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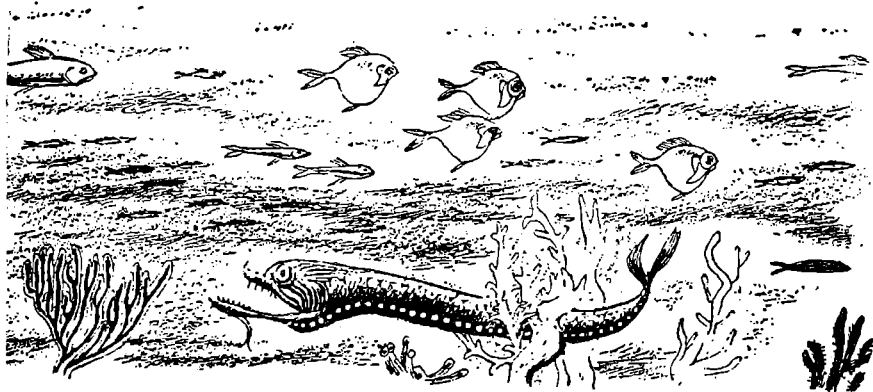
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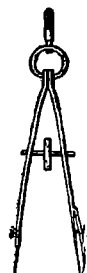
ENGLE



the engineer

***The Big Wheels of tomorrow will be men
who can see the big picture. But
blowouts have small beginnings . . .***

by FREDERIK POHL and C. M. KORNBLUTH



IT WAS very simple. Some combination of low temperature and high pressure had forced something from the seepage at the ocean bottom into combination with something in the water around them.

And the impregnable armor around Subatlantic Oil's drilling chamber had discovered a weakness.

On the television screen it looked more serious than it was—so Muhlenhoff told himself, staring at it grimly. You

get down more than a mile, and you're bound to have little technical problems. That's why deepsea oil wells were still there.

Still, it did look kind of serious. The water driving in the pitted faults had the pressure of eighteen hundred meters behind it, and where it struck it did not splash—it battered and destroyed. As Muhlenhoff watched, a bulkhead collapsed in an explosion of spray; the remote camera caught a tiny dribble of the scattering brine, and the picture in the screen fluttered and shrank, and came back with a wavering side-wise pulse.

Muhlenhoff flicked off the screen and marched into the room where the Engineering Board was waiting in attitudes of flabby panic.

As he swept his hand through his snow-white crew cut and called the board to order a dispatch was handed to him—a preliminary report from a quickly-dispatched company trouble-shooter team. He read it to the board, stone-faced.

A veteran heat-transfer man, the first to recover, growled:

"Some vibration thing—and seepage from the oil pool. Sloppy drilling!" He

sneered. "Big deal! So a couple hundred meters of shaft have to be plugged and pumped. So six or eight compartments go pop. Since when did we start to believe the cack Research & Development hands out? Armor's armor. Sure it pops—when something makes it pop. If Atlantic oil was easy to get at, it wouldn't be here waiting for us now. Put a gang on the job. Find out what happened, make sure it doesn't happen again. Big deal!"

Muhlenhoff smiled his attractive smile. "Breck," he said, "thank God you've got guts. Perhaps we were in a bit of a panic. Gentlemen, I hope we'll all take heart from Mr. Breck's level-headed—what did you say, Breck?"

Breck didn't look up. He was pawing through the dispatch Muhlenhoff had dropped to the table. "Nine-inch plate," he read aloud, white-faced. "And time of installation, not quite seven weeks ago. If this goes on in a straight line—" he grabbed for a pocket slide-rule—"we have, uh—" he swallowed—"less time than the probable error," he finished.

"Breck!" Muhlenhoff yelled. "Where are you going?"

The veteran heat-transfer man said grimly as he sped

through the door: "To find a submarine."

The rest of the Engineering Board was suddenly pulling chairs toward the trouble-shooting team's dispatch. Muhlenhoff slammed a fist on the table.

"Stop it," he said evenly. "The next man who leaves the meeting will have his contract canceled. Is that clear, gentlemen? Good. We will now proceed to get organized."

He had them; they were listening. He said forcefully: "I want a task force consisting of a petrochemist, a vibrations man, a hydrostatics man and a structural engineer. Co-opt mathematicians and computermen as needed. I will have all machines capable of handling Fourier series and up cleared for your use. The work of the task force will be divided into two phases. For Phase One, members will keep their staffs as small as possible. The objective of Phase One is to find the cause of the leaks and predict whether similar leaks are likely elsewhere in the project. On receiving a first approximation from the force I will proceed to set up Phase Two, to deal with countermeasures."

He paused. "Gentlemen," he said, "we must not lose our

nerve. We must not panic. Possibly the most serious technical crisis in Atlantic's history lies before us. Your most important job is to maintain—at all times—a cheerful, courageous attitude. We cannot, repeat cannot, afford to have the sub-technical staff of the project panicked for lack of a good example from us." He drilled each of them in turn with a long glare. "And," he finished, "if I hear of anyone suddenly discovering emergency business ashore, the man who does it better get fitted for a sludgemonkey's suit, because that's what he'll be tomorrow. Clear?"

Each of the executives assumed some version of a cheerful, courageous attitude. They looked ghastly, even to themselves.

MUHLENHOFF stalked into his private office, the nerve-center of the whole bulkheaded works.

In Muhlenhoff's private office, you would never know you were 1800 meters below the surface of the sea. It looked like any oilman's brass-hat office anywhere, complete to the beautiful blonde outside the door (but whitefaced and trembling), the potted palm (though the ends of its

fronds vibrated gently), and the typical section chief bursting in in the typical flap. "Sir," he whined, frenzied, "Section Six has pinholed! The corrosion—"

"Handle it!" barked Muhlenhoff, and slammed the door. Section Six be damned! What did it matter if a few of the old bulkheads pinholed and filled? The central chambers were safe, until they could lick whatever it was that was corroding. The point was, you had to stay with it and get out the oil; because if you didn't prove your lease, PetroMex would. Mexican oil wanted those reserves mighty badly.

Muhlenhoff knew how to handle an emergency. Back away from it. Get a fresh slant. Above all, *don't panic*.

He slapped a button that guaranteed no interruption and irritably, seeking distraction, picked up his latest copy of the *New New Review*—for he was, among other things, an intellectual as time allowed.

Under the magazine was the latest of several confidential communications from the home office. Muhlenhoff growled and tossed the magazine aside. He reread what Priestley had had to say:

"I know you understand

the importance of beating our Spic friends to the Atlantic deep reserves, so I won't give you a hard time about it. I'll just pass it on the way Lundstrom gave it to me: 'Tell Muhlenhoff he'll come back on the Board or on a board, and no alibis or excuses.' Get it? Well—"

Hell, Muhlenhoff threw the sheet down and tried to think about the damned corrosion-leakage situation.

But he didn't try for long. There was, he realized, no point at all in him thinking about the problem. For one thing, he no longer had the equipment.

Muhlenhoff realized, wonderingly, that he hadn't opened a table of integrals for ten years; he doubted that he could find his way around the pages well enough to run down a tricky form. He had come up pretty fast through the huge technical staff of Atlantic. First he had been a geologist in the procurement section, one of those boots-and-leather-jacket guys who spent his days in rough, tough blasting and drilling and his nights in rarefied scientific air, correlating and integrating the findings of the day. Next he had been a Chief Geologist, chairborne director of youngsters, now

and then tackling a muddled report with Theory of Least Squares and Gibbs Phase Rule that magically separated dross from limpid fact... or, he admitted wryly, at least turning the muddled reports over to mathematicians who specialized in those disciplines.

Next he had been a Raw Materials Committee member who knew that drilling and figuring weren't the almighty things he had supposed them when he was a kid, who began to see the Big Picture of off-shore leases and depreciation allowances; of power and fusible rocks and steel for the machines, butane for the drills, plastics for the pipelines, metals for the circuits, the computers, the doors, windows, walls, tools, utilities. A committeeman who began to see that a friendly beer poured for the right resources-commission man was really more important than Least Squares or Phase Rule, because a resources commissioner who didn't get along with you might get along, for instance, with somebody from Coastwide, and allot to Coastwide the next available block of leases—thus working grievous harm to Atlantic and the billions it served. A committeeman who began to see

that the Big Picture meant government and science leaning chummily against each other, government setting science new and challenging tasks like the billion-barrel procurement program, science backing government with all its tremendous prestige. You consume my waste hydrocarbons, Muhlenhoff thought comfortably, and I'll consume yours.

Thus mined, smelted and milled, Muhlenhoff was tempered for higher things. For the first, the technical directorate of an entire Atlantic Sub-Sea Petroleum Corporation district, and all wells, fields, pipelines, stills, storage fields, transport, fabrication and maintenance appertaining thereto. Honors piled upon honors. And then—

He glanced around him at the comfortable office. The top. Nothing to be added but voting stock and Board membership—and those within his grasp, if only he weathered this last crisis. And then the rarefied height he occupied alone.

And, by God, he thought, I do a damn good job of it! Pleasurably he reviewed his conduct at the meeting; he had already forgotten his panic. Those shaking fools would have brought the roof

down on us, he thought savagely. A few gallons of water in an unimportant shaft, and they're set to message the home office, run for the surface, abandon the whole project. The Big Picture! They didn't see it, and they never would. He might, he admitted, not be able to chase an integral form through a table, but by God he could give the orders to those who would. The thing was organized now; the project was rolling; the task force had its job mapped out; and somehow, although he would not do a jot of the brainwearing, eyestraining, actual work, it would be *his* job, because he had initiated it. He thought of the flat, dark square miles of calcareous ooze outside, under which lay the biggest proved untapped petroleum reserve in the world. Sector Fortyone, it was called on the hydrographic charts.

Perhaps, some day, the charts would say: *Muhlenhoff Basin*.

Well, why not?

THE emergency intercom was flickering its red call light pusillaniously. Muhlenhoff calmly lifted the handset off its cradle and ignored the tinny bleat. When you gave an order, you had to

leave the men alone to carry it out.

He relaxed in his chair and picked up a book from the desk. He was, among other things, a student of Old American History, as time permitted.

Fifteen minutes now, he promised himself, with the heroic past. And then back to work refreshed!

Muhlenhoff plunged into the book. He had schooled himself to concentration; he hardly noticed when the pleading noise from the intercom finally gave up trying to attract his attention. The book was a study of that Mexican War in which the United States had been so astonishingly deprived of Texas, Oklahoma and points west under the infamous Peace of Galveston. The story was well told; Muhlenhoff was lost in its story from the first page.

Good thumbnail sketch of Presidente Lopez, artistically contrasted with the United States' Whitmore. More-in-sorrow-than-in-anger off-the-cuff psychoanalysis of the crackpot Texan Byerly, derisively known to Mexicans as "El Cacafuego." Byerly's raid at the head of his screwball irredentists, their prompt annihilation by the Mexican Third Armored Regiment,

Byerly's impeccably legal trial and execution at Tehuantepec. Stiff diplomatic note from the United States. Bland answer: Please mind your business, Senores, and we will mind ours. Stiffer diplomatic note. We said *please*, Senores, and can we not let it go at that? *Very* stiff diplomatic note; and Latin temper flares at last: Mexico severs relations.

Bad to worse. Worse to worst.

Massacre of Mexican nationals at San Antonio. Bland refusal of the United States federal government to interfere in "local police problem" of punishing the guilty. Mexican Third Armored raids San Antonio, arrests the murderers (feted for weeks, their faces in the papers, their proud boasts of butchery retold everywhere), and hangs them before recrossing the border.

United States declares war. United States loses war—outmaneuvered, outgeneraled, out-logisticated, outgunned, outmanned.

And outfought.

Said the author:

"The colossal blow this cold military fact delivered to the United States collective ego is inconceivable to us today. Only a study of contemporary comment can make it real to

the historian: The choked hysteria of the newspapers, the raging tides of suicides, Whitmore's impeachment and trial, the forced resignations of the entire General Staff—all these serve only to sketch in the national mood.

"Clearly something had happened to the military power which, within less than five decades previous, had annihilated the war machines of the Cominform and the Third Reich.

"We have the words of the contemporary military analyst, Osgood Ferguson, to explain it:

"The rise of the so-called 'political general' means a decline in the efficiency of the army. Other things being equal, an undistracted professional beats an officer who is half soldier and half politician. A general who makes it his sole job to win a war will infallibly defeat an opponent who, by choice or constraint, must offend no voters of enemy ancestry, destroy no cultural or religious shrines highly regarded by the press, show leniency when leniency is fashionable at home, display condign firmness when the voters demand it (though it cause

his zone of communications to blaze up into a fury of guerrilla clashes), choose his invasion routes to please a state department apprehensive of potential future ententes.

"It is unfortunate that most of Ferguson's documentation was lost when his home was burned during the unsettled years after the war. But we know that what Mexico's Presidente Lopez said to his staff was: 'My generals, win me this war.' And this entire volume does not have enough space to record what the United States generals were told by the White House, the Congress as a whole, the Committees on Military Affairs, the Special Committees on Conduct of the War, the State Department, the Commerce Department, the Interior Department, the Director of the Budget, the War Manpower Commission, the Republican National Committee, the Democratic National Committee, the Steel lobby, the Oil lobby, the Labor lobby, the political journals, the daily newspapers, the broadcasters, the ministry, the Granges, the Chambers of Commerce. However, we do know—unhappily—that the United States generals obeyed their orders. This sorry fact

was inscribed indelibly on the record at the Peace of Galveston."

MUHLENHOFF yawned and closed the book. An amusing theory, he thought, but thin. Political generals? Nonsense.

He was glad to see that his subordinates had given up their attempt to pass responsibility for the immediate problem to his shoulders; the intercom had been silent for many minutes now. It only showed, he thought comfortably, that they had absorbed his leading better than they knew.

He glanced regretfully at the door that had sheltered him, for this precious refreshing interlude, from the shocks of the project outside. Well, the interlude was over; now to see about this leakage thing. Muhlenhoff made a note, in his tidy card-catalog mind, to have Maintenance on the carpet. The door was bulging out of true. Incredible sloppiness! And some damned fool had shut the locks in the ventilating system. The air was becoming stuffy.

Aggressive and confident, the political engineer pressed the release that opened the door to the greatest shock of all.

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