ICHTHYOLOGY

Shark Finds Food Fast By Underwater Sound

➤ USING UNDERWATER SOUND signals as bait and a light plane for tracking, a scientist has fished out facts on the shark's remarkable ability to find food—including swimmers—quickly and accurately in the vast ocean.

Dr. Warren J. Wisby of the University of Miami's institute of marine sciences, Miami, Fla., found that sharks can detect and locate the source of sounds more than 200 yards away. This follows an earlier discovery that a struggling fish or swimmer generates a "dinner bell" sound wave through the water to the hungry shark.

Struggling fish or humans apparently create sound waves that are transmitted in bursts as they thrash about. These bursts of sound can travel through the water a mile a second. They are easily within the hearing range of the shark and seem to indicate a possible food source.

Dr. Wisby believes that sharks use the lower part of their hearing range, from about 7.5 to 100 cycles per second (cps), for hunting. Sharks can hear up to about 400 cps, while human hearing ranges between about 40 cps and 20,000 cps.

Using the plane to find and follow the sharks and a surface vessel with equipment to transmit the underwater "dinner call," Dr. Wisby and his associates have carried out about 20 shark-tracking missions.

All common types of sharks, some up to 14 feet long, have been attracted by the signals. Other killer-fish such as barricudas, jacks and groupers also were regularly attracted.

Dr. Wisby reported his findings at the 94th annual meeting of the American Fisheries Society in Atlantic City, N.J. The investigations were supported by the National Science Foundation and the Office of Naval Research.

• Science News Letter, 86:200 Sept. 26, 1964

PHYSICS

Superconductor Forecast At Room Temperature

➤ AN ARTIFICIAL compound that will be superconducting at room temperature can be created in the laboratory, it is predicted.

Superconductors carry an electric current indefinitely without any apparent loss of energy. All superconductors now known work only at temperatures near absolute zero, which is 459.7 degrees below zero Fahrenheit.

However, Dr. William A. Little of Stanford University, Stanford, Calif., believes it is possible to make a synthetic superconductor out of organic materials that will operate at room temperatures, or even when red hot.

Extremely powerful magnets have been built using known semiconductors. Other such uses as frictionless bearings and lines transmitting power without loss await technological development.

If Dr. Little's synthetic superconductor can be built from organic materials, many new applications would be possible. Dr. Little reports in the Physical Review, 134: A1416, 1964, that his model of a superconducting molecule has a "spine" of atoms tied together by alternating double and single chemical bonds.

In a rough way, this model resembles the chain-like structure of DNA, or deoxyribonucleic acid, the protein molecule containing the code of life that governs the growth of all living organisms. DNA's structure gave Dr. Little the idea for his model of an organic superconductor.

With Dr. Derek Griffith, also of Stanford University, Dr. Little has produced a key part of the molecule, known chemically as diethylcyanine iodide, which is a dye used to sensitize photographic plates.

• Science News Letter, 86:200 Sept. 26, 1964

ENGINEERING

Squeeze Underway on Light-Study Equipment

➤ TWO SCIENTISTS are trying to squeeze a roomful of equipment into a cubic-foot package that they hope will one day be part of a space satellite.

Drs. Auguste L. Rouy and Benjamin Carroll, Rutgers University's Newark College of Arts and Sciences, are attempting this difficult condensation of instruments to study zodiacal light, caused when the sun's rays are scattered by tiny bits of matter in space.

• Science News Letter, 86:200 Sept. 26, 1964

MEDICINE

New Diabetes Test Completed in One Minute

➤ A ONE-MINUTE TEST to detect diabetes is a "breakthrough in preventive medicine," reported Prof. W. J. H. Butterfield of Guy's Hospital Medical School in London.

The test indicates the amount of sugar in the blood and can reveal cases of diabetes that methods now used leave undetected. It was developed by Miles Laboratories at Slough, near London.

Prof. Butterfield said the new test is simpler and cheaper than other methods of diagnosis. An accurate reading of the amount of sugar in the blood is given when one drop of blood is placed on a strip of impregnated paper, which changes color.

Recent tests among 570 volunteers disclosed more than 70 borderline diabetics. Their condition would not have been discovered by ordinary methods of diagnosis.

"The earliest possible detection of diabetes is essential if complications such as blindness and heart trouble are to be avoided," Prof. Butterfield said.

"There are some surprisingly sick people at large who are not picked up by our current health methods. With the new blood sugar techniques we can do our investigations on a much wider scale. The new test can be carried out by the family doctor at the bedside."

• Science News Letter, 86:200 Sept. 26, 1964

IN SCIEN

PUBLIC HEALTH

More Strontium-90 In Milk This Year

➤ THE AVERAGE LITER of milk in the United States last March contained 24 picocuries of radioactive strontium-90, compared with 16 picocuries in March 1963, U.S. Public Health Service figures show. This is still far below the level of 200 picocuries per day considered "acceptable" by the Federal Radiation Council, however.

A curie is the equivalent of the radioactivity produced by one gram of radium. A picocurie is one millionth of one millionth of a curie.

• Science News Letter, 86:200 Sept. 26, 1964

METALLURGY

Giant 'Camera' Shows Metal Breaking Process

➤ SCIENTISTS are using a gigantic "camera" that can snap two million pictures a second to photograph metal samples as they are ripped apart in the laboratory.

The "camera," called an image converter, is a mass of electronic equipment almost filling a room. Information on the breaking process in metals is necessary for the development of tougher metals in the future.

With the image converter, the scientists can "see" and analyze the action of a running crack in metal. In just three thousandths of a second, it can make up to eight exposures, each in one ten-millionth of a second, separated by intervals of one-half millionth of a second.

The major component of the camera is a double-ended image converter tube, similar to a television tube. The sequence of pictures forms a line of images across the front screen and these are recorded as a group with a conventional camera.

The image converter was built by Dr. Harold Margolin and graduate student Harvey Ezrol of New York University. U.S. Air Force contracts totaling more than $165,000 financed the construction.

• Science News Letter, 86:200 Sept. 26, 1964

TECHNOLOGY

Chemical Separates Oil-Water Mixture

➤ A NEWLY DEVELOPED chemical compound called Breaxit 941 is being used to separate the oil-water mixture left in tankers after the empty cargo compartments have been washed out with seawater.

The de-emulsifying agent enables the tiny water droplets suspended in the oil to combine and settle out. It was developed by the Standard Oil Company of New Jersey to allow them to salvage oil residues in tanks and to avoid polluting the seawater.

• Science News Letter, 86:200 Sept. 26, 1964

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CE FIELDS

ASTRONOMY

Stellar Pair in Dipper Found to Be Seven Stars

➤ THE FAMOUS PAIR of visible stars in the handle of the Big Dipper, Mizar and Alcor, has now been found to consist of seven stars.

The ability to distinguish the faint companion, Alcor, from brighter Mizar was widely used as a test of normal vision before the days of eye glasses and oculist's charts. However, the ability to spot the six other stars now known to be around the middle star of the Dipper's handle will never be used as a test of even supersensitive vision —a telescope is needed to separate them.

It has been known for years that Alcor is actually a double star. Mizar is also really two stars, called Mizar A and Mizar B, and Mizar A has long been known to be a double star.

Now Wallace R. Beardsley of the University of Pittsburgh's Allegheny Observatory, Pittsburgh, has found that Mizar B consists of a pair of stars revolving around each other every 182 days, with a third companion orbiting the pair in 1,350 days.

Details of Mr. Beardsley's study of this seven-starred system are reported in Sky and Telescope, 28:131, 1964.

• Science News Letter, 86:201 Sept. 26, 1964

ENGINEERING

New Twist for Maps With Old Instrument

➤ A 65-YEAR-OLD INSTRUMENT can make the task of mapping an area much simpler—at least in theory.

Ohio State University engineers, under the direction of Prof. Ivan I. Mueller, department of geodetic science, have been investigating new uses for the torsion balance, an instrument given up 30 years ago as useless in map making. Their findings have brought the torsion balance from laboratory attics into new prominence.

The torsion balance is an extremely sensitive device that, instead of measuring distances between two points, measures the degree of gravity in different areas of the local gravitational field. A weight, attached to a fine wire, "twists" under the influence of the earth's gravity or a local gravitational field in proportion to the field's strength. From a series of readings, it is possible to determine the exact location of the torsion balance in relation to the gravitational field's known center.

Maps are conventionally made by an ancient process, "triangulation and trilateration." Three points are located with a surveying instrument, necessitating clear site lines to both points. However, the earth's curvature prevents using trigonometry to find the distances between the points. Elaborate and tedious computations must instead be used.

The location of points on earth from star observations—a technique used by Renaissance ships at sea to keep from "sailing off the end of the earth"—are compared with these triangulation distances. From this data and a myriad of correction factors, map "scales" are established to get different distance sitings to "fit" together.

Prof. Mueller's work disposes of this long, drawn-out process with a few simple twists of knobs. The only drawback to using the torsion beam balance in map making is its extreme delicacy and sensitivity to locally "irregular" gravity fields.

• Science News Letter, 86:201 Sept. 26, 1964

BIOTECHNOLOGY

Doughnut-Like Device Aids Circulation Study

➤ NEW CLUES to heart attacks, strokes and other critical heart and brain problems may result from research with a plastic doughnut smaller than an aspirin tablet.

The device, which electromagnetically measures blood flow through arteries as small as four-hundredths of an inch in diameter, was designed to determine how blood is delivered to vital centers in the body.

By placing several of these devices around different heart arteries at the same time, researchers have discovered that the heart's arterial tree is not uniform, as has been assumed by many investigators.

This knowledge makes possible advances in prevention and treatment of heart attacks involving arterial obstructions that block delivery of blood to heart muscle.

The device permits blood flow studies in small animals such as rats. Previous blood circulation research required larger, more expensive animals, thus slowing down investigations.

The same techniques have been used to study the flow through arteries supplying the brain. Changes in flow in response to stress and various drugs have been recorded in conscious, freely-moving animals.

Arteries can be visualized by X-rays, probed with catheters and studied with radioactive tracers. But these procedures have revealed limited information about the regulation of the arterial system.

The research is headed by Drs. Alexander Kolin and Gordon Ross, University of California, Los Angeles.

• Science News Letter, 86:201 Sept. 26, 1964

PUBLIC HEALTH

Portable Device Speeds Testing for Diabetes

➤ A PORTABLE DEVICE in mobile clinics is enabling people in Cleveland, Ohio, to find out—in eight minutes—whether or not they have diabetes.

The device compares a blood sample to a solution of known concentration, then measures the resulting blood-sugar index. Dr. Jack R. Leonards of the School of Medicine, Western Reserve University, Cleveland, developed the apparatus.

• Science News Letter, 86:201 Sept. 26, 1964

ASTRONOMY

Comet Rediscovered, Unseen for 58 Years

➤ A COMET that has not been seen for 58 years has been rediscovered, due to remarkably accurate predictions of its location after such a long gap.

The long-lost Comet Holmes is far too faint to be seen in any except very large telescopes. Dr. Elizabeth Roemer of the U.S. Naval Observatory, Flagstaff Station, Ariz., used the 40-inch telescope there to spot the faint object.

She rediscovered Comet Holmes on the basis of accurate positions predicted by Brian G. Marsden of Yale University Observatory, New Haven, Conn. Comet Holmes was first seen in 1892. It was also observed in 1899 and 1906.

The comet has a history of such physical activity as outbursts when it draws close to the sun, as it is doing now. It is in the constellation of Capricornus, the horned goat, which is now in the southern sky.

News of the rediscovery of Comet Holmes was telegraphed to astronomers by Harvard College Observatory, Cambridge, Mass., the clearing house for astronomical information in the Western Hemisphere.

• Science News Letter, 86:201 Sept. 26, 1964

ENGINEERING

New Suspension Bridge Fourth Largest in World

➤ THE LONGEST suspension bridge in Europe, and fourth largest in the world, the first three being in the United States, has opened in Edinburgh, Scotland.

Called Forth Road Bridge, it has 30,000 miles of mild-steel wire holding up its roadway, with a 3,300-foot central span.

• Science News Letter, 86:201 Sept. 26, 1964

PHYSICS

Wave Analysis Locates Plane Crash in Lake

➤ THE POINT OF IMPACT of a jet airliner that crashed into Lake Pontchartrain, La., last Feb. 25, was calculated by looking at the waves it made, and then tracing them back to their origin—a method that may prove useful in similar cases in the future.

David E. Amstutz and Steve Neshyba of the Texas A & M University department of oceanography figured that the plane would have caused a two-inch-high wave in the 640-square-mile lake.

They checked the recorded graphs produced by four tide gauges located on the lake during the period immediately following the crash. From this, they calculated the point of the crash within 1,200 feet of the actual location of the wreckage, which had already been spotted by conventional methods. The study was reported in Science, 145:921, 1964.

• Science News Letter, 86:201 Sept. 26, 1964