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pass the oxygen

by . . . F. B. Bryning

A cave-in on the dark, airless surface of the moon calls for a very stubborn breed of men—and golden nuggets of valor.

THROUGH THE helmet earphones came the voice of foreman electrician Calvert.

"All correct, Jim! Close the box and come inside."

Jim Miller fought against the dreamlike sense of unreality he always felt when working inside a space suit in the soundless vacuum of the moon's surface. Part of it was a feeling of remoteness from his own hands—of detachment from his tools. His wrench jarred in his hand as it gripped the nut, but there came no clatter through the airless void outside. Whatever his hands did out there his ears heard only the sounds made in his private atmosphere inside the suit—his own breathing, the sibilant whisper of the oxygen feed, the creaking of elbow and knee joints, the occasional message in his radio earphones.

Miller tightened the last nut, sealed the junction box, and straightened his back. The harsh black and white of the rugged moonscape, without softening half-tones or gradations of shadow such as the air-diffused light of Earth

So conscientiously and imaginatively recorded are F. B. Bryning's stirring documentary portrayals of the human struggle for survival on worlds more bleak and pitiless than Earth's arctic tundra that they result in full-length portraits of individual men more rugged and distinctive than any hitherto found in science fiction. Our hat is off again to this brilliant young Australian writer whose work has delighted so many of our readers.

would have provided, increased the sense of unreality.

He turned, and along the front of the many-celled, double-walled, plastiglass window which sealed the mouth of the newly excavated cave, trudged toward the nearer of the two airlocks.

Underfoot, the ground quivered soundlessly. Alarmed, Miller swung about, his gaze sweeping the cliff wall around the perimeter of the window. Then he leapt for his life . . .

A huge boulder, bounding past, grazed his shoulder. Leisurely, in the moon's weak gravity, it fell to the ground and bounced again. A rain of debris pattered on his helmet and shoulders as his leap carried him nearly thirty feet away. Teetering a few steps, he saw that a small landslide was occurring at one side of the cave mouth, bringing down part of the cliff outside and some of the cave wall inside.

Keeping a wary eye aloft as the last streams of dust and rubble trickled down, Miller loped back to the transparent wall to inspect an ominous distortion in the metal framework and some of the cells. Even as he approached he could see frost spreading along several joints, showing positively that air was escaping.

Inside there was frantic activity. Visor against plastiglass, and gloved hands shading each side of his helmet, he could see John Calvert, one arm pointing and the other beckoning. The three other men

were clambering over the huge stacks of building materials and equipment which had been delivered on to the spacious concrete floor before the sealing window had been erected. They began tearing open kegs of caulking compound, bales of rockwool, and rolls of canvas lagging.

They moved freely in shirts and shorts, their space suits having been laid out handily and ready in a cleared area near one of the airlocks. For not until the builders and fitters had partitioned the cave into a honeycomb of airtight rooms and sections would it be really safe for men to live and work beyond jumping distance from their space suits. Only then could damage to the pressure seal of the cave, such as had now occurred, be isolated in a section or two, and the bulk of the cave's air retained.

Calvert turned, espied Miller staring at him from outside, and with a sweeping gesture, beckoned him in.

"Stay in your suit!" cried Calvert when Miller came through the airlock, his helmet off and under his arm. "You'll have to go for help. All our suits are buried under that landslide!"

"Can you reseal the entire cave?" Miller asked, breathing heavily.

"I don't know," Calvert replied. "I doubt it. There's seepage through the fallen rocks and several cells are sprung. It's a question whether we can hold in enough air until they bring help."

"How long?" Miller wheezed.

Calvert gestured for silence as Evans came up, air pressure gauge in hand.

"We've lost forty-six ounces' pressure in three minutes," reported Evans. "At that rate we'll be down to two and a half pounds in about twelve minutes—perhaps fifteen minutes if the rate of loss slackens at all with reducing pressure."

"And at two and a half pounds—we're finished," murmured Calvert.

Blood-choked lungs—bleeding nostrils—distended eyeballs—bloated limbs—inevitable and torturing suffocation . . . Miller tried to drive the appalling thoughts from his mind.

"We can't expect help in less than fifteen minutes after they hear from us," said Calvert, "and it'll take Jim, here, four to six minutes to get around the hill so his radio can contact them."

"Too long by far," replied Evans. "We can't survive for ten minutes—or even five—without breathing, let alone what zero pressure will do to us. It's getting cold now . . . although freezing won't matter by the time—"

He stopped as Calvert laid a hand on his arm.

"Ten minutes without breathing!" Calvert echoed. "It has been done in a laboratory, although not without pressure . . ." He clapped Evans on the shoulder. "It's a long chance, Bob, but we'll have to try

something like that. Get out the oxygen resuscitator, will you?"

As Evans made for the big First Aid cabinet, Calvert took Miller by the arm.

"Now take it easy, Jim, and listen to me carefully. You're our only hope. You must act fast and do exactly as I ask . . ."

Tensely he explained while Miller fitted his helmet back on with the visor open. "And tell 'em," Calvert finished, opening the inner hatch of the airlock, "it's most important to have that tank open to space—and the 'dozer too—and for them all to be in space suits, ready to act fast. There'll be no time to work through airlocks!"

Banging the hatch after Miller, Calvert ran across to where Evans had the resuscitator case open. "Damn it, Bob! Only the small, one-man job! I was afraid of that. It'll have to do, but I'd like our chances better with three masks and feed lines instead of one."

"What makes you think it's any good at all, for four of us?"

"Come with me and I'll tell you." Snapping the case shut Calvert raced with it to where the two other men were vainly trying to stop the leaking window cells. "Never mind those leaks, boys!" he cried. "We haven't a chance that way. There's a better use for that caulking!"

Outside, stripped of weighted soles, tools, or needless equipment, Miller raced to take his space suit

radio beyond the intervening spur of the hill so that he could make contact with Moonbase. He leapt like a frog, in long, low arcs of twenty to thirty feet at a time, cursing the seconds spent out of contact with the ground, landing on all fours to be in take-off crouch all the sooner, and driving ahead in as low a trajectory as possible.

The glare of the sunbaked Lunar crust was cut down by the polarized, ultra-violet resistant plastic of his visor, and the heat radiated from the ground beat unheeded against his insulated suit. But his exertions had him hot and gasping before he was half way. He turned up his oxygen supply and drove on.

He made good time, but it was with a desperate feeling of inadequacy at not doing better that he made his last leap up on to a ridge that put him into a direct line of sight with Moonbase.

"Calling Moonbase! Emergency! Calling Moonbase!"

Between great gasps he made contact, in a voice that left no doubt of the urgency of his appeal. It took three minutes to tell his tale, but the men at the base were in action before he had finished.

"Don't know," Miller snapped when they asked him what Calvert had in mind. "Just do as he says to the last detail—and we'll have a fighting chance. No time for questions when I left him. No time now. I've got to hurry back. Just remember—come fast, with open

airlocks and all personnel in space suits, doctor included!"

"We're coming!"

Pressure was down to five pounds per square inch when Miller got back, to find two of his four companions flat on their backs, swathed like Egyptian mummies from groin to scalp, and the third, Samuels, bandaging himself in similar fashion with canvas lagging, and Calvert kneeling by the second man, giving him oxygen through the resuscitator.

"They're on their way," said Miller. "Started nearly five minutes ago." He noted with dismay the reedy sound of his own voice in the thin air. It was poor breathing, too, after his rich diet of oxygen of the past twelve minutes or so, which probably accounted for the fact that he did not yet have to pant and gasp like Calvert and Samuels.

"Good work, Jim," wheezed Calvert, his eyes on the watch he had strapped to the resuscitator. "No questions now—just listen. Keep your helmet on. Soon you'll have to close your visor, and you'll be our life-line when the air goes." He breathed rapidly several times. "We're gambling that we can beat decompression by plugging our eyes, ears, and noses with caulking compound and binding over with canvas lagging. And by binding our bodies from throat to groin we'll prevent rupture of internal organs and bloating by stomach gases—we hope. Legs and arms

will have to take their chances . . ."

"But air — oxygen?" Miller smothered his concern and waited for Calvert to continue.

"There's a gag, like this, for each man's mouth." Calvert indicated a putty-like lump of mixed caulking compound and rockwool as big as a coconut in the hand of the man he was treating. "It's his own responsibility to keep his mouth sealed while not taking oxygen—like Evans, here."

A glance showed Miller that the other man, Evans, was holding a similar plug over his mouth.

"You, Jim," panted Calvert, "must feed each man oxygen in turn—ten litres a minute . . . But only for twenty-five seconds at a time, and then on to the next man, as quickly as possible." He stopped for a few straining breaths. "I'm now saturating their lungs with as much as they can take in ninety seconds. After his dose Evans has held his breath for nearly three minutes already. McVey is getting his, now . . . Samuels next."

"What about you, Jack?" protested Samuels, hoarsely. "You're not leaving yourself much time . . . to wrap up!"

Calvert handed the resuscitator to Miller. "I'll manage, Nat," he gasped. "You seal up."

Samuels eased himself over beside McVey, plugged his ears, nose, and eyes, and began to bandage his head.

Miller had fitted the mask over Samuels' mouth and was feeding

him oxygen when Evans signalled by slapping his hand on the concrete floor. Calvert, glancing first at the watch on the resuscitator, went to him. Evans removed his mouth plug, exhaled, and gulped the thin air.

"How long?" he piped.

"Nearly three and a quarter minutes!" shouted Calvert into Evans' mouth. "We've got a chance!"

Through palate and face bones Evans heard. He relaxed and waited.

"Keep still!" warned Calvert. "Don't waste energy or you'll need more oxygen."

When McVey signalled, Calvert, breathing rapidly, again checked the time. He laid a hand on McVey's shoulder.

"Not quite three minutes!" he yelled into the latter's mouth. "Try to hold longer, next time." To Miller he added, "You might give Mac a few seconds extra—or step up the flow a bit. He can't hold it so well."

Miller nodded. "Jack—you're leaving it too late for yourself! You've got to wrap up!"

Calvert lifted his chin and looked with hard eyes at Miller. "There wasn't time for me from the start, Jim, if I was to get all these chaps shipshape. And the oxygen schedule won't allow another interval in the sequence to saturate me."

"There must be a way!" pro-

tested Miller. "You've got to have a chance!"

"I can't wrap up before this air goes."

Miller's eyes were scanning desperately the ground about them. By the landslide he noticed something.

"You would have time to caulk and bind your head?"

"Yes." Calvert shrugged. "But what good would it do? I'm going behind those bales of hardboard so I won't make a— a spectacle of myself, and interrupt your work. 'Bye, Jim. Seal up—"

"Come back!" shouted Miller, and pointed to the pile of fallen rock. "Look at that big slide of sand held up behind the packing case. If you got alongside that case and pushed . . ."

"I get it, Jim. But there's still the oxygen. I tell you, it's no use!"

"I'll cut the dose to twenty seconds and increase the flow! Each man will only need to hold his breath for . . . about seventy seconds between doses . . . with four of you in the schedule. *Now get moving!*"

Miller took the resuscitator back to Evans and fitted the mask. As he opened the valve for the first of the twenty-seconds doses he closed the visor of his helmet.

Airlocks were open and all wore space suits in the rescue bulldozer and the trailing personnel tanker. Their radios said little, for each man was grim and strained. Each

hoped, but none had any real belief in the possibility of men surviving for more than about fifteen seconds in the complete absence of breathable oxygen or atmospheric pressure. Each dreaded what he might see when they entered the cave.

As they rounded the spur of rock from which Miller had first called them, and came in sight of the glassed-over cave mouth, Medical Officer Cousens called Miller by radio.

"Thank God!" came Miller's exhausted voice. "Hurry! Drive right through the seal over near Airlock Two. I think we're holding out—but don't waste a second."

"We'll drive right through," answered Cousens, and since everyone was listening in he knew the driver would take that as an instruction. "But what must we do first? How are you holding out?"

"You'll see! What you do is rush the three men on the floor into the tanker, seal up and fill with oxygen to three pounds—fast! Resuscitate anyone needing it. Then unbind wrappings . . . Two men stay out with me to look after Calvert."

Approaching the cave mouth the dozer driver switched on his powerful searchlight to see better into the cave.

"No air there!" he exclaimed. "Look at those sharp shadows!"

He raised the blade of his machine to protect the pressure dome, and drove straight at the plastic glass. The sound of the impact

came fairly clear, transmitted through the metal of the vehicles and the footwear of those aboard.

As they leapt from the open airlocks toward the three mummified figures on the ground, they saw the space-suited figure of Miller scuttling with the resuscitator towards the great pile of fallen rock and loose soil.

"Get those men inside and sealed up with three pounds of oxygen!" came Miller's voice. "Prepare to take in Calvert through the airlock in about ten minutes."

Two men followed Miller to where he was feeding oxygen to Calvert. Calvert's head and shoulders, caulked and bandaged from the collarbone up, protruded from a heap of sand, soil, and rock fragments.

"He had no time to bind his body," explained Miller, "so he pulled this rubble down on himself to hold pressure on his body. We've got to bind him from the shoulders down as we dig him out. Work fast! There's not too much oxygen left."

Inside the tanker Medical Officer Cousens, space helmet off, got up from his knees and looked down on the four naked men who squatted and lay on the floor, rubbing their limbs.

"You'll do," he commented with a grin. "John Calvert—that was a great piece of improvisation! Instead of four dead men we have two mild retching cases, one partial

asphyxia, your own broken rib and abrasions, and four cases of dirty faces and acute pins-and-needles."

"Pins-and-needles!" objected Evans. "'Swords-and-sabres' is more like it."

"Those circulation pains will soon work off," consoled Cousens. "Just keep massaging where your legs and arms swelled against the bindings. How you thought you could get away with it, John, I don't know."

"Had to try something." Calvert shrugged, then winced as his rib hurt. "I have always been impressed with the fact that men can go for as much as ten minutes—in some cases longer—without breathing if their lungs have been first thoroughly saturated with oxygen. They found that out back in the nineteen-fifties, I believe.

"I knew we had no hope of doing that, but I relied on what we all know here—that after breathing oxygen at three pounds pressure in a space suit we can hold our breaths for about three minutes, instead of the average sixty to ninety seconds in air at Earth's normal fourteen pounds. The problem was to inhale that oxygen at a sufficient pressure while in a vacuum. The resuscitator made that possible. It was then a matter of working to a schedule."

"And of preventing decompression killing you at the same time," added Cousens. "As a doctor I'm afraid I'd have thought of too many—"

The airlock hissed and sucked, opening prematurely, which alerted everyone for some emergency. Out staggered one space-suited figure, dragging another.

"Miller!" croaked Calvert. "What's up with him?"

Cousens had pounced on the limp figure and wrenched open his visor. "Asphyxia!" he exclaimed. "The resuscitator—quickly!"

"Help him, Evans!" McVey cried.

Evans unscrewed and removed Miller's helmet.

"He's pretty far gone," said Cousens as he took up the mask. "Someone get that suit off while I work on him." Without looking up he spoke to the man who had brought Miller in, and who now had his own helmet off. "What

happened, Jeffries? How long has he been out to it?"

"Seems he collapsed soon after we got Calvert into the airlock. He was probably out a minute or so before Dick Day stumbled over him. We found he had only one oxygen bottle on his back, and that was exhausted."

"Only one?" queried Calvert. "*His* suit wasn't damaged!"

"He's got two here—on his suit!" said Evans.

"One's mine," replied Jeffries. "We switched it as soon as we found out what was wrong, and turned it full on."

"But why was he one short?"

"Dick Day found it hooked up to the resuscitator. He must have needed extra gas for you chaps."
