

captains, no scientist has verified this to date. Notty has been clocked at 16 knots top speed, and her handlers still do not know whether she is incapable of going faster or whether she is being temperamental.

Whether the porpoise is swimming lazily or bolting to the rescue, there is almost no turbulence or wake, indicating drag, behind the animal. If boats, ships and torpedoes could be made to move with the same ease, sailing and underwater warfare could be revolutionized.

This was the goal of Dr. Max O. Kramer, a German-born expert in fluid dynamics who conceived the idea of applying a porpoise skin made of rubber to the hulls of vessels. This concept is coming to fruition in the form of Lamiflo coatings being developed by the U. S. Rubber Company.

### Coatings Not Perfect Yet

The coatings are not yet perfected and scientists are still trying to find out how the real animal gets the very thin layers of water nearest the body to slide smoothly over each other rather than letting them flow at different speeds to produce turbulence and drag.

Smooth flow apparently is enhanced by the two-layered porpoise skin, constructed somewhat like a building with a flat roof resting on millions of flexible pillars.

Skin on the front end of the porpoise, from the nose to about three feet back, has very few blood vessels. Very little drag would be expected here. But toward the tail, where the skin has numerous blood vessels, there is still no drag.

The China Lake team, headed by Dr. Rene Engel, believes the expected tail drag may be reduced effectively by heat transfer or by skin mobility.

One aspect of porpoise physiology, however, really has scientists stumped. This is the question of deep sea diving and the bends, or caisson disease. When a human diver surfaces too fast, the nitrogen dissolved in his blood comes out of solution and forms bubbles. He doubles over with cramps, gasps for breath and finally collapses unconscious.

The porpoise can submerge to 1,000 feet and come up chattering gaily. Its bigger relative, the whale, can perform the same feat from depths of 3,000 feet. Apparently nitrogen bubbles give them no trouble.

Porpoise organs and tissues have been studied for more than 30 years and researchers still do not know how the blood gases are processed. Because these animals can stay under water for long periods, it is suggested that they can store up oxygen, perhaps in the muscles, and eliminate carbon dioxide by some method other than exhalation from the lungs.

Research porpoises, most of which are bottle-nosed porpoises, or *Tursiops truncatus*, work hard. They can be stubborn about refusing to wear uncomfortable blinders and harnesses, but this is actually a help because the porpoise works best when it is comfortable. For the most part they are cooperative. Some even adjust the fit of training gear to their own bodies. They work so many hours a day that they frequently sunburn their foreheads, and handlers have learned that their pupils appreciate an application of petroleum jelly now and then.

Throughout, the porpoises maintain their sense of humor and each is a pet to its own group of scientists. No one minds when an animal flings a fish back in his face. This is par for the playful, puzzling porpoise.

• Science News Letter, 79:202 April 1, 1961

### MEDICINE

## Migraine Sufferers Bright

► PERSONS SUFFERING from migraine headaches are almost without exception intelligent, regardless of the schooling they have had, Dr. Charles D. Aring, director, University of Cincinnati department of neurology, told a symposium on cardiovascular diseases in Louisville, Ky. However, they are tense and inflexible.

"Migraine victims are tense, striving, perfectionistic and orderly people," Dr. Aring said, going on to point out that such patients are not only overly conscientious about the performance of their own "duties" but in their requirement of behavior from others.

These attitudes are bound to be frustrating, the neurologist added, since their requirements cannot be met consistently.

However, there are persons of this pattern who never have migraine, he noted, commenting that the disorder is not that simple.

"Drugs that constrict blood vessels may be helpful in treatment," he said "but analgesics, sedatives and 'tranquilizing' drugs have limited uses."

He explained that "psychotherapy is usually required in any thorough-going treatment," and that perhaps re-education is the most useful single factor in relieving symptoms.

The sufferer is dependent upon others for approval, Dr. Aring reported, instead of depending on valid self-approval.

"The hard work that he is willing to do to garner such approval is a reflection of the magnitude of the need," he said. "His meticulous and effective performance under these circumstances exacts an undue toll on what we may call his energy stores."

While these energy stores are strong, as in childhood, such a pattern can be supported, he said, but migraine usually makes its appearance during adolescence or later when, with increasing responsibility or decreasing energy, a difficult way of life becomes harder to maintain.

Migraine is either becoming increasingly prevalent or is increasingly recognized in early childhood, Dr. Aring said.

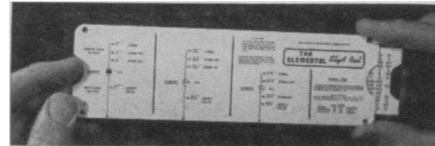
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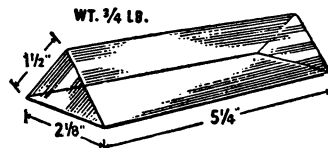
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