¶A real man's job—

MY ADVENTURES IN DEEP-SEA DIVING

DIVING used to be a game for muscle-bound weightlifters — men very shy on brains, or they wouldn't have been divers. The risks involved were p o o h - poohed by these huskies, partly because of their brusque nature, partly because they had dived so recklessly and been subjected to "bends" so often as to become a little punch-drunk—like a burned-out fighter. Things happened to their minds under water. Eventually it caused most of them to become mentally unreliable, a little crippled. Many died suddenly from internal complaints that doctors couldn't understand.

Today, it is a different story. On December 1, 1937, people sitting by their radios heard the voice of a diver being broadcast from the bottom of Lake Michigan. Four hundred and twenty feet of water was between him and the surface. Max Gene Nohl, the broadcasting diver, had gone 114 feet deeper than any man had ever attempted before. This is the story behind that record-breaking dive.

Air inside the diving equipment is not only air for the diver to breathe; it is also a safety factor—the strong medium which puts its shoulder against the wall of the diving dress and pushes outward a little harder than the water is pushing in. In 100 feet of depth there are almost 48 tons of crushing water pressure being lifted off the diver's shoulders by the air inside his dress.

Should the air bubble suddenly escape, the weight of the water will smash in, forcing the diver's body into his helmet, killing him instantly.

The nitrogen one breathes on the surface is mostly exhaled. But under pressure, as in a diving dress on the sea bottom, much of it is condensed in the diver's lungs and passes into the blood stream, and then it is deposited in the various tissues and liquids throughout the body. When the diver returns to the surface, this nitrogen in his system returns again to a gaseous form, causing bubbles to appear in the blood and tissues.

Should the diver come up to the surface too fast, these nitrogen bubbles rupture the blood vessels, tear the tissue, and shatter the nerves. If one bursts in the brain, it will either kill the diver instantly or paralyze him

for life. Divers have a great fear of compressed-air illness, which they term "the bends."

To overcome this painful and dangerous condition, the diver is "decompressed" in the water. That is, he is brought slowly to the surface so that the nitrogen has a chance to escape from the body.

When I was working undersea off Mexico, small fish often struck at my hands (we cannot wear gloves when operating the intricate mechanisms on the cameras). I noticed that I did not feel pain to any great extent from these wounds. I learned that the nitrogen that had saturated my system stupefied the nerves.

Oxygen is the very breath of life, but under pressure it burns the tissue away so rapidly that divers fear it as much as they fear "the bends."

These factors have retarded diving, and until last summer no serious attempt was made to overcome the restrictions compressed air imposed on diving.

I went to Milwaukee, Wisconsin, which is the home town of Max Gene Nohl, and there we decided to apply science to the problems of diving.

We overcame the tiring problem of dressing the diver. (Ordinarily it requires two tenders to aid the diver into his dress, and during the process the diver must support the weight of a heavy breast-plate, helmet, lead shoes, and finally a 100-pound belt of lead.)

We constructed the diving dress in one piece, hanging all the weights to the helmet. The diver slips into the rubber-canvas dress. The helmet is lowered, the dress cuff is snapped to the helmet, and he is lifted off the deck into the water within 60 seconds from the time he starts dressing. On the bottom he can unshackle the lowering line, and walk anywhere he chooses.

Our heads are enclosed in a helmet with a circular window. Into the helmet we built depth gauges, pressure gauges, a compass, watch, microphone, and even a container for liquid food. The air supply is contained in three air bottles attached to the diver's back.

It was then we began experimenting with other gases for breathing.

We enlisted the co-operation of Dr. Edgar End, a young professor with a bent for adventure. With him we entered upon a series of tests that have made diving history.

No one knew how fast helium gas saturated the blood, nor how fast it would come out of the tissues once it got in. We knew that nitrogen was about seven times as heavy as helium.

In theory helium should, therefore, saturate the tissues seven times as fast as nitrogen did. Also, it should come out of solution at the same rate of speed as it saturated, or in one-seventh the time nitrogen required.

Then one day Doc End approached Nohl and me with that peculiar gleam in his eyes that most medical men have when about to saw off your leg. "How about you fellows playing guinea pig?" he said.

At a Milwaukee hospital, a far-sighted engineer, Mr. Joseph C. Fisher, had built a re-compression chamber. These chambers look like big boilers. Persons suffering from "bends" are placed in them and the pressure controlled until the nitrogen bubbles are released from the body. It was to this chamber that Doc End guided us.

Stand by and look at the test.

"In we go," nods Doc End, and Nohl and I follow.

"If anything happens we'll hammer three times," is my last message to Fisher.

We three are stripped to shorts, pants and shoes. It is going to be hot and muggy inside.

The first jolting blast of air is shot into the sealed chamber. We swallow hard as the air crackles. It hurts, but it's soon over.

Nohl and I wear clips over our noses, and from now on until the end of the test it's pure helium-oxygen atmosphere, without nitrogen. Higher goes the pressure. Sweat beads begin to appear on our naked backs. Doc methodically takes notes. Heart beats and blood pressures are checked. Periodically Doc draws samples of our blood.

Higher goes the pressure—30 pounds now. A swirling mist fills the chamber. It is very warm.

A faint tint of red appears on the cotton sticking out of Nohl's nose, mild bleeding from pressure.

Up goes the gauge.

"All O.K., give her the full jolt."

The last two pounds of pressure are forced in. It looks like a fog inside. Sweat streaks down our backs and streams from our faces.

The period of breathing the helium is up.

Now comes the risky test . . . coming out in two minutes instead of the prescribed 47 minutes.

"Everything all right?" asks Fisher.

"Fine, let's go," comes Doc's anxious voice. The strain is beginning to tell.

"Well, we asked for it . . . here we go."

You've heard the sound when a railroad brakeman uncouples the air brakes on a train? The first rush of air from the compression chamber sounds fifty times as loud.

Down drops the gauge from 42 pounds pressure. Faster and faster the air is pouring out.

Lightning fast is the temperature change as the pressure drops. Before, it was hot—103 degrees, exaggerated by the humidity and tension. Now it gets cold quickly. Frosty fog fills the chamber. Anxious faces peer in at the window—a nurse —a doctor—the press. We slap our legs and chests to keep warm. Everything's fine. The last ebbing outburst of air . . . crackling sound fills our ears . . . bubbling, snapping. The temperature inside the lock dropped from 103 to 45 degrees in the two minutes. The door swings open. A burst of hot air warms our chilled bodies.

We must wait at least 30 minutes before we are certain the dreaded "bends" will not develop. Everyone is most concerned over how we feel. We look at each other and grin.

Today, in every branch of man's activity you will find the pioneer—the adventurer. If the ground he treads is unknown and fraught with possible dangers to his person or to his estate, we applaud his courage. Many of us, following what we consider a more mundane occupation, like to fancy ourselves in his shoes. In looking at these adventurers' apparently more colorful lives, we lose sight of the fact that our own adventure in living might be just as colorful from his point of view.—*John D. Craig, condensed from Natural History.*

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Adversity

SPRING is more welcome because it follows the rigors of winter. Dawn is more beautiful because it succeeds the blackness of night. A rainbow is more striking in the riot of color because it leaps into visibility after the storm has passed.—*J. Homer Slutz.*