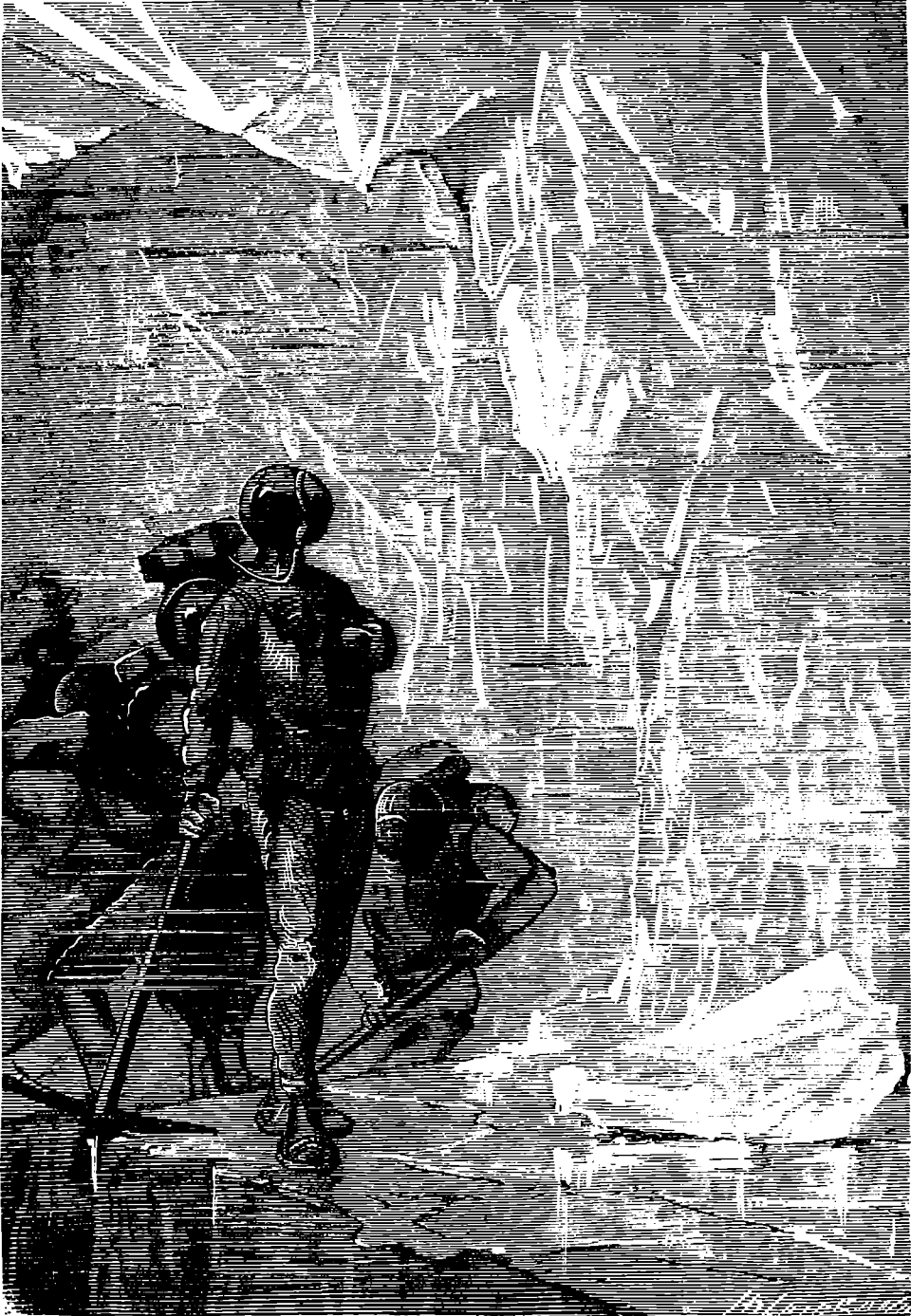
"Sir," replied the Canadian, "I am ready to do anything for the general safety."

"Good! Ned," and I held out my hand to the Canadian.

"I will add," he continued, "that being as handy with the pickaxe as with the harpoon, if I can be useful to the Captain, he can command my services."

"He will not refuse your help. Come, Ned!"

I led him to the room where the crew of the *Nautilus* were putting on their cork-jackets. I told the Captain of Ned's proposal, which he accepted. The Canadian put on his sea-costume, and was ready as soon as his companions. When Ned was dressed, I re-entered the drawing-room, where the panes of glass were open, and, posted near Conseil, I examined the ambient beds that supported the *Nautilus*. Some instants after, we saw a dozen of the crew set foot on the bank of ice, and among them Ned Land, easily known by his stature. Captain Nemo was with them. Before proceeding to dig the walls, he took the soundings, to be sure of working in the right direction. Long sounding lines were sunk in the side walls, but after fifteen yards they were again stopped by the thick wall. It was useless to attack it on the ceiling-like surface, since the iceberg itself measured more than 400 yards in height. Captain Nemo then sounded the lower surface. There ten yards of wall separated us from the water, so great was the thickness of the ice-field. It was necessary, therefore, to cut from it a piece equal in extent to the waterline of the *Nautilus*. There were about 6000 cubic yards to detach, so as to dig a hole by which we could descend to the ice-field. The work was begun immediately, and carried on with indefatigable energy. Instead of digging round the *Nautilus*, which would have involved greater difficulty, Captain Nemo had an immense trench made at eight yards from the port quarter. Then the men set to work simultaneously with their screws, on several points of its circumference. Presently the pickaxe attacked this compact matter vigorously, and large blocks were detached from the mass. By a curious effect of specific gravity, these blocks, lighter than water, fled, so to speak, to the vault of the tunnel, that increased in thickness at the top in proportion as it diminished at the base. But that mattered little, so long as the lower part grew thinner. After two hours' hard work, Ned Land came in exhausted. He and his comrades were replaced by new workers, whom Conseil and I joined. The second lieutenant of the *Nautilus* superintended us. The water seemed singularly cold, but I soon got warm handling the



“I remarked that the side walls were gradually closing in.”

pickaxe. My movements were free enough, although they were made under a pressure of thirty atmospheres. When I re-entered, after working two hours, to take some food and rest, I found a perceptible difference between the pure fluid with which the Rouquayrol engine supplied me, and the atmosphere of the *Nautilus*, already changed with carbonic acid. The air had not been renewed for forty-eight hours, and its vivifying qualities were considerably enfeebled. However, after a lapse of twelve hours, we had only raised a block of ice one yard thick, on the marked surface, which was about 600 cubic yards! Reckoning that it took twelve hours to accomplish this much, it would take five nights and four days to bring this enterprise to a satisfactory conclusion. Five nights and four days! And we have only air enough for two days in the reservoirs! "Without taking into account," said Ned, "that, even if we get out of this infernal prison, we shall also be imprisoned under the iceberg, shut out from all possible communication with the atmosphere." True enough! Who could then foresee the minimum of time necessary for our deliverance? We might be suffocated before the *Nautilus* could regain the surface of the waves? Was it destined to perish in this ice-tomb, with all those it enclosed? The situation was terrible. But every one had looked the danger in the face, and each was determined to do his duty to the last.

As I expected, during the night a new block a yard square was carried away, and still further sank the immense hollow. But in the morning when, dressed in my cork-jacket, I traversed the slushy mass at a temperature of six or seven degrees below zero, I remarked that the side walls were gradually closing in. The beds of water farthest from the trench, that were not warmed by the men's mere work, showed a tendency to solidification. In presence of this new and imminent danger, what would become of our chances of safety, and how hinder the solidification of this liquid medium, that would burst the partitions of the *Nautilus* like glass?

I did not tell my companions of this new danger. What was the good of damping the energy they displayed in the painful work of escape? But when I went on board again, I told Captain Nemo of this grave complication.

"I know it," he said, in that calm tone which could counteract the most terrible apprehensions. "It is one danger more; but I see no way of escaping it; the only chance of safety is to go quicker than solidification. We must be beforehand with it, that is all."

On this day for several hours I used my pickaxe vigorously. The work kept me up. Besides, to work was to quit the *Nautilus*, and breathe directly the pure air drawn from the reservoirs, and supplied by our apparatus, and to quit the impoverished and vitiated atmosphere. Towards evening the trench was dug one yard deeper. When I returned on board, I was nearly suffocated by the carbonic acid with which the air was filled—ah! if we had only the chemical means to drive away this deleterious gas. We had plenty of oxygen; all this water contained a considerable quantity, and by dissolving it with our powerful piles, it would restore the vivifying fluid. I had thought well over it; but of what good was that, since the carbonic acid produced by our respiration had invaded every part of the vessel? To absorb it, it was necessary to fill some jars with caustic potash, and to shake them incessantly. Now this substance was wanting on board, and nothing could replace it. On that evening, Captain Nemo ought to open the taps of his reservoirs, and let some pure air into the interior of the *Nautilus*; without this precaution, we could not get rid of the sense of suffocation. The next day, March 26th, I resumed my miner's work in beginning the fifth yard. The side walls and the lower surface of the iceberg thickened visibly. It was evident that they would meet before the *Nautilus* was able to disengage itself. Despair seized me for an instant, my pickaxe nearly fell from my hands. What was the good of digging if I must be suffocated, crushed by the water that was turning into stone?—a punishment that the ferocity of the savages even would not have invented! Just then Captain Nemo passed near me. I touched his hand and showed him the walls of our prison. The wall to port had advanced to at least four yards from the hull of the *Nautilus*. The Captain understood me, and signed to me to follow him. We went on board. I took off my cork-jacket, and accompanied him into the drawing-room.

"M. Aronnax, we must attempt some desperate means, or we shall be sealed up in this solidified water as in cement."

"Yes; but what is to be done?"

"Ah! if my *Nautilus* were strong enough to bear this pressure without being crushed!"

"Well?" I asked, not catching the Captain's idea.

"Do you not understand," he replied, "that this congelation of water will help us? Do you not see that, by its solidification, it would burst through this field of ice that imprisons us, as, when it freezes, it bursts the hardest

stones? Do you not perceive that it would be an agent of safety instead of destruction?"

"Yes, Captain, perhaps. But whatever resistance to crushing the *Nautilus* possesses, it could not support this terrible pressure, and would be flattened like an iron plate."

"I know it, sir. Therefore we must not reckon on the aid of nature, but on our own exertions. We must stop this solidification. Not only will the side walls be pressed together; but there is not ten feet of water before or behind the *Nautilus*. The congelation gains on us on all sides."

"How long will the air in the reservoirs last for us to breathe on board?"

The Captain looked in my face. "After to-morrow they will be empty!"

A cold sweat came over me. However, ought I to have been astonished at the answer? On March 22nd, the *Nautilus* was in the open polar seas. We were at 26°. For five days we had lived on the reserve on board. And what was left of the respirable air must be kept for the workers. Even now, as I write, my recollection is still so vivid, that an involuntary terror seizes me, and my lungs seem to be without air. Meanwhile, Captain Nemo reflected silently, and evidently an idea had struck him; but he seemed to reject it. At last, these words escaped his lips—

"Boiling water!" he muttered.

"Boiling water?" I cried.

"Yes, sir. We are enclosed in a space that is relatively confined. Would not jets of boiling water, constantly injected by the pumps, raise the temperature in this part, and stay the congelation?"

"Let us try it," I said, resolutely.

"Let us try, Professor."

The thermometer then stood at seven degrees outside. Captain Nemo took me to the galleys, where the vast distillatory machines stood that furnished the drinkable water by evaporation. They filled these with water, and all the electric heat from the piles were thrown through the worms bathed in the liquid. In a few minutes this water reached a hundred degrees. It was directed towards the pumps, while fresh water replaced it in proportion. The heat developed by the troughs was such that cold water, drawn up from the sea, after only having gone through the machines, came boiling into the body of the pump. The injection was begun, and three hours after the thermometer marked six degrees below zero outside. One degree was gained. Two hours later, the thermometer only marked four degrees.

"We shall succeed," I said to the Captain, after having anxiously watched the result of the operation.

"I think," he answered, "that we shall not be crushed. We have no more suffocation to fear."

During the night the temperature of the water rose to one degree below zero. The injections could not carry it to a higher point. But as the congelation of the sea-water produces at least two degrees, I was at last reassured against the dangers of solidification.

The next day, March 27th, six yards of ice had been cleared, four yards only remaining to be cleared away. There was yet forty-eight hours' work. The air could not be renewed in the interior of the *Nautilus*. And this day would make it worse. An intolerable weight oppressed me. Towards three o'clock in the evening, this feeling rose to a violent degree. Yawns dislocated my jaws. My lungs panted as they inhaled this burning fluid, which became rarified more and more. A moral torpor took hold of me. I was powerless, almost unconscious. My brave Conseil, though exhibiting the same symptoms and suffering in the same manner, never left me. He took my hand and encouraged me, and I heard him murmur, "Oh! if I could only not breathe, so as to leave more air for my master!"

Tears came into my eyes on hearing him speak thus. If our situation to all was intolerable in the interior, with what haste and gladness would we put on our cork-jackets to work in our turn! Pickaxes sounded on the frozen ice-beds. Our arms ached, the skin was torn off our hands. But what were these fatigues, what did the wounds matter? Vital air came to the lungs! we breathed! we breathed!

All this time, no one prolonged his voluntary task beyond the prescribed time. His task accomplished, each one handed in turn to his panting companions the apparatus that supplied him with life. Captain Nemo set the example, and submitted first to this severe discipline. When the time came, he gave up his apparatus to another, and returned to the vitiated air on board, calm, unflinching unmurmuring.

On that day the ordinary work was accomplished with unusual vigour. Only two yards remained to be raised from the surface. Two yards only separated us from the open sea. But the reservoirs were nearly emptied of air. The little that remained ought to be kept for the workers; not a particle for the *Nautilus*. When I went back on board, I was half suffocated.



“Half-stretched upon a divan in the library, I was suffocating.”

What a night! I know not how to describe it. The next day my breathing was oppressed. Dizziness accompanied the pain in my head, and made me like a drunken man. My companions showed the same symptoms. Some of the crew had rattling in the throat.

On that day, the sixth of our imprisonment, Captain Nemo, finding the pickaxes work too slowly, resolved to crush the ice-bed that still separated us from the liquid sheet. This man's coolness and energy never forsook him. He subdued his physical pains by moral force.

By his orders the vessel was lightened, that is to say, raised from the ice-bed by a change of specific gravity. When it floated they towed it so as to bring it above the immense trench made on the level of the water-line, then filling his reservoirs of water, he descended and shut himself up in the hole.

Just then all the crew came on board, and the double door of communication was shut. The *Nautilus* then rested on the bed of ice, which was not one yard thick, and which the sounding leads had perforated in a thousand places. The taps of the reservoirs were then opened, and a hundred cubic yards of water was let in, increasing the weight of the *Nautilus* to 1800 tons. We waited, we listened, forgetting our sufferings in hope. Our safety depended on this last chance. Notwithstanding the buzzing in my head, I soon heard the humming sound under the hull of the *Nautilus*. The ice cracked with a singular noise, like tearing paper, and the *Nautilus* sank.

"We are off!" murmured Conseil in my ear.

I could not answer him. I seized his hand, and pressed it convulsively. All at once, carried away by its frightful overcharge, the *Nautilus* sank like a bullet under the waters, that is to say, it fell as if it was in a vacuum. Then all the electric force was put on the pumps, that soon began to let the water out of the reservoirs. After some minutes, our fall was stopped. Soon, too, the manometer indicated an ascending movement. The screw, going at full speed, made the iron hull tremble to its very bolts, and drew us towards the

north. But if this floating under the iceberg is to last another day before we reach the open sea, I shall be dead first.

Half stretched upon a divan in the library, I was suffocating. My face was purple, my lips blue, my faculties suspended. I neither saw nor heard. All notion of time had gone from my mind. My muscles could not contract. I do not know how many hours passed thus, but I was conscious of the agony that was coming over me. I felt as if I was going to die. Suddenly I came to. Some breaths of air penetrated my lungs. Had we risen to the surface of the waves? Were we free of the iceberg? No; Ned and Conseil, my two brave friends, were sacrificing themselves to save me. Some particles of air still remained at the bottom of one apparatus. Instead of using it, they had kept it for me, and while they were being suffocated, they gave me life drop by drop. I wanted to push back the thing; they held my hands, and for some moments I breathed freely. I looked at the clock; it was eleven in the morning. It ought to be the 28th of March. The *Nautilus* went at a frightful pace, forty miles an hour. It literally tore through the water. Where was Captain Nemo? Had he succumbed? Were his companions dead with him? At the moment, the manometer indicated that we were not more than twenty feet from the surface. A mere plate of ice separated us from the atmosphere, could we not break it? Perhaps. In any case the *Nautilus* was going to attempt it. I felt that it was in an oblique position, lowering the stern, and raising the bows. The introduction of water had been the means of disturbing its equilibrium. Then, impelled by its powerful screw, it attacked the ice-field from beneath like a formidable battering-ram. It broke it by backing and then rushing forward against the field, which gradually gave way; and at last, dashing suddenly against it, shot forwards on the icy field, that crushed beneath its weight. The panels were opened—one might say torn off—and the pure air came in in abundance to all parts of the *Nautilus*.

Twenty Thousand Leagues Under the Sea

CHAPTER XVII

FROM CAPE HORN TO THE AMAZON

HOW I got on to the platform, I have no idea; perhaps the Canadian had carried me there. But I breathed, I inhaled the vivifying sea-air. My two companions were getting drunk with the fresh particles. The other unhappy men had been so long without food, that they could not with impunity indulge in the simplest aliments that were given them. We, on the contrary, had no need to restrain ourselves; we could draw this air freely into our lungs, and it was the breeze, the breeze alone, that filled us with this keen enjoyment.

"Ah!" said Conseil, "how delightful this oxygen is! Master need not fear to breathe it. There is enough for everybody."

Ned Land did not speak, but he opened his jaws wide enough to frighten a shark. Our strength soon returned, and when I looked round me, I saw we were alone on the platform. The foreign seamen in the *Nautilus* were contented with the air that circulated in the interior; none of them had come to drink in the open air.

The first words I spoke were words of gratitude and thankfulness to my two companions. Ned and Conseil had prolonged my life during the last hours of this long agony. All my gratitude could not repay such devotion.

"My friends," said I, "we are bound one to the other for ever, and I am under infinite obligations to you."

"Which I shall take advantage of," exclaimed the Canadian.

"What do you mean?" said Conseil.

"I mean that I shall take you with me when I leave this infernal *Nautilus*."

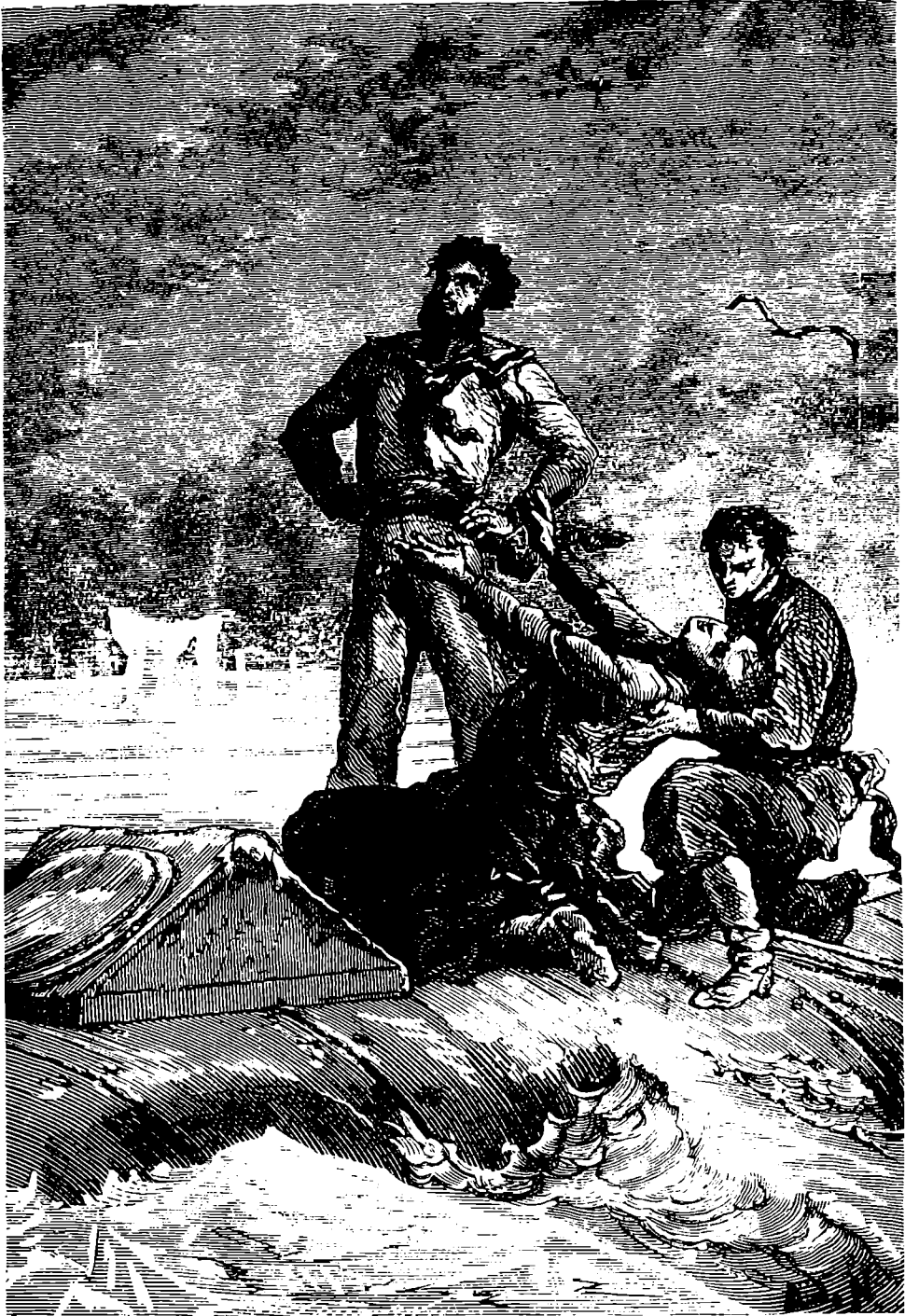
"Well," said Conseil, "after all this, are we going right?"

"Yes," I replied, "for we are going the way of the sun, and here the sun is in the north."

"No doubt," said Ned Land; "but it remains to be seen whether he will bring the ship into the Pacific or the Atlantic Ocean, that is, into frequented or deserted seas."

I could not answer that question, and I feared that Captain Nemo would rather take us to the vast ocean that touches the coasts of Asia and America at the same time. He would thus complete the tour round the submarine

world, and return to those waters in which the *Nautilus* could sail freely. We ought, before long, to settle this important point. The *Nautilus* went at a rapid pace. The polar circle was soon passed, and the course shaped for Cape Horn. We were off the American point, March 31, at seven o'clock in the evening. Then all our past sufferings were forgotten. The remembrance of that imprisonment in the ice was effaced from our minds. We only thought of the future. Captain Nemo did not appear again either in the drawing-room or on the platform. The point shown each day on the planisphere, and marked by the lieutenant, showed me the exact direction of the *Nautilus*. Now, on that evening, it was evident, to my great satisfaction, that we were going back to the north by the Atlantic. The next day, April 1st, when the *Nautilus* ascended to the surface, some minutes before noon, we sighted land to the west. It was Terra del Fuego, which the first navigators named thus from seeing the quantity of smoke that rose from the natives' huts. The coast seemed low to me, but in the distance rose high mountains. I even thought I had a glimpse of Mount Sarmiento, that rises 2070 yards above the level of the sea, with a very pointed summit, which, according as it is misty or clear, is a sign of fine or of wet weather. At this moment, the peak was clearly defined against the sky. The *Nautilus*, diving again under the water, approached the coast, which was only some few miles off. From the glass windows in the drawing-room, I saw long seaweeds, and gigantic fuci, and varech, of which the open polar sea contains so many specimens, with their sharp polished filaments; they measured about 300 yards in length,—real cables, thicker than one's thumb; and having great tenacity, they are often used as ropes for vessels. Another weed known as velp, with leaves four feet long, buried in the coral concretions, hung at the bottom. It served as nest and food for myriads of crustacea and molluscs, crabs and cuttlefish. There seals and otters had splendid repasts, eating the flesh of fish with sea-vegetables, according to the English fashion. Over this fertile and luxuriant ground the *Nautilus* passed with great rapidity. Towards evening, it



“I breathed, I inhaled the vivifying sea-air.”

approached the Falkland group, the rough summits of which I recognised the following day. The depth of the sea was moderate. On the shores, our nets brought in beautiful specimens of seaweed, and particularly a certain fucus, the roots of which were filled with the best mussels in the world. Geese and ducks fell by dozens on the platform, and soon took their places in the pantry on board. With regard to fish, I observed especially specimens of the goby species, some two feet long, all over white and yellow spots. I admired also numerous medusae, and the finest of the sort, the cysaora, peculiar to the sea about the Falkland Isles. I should have liked to preserve some specimens of these delicate zoophytes: but they are only like clouds, shadows, apparitions, that sink and evaporate, when out of their native element.

When the last heights of the Falklands had disappeared from the horizon, the *Nautilus* sank to between twenty and twenty-five yards, and followed the American coast. Captain Nemo did not show himself. Until the 3rd of April we did not quit the shores of Patagonia, sometimes under the ocean, sometimes at the surface. The *Nautilus* passed beyond the large estuary formed by the mouth of the Plata, and was, on the 4th of April, fifty-six miles off Uruguay. Its direction was northwards, and followed the long windings of the coast of South America. We had then made 1600 miles since our embarkation in the seas of Japan. About eleven o'clock in the morning the Tropic of Capricorn was crossed on the thirty-seventh meridian, and we passed Cape Frio standing out to sea. Captain Nemo, to Ned Land's great displeasure, did not like the neighbourhood of the inhabited coasts of Brazil, for we went at a giddy speed. Not a fish, not a bird of the swiftest kind could follow us, and the natural curiosities of these seas escaped all observation.

This speed was kept up for several days, and in the evening of the 9th of April we sighted the most westerly point of South America that forms Cape San Roque. But then the *Nautilus* swerved again, and sought the lowest depth of a submarine valley which is between this cape and Sierra Leone on the African coast. This valley bifurcates to the parallel of the Antilles, and terminates at the north by the enormous depression of 9000 yards. In this place, the geological basin of the ocean forms, as far as the Lesser Antilles, a cliff of three and a half miles perpendicular in height, and at the parallel of the Cape Verd Islands, another wall not less considerable, that encloses thus all the

sunk continent of the Atlantic. The bottom of this immense valley is dotted with some mountains, that give to these submarine places a picturesque aspect. I speak, moreover, from the manuscript charts that were in the library of the *Nautilus*—charts evidently due to Captain Nemo's hand, and made after his personal observations. For two days the desert and deep waters were visited by means of the inclined planes. The *Nautilus* was furnished with long diagonal broadsides which carried it to all elevations. But, on the 11th of April, it rose suddenly, and land appeared at the mouth of the Amazon River, a vast estuary, the embouchure of which is so considerable that it freshens the sea-water for the distance of several leagues.

The equator was crossed. Twenty miles to the west were the Guianas, a French territory, on which we could have found an easy refuge; but a stiff breeze was blowing, and the furious waves would not have allowed a single boat to face them. Ned Land understood that, no doubt, for he spoke not a word about it. For my part, I made no allusion to his schemes of flight, for I would not urge him to make an attempt that must inevitably fail. I made the time pass pleasantly by interesting studies. During the days of April 11th and 12th, the *Nautilus* did not leave the surface of the sea, and the net brought in a marvellous haul of zoophytes, fish and reptiles. Some zoophytes had been fished up by the chain of the nets; they were for the most part beautiful phycallines, belonging to the actinidian family, and among other species the phycalis protecta, peculiar to that part of the ocean, with a little cylindrical trunk, ornamented with vertical lines, speckled with red dots, crowning a marvellous blossoming of tentacles. As to the molluscs, they consisted of some I had already observed—turritellas, olive porphyras, with regular lines intercrossed, with red spots standing out plainly against the flesh; odd pteroceras, like petrified scorpions; translucent hyaleas, argonauts, cuttle-fish (excellent eating), and certain species of calmars that naturalists of antiquity have classed amongst the flying-fish, and that serve principally for bait for cod-fishing. I had not an opportunity of studying several species of fish on these shores. Amongst the cartilaginous ones, petromyzons-pricka, a sort of eel, fifteen inches long, with a greenish head, violet fins, grey-blue back, brown belly, silvered and sown with bright spots, the pupil of the eye encircled with gold—a curious animal, that the current of the Amazon had drawn to the sea, for they

inhabit fresh waters—tuberculated streaks, with pointed snouts, and a long loose tail, armed with a long jagged sting; little sharks, a yard long, grey and whitish skin, and several rows of teeth, bent back, that are generally known by the name of pantouffles; vespertilios, a kind of red isosceles triangle, half a yard long, to which pectorals are attached by fleshy prolongations that make them look like bats, but that their horny appendage, situated near the nostrils, has given them the name of sea-unicorns; lastly, some species of balistae, the curassavian, whose spots were of a brilliant gold colour, and the capricus of clear violet, and with varying shades like a pigeon's throat.

I end here this catalogue, which is somewhat dry perhaps, but very exact, with a series of bony fish that I observed in passing belonging to the apteronotes, and whose snout is white as snow, the body of a beautiful black, marked with a very long loose fleshy strip; odontognathes, armed with spikes; sardines, nine inches long, glittering with a bright silver light; a species of mackerel provided with two anal fins; centronotes of a blackish tint, that are fished for with torches, long fish, two yards in length, with fat flesh, white and firm, which, when they are fresh, taste like eel, and when dry, like smoked salmon; labres, half red, covered with scales only at the bottom of the dorsal and anal fins; chrysoptera, on which gold and silver blend their brightness with that of the ruby and topaz; golden-tailed spares, the flesh of which is extremely delicate, and whose phosphorescent properties betray them in the midst of the waters; orange-coloured spares with a long tongue; maigres, with gold caudal fins, dark thorn-tails, anableps of Surinam, &c.

Notwithstanding this "etcetera," I must not omit to mention fish that Conseil will long remember, and with good reason. One of our nets had hauled up a sort of very flat rayfish, which, with the tail cut off, formed a perfect disc, and weighed twenty ounces. It was white underneath, red above, with large round spots of dark blue encircled with black, very glossy skin, terminating in a bilobed fin. Laid out on the platform, it struggled, tried to turn itself by convulsive movements, and made so many efforts, that one last turn had nearly sent it into the sea. But Conseil, not wishing to let the fish go, rushed to it, and, before I could prevent him, had seized it with both hands. In a moment he was overthrown, his legs in the air, and half his body paralysed, crying—

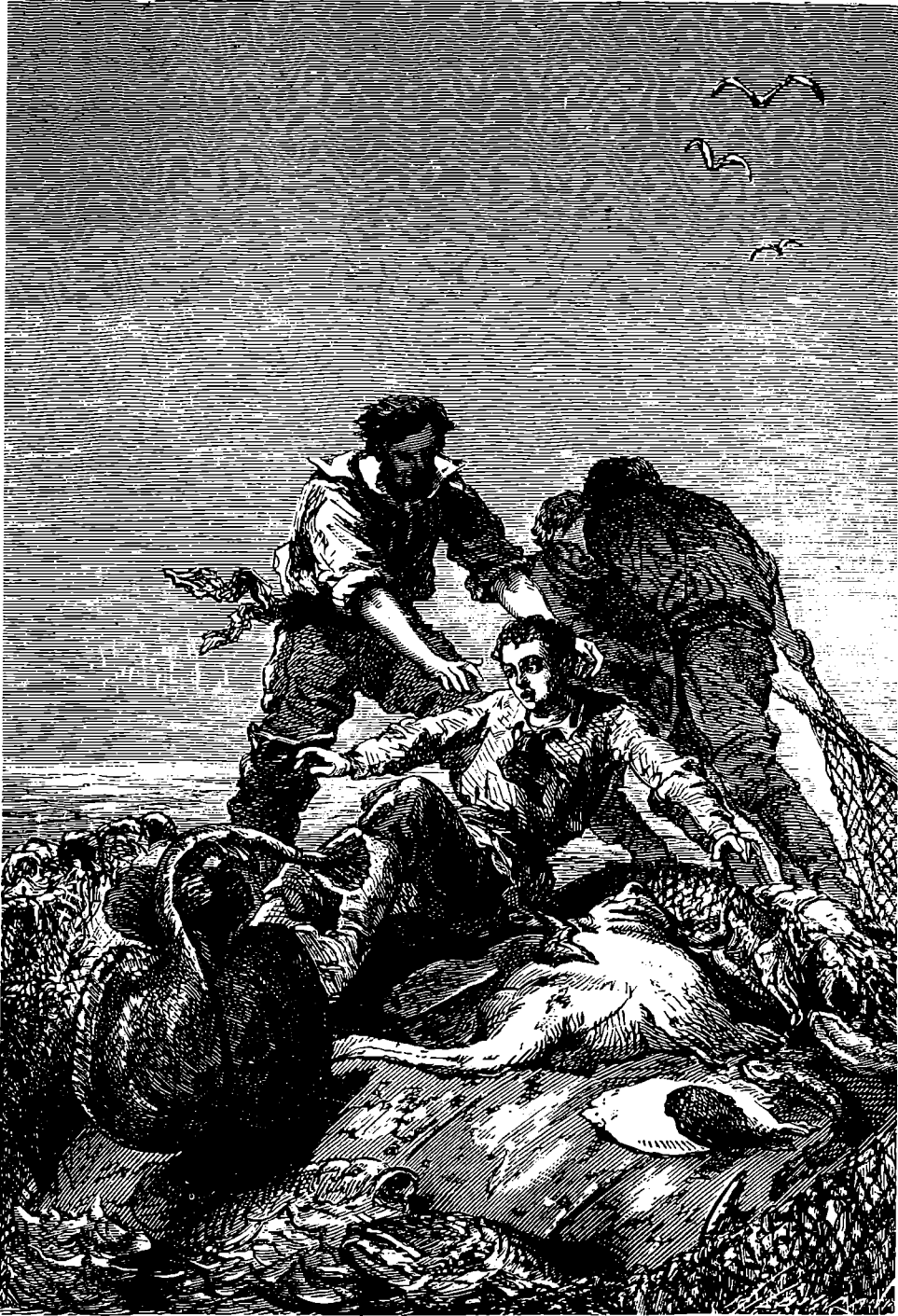
"Oh! master, master! come to me!"

It was the first time the poor boy had not

spoken to me in the third person. The Canadian and I took him up, and rubbed his contracted arms till he became sensible. The unfortunate Conseil had attacked a crampfish of the most dangerous kind, the cumana. This odd animal, in a medium conductor like water, strikes fish at several yards' distance, so great is the power of its electric organ, the two principal surfaces of which do not measure less than twenty-seven square feet. The next day, April 12th, the *Nautilus* approached the Dutch coast, near the mouth of the Maroni. There several groups of sea-cows herded together; they were manatees, that, like the dugong and the stelleria, belong to the sirenian order. These beautiful animals, peaceable and inoffensive, from eighteen to twenty-one feet in length, weigh at least sixteen hundredweight. I told Ned Land and Conseil that provident nature had assigned an important rôle to these mammalia. Indeed, they, like the seals, are designed to graze on the submarine prairies, and thus destroy the accumulation of weed that obstructs the tropical rivers.

"And do you know," I added, "what has been the result since men have almost entirely annihilated this useful race? That the putrified weeds have poisoned the air, and the poisoned air causes the yellow fever, that desolates these beautiful countries. Enormous vegetations are multiplied under the torrid seas, and the evil is irresistibly developed from the mouth of the Rio de la Plata to Florida. If we are to believe Toussenet, this plague is nothing to what it would be if the seas were cleared of whales and seals. Then, infested with poulps, medusae, and cuttle-fish, they would become immense centres of infection, since their waves would not possess 'these vast stomachs that God had charged to infest the surface of the seas.'"

However, without disputing these theories, the crew of the *Nautilus* took possession of half a dozen manatees. They provisioned the larders with excellent flesh, superior to beef and veal. This sport was not interesting. The manatees allowed themselves to be hit without defending themselves. Several thousand pounds of meat were stored up on board to be dried. On this day, a successful haul of fish increased the stores of the *Nautilus*, so full of game were these seas. They were echeineides belonging to the third family of the malacopterygiens; their flattened discs were composed of transverse movable cartilaginous plates, by which the animal was enabled to create a vacuum, and so to adhere to any object like a cupping-glass. The remora that I had observed in the Mediterranean belongs to this species.



“In a moment he was overthrown, his legs in the air, and half his body paralysed.”



“There several groups of sea-cows herded together.”

But the one of which we are speaking was the echeneis osteochera, peculiar to this sea.

The fishing over, the *Nautilus* neared the coast. About here a number of sea-turtles were sleeping on the surface of the water. It would have been difficult to capture these precious reptiles, for the least noise awakens them, and their solid skull is proof against the harpoon. But the echeneis effects their capture with extraordinary precision and certainty. This animal is, indeed, a living fishhook, which would make the fortune of an inexperienced fisherman. The crew of the *Nautilus* tied a ring to the tail of these fish, so large as not to encumber their movements, and to this ring a long cord, lashed to the ship's side by the other end. The echeneids, thrown into the sea,

directly began their game, and fixed themselves to the breastplate of the turtles. Their tenacity was such, that they were torn rather than let go their hold. The men hauled them on board, and with them the turtles to which they adhered. They took also several cacouannes a yard long, which weighed 400 lbs. Their carapace covered with large horny plates, thin, transparent, brown, with white and yellow spots, fetch a good price in the market. Besides, they were excellent in an edible point of view, as well as the fresh turtles, which have an exquisite flavour. This day's fishing brought to a close our stay on the shores of the Amazon, and by nightfall the *Nautilus* had regained the high seas.

Twenty Thousand Leagues Under the Sea

CHAPTER XVIII

THE POULPS

FOR several days the *Nautilus* kept off from the American coast. Evidently it did not wish to risk the tides of the Gulf of Mexico, or of the sea of the Antilles. April 16th, we sighted Martinique and Guadeloupe from a distance of about thirty miles. I saw their tall peaks for an instant. The Canadian, who counted on carrying out his projects in the Gulf, by either landing, or hailing one of the numerous boats that coast from one island to another, was quite disheartened. Flight would have been quite practicable, if Ned Land had been able to take possession of the boat without the Captain's knowledge. But in the open sea it could not be thought of. The Canadian, Conseil, and I, had a long conversation on this subject. For six months we had been prisoners on board the *Nautilus*. We had travelled 17,000 leagues; and, as Ned Land said, there was no reason why it should not come to an end. We could hope nothing from the Captain of the *Nautilus*, but only from ourselves. Besides, for some time past he had become graver, more retired, less sociable. He seemed to shun me. I met him rarely. Formerly, he was pleased to explain the submarine marvels to me; now, he left me to my studies, and came no more to the saloon. What change had come over him? For what cause? For my part, I did not wish to bury with me my curious and novel studies. I had now the power to write the true book of the sea; and this book, sooner or later, I wished to see daylight. Then again, in the water by the Antilles, ten yards below the surface of the waters, by the open panels, what interesting products I had to enter on my daily notes! There were, among other zoophytes, those known under the name of *physalis pelagica*, a sort of large oblong bladder, with mother-of-pearl rays, holding our their membranes to the wind, and letting their blue tentacles float like threads of silk; charming medusæ to the eye, real nettles to the touch, that distil a corrosive fluid. There were also annelides, a yard and a half long, furnished with a pink horn, and with 1700 locomotive organs, that wind through the waters, and throw out in passing all the light of the solar spectrum. There were, in the fish category, some Malabar rays, enormous gristly things,

ten feet long, weighing 600 pounds, the pectoral fin triangular in the midst of a slightly humped back, the eyes fixed in the extremities of the face, beyond the head, and which floated like weft, and looked sometimes like an opaque shutter on our glass window. There were American balistæ, which nature has only dressed in black and white; gobies, with yellow fins and prominent jaw; mackerel sixteen feet long, with short-pointed teeth, covered with small scales, belonging to the albicore species. Then, in swarms, appeared grey mullet, covered with stripes of gold from the head to the tail, beating their resplendent fins, like masterpieces of jewellery, consecrated formerly to Diana, particularly sought after by rich Romans, and of which the proverb says, "Whoever takes them does not eat them." Lastly, pomacanthæ dorees, ornamented with emerald bands, dressed in velvet and silk, passed before our eyes like Veronese lords; spurred spari passed with their pectoral fins; clupanodons fifteen inches long, enveloped in their phosphorescent light; mullet beat the sea with their large jagged tail; red vendaces seemed to mow the waves with their showy pectoral fins; and silvery selenes, worthy of their name, rose on the horizon of the waters like so many moons with whitish rays. April 20th, we had risen to a mean height of 1500 yards. The land nearest us then was the archipelago of the Bahamas. There rose high submarine cliffs covered with large weeds, giant laminariæ and fuci, a perfect espalier of hydrophytes worthy of a Titan world. It was about eleven o'clock when Ned Land drew my attention to a formidable pricking, like the sting of an ant, which was produced by means of large seaweeds.

"Well," I said, "these are proper caverns for poulps, and I should not be astonished to see some of these monsters."

"What!" said Conseil; "cuttle-fish, real cuttle-fish, of the cephalopod class?"

"No," I said; "poulps of huge dimensions."

"I will never believe that such animals exist," said Ned.

"Well," said Conseil, with the most serious air in the world; "I remember perfectly to have

seen a large vessel drawn under the waves by a cephalopod's arm."

"You saw that?" said the Canadian.

"Yes, Ned."

"With your own eyes?"

"With my own eyes."

"Where, pray, might that be?"

"At St Malo," answered Conseil.

"In the port?" said Ned, ironically.

"No; in a church," replied Conseil.

"In a church!" cried the Canadian.

"Yes; friend Ned. In a picture representing the poulp in question."

"Good!" said Ned Land, bursting out laughing.

"He is quite right," I said. "I have heard of this picture; but the subject represented is taken from a legend, and you know what to think of legends in the matter of natural history. Besides, when it is a question of monsters, the imagination is apt to run wild. Not only is it supposed that these poulps can draw down vessels, but a certain Olaüs Magnus speaks of a cephalopod a mile long, that is more like an island than an animal. It is also said that the Bishop of Nidros was building an altar on an immense rock. Mass finished, the rock began to walk, and returned to the sea. The rock was a poulp. Another bishop, Pontoppidan, speaks also of a poulp on which a regiment of cavalry could manoeuvre. Lastly, the ancient naturalists speak of monsters whose mouths were like gulfs, and which were too large to pass through the Straits of Gibraltar."

"But how much is true of these stories?" asked Conseil.

"Nothing, my friends; at least of that which passes the limit of truth to get to fable or legend. Nevertheless, there must be some ground for the imagination of the story-tellers. One cannot deny that poulps and cuttle-fish exist of a large species, inferior, however, to the cetaceans. Aristotle has stated the dimensions of a cuttle-fish as five cubits, or nine feet two inches. Our fishermen frequently see some that are more than four feet long. Some skeletons of poulps are preserved in the museums of Trieste and Montpellier, that measure two yards in length. Besides, according to the calculations of some naturalists, one of these animals, only six feet long, would have tentacles twenty-seven feet long. That would suffice to make a formidable monster."

"Do they fish for them in these days?" asked Ned.

"If they do not fish for them, sailors see them at least. One of my friends, Captain Paul

Bos of Havre, has often affirmed that he met one of these monsters, of colossal dimensions, in the Indian seas. But the most astonishing fact, and which does not permit of the denial of the existence of these gigantic animals, happened some years ago, in 1861."

"What is the fact?" asked Ned Land.

"This is it. In 1861, to the north-east of Teneriffe, very nearly in the same latitude we are in now, the crew of the despatch-boat *Alector* perceived a monstrous cuttle-fish swimming in the waters. Captain Bouguer went near to the animal, and attacked it with harpoons and guns, without much success, for balls and harpoons glided over the soft flesh. After several fruitless attempts, the crew tried to pass a slip-knot round the body of the mollusc. The noose slipped as far as the caudal fins, and there stopped. They tried then to haul it on board, but its weight was so considerable that the tightness of the cord separated the tail from the body, and, deprived of this ornament, he disappeared under the water."

"Indeed! is that a fact?"

"An indisputable fact, my good Ned. They proposed to name this poulp 'Bouguer's cuttle-fish.'"

"What length was it?" asked the Canadian.

"Did it not measure about six yards?" said Conseil, who, posted at the window, was examining again the irregular windings of the cliff.

"Precisely," I replied.

"Its head," rejoined Conseil, "was it not crowned with eight tentacles, that beat the water like a nest of serpents?"

"Precisely."

"Had not its eyes, placed at the back of its head, considerable development?"

"Yes, Conseil."

"And was not its mouth like a parrot's beak?"

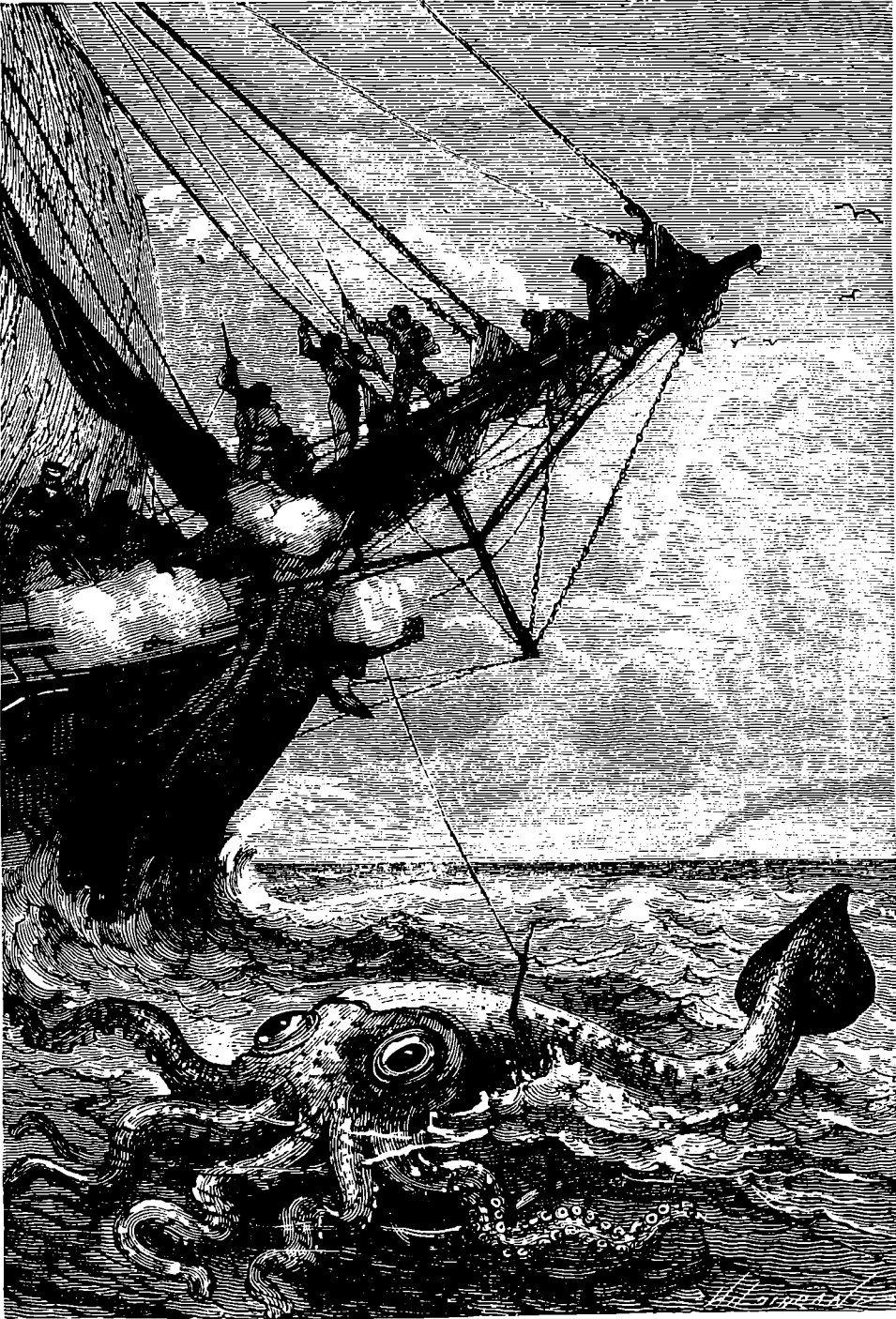
"Exactly, Conseil."

"Very well! no offence to master," he replied, quietly; "if this is not bouguer's cuttle-fish, it is, at least, one of its brothers."

I looked at Conseil. Ned Land hurried to the window.

"What a horrible beast!" he cried.

I looked in my turn, and could not repress a gesture of disgust. Before my eyes was a horrible monster, worthy to figure in the legends of the marvellous. It was an immense cuttle-fish, being eight yards long. It swam crossways in the direction of the *Nautilus* with great speed, watching us with its enormous staring green eyes. Its eight arms, or rather



“Captain Bouguer attacked the poult with harpoons and guns.”



“Before my eyes was a horrible monster, worthy to figure in the legends of the marvellous.”

feet, fixed to its head, that have given the name of cephalopod to these animals, were twice as long as its body, and were twisted like the furies' hair. One could see the 250 air-holes on the inner side of the tentacles. The monster's mouth, a horned beak like a parrot's, opened and shut vertically. Its tongue, a horned substance, furnished with several rows of pointed teeth, came out quivering from this veritable pair of shears. What a freak of nature, a bird's beak on a mollusc! Its spindle-like body formed a fleshy mass that might weigh 4000 to 5000 lbs.; the varying colour changing with great rapidity, according to the irritation of the animal, passed successively from livid grey to reddish brown. What irritated this mollusc? No doubt the presence of the *Nautilus*, more formidable than itself, and on which its suckers or its jaws had no hold. Yet, what monsters these poulps are! what vitality the Creator has given them! what vigour in their movements! and they possess three hearts! Chance had brought us in presence of this cuttle-fish, and I did not wish to lose the opportunity of carefully studying this specimen of cephalopods. I overcame the horror that inspired me; and, taking a pencil, began to draw it.

"Perhaps this is the same which the *Alecto* saw," said Conseil.

"No," replied the Canadian; "for this is whole, and the other had lost its tail."

"That is no reason," I replied. "The arms and tails of these animals are reformed by redintegration; and, in seven years, the tail of Bouguer's cuttle-fish has no doubt had time to grow."

By this time other poulps appeared at the port light. I counted seven. They formed a procession after the *Nautilus*, and I heard their beaks gnashing against the iron hull. I continued my work. These monsters kept in the water with such precision, that they seemed immovable. Suddenly the *Nautilus* stopped. A shock made it tremble in every plate.

"Have we struck anything?" I asked.

"In any case," replied the Canadian, "we shall be free, for we are floating."

The *Nautilus* was floating, no doubt, but it did not move. A minute passed. Captain Nemo, followed by his lieutenant, entered the drawing-room. I had not seen him for some time. He seemed dull. Without noticing or speaking to us, he went to the panel, looked at the poulps, and said something to his lieutenant. The latter went out. Soon the panels were shut. The ceiling was lighted. I went towards the Captain.

"A curious collection of poulps?" I said.

"Yes, indeed, Mr Naturalist," he replied; "and we are going to fight them, man to beast."

I looked at him. I thought I had not heard aright.

"Man to beast?" I repeated.

"Yes, sir. The screw is stopped. I think that the horny jaws of one of the cuttle-fish is entangled in the blades. That is what prevents our moving."

"What are you going to do?"

"Rise to the surface, and slaughter this vermin."

"A difficult enterprise."

"Yes, indeed. The electric bullets are powerless against the soft flesh, where they do not find resistance enough to go off. But we shall attack them with the hatchet."

"And the harpoon, sir," said the Canadian, "if you do not refuse my help."

"I will accept it, Master Land."

"We will follow you," I said, and following Captain Nemo, we went towards the central staircase.

There, about ten men with boarding hatchets were ready for the attack. Conseil and I took two hatchets; Ned Land seized a harpoon. The *Nautilus* had then risen to the surface. One of the sailors, posted on the top ladder-step, unscrewed the bolts of the panels. But hardly were the screws loosed, when the panel rose with great violence, evidently drawn by the suckers of a poulp's arm. Immediately one of these arms slid like a serpent down the opening, and twenty others were above. With one blow of the axe, Captain Nemo cut this formidable tentacle, that slid wriggling down the ladder. Just as we were pressing one on the other to reach the platform, two other arms, lashing the air, came down on the seaman placed before Captain Nemo, and lifted him up with irresistible power. Captain Nemo uttered a cry, and rushed out. We hurried after him.

What a scene! The unhappy man, seized by the tentacle, and fixed to the suckers, was balanced in the air at the caprice of this enormous trunk. He rattled in his throat, he was stifled, he cried, "Help! help!" These words, *spoken in French*, startled me! I had a fellow-countryman on board, perhaps several! That heart-rending cry! I shall hear it all my life. The unfortunate man was lost. Who could rescue him from that powerful pressure? However, Captain Nemo had rushed to the poulp, and with one blow of the axe had cut through one arm. His lieutenant struggled



“With one blow of the axe, Captain Nemo cut this formidable tentacle, that slid wriggling down the ladder.”



“Only one of its arms wriggled in the air, brandishing the victim like a feather.”

furiously against other monsters that crept on the flanks of the *Nautilus*. The crew fought with their axes. The Canadian, Conseil, and I, buried our weapons in the fleshy masses; a strong smell of musk penetrated the atmosphere. It was horrible!

For one instant, I thought the unhappy man, entangled with the poulp, would be torn from its powerful suction. Seven of the eight arms had been cut off. One only wriggled in the air, brandishing the victim like a feather. But just as Captain Nemo and his lieutenant threw themselves on it, the animal ejected a stream of black liquid. We were blinded with it. When the cloud dispersed, the cuttle-fish had disappeared, and my unfortunate countryman with it. Ten or twelve poulps now invaded the platform and sides of the *Nautilus*. We rolled pell-mell into the midst of this nest of serpents, that wriggled on the platform in the waves of blood and ink. It seemed as though these slimy tentacles sprang up like the hydra's heads. Ned Land's harpoon, at each stroke,

was plunged into the staring eyes of the cuttle-fish. But my bold companion was suddenly overturned by the tentacles of a monster he had not been able to avoid.

Ah! how my heart beat with emotion and horror! The formidable beak of a cuttle-fish was open over Ned Land. The unhappy man would be cut in two. I rushed to his succour. But Captain Nemo was before me; his axe disappeared between the two enormous jaws, and miraculously saved the Canadian, rising, plunged his harpoon deep into the triple heart of the poulp.

"I owed myself this revenge!" said the Captain to the Canadian.

Ned bowed without replying. The combat had lasted a quarter of an hour. The monsters, vanquished and mutilated, left us at last, and disappeared under the waves. Captain Nemo, covered with blood, nearly exhausted, gazed upon the sea that had swallowed up one of his companions, and great tears gathered in his eyes.

Twenty Thousand Leagues Under the Sea

CHAPTER XIX

THE GULF STREAM

THIS terrible scene of the 20th of April none of us can ever forget. I have written it under the influence of violent emotion. Since then I have revised the recital; I have read it to Conseil and to the Canadian. They found it exact as to facts, but insufficient as to effect. To paint such pictures, one must have the pen of the most illustrious of our poets, the author of "The Toilers of the Deep."

I have said that Captain Nemo wept while watching the waves; his grief was great. It was the second companion he had lost since our arrival on board, and what a death! That friend, crushed, stifled, bruised by the dreadful arms of a poulp, pounded by his iron jaws, would not rest with his comrades in the peaceful coral cemetery! In the midst of the struggle, it was the despairing cry uttered by the unfortunate man that had torn my heart. The poor Frenchman, forgetting his conventional language, had taken to his own mother tongue, to utter a last appeal! Amongst the crew of the *Nautilus*, associated with the body and soul of the Captain, recoiling like him from all contact with men, I had a fellow countryman. Did he alone represent France in this mysterious association, evidently composed of individuals of divers nationalities? It was one of these insoluble problems that rose up unceasingly before my mind!

Captain Nemo entered his room, and I saw him no more for some time. But that he was sad and irresolute I could see by the vessel, of which he was the soul, and which received all his impressions. The *Nautilus* did not keep on in its settled course; it floated about like a corpse at the will of the waves. It went at random. He could not tear himself away from the scene of the last struggle, from this sea that had devoured one of his men. Ten days passed thus. It was not till the 1st of May that the *Nautilus* resumed its northerly course, after having sighted the Bahamas at the mouth of the Bahama Canal. We were then following the current from the largest river to the sea, that has its banks, its fish, and its proper temperatures. I mean the gulf Stream. It is really a river, that flows freely to the middle of the Atlantic, and whose waters do not mix with the ocean waters. It is a salt river, salter

than the surrounding sea. Its mean depth is 1500 fathoms, its mean breadth ten miles. In certain places the current flows with the speed of two miles and a half an hour. The body of its waters is more considerable than that of all the rivers in the globe. It was on this ocean river that the *Nautilus* then sailed.

This current carried with it all kinds of living things. Argonauts, so common in the Mediterranean, were there in quantities. Of the gristly sort, the most remarkable were the turbot, whose slender tails form nearly the third part of the body, and that looked like large lozenges twenty-five feet long; also, small sharks a yard long, with large heads, short rounded muzzles, pointed teeth in several rows, and whose bodies seemed covered with scales. Among the bony fish I noticed some grey gobies, peculiar to these waters; black gilthead, whose iris shone like fire; sirenes a yard long, with large snouts thickly set with little teeth, that uttered little cries; blue coryphaenes, in gold and silver; parrots, like the rainbows of the ocean, that could rival in colour the most beautiful tropical birds; blennies with triangular heads; bluish rhombs destitute of scales; batrachoides covered with yellow transversal bands like a Greek *r*; heaps of little gobies spotted with yellow; dipterodons with silvery heads and yellow tails; several specimens of salmon, mugilomores slender in shape, shining with a soft light that Lacépède consecrated to the service of his wife; and lastly, a beautiful fish, the American-knight, that, decorated with all the orders and ribbons, frequents the shores of this great nation, that esteems orders and ribbons so little.

I must add that, during the night, the phosphorescent waters of the Gulf Stream rivalled the electric power of our watch-light, especially in the stormy weather that threatened us so frequently. May 8th, we were still crossing Cape Hatteras, at the height of the North Caroline. The width of the Gulf Stream there is seventy-five miles, and its depth 210 yards. The *Nautilus* still went at random; all supervision seemed abandoned. I thought that, under these circumstances, escape would be possible. Indeed, the inhabited shores offered

anywhere an easy refuge. The sea was incessantly ploughed by the steamers that ply between New York or Boston and the Gulf of Mexico, and overrun day and night by the little schooners coasting about the several parts of the American coast. We could hope to be picked up. It was a favourable opportunity, notwithstanding the thirty miles that separated the *Nautilus* from the coasts of the Union. One unfortunate circumstance thwarted the Canadian's plans. The weather was very bad. We were nearing these shores where tempests are so frequent, that country of waterspouts and cyclones actually engendered by the current of the Gulf Stream. To tempt the sea in a frail boat was certain destruction. Ned Land owned this himself. He fretted, seized with nostalgia that flight only could cure.

"Master," he said that day to me, "this must come to an end. I must make a clean breast of it. This Nemo is leaving land and going up to the north. But I declare to you, I have had enough of the South Pole, and I will not follow him to the North."

"What is to be done, Ned, since flight is impracticable just now?"

"We must speak to the Captain," said he; "you said nothing when we were in your native seas. I will speak, now we are in mine. When I think that before long the *Nautilus* will be by Nova Scotia, and that there near Newfoundland is a large bay, and into that bay the St Lawrence empties itself, and that the St Lawrence is my river, the river by Quebec my native town,—when I think of this, I feel furious, it makes my hair stand on end. Sir, I would rather throw myself into the sea! I will not stay here! I am stifled!"

The Canadian was evidently losing all patience. His vigorous nature could not stand this prolonged imprisonment. His face altered daily; his temper became more surly. I knew what he must suffer, for I was seized with nostalgia myself. Nearly seven months had passed without our having had any news from land; Captain Nemo's isolation, his altered spirits, especially since the fight with the poupls, his taciturnity, all made me view things in a different light.

"Well, sir?" said Ned, seeing I did not reply.

"Well, Ned! do you wish me to ask Captain Nemo his intentions concerning us?"

"Yes, sir."

"Although he has already made them known?"

"Yes; I wish it settled finally. Speak for me, in my name only, if you like."

"But I so seldom meet him. He avoids me."

"That is all the more reason for you to go to see him."

I went to my room. From thence I meant to go to Captain Nemo's. It would not do to let this opportunity of meeting him slip. I knocked at the door. No answer. I knocked again, then turned the handle. The door opened, I went in. The Captain was there. Bending over his work-table, he had not heard me. Resolved not to go without having spoken, I approached him. He raised his head quickly, frowned, and said roughly, "You here! What do you want?"

"To speak to you, Captain."

"But I am busy, sir; I am working. I leave you at liberty to shut yourself up; cannot I be allowed the same?"

This reception was not encouraging; but I was determined to hear and answer everything.

"Sir," I said, coldly, "I have to speak to you on a matter that admits of no delay."

"What is that, sir?" he replied, ironically. "Have you discovered something that has escaped me, or has the sea delivered up any new secrets?"

We were at cross-purposes. But before I could reply, he showed me an open manuscript on his table, and said, in a more serious tone, "Here, M. Aronnax, is a manuscript written in several languages. It contains the sum of my studies of the sea; and, if it please God, it shall not perish with me. This manuscript, signed with my name, completed with the history of my life, will be shut up in a little insubmersible case. The last survivor of all of us on board the *Nautilus* will throw this case into the sea, and it will go whither it is borne by the waves."

This man's name! his history written by himself! His mystery would then be revealed some day.

"Captain," I said, "I can but approve of the idea that makes you act thus. The result of your studies must not be lost. But the means you employ seem to me to be primitive. Who knows where the winds will carry this case, and in whose hands it will fall? Could you not use some other means? Could not you, or one of yours?"—

"Never, sir!" he said, hastily interrupting me.

"But I and my companions are ready to keep this manuscript in store; and, if you will put us at liberty"—

"At liberty?" said the Captain, rising.

"Yes, sir; that is the subject on which I wish to question you. For seven months we have been here on board, and I ask you to-day, in

the name of my companions, and in my own, if your intention is to keep us here always?"

"M. Aronnax, I will answer you to-day as I did seven months ago: Whoever enters the *Nautilus* must never quit it."

"You impose actual slavery on us!"

"Give it what name you please."

"But everywhere the slave has the right to regain his liberty."

"Who denies you this right? Have I ever tried to chain you with an oath?"

He looked at me with his arms crossed.

"Sir," I said, "to return a second time to this subject will be neither to your nor to my taste; but, as we have entered upon it, let us go through with it. I repeat, it is not only myself whom it concerns. Study is to me a relief, a diversion, a passion that could make me forget everything. Like you, I am willing to live obscure, in the frail hope of bequeathing one day, to future time, the result of my labours. But it is otherwise with Ned Land. Every man, worthy of the name, deserves some consideration. Have you thought that love of liberty, hatred of slavery, can give rise to schemes of revenge in a nature like the Canadian's; that he could think, attempt, and try?"—

I was silenced; Captain Nemo rose.

"Whatever Ned Land thinks of, attempts, or tries, what does it matter to me? I did not seek him! It is not for my pleasure that I keep him on board! As for you, M. Aronnax, you are one of those who can understand everything, even silence. I have nothing more to say to you. Let this first time you have come to treat of this subject be the last; for a second time I will not listen to you."

I retired. Our situation was critical. I related my conversation to my two companions.

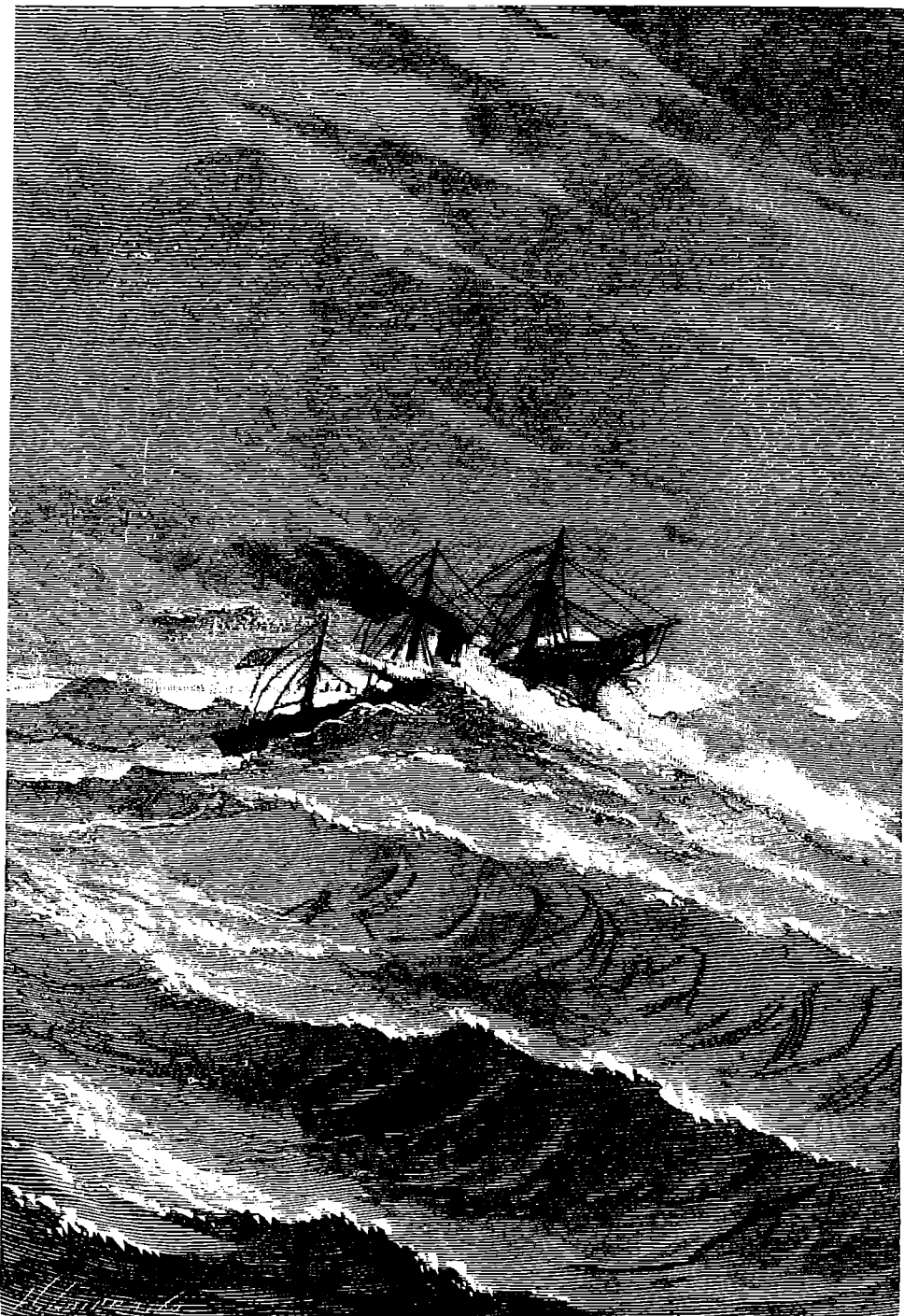
"We know now," said Ned, "that we can expect nothing from this man. The *Nautilus* is nearing Long Island. We will escape, whatever the weather may be."

But the sky became more and more threatening. Symptoms of a hurricane became manifest. The atmosphere was becoming white and misty. On the horizon fine streaks of cirrhous clouds were succeeded by masses of cumuli. Other low clouds passed swiftly by. The swollen sea rose in huge billows. The birds disappeared, with the exception of the petrels, those friends of the storm. The barometer fell sensibly, and indicated an extreme tension of the vapours. The mixture of the storm glass was decomposed under the influence of the electricity that pervaded the atmosphere. The tempest burst on the 18th of May, just as the *Nautilus* was floating off Long Island, some

miles from the port of New York. I can describe this strife of the elements! for, instead of fleeing to the depths of the sea, Captain Nemo, by an unaccountable caprice, would brave it at the surface. The wind blew from the south-west at first. Captain Nemo, during the squalls, had taken his place on the platform. He had made himself fast, to prevent being washed overboard by the monstrous waves. I had hoisted myself up, and made myself fast also, dividing my admiration between the tempest and this extraordinary man who was coping with it. The raging sea was swept by huge cloud-drifts, which were actually saturated with the waves. The *Nautilus*, sometimes lying on its side, sometimes standing up like a mast, rolled and pitched terribly. About five o'clock a torrent of rain fell, that lulled neither sea nor wind. The hurricane blew nearly forty leagues an hour. It is under these conditions that it overturns houses, breaks iron gates, displaces twenty-four pounders. However, the *Nautilus*, in the midst of the tempest, confirmed the words of a clever engineer, "There is no well-constructed hull that cannot defy the sea." This was not a resisting rock; it was a steel spindle, obedient and movable, without rigging or masts, that braved its fury and impunity. However, I watched these raging waves attentively. They measured fifteen feet in height, and 150 to 175 yards long, and their speed of propagation was thirty feet per second. Their bulk and power increased with the depth of the water. Such waves as these, at the Hebrides, have displaced a mass weighing 8400 lbs. They are they which, in the tempest of December 23, 1864, after destroying the town of Yeddo, in Japan, broke the same day on the shores of America. The intensity of the tempest increased with the night. The barometer, as in 1860 at Reunion during a cyclone, fell seven-tenths at the close of day. I saw a large vessel pass the horizon struggling painfully. She was trying to lie to under half-steam, to keep up above the waves. It was probably one of the steamers of the line from New York to Liverpool, or Havre. It soon disappeared in the gloom. At ten o'clock in the evening the sky was on fire. The atmosphere was streaked with vivid lightning. I could not bear the brightness of it; while the Captain, looking at it, seemed to envy the spirit of the tempest. A terrible noise filled the air, a complex noise, made up of the howls of the crushed waves, the roaring of the wind, and the claps of thunder. The wind veered suddenly to all points of the horizon; and the cyclone, rising in the east, returned after



“A shower of fire had succeeded the rain.”



“I saw a large vessel pass the horizon struggling painfully.”

passing by the north, west, and south, in the inverse course pursued by the circular storms of the southern hemisphere. Ah, that Gulf Stream! It deserves its name of the King of Tempests. It is that which causes those formidable cyclones, by the difference of temperature between its air and its currents. A shower of fire had succeeded the rain. The drops of water were changed to sharp spikes. One would have thought that Captain Nemo was courting a death worthy of himself, a death by lightning. As the *Nautilus*, pitching dreadfully, raised its steel spur in the air, it seemed to act as a conductor, and I saw long sparks burst from it. Crushed and without strength, I crawled to the panel, opened it, and descended to the saloon. The storm was then at its height. It was

impossible to stand upright in the interior of the *Nautilus*. Captain Nemo came down about twelve. I heard the reservoirs filling by degrees, and the *Nautilus* sank slowly beneath the waves. Through the open windows in the saloon I saw large fish terrified, passing like phantoms in the water. Some were struck before my eyes. The *Nautilus* was still descending. I thought that at about eight fathoms deep we should find a calm. But no! the upper beds were too violently agitated for that. We had to seek repose at more than twenty-five fathoms in the bowels of the deep. But there, what quiet, what silence, what peace! Who could have told that such a hurricane had been let loose on the surface of that ocean?

Twenty Thousand Leagues Under the Sea

CHAPTER XX

FROM LATITUDE 47° 24', TO LONGITUDE 17° 28'

IN consequence of the storm, we had been thrown eastward once more. All hope of escape on the shores of New York or St Lawrence had faded away; and poor Ned, in despair, had isolated himself like Captain Nemo. Conseil and I, however, never left each other. I said that the *Nautilus* had gone aside to the east. I should have said (to be more exact), the north-east. For some days, it wandered first on the surface, and then beneath it, amid these fogs so dreaded by sailors. What accidents are due to these thick fogs! What shocks upon these reefs when the wind drowns the breaking of the waves! What collisions between vessels, in spite of their warning lights, whistles, and alarm bells! And the bottoms of these seas look like a field of battle, where still lie all the conquered of the ocean; some old and already encrusted, others fresh and reflecting from their iron bands and copperplates the brilliancy of our lantern.

On the 15th of May we were at the extreme south of the Bank of Newfoundland. This bank consists of alluvia, or large heaps of organic matter, brought either from the Equator by the Gulf Stream, or from the North Pole by the counter current of cold water which skirts the American coast. There also are heaped up those erratic blocks which are carried along by the broken ice; and close by, a vast charnel-house of molluscs or zoophytes, which perish here by millions. The depth of the sea is not great at Newfoundland—not more than some hundreds of fathoms; but towards the south is a depression of 1500 fathoms. There the Gulf Stream widens. It loses some of its speed and some of its temperature, but it becomes a sea.

It was on the 17th of May, about 500 miles from Heart's Content, at a depth of more than 1400 fathoms, that I saw the electric cable lying on the bottom. Conseil, to whom I had not mentioned it, thought at first that it was a gigantic sea-serpent. But I undeceived the worthy fellow, and by way of consolation related several particulars in the laying of this cable. The first one was laid in the years 1857 and 1858; but, after transmitting about 400 telegrams, would not act any longer. In 1863, the engineers constructed another one,

measuring 2000 miles in length, and weighing 4500 tons, which was embarked on the *Great Eastern*. This attempt also failed.

On the 25th of May the *Nautilus*, being at a depth of more than 1918 fathoms, was on the precise spot where the rupture occurred which ruined the enterprise. It was within 638 miles of the coast of Ireland; and at half-past two in the afternoon, they discovered that communication with Europe had ceased. The electricians on board resolved to cut the cable before fishing it up, and at eleven o'clock at night they had recovered the damaged part. They made another point and spliced it, and it was once more submerged. But some days after it broke again, and in the depths of the ocean could not be recaptured. The Americans, however, were not discouraged. Cyrus Field, the bold promoter of the enterprise, as he had sunk all his own fortune, set a new subscription on foot, which was at once answered, and another cable was constructed on better principles. The bundles of conducting wires were each enveloped in gutta-percha, and protected by a wadding of hemp, contained in a metallic covering. The *Great Eastern* sailed on the 13th of July 1866. The operation worked well. But one incident occurred. Several times in unrolling the cable they observed that nails had been recently forced into it, evidently with the motive of destroying it. Captain Anderson, the officers, and engineers, consulted together, and had it posted up that if the offender was surprised on board, he would be thrown without further trial into the sea. From that time the criminal attempt was never repeated.

On the 23rd of July the *Great Eastern* was not more than 500 miles from Newfoundland, when they telegraphed from Ireland news of the armistice concluded between Prussia and Austria after Sadowa. On the 27th, in the midst of heavy fogs, they reached the port of Heart's Content. The enterprise was successfully terminated; and for its first despatch, young America addressed old Europe in these words of wisdom so rarely understood—"Glory to God in the highest, and on earth peace, goodwill towards men."

I did not expect to find the electric cable in

its primitive state, such as it was on leaving the manufactory. The long serpent, covered with the remains of shells, bristling with foraminiferae, was encrusted with a strong coating which served as a protection against all boring molluscs. It lay quietly sheltered from the motions of the sea, and under a favourable pressure for the transmission of the electric spark which passes from Europe to America in .32 of a second. Doubtless this cable will last for a great length of time, for they find that the gutta-percha covering is improved by the sea-water. Besides, on this level, so well chosen, the cable is never so deeply submerged as to cause it to break. The *Nautilus* followed it to the lowest depth, which was more than 2212 fathoms, and there it lay without any anchorage; and then we reached the spot where the accident had taken place in 1863. The bottom of the ocean then formed a valley about 100 miles broad, in which Mont-Blanc might have been placed without its summit appearing above the waves. This valley is closed at the east by a perpendicular wall more than 2000 yards high. We arrived there on the 28th of May, and the *Nautilus* was then not more than 120 miles from Ireland.

Was Captain Nemo going to land on the British Isles? No. To my great surprise he made for the south, once more coming back towards European seas. In rounding the Emerald Isle, for one instant I caught sight of Cape Clear, and the light which guides the thousands of vessels leaving Glasgow or Liverpool. An important question then arose in my mind. Did the *Nautilus* dare entangle itself in the Mauch? Ned Land, who had reappeared since we had been nearing land, did not cease to question me. How could I answer? Captain Nemo remained invisible. After having shown the Canadian a glimpse of American shores, was he going to show me the coast of France?

But the *Nautilus* was still going southward. On the 30th of May, it passed in sight of the Land's End, between the extreme point of England and the Scilly Isles, which were left to starboard. If he wished to enter the Mauch he must go straight to the east. He did not do so.

During the whole of the 31st of May, the *Nautilus* described a series of circles on the water, which greatly interested me. It seemed to be seeking a spot it had some trouble in finding. At noon, Captain Nemo himself came to work the ship's log. He spoke no word to me, but seemed gloomier than ever. What could sadden him thus? Was it his proximity to European shores? Had he some recollections

of his abandoned country? If not, what did he feel? Remorse or regret? For a long while this thought haunted my mind, and I had a kind of presentiment that before long chance would betray the Captain's secrets.

The next day, the 31st of June, the *Nautilus* continued the same process. It was evidently seeking some particular spot in the ocean. Captain Nemo took the sun's altitude as he had done the day before. The sea was beautiful, the sky clear. About eight miles to the east, a large steam vessel could be discerned on the horizon. No flag fluttered from its mast, and I could not discover its nationality. Some minutes before the sun passed the meridian, Captain Nemo took his sextant, and watched with great attention. The perfect rest of the water greatly helped the operation. The *Nautilus* was motionless; it neither rolled nor pitched.

I was on the platform when the altitude was taken, and the Captain pronounced these words—"It is here."

He turned and went below. Had he seen the vessel which was changing its course and seemed to be nearing us? I could not tell. I returned to the saloon. The panels closed, I heard the hissing of the water in the reservoirs. The *Nautilus* began to sink, following a vertical line, for its screw communicated no motion to it. Some minutes later it stopped at a depth of more than 420 fathoms, resting on the ground. The luminous ceiling was darkened, then the panels were opened, and through the glass I saw the sea brilliantly illuminated by the rays of our lantern for at least half a mile round us.

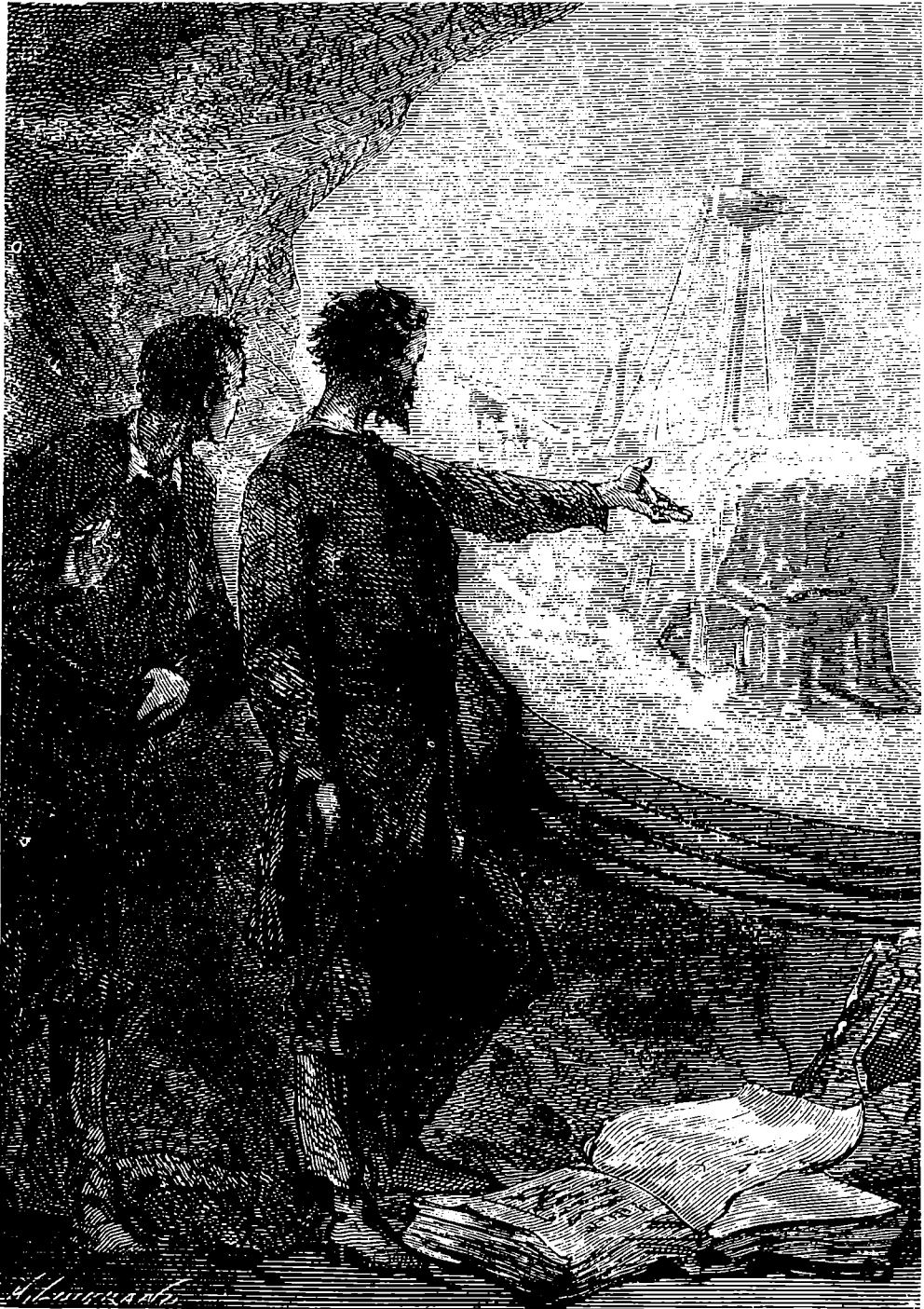
I looked to the port side, and saw nothing but an immensity of quiet waters. But to starboard, on the bottom appeared a large protuberance, which at once attracted my attention. One would have thought it a ruin buried under a coating of white shells, much resembling a covering of snow. Upon examining the mass attentively, I could recognise the ever thickening form of a vessel bare of its masts, which must have sunk. It certainly belonged to past times. This wreck, to be thus encrusted with the lime of the water, must already be able to count many years passed at the bottom of the ocean.

What was this vessel? Why did the *Nautilus* visit its tomb? Could it have been aught but a shipwreck which had drawn it under the water? I knew not what to think, when near me in a slow voice I heard Captain Nemo say—

"At one time this ship was called the *Marseillais*. It carried seventy-four guns, and



“The Captain pronounced these words - ‘It is there’ ”



“‘The Avenger!’ I exclaimed.”

was launched in 1762. In 1778, the 13th of August, commanded by La Poype-Vertrieux, it fought boldly against the *Preston*. In 1779, on the 4th of July, it was at the taking of Grenada, with the squadron of Admiral Estaing. In 1781, on the 5th of September, it took part in the battle of Comte de Grasse, in Chesapeake Bay. In 1794, the French Republic changed its name. On the 16th of April, in the same year, it joined the squadron of Villaret Joyeuse, at Brest, being entrusted with the escort of a cargo of corn coming from America, under the command of Admiral Van Stabel. On the 11th and 12th Prairal of the

second year, this squadron fell in with an English vessel. Sir, to-day is the 13th Prairal, the 1st of June 1868. It is now seventy-four years ago, day for day on this very spot, in latitude 47° 24', longitude 17° 28', that this vessel, after fighting heroically, losing its three masts, with the water in its hold, and the third of its crew disabled, preferred sinking with its 356 sailors or surrendering; and nailing its colours to the poop, disappeared under the waves to the cry of 'Long live the Republic!'

"The *Avenger!*" I exclaimed.

"Yes, sir, the *Avenger!* A good name!" muttered Captain Nemo, crossing his arms.

Twenty Thousand Leagues Under the Sea

CHAPTER XXI

A HECATOMB

THE way of describing this unlooked-for scene, the history of the patriot ship, told at first so coldly, and the emotion with which this strange man pronounced the last words, the name of the *Avenger*, the significance of which could not escape me, all impressed itself deeply on my mind. My eyes did not leave the Captain; who, with his hand stretched out to sea, was watching with a glowing eye the glorious wreck. Perhaps I was never to know who he was, from whence he came, or where he was going to, but I saw the man move, and apart from the savant. It was no common misanthropy which had shut Captain Nemo and his companions within the *Nautilus*, but a hatred, either monstrous or sublime, which time could never weaken. Did this hatred still seek for vengeance? The future would soon teach me that. But the *Nautilus* was rising slowly to the surface of the sea, and the form of the *Avenger* disappeared by degrees from my sight. Soon a slight rolling told me that we were in the open air. At that moment a dull boom was heard. I looked at the Captain. He did not move.

"Captain?" said I.

He did not answer. I left him and mounted the platform. Conseil and the Canadian were already there.

"Where did that sound come from?" I asked.

"It was a gunshot," replied Ned Land.

I looked in the direction of the vessel I had already seen. It was nearing the *Nautilus*, and we could see that it was putting on steam. It was within six miles of us.

"What is that ship, Ned?"

"By its rigging, and the height of its lower masts," said the Canadian, "I bet she is a ship of war. May it reach us; and, if necessary, sink this cursed *Nautilus*."

"Friend Ned," replied Conseil, "what harm can it do to the *Nautilus*? Can it attack it beneath the waves? Can it cannonade us at the bottom of the sea?"

"Tell me, Ned," said I, "can you recognise what country she belongs to?"

The Canadian knitted his eyebrows, dropped his eyelids, and screwed up the corners of his eyes, and for a few moments

fixed a piercing look upon the vessel.

"No, sir," he replied; "I cannot tell what nation she belongs to, for she shows no colours. But I can declare she is a man-of-war, for a long pennant flutters from her main-mast."

For a quarter of an hour we watched the ship which was steaming towards us. I could not, however, believe that she could see the *Nautilus* from that distance; and still less, that she could know what this submarine engine was. Soon the Canadian informed me that she was a large armoured two-decker ram. A thick black smoke was pouring from her two funnels. Her closely-furled sails were stopped to her yards. She hoisted no flag at her mizen-peak. The distance prevented us from distinguishing the colours of her pennant, which floated like a thin ribbon. She advanced rapidly. If Captain Nemo allowed her to approach, there was a chance of salvation for us.

"Sir," said Ned Land, "if that vessel passes within a mile of us I shall throw myself into the sea, and I should advise you to do the same."

I did not reply to the Canadian's suggestion, but continued watching the ship. Whether English, French, American, or Russian, she would be sure to take us in if we could only reach her. Presently a white smoke burst from the fore part of the vessel; some second after the water, agitated by the fall of a heavy body, splashed the stern of the *Nautilus*, and shortly afterwards a loud explosion struck my ear.

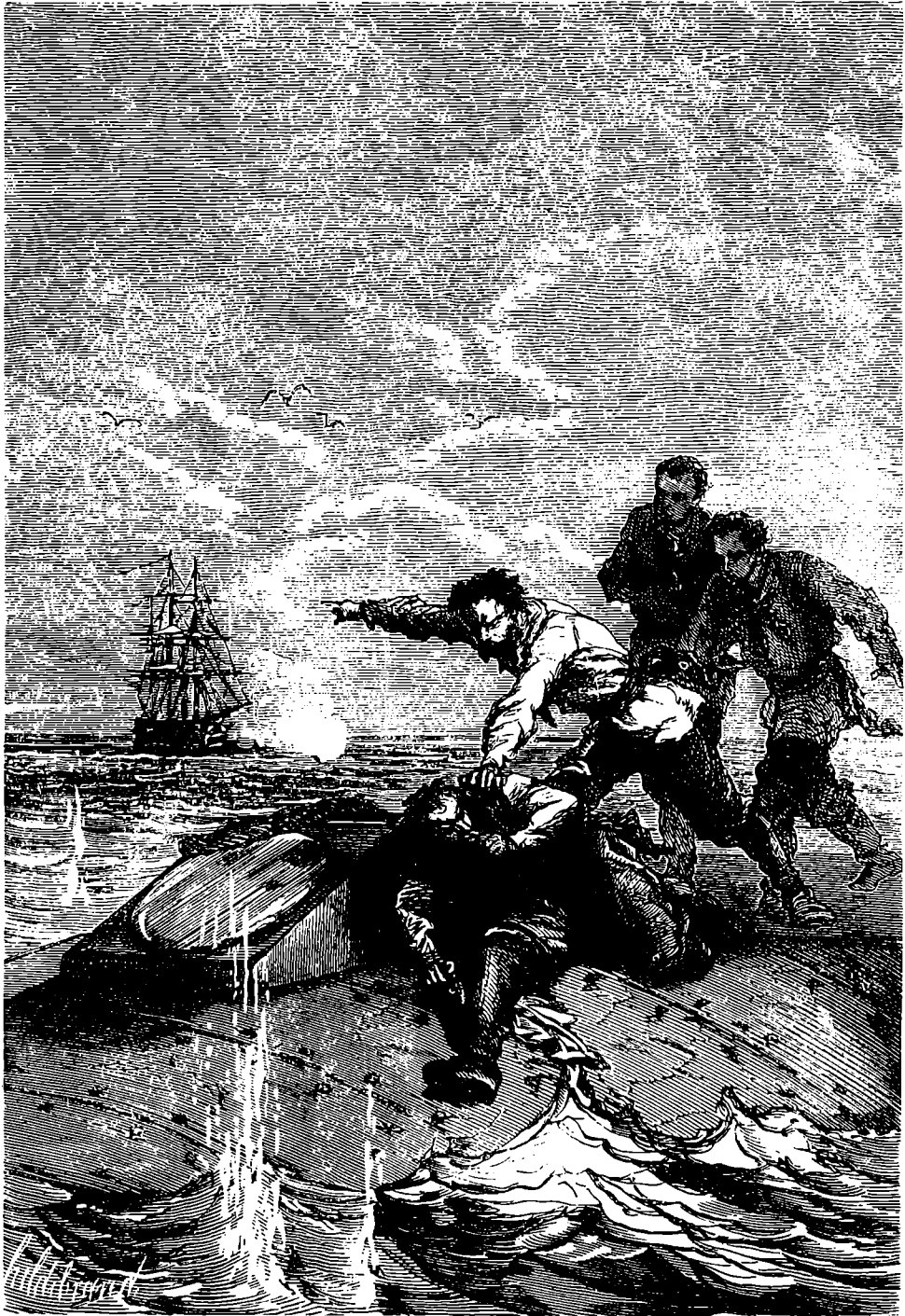
"What! they are firing at us!" I exclaimed.

"So please you, sir," said Ned, "they have recognised the unicorn, and they are firing at us."

"But," I exclaimed, "surely they can see that there are men in the case?"

"It is, perhaps, because of that," replied Ned Land, looking at me.

A whole flood of light burst upon my mind. Doubtless they knew now how to believe the stories of the pretended monster. No doubt, on board the *Abraham Lincoln*, when the Canadian struck it with the harpoon, Commander Farragut had recognised in the supposed narwhal a submarine vessel, more dangerous than a supernatural cetacean. Yes,



“Ned Land was struck down by an iron hand, and fell upon the deck.”

it must have been so; and on every sea they were now seeking this engine of destruction. Terrible indeed! if, as we supposed, Captain Nemo employed the *Nautilus* in works of vengeance. On the night when we were imprisoned in that cell, in the midst of the Indian Ocean, had he not attacked some vessel? The man buried in the coral cemetery, had he not been a victim to the shock caused by the *Nautilus*? Yes, I repeat it, it must be so. One part of the mysterious existence of Captain Nemo had been unveiled; and, if his identity had not been recognised, at least, the nations united against him were no longer hunting a chimerical creature, but a man who had vowed a deadly hatred against them. All the formidable past rose before me. Instead of meeting friends on board the approaching ship, we could only expect pitiless enemies. But the shot rattled about us. Some of them struck the sea and ricocheted, losing themselves in the distance. But none touched the *Nautilus*. The vessel was not more than three miles from us. In spite of the serious cannonade, Captain Nemo did not appear on the platform; but, if one of the conical projectiles had struck the shell of the *Nautilus*, it would have been fatal. The Canadian then said, "Sir, we must do all we can to get out of this dilemma. Let us signal them. They will then, perhaps, understand that we are honest folks."

Ned Land took his handkerchief to wave in the air; but he had scarcely displayed it, when he was struck down by an iron hand, and fell, in spite of his great strength, upon the deck.

"Fool!" exclaimed the Captain, "do you wish to be pierced by the spur of the *Nautilus* before it is hurled at this vessel?"

Captain Nemo was terrible to hear; he was still more terrible to see. His face was deadly pale, with a spasm at his heart. For an instant it must have ceased to beat. His pupils were fearfully contracted. He did not *spe*ak, he *roared*, as, with his body thrown forward, he wrung the Canadian's shoulders. Then, leaving him, and turning to the ship of war, whose shot was still raining around him, he exclaimed, with a powerful voice, "Ah, ship of an accursed nation, you know who I am! I do not want your colours to know you by! Look! and I will show you mine!"

And on the fore part of the platform Captain Nemo unfurled a black flag, similar to the one he had placed at the south-pole. At that moment a shot struck the shell of the *Nautilus* obliquely, without piercing it; and, rebounding near the Captain, was lost in the

sea. He shrugged his shoulders; and addressing me, said shortly, "Go down, you and your companions, go down!"

"Sir," I exclaimed, "are you going to attack this vessel?"

"Sir, I am going to sink it."

"You will not do that?"

"I shall do it," he replied, coldly. "And I advise you not to judge me, sir. Fate has shown you what you ought not have seen. The attack has begun; go down."

"What is this vessel?"

"You do not know? Very well! so much the better! its nationality to you, at least, will be a secret. Go down!"

We could but obey. About fifteen of the sailors surrounded the Captain, looking with implacable hatred at the vessel nearing them. One could feel that the same desire of vengeance animated every soul. I went down at the moment another projectile struck the *Nautilus*, and I heard the Captain exclaim—

"Strike, mad vessel! Shower your useless shot! And then, you will not escape the spur of the *Nautilus*. But it is not here that you shall perish! I would not have your ruins mingle with those of the *Avenger*!"

I reached my room. The Captain and his second had remained on the platform. The screw was set in motion, and the *Nautilus*, moving with speed, was soon beyond the reach of the ship's guns. But the pursuit continued, and Captain Nemo contented himself with keeping his distance.

About four in the afternoon, being no longer able to contain my impatience, I went to the central staircase. The panel was open, and I ventured on to the platform. The Captain was still walking up and down with an agitated step. He was looking at the ship, which was five or six miles to leeward.

He was going round it like a wild beast, and drawing it eastward, he allowed them to pursue. But he did not attack. Perhaps he still hesitated? I wished to mediate once more. But I had scarcely spoken, when Captain Nemo imposed silence, saying—

"I am the law, and I am the judge! I am the oppressed, and there is the oppressor! Through him I have lost all that I loved, cherished, and venerated,—country, wife, children, father, and mother. I saw all perish! All that I hate is there! Say no more!"

I cast a last look at the man-of-war, which was putting on steam, and rejoined Ned and Conseil.

"We will fly!" I exclaimed.

"God!" said Ned. "What is this vessel?"

"I do not know; but whatever it is, it will be sunk before night. In any case, it is better to perish with it, than be made accomplices in a retaliation, the justice of which we cannot judge."

"That is my opinion too," said Ned Land, coolly. "Let us wait for night."

Night arrived. Deep silence reigned on board. The compass showed that the *Nautilus* had not altered its course. It was on the surface, rolling slightly. My companions and I resolved to fly when the vessel should be near enough either to hear us or to see us; for the moon, which would be full in two or three days, shone brightly. Once on board the ship, if we could not prevent the blow which threatened it, we could, at least we would, do all that circumstances would allow. Several times I thought the *Nautilus* was preparing for attack; but Captain Nemo contented himself with allowing his adversary to approach, and then fled once more before it.

Part of the night passed without any incident. We watched the opportunity for action. We spoke little, for we were too much moved. Ned Land would have thrown himself into the sea, but I forced him to wait. According to my idea, the *Nautilus* would attack the ship at her waterline, and then it would not only be possible, but easy to fly.

At three in the morning, full of uneasiness, I mounted the platform. Captain Nemo had not left it. He was standing at the forepart near his flag, which a slight breeze displayed above his head. He did not take his eyes from the vessel. The intensity of his look seemed to attract, and fascinate, and draw it onward more purely than if he had been towing it. The moon was then passing the meridian. Jupiter was rising in the east. Amid this peaceful scene of nature, sky and ocean rivalled each other in tranquillity, the sea offering to the orbs of night the finest mirror they could ever have in which to reflect their image. As I thought of the deep calm of these elements, compared with all those passions brooding imperceptibly within the *Nautilus*, I shuddered.

The vessel was within two miles of us. It was ever nearing that phosphorescent light which showed the presence of the *Nautilus*. I could see its green and red lights, and its white lantern hanging from the large mizenmast. An indistinct vibration quivered through its rigging, showing that the furnaces were heated to the uttermost. Sheaves of sparks and red ashes flew from the funnels, shining in the atmosphere like stars.

I remained thus until six in the morning,

without Captain Nemo noticing me. The ship stood about a mile and a half from us, and with the first dawn of day the firing began afresh. The moment could not be far off when, the *Nautilus* attacking its adversary, my companions and myself should for ever leave this man. I was preparing to go down to remind them, when the second mounted the platform, accompanied by several sailors. Captain Nemo either did not, or would not, see them. Some steps were taken which might be called the signal for action. They were very simple. The iron balustrade around the platform was lowered, and the lantern and pilot cages were pushed within the shell until they were flush with the deck. The long surface of the steel cigar no longer offered a single point to check its manoeuvres. I returned to the saloon. The *Nautilus* still floated; some streaks of light were filtering through the liquid beds. With the undulations of the waves the windows were brightened by the red streaks of the rising sun, and this dreadful day of the 2nd of June had dawned.

At five o'clock, the log showed that the speed of the *Nautilus* was slackening, and I knew that it was allowing them to draw nearer. Besides, the reports were heard more distinctly, and the projectiles, labouring through the ambient water, were extinguished with a strange hissing noise.

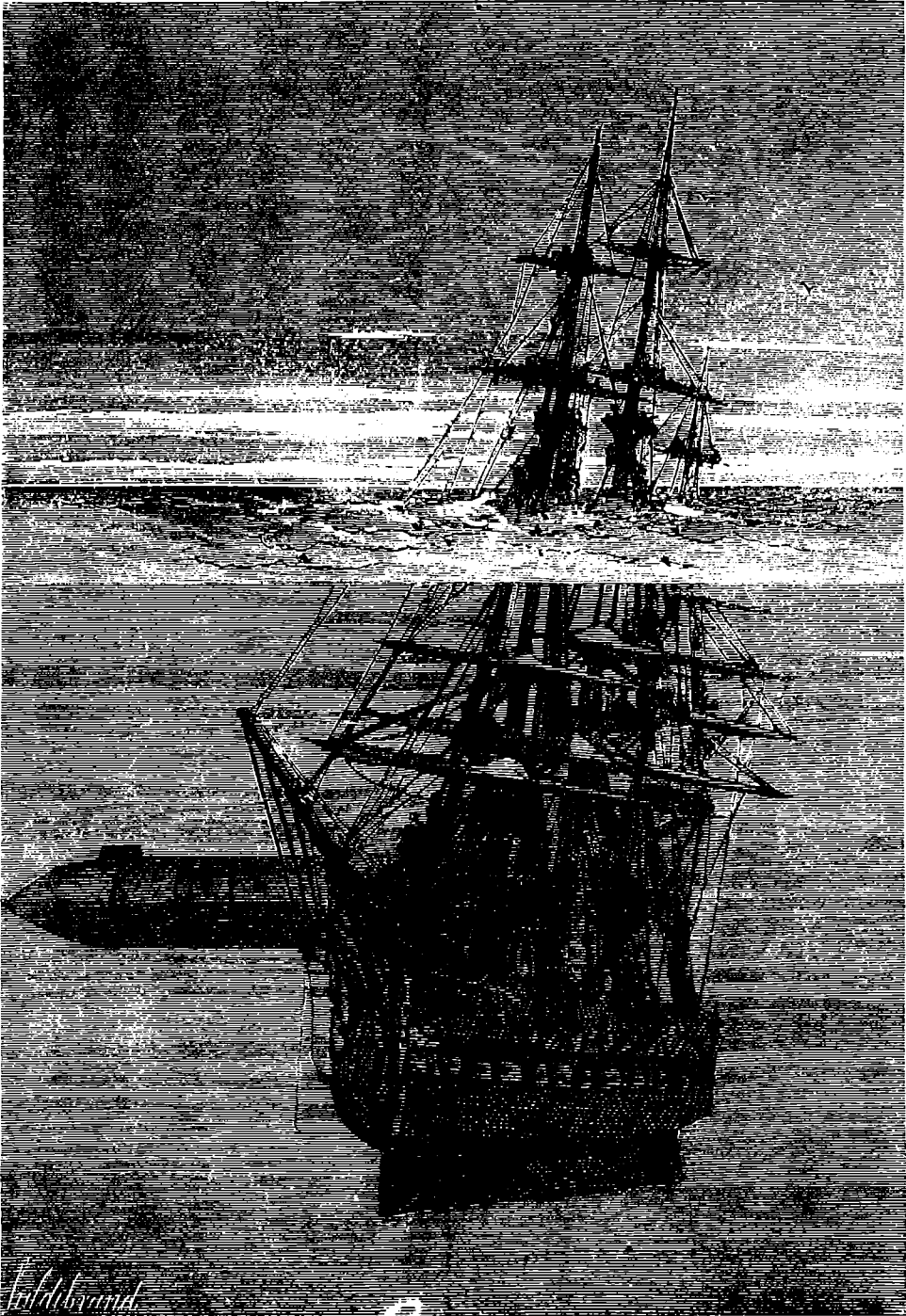
"My friends," said I, "the moment is come. One grasp of the hand, and may God protect us!"

Ned Land was resolute, Conseil calm, myself so nervous that I knew not how to contain myself. We all passed into the library; but the moment I pushed the door opening on to the central staircase, I heard the upper panel close sharply. The Canadian rushed on to the stairs, but I stopped him. A well-known hissing noise told me that the water was running into the reservoirs, and in a few minutes the *Nautilus* was some yards beneath the surface of the waves. I understood the manoeuvre. It was too late to act. The *Nautilus* did not wish to strike at the impenetrable cuirass, but below the waterline, where the metallic covering no longer protected it.

We were again imprisoned, unwilling witness of the dreadful drama that was preparing. We had scarcely time to reflect; taking refuge in my room, we looked at each other without speaking. A deep stupor had taken hold of my mind: thought seemed to stand still. I was in that painful state of expectation preceding a dreadful report. I



“Captain Nemo did not take his eyes from the vessel.”



“The *Nautilus* passed through the mass of the vessel,
like a needle through sailcloth.”

waited, I listened, every sense was merged in that of hearing! The speed of the *Nautilus* was accelerated. It was preparing to rush. The whole ship trembled. Suddenly I screamed. I felt the shock, but comparatively light. I felt the penetrating power of the steel spur. I heard rattlings and scrapings. But the *Nautilus*, carried along by its propelling power, passed through the mass of the vessel, like a needle through sailcloth!

I could stand it no longer. Mad, out of my mind, I rushed from my room into the saloon. Captain Nemo was there, mute, gloomy, implacable; he was looking through the port panel. A large mass cast a shadow on the water; and that it might lose nothing of her agony, the *Nautilus* was going down into the abyss with her. Ten yards from me I saw the open shell through which the water was rushing with the noise of thunder, then the double line of guns and the netting. The bridge was covered with black agitated shadows.

The water was rising. The poor creatures were crowding the ratlings, clinging to the masts, struggling under the water. It was a

human ant-heap overtaken by the sea. Paralysed, stiffened with anguish, my hair standing on end, with eyes wide open, panting, without breath, and without voice, I too was watching! An irresistible attraction glued me to the glass! Suddenly an explosion took place. The compressed air blew up her decks, as if the magazines had caught fire. Then the unfortunate vessel sunk more rapidly. Her topmast, laden with victims, now appeared; then her spars, bending under the weight of men; and last of all, the top of her mainmast. Then the dark mass disappeared, and with it the dead crew, drawn down by the strong eddy.

I turned to Captain Nemo. That terrible avenger, a perfect archangel of hatred, was still looking. When all was over, he turned to his room, opened the door, and entered. I followed him with my eyes. On the end wall beneath his heroes, I saw the portrait of a woman still young, and two little children. Captain Nemo looked at them for some moments, stretched his arms towards them, and kneeling down burst into deep sobs.

Twenty Thousand Leagues Under the Sea

CHAPTER XXII

THE LAST WORDS OF CAPTAIN NEMO

THE panels had closed on this dreadful vision, but light had not returned to the saloon: all was silence and darkness within the *Nautilus*. At wonderful speed, a hundred feet beneath the water, it was leaving this desolate spot. Whither was it going? To the north or south? Where was the man flying to after such dreadful retaliation? I had returned to my room, where Ned and Conseil had remained silent enough. I felt an insurmountable horror for Captain Nemo. Whatever he had suffered at the hands of these men, he had no right to punish thus. He had made me, if not an accomplice, at least a witness of his vengeance. At eleven the electric light reappeared. I passed into the saloon. It was deserted. I consulted the different instruments. The *Nautilus* was flying northward at the rate of twenty-five miles an hour, now on the surface, and now thirty feet below it. On taking the bearings by the chart, I saw that we were passing the mouth of the Manche, and that our course was hurrying us towards the northern seas at a frightful speed. That night we had crossed two hundred leagues of the Atlantic. The shadows fell, and the sea was covered with darkness until the rising of the moon. I went to my room, but could not sleep. I was troubled with dreadful nightmare. The horrible scene of destruction was continually before my eyes. From that day, who could tell into what part of the North Atlantic basin the *Nautilus* would take us? Still, with unaccountable speed. Still in the midst of these northern fogs. Would it touch at Spitzbergen, or on the shores of Nova Zembla? Should we explore those unknown seas, the White Sea, the Sea of Kara, the gulf of Obi, the Archipelago of Liarrov, and the unknown coast of Asia? I could not say. I could no longer judge of the time that was passing. The clocks had been stopped on board. It seemed, as in polar countries, that night and day no longer followed their regular course. I felt myself being drawn into that strange region where the foundered imagination of Edgar Poe roamed at will. Like the fabulous Gordon Pym, at every moment I expected to see "That veiled human figure, of larger proportions than those of any inhabitant of the earth, thrown across the cataract

which defends the approach to the pole." I estimated (though, perhaps, I may be mistaken),—I estimated this adventurous course of the *Nautilus* to have lasted fifteen or twenty days. And I know not how much longer it might have lasted, had it not been for the catastrophe which ended this voyage. Of Captain Nemo I saw nothing whatever now, nor of his second. Not a man of the crew was visible for an instant. The *Nautilus* was almost incessantly under water. When we came to the surface to renew the air, the panels opened and shut mechanically. There were no more marks on the planisphere. I knew not where we were. And the Canadian, too, his strength and patience at an end, appeared no more. Conseil could not draw a word from him; and fearing that, in a dreadful fit of madness, he might kill himself, watched him with constant devotion. One morning (what date it was I could not say), I had fallen into a heavy sleep towards the early hours, a sleep both painful and unhealthy, when I suddenly awoke. Ned Land was leaning over me, saying, in a low voice, "We are going to fly."

I sat up.

"When shall we go?" I asked.

"To-morrow night. All inspection on board the *Nautilus* seems to have ceased. All appear to be stupified. You will be ready, sir?"

"Yes; where are we?"

"In sight of land. I took the reckoning this morning in the fog,—twenty miles to the east."

"What country is it?"

"I do not know; but whatever it is, we will take refuge there."

"Yes, Ned, yes. We will fly to-night, even if the sea should swallow us up."

"The sea is bad, the wind violent, but twenty miles in that light boat of the *Nautilus* does not frighten me. Unknown to the crew, I have been able to procure food and some bottles of water."

"I will follow you."

"But," continued the Canadian, "if I am surprised, I will defend myself; I will force them to kill me."

"We will die together, friend Ned."

I had made up my mind to all. The

Canadian left me. I reached the platform, on which I could with difficulty support myself against the shock of the waves. The sky was threatening; but, as land was in those thick brown shadows, we must fly. I returned to the saloon, fearing and yet hoping to see Captain Nemo, wishing and yet not wishing to see him. What could I have said to him? Could I hide the involuntary horror with which he inspired me? No. It was better that I should not meet him face to face; better to forget him. And yet— How long seemed that day, the last that I should pass in the *Nautilus*. I remained alone. Ned Land and Conseil avoided speaking, for fear of betraying themselves. At six I dined, but I was not hungry; I forced myself to eat in spite of my disgust, that I might not weaken myself. At half-past six Ned Land came to my room, saying, "We shall not see each other again before our departure. At ten the moon will not be risen. We will profit by the darkness. Come to the boat; Conseil and I will wait for you."

The Canadian went out without giving me time to answer. Wishing to verify the course of the *Nautilus*, I went to the saloon. We were running N.N.E. at frightful speed, and more than fifty yards deep. I cast a last look on these wonders of nature, on the riches of art heaped up in this museum, upon the unrivalled collection destined to perish at the bottom of the sea, with him who had formed it. I wished to fix an indelible impression of it in my mind. I remained an hour thus, bathed in the light of that luminous ceiling, and passing in review those treasures shining under their glasses. Then I returned to my room.

I dressed myself in strong sea clothing. I collected my notes, placing them carefully about me. My heart beat loudly. I could not check its pulsations. Certainly my trouble and agitation would have betrayed me to Captain Nemo's eyes. What was he doing at this moment? I listened at the door of his room. I heard steps. Captain Nemo was there. He had not gone to rest. At every moment I expected to see him appear, and ask me why I wished to fly. I was constantly on the alert. My imagination magnified everything. The impression became at last so poignant, that I asked myself if it would not be better to go to the Captain's room, see him face to face, and brave him with look and gesture.

It was the inspiration of a madman; fortunately I resisted the desire, and stretched myself on my bed to quiet by bodily agitation. My nerves were somewhat calmer, but in my excited brain I saw over again all my existence

on board the *Nautilus*; every incident, either happy or unfortunate, which had happened since my disappearance from the *Abraham Lincoln*;—the submarine hunt, the Torres Straits, the savages of Papua, the running ashore, the coral cemetery, the passage of Suez, the island of Santorin, the Cretan diver, Vigo Bay, Atlants, the iceberg, the south pole, the imprisonment in the ice, the fight among the poulps, the storm in the Gulf Stream, the *Avenger*, and the horrible scene of the vessel sunk with all her crew. All these events passed before my eyes like scenes in a drama. Then Captain Nemo seemed to grown enormously, his features to assume superhuman proportions. He was no longer my equal, but a man of the waters, the genie of the sea.

It was then half-past nine. I held my head between my hands to keep it from bursting. I closed my eyes, I would not think any longer. There was another half hour to wait, another half hour of a nightmare, which might drive me mad.

At that moment I heard the distant strains of the organ, a sad harmony to an undefinable chaunt, the wail of a soul longing to break these earthly bonds. I listened with every sense, scarcely breathing; plunged, like Captain Nemo, in that musical ecstasy, which was drawing him in spirit to the end of life.

Then a sudden thought terrified me. Captain Nemo had left his room. He was in the saloon, which I must cross to fly. There I should meet him for the last time. He would see me, perhaps speak to me. A gesture of his might destroy me, a single word chain me on board.

But ten was about to strike. The moment had come for me to leave my room, and join my companions.

I must not hesitate, even if Captain Nemo himself should rise before me. I opened my door carefully; and even then, as it turned on its hinges, it seemed to me to make a dreadful noise. Perhaps it only existed in my own imagination.

I crept along the dark stairs of the *Nautilus*, stopping at each step to check the beating of my heart. I reached the door of the saloon, and opened it gently. It was plunged in profound darkness. The strains of the organ sounded faintly. Captain Nemo was there. He did not see me. In the full light I do not think he would have noticed me, so entirely was he absorbed in the ecstasy.

I crept along the carpet, avoiding the slightest sound which might betray my presence. I was at least five minutes reaching



“The boat was hurled, like a stone from a sling, into the midst of the whirlpool.”

the door, at the opposite side, opening into the library.

I was going to open it, when a sigh from Captain Nemo nailed me to the spot. I knew that he was rising. I could even see him, for the light from the library came through to the saloon. He came towards me silently, with his arms crossed, gliding like a spectre rather than walking. His breast was swelling with sobs; and I heard him murmur these words (the last which ever struck my ear)—

“Almighty God! enough! enough!”

Was it a confession of remorse which thus escaped from this man’s conscience?

In desperation I rushed through the library, mounted the central staircase, and following the upper flight reached the boat. I crept through the opening, which had already admitted my two companions.

“Let us go! let us go!” I exclaimed.

“Directly!” replied the Canadian.

The orifice in the plates of the *Nautilus* was first closed, and fastened down by means of a false key, with which Ned Land had provided himself; the opening in the boat was also closed. The Canadian began to loosen the bolts which still held us to the submarine boat.

Suddenly a noise within was heard. Voices were answering each other loudly. What was the matter? Had they discovered our flight? I felt Ned Land slipping a dagger into my hand.

“Yes,” I murmured, “we know how to die!”

The Canadian had stopped in his work. But one word many times repeated, a dreadful word, revealed the cause of the agitation spreading on board the *Nautilus*. It was not we the crew were looking after!

“The maelstrom! the maelstrom!” I exclaimed.

The maelstrom! Could a more dreadful word in a more dreadful situation have sounded in our ears! We were then upon the dangerous coast of Norway. Was the *Nautilus* being drawn into the gulf at the moment our

boat was going to leave its sides? We knew that at the tide the pent-up waters between the islands of Ferroe and Loffoden rush with irresistible violence, forming a whirlpool from which no vessel ever escapes. From every point of the horizon enormous waves were meeting, forming a gulf justly called the “Navel of the Ocean,” whose power of attraction extends to a distance of twelve miles. There, not only vessels, but whales are sacrificed, as well as white bears from the northern regions.

It is thither that the *Nautilus*, voluntarily or involuntarily, had been run by the Captain.

It was describing a spiral, the circumference of which was lessening by degrees, and the boat, which was still fastened to its side, was carried along with giddy speed. I felt that sickly giddiness which arises from long-continued whirling round.

We were in dread. Our horror was at its height, circulation had stopped, all nervous influence was annihilated, and we were covered with cold sweat, like a sweat of agony! And what noise around our frail bark! What roarings repeated by the echo miles away! What an uproar was that of the waters broken on the sharp rocks at the bottom, where the hardest bodies are crushed, and trees worn away, “with all the fur rubbed off,” according to the Norwegian phrase!

What a situation to be in! We rocked frightfully. The *Nautilus* defended itself like a human being. Its steel muscles cracked. Sometimes it seemed to stand upright, and we with it!

“We must hold on,” said Ned, “and look after the bolts. We may still be saved if we stick to the *Nautilus*!”—

He had not finished the words, when we heard a crashing noise, the bolts gave way, and the boat, torn from its groove, was hurled like a stone from a sling into the midst of the whirlpool.

My head struck on a piece of iron, and with the violent shock I lost all consciousness.



“When I returned to consciousness, I was lying in a fisherman’s hut on the Loffoden Isles.”

Twenty Thousand Leagues Under the Sea

CHAPTER XXIII

CONCLUSION

THUS ends the voyage under the seas. What passed during that night—how the boat escaped from the eddies of the maelstrom—how Ned Land, Conseil, and myself ever came out of the gulf, I cannot tell.

But when I returned to consciousness, I was lying in a fisherman's hut, on the Loffoden Isles. My two companions, safe and sound, were near me holding my hands. We embraced each other heartily.

At that moment we could not think of returning to France. The means of communication between the north of Norway and the south are rare. And I am therefore obliged to wait for the steamboat running monthly from Cape North.

And among the worthy people who have so kindly received us, I revise my record of these adventures once more. Not a fact has been omitted, not a detail exaggerated. It is a faithful narrative of this incredible expedition in an element inaccessible to man, but to which Progress will one day open a road.

Shall I be believed? I do not know. And it matters little, after all. What I now affirm is, that I have a right to speak of these seas, under which, in less than ten months, I have crossed 20,000 leagues in that submarine tour of the world, which has revealed so many wonders.

But what has become of the *Nautilus*? Did it

resist the pressure of the maelstrom? Does Captain Nemo still live? And does he still follow under the ocean those frightful retaliations? Or, did he stop after that last hecatomb?

Will the waves one day carry to him this manuscript containing the history of his life? Shall I ever know the name of this man? Will the missing vessel tell us by its nationality that of Captain Nemo?

I hope so. And I also hope that this powerful vessel has conquered the sea at its most terrible gulf, and that the *Nautilus* has survived where so many other vessels have been lost! If it be so—if Captain Nemo still inhabits the ocean, his adopted country, may hatred be appeased in that savage heart! May the contemplation of so many wonders extinguish for ever the spirit of vengeance! May the judge disappear, and the philosopher continue the peaceful exploration of the sea! If his destiny be strange, it is also sublime. Have I not understood it myself? Have I not lived ten months of this unnatural life? And to the question asked by Ecclesiastes 3000 years ago, "That which is far off and exceeding deep, who can find it out?" two men alone of all now living have the right to give an answer—

CAPTAIN NEMO AND MYSELF.



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