PHYSIOLOGY

Brain Goes Without Oxygen for 20 Minutes

➤ THE SUCCESSFUL RECOVERY of a man whose brain had gone without oxygen for nearly 20 minutes, instead of the accepted limit of five minutes, is reported by four Illinois scientists in the *Journal of the American Medical Association* (Aug. 10).

The patient was a 24-year-old man whose brain was oxygen-starved for 19 and one-half minutes while a gunshot wound in his heart was being repaired.

During the operation the patient suffered several severe hemorrhages in an artery leading to the brain, including one which kept him in a shock-like state for the 19 and one-half minutes.

An electroencephalograph, attached to his brain during the operation, showed that electrical activity in the brain's cortex or outer layer stopped altogether during this time. The stoppage was apparently due to the lack of blood flow.

The patient's safe recovery was attributed to the use of both hypothermia and the tranquilizer chlorpromazine, both of which served to protect the brain. In hypothermia, the temperature of the body is reduced so that its functions are slowed and it requires less oxygen during surgery.

A battery of psychological tests were given the patient before and after the surgery, and the results showed that the operation caused no significant change in his mental abilities.

The unusual case is reported by Drs. Robert L. Tentler, Max Sadove, Dorothy R. Becka and Robert C. Taylor of the Veterans Administration Hospital, Hines, Ill.

Science News Letter, August 24, 1957

FORESTRY

Drug Treatment Saves Western White Pine

➤ DAMAGE from blister rust, a fungus disease that annually destroys enough sawtimber to build more than 62,000 five-room houses, can be cut by treating affected trees with an antibiotic drug.

Acti-dione successfully halted the spreading fungus in a four-year trial of the drug on a stand of western white pine, Virgil D. Moss, forester with the U. S. Forest Service's division of blister rust control, reports. A single application of Acti-dione killed between 77% and 80% of the cankers treated. Treatment consisted in pruning infected branches and partially cutting away trunk cankers in order to expose the disease-causing fungus. The drug, mixed with oil, was then applied to the cut surface.

In Idaho, Montana, Washington, Oregon and California blister rust is a menace on almost 8,000,000 acres of pines valued at an estimated $1.5 billion.

The disease attacks currant and gooseberry plants, or Ribes, as well as pine, alternating between the tree and the plant. The fungus spreads from nearby Ribes, enters the tree through its needles and grows down the branch, eventually entering the trunk. After about three years, the resulting trunk canker of swollen bark breaks open. This allows wood-rotting fungi and insects to enter. When the canker encircles the trunk the tree is killed.

Control of the disease in the past has been mainly by destroying the Ribes since the disease cannot spread from tree to tree. With Acti-dione, however, the forest pathologist has a new control method. Treatment programs that include thousands of infected small trees in national western white pine forests have begun.

Science News Letter, August 24, 1957

EDUCATION

College Teacher Shortage To Be Most Crucial Need

➤ A COLLEGE teachers' shortage will be the nation's most crucial educational problem by 1970, the President's Committee on Education Beyond the High School has reported.

Pointing out that the number of persons who want to go to college is expected to double within the next 12 years, the Committee warned that between 180,000 and 270,000 new college teachers must be recruited to meet the increase.

Four lines of attack can be made to meet the foreseeable need of such teachers:

1. Deliberate, organized recruitment, plus continuing employment of competent older teachers;
2. Expansion and strengthening of graduate programs;
3. Finding ways to teach larger numbers without loss of quality;
4. Making the teacher profession more attractive through improving its status, particularly its economic status.

The Committee, headed by Devereux C. Josephs, chairman of the board, New York Life Insurance Co., also examined four other major problem areas and made recommendations in each. The areas covered in this second and final report to the President include the need for assistance to students, expansion and diversity of educational opportunities, financing higher education, and the Federal Government's role in education beyond the high school.

Science News Letter, August 24, 1957

TECHNOLOGY

Synthetic Tires Hold Up in Storage

➤ THE TAXPAYER'S pocketbook received a cushion with the report that an all-synthetic, heavy duty truck tire for the Army has been developed.

Promising to save countless defense dollars, the tires are designed to resist deterioration in storage. Made of butyl, a synthetic rubber created from oil refinery gases, the truck tire is said to virtually eliminate ozone cracking and deterioration, particularly in the tread area.

Scientists of the Pennsylvania Tire Company of Mansfield, Ohio, and the Esso Research and Engineering Company of New York conducted the research.

Science News Letter, August 24, 1957

IN SCIEN

ANIMAL PHYSIOLOGY

Underwater Sounds From Sperm Whales Heard

➤ SOUNDS ranging from sharp clicks, a "grating sort of groan" and a muffled smashing noise are apparently made by sperm whales.

Two American scientists report in *Nature* (Aug. 10) that while off the North Carolina coast, in late March, 1957, they encountered five sperm whales and were able to distinguish the three different sounds.

The scientists, L. V. Worthington and William E. Schevill of Woods Hole Oceanographic Institution, Woods Hole, Mass., did not have equipment on board their vessel, the Atlantis, for making phonographic recordings of the whales' sounds. However, they describe their results as "reliable evidence" that the sperm whale, along with the porpoise and a few other related animals, does make underwater sounds.

Nineteenth-century sperm whalers often claimed to have heard their quarry and this now seems to be probable.

Science News Letter, August 24, 1957

AGRICULTURE

USSR Agriculture Hurt By Lysenko Theories

➤ RUSSIAN agriculture was damaged to the extent of possibly hundreds of millions of dollars and a near-disaster to the potato industry was caused by the unsound theories of T. D. Lysenko, "the Stalinist Svengali of Russian science."

So reports Dr. Anton Lang, plant scientist at the University of California at Los Angeles. Dr. Lang, a native of Russia now a naturalized U. S. citizen, has followed Soviet plant science closely for many years.

Dr. Lang evaluates the effect of Lysenkoism on Russian agriculture in *Plant Science Bulletin*. Lysenkoism is the doctrine of inheritance of acquired characteristics expounded by the Soviet scientist.

Planting procedures for potatoes recommended by Lysenko have resulted in almost complete extinction of certain early varieties formerly grown widely in Russia, Dr. Lang reports. Since the potato is one of Russia's most important crops, this approaches a major disaster.

Lysenko's opposition to planting of hybrid corn, a standard practice in the world's leading corn growing areas, set the Russian corn industry back at least 20 years. Cotton and wheat production also suffered under the Lysenko "regime."

As far as Russian agriculture is concerned, Lysenko's influence seems to be on the wane, Dr. Lang says. "His downgrading may be in time enough to save other crops from disaster."

Science News Letter, August 24, 1957

CE FIELDS

ARCHAEOLOGY

Ancient Toltec Colony Found in Western Mexico

➤ A PREVIOUSLY unknown Toltec colony has been discovered on the west coast of Mexico, representing the westward limit of expansion of this ancient civilization.

The site has been officially explored for the first time by archaeologists from the University of California at Los Angeles, under the direction of Dr. Clement Meighan. The expedition was sponsored by Phil Berg, a Los Angeles executive.

The site lies along Mexico's new West Coast highway near the city of Tepic. Dr. Meighan estimates the colony reached its cultural peak about 1200 A.D.

Relics from the site represent a higher degree of cultural achievement than had previously been thought to exist in this region during this period, Dr. Meighan said.

They include excellent examples of pottery of six-color decor, figurines, bronze axe-heads, copper pins and tweezers, and a whistle with an authoritative tweet that would "make a basketball referee green with envy."

The pottery is described as being of high quality with exquisite patterns in six different colors. Much of the pottery appear to be art objects rather than utilitarian items. Some of it was apparently used only in connection with burial rites.

Science News Letter, August 24, 1957

CHEMISTRY

Chromium Chemical Makes Ruby Redness

➤ SCIENTISTS have found why the redness of rubies comes from a green chemical, a compound of the same metal chromium that is used to put glittering platings on automobile trim.

Delving into the secrets of these fascinating jewels, Dr. L. E. Orgel of the department of theoretical chemistry, at Britain's University of Cambridge, describes his researches on rubies in *Nature* (June 29).

Most jewels are really a "solid solution" of some chemical compound, usually a metal oxide or silicate, in a basic mineral or "matrix." These metals are really impurities, making jewels "contaminated minerals," and the color of the jewel is very close to that of the metal compound dissolved in its matrix.

In the case of rubies, the effect is just the opposite. Chromium oxide, a green chemical, dissolved in an aluminum oxide matrix, a colorless or white substance, gives not a green stone but a red one: the ruby.

Dr. Orgel, investigating this property, made use of the fact that synthetic rubies could be made only if the chromium content of the melted aluminum oxide was below eight percent. Above this, the ruby would become green-colored.

Measurements of the minute distances between the atoms in red rubies and "green rubies" showed that above eight percent chromium, the chemical bonds between the aluminum and the chromium atoms and the matrix "softened up," allowing the true green color of chromium to show through.

Below eight percent, the tight aluminum oxide crystal structure literally "squeezes" the chromium atoms, shortening the interatomic bonds as much as four percent. This shortening causes the shift in color from green to red. . .

Science News Letter, August 24, 1957

ENGINEERING

Study Tiny Tempests on Aircraft, Missile "Skin"

➤ STRUCTURAL FAILURE of the "skin" of aircraft and missiles traveling at supersonic speeds may be due to tiny tempests that rage over it.

This phenomenon, known as panel flutter, is the subject of research by John Miles, professor of engineering at the University of California at Los Angeles.

Panel flutter has been a suspect in certain structural failures ever since such defects were noticed in the first German V-2 rockets, Mr. Miles pointed out. But the forces acting to cause the failures were not known.

The action is very similar to that of ocean waves generated by high winds or the flutter of a flag. In fact the study has thrown new light on wave formation in the ocean.

The study has indicated that the effect is eliminated with thicker "skins."

Practical design criteria are currently being worked out to assure that "skin" thickening does not pose a weight problem, a particularly critical area in missiles, Mr. Miles said.

Science News Letter, August 24, 1957

CHEMISTRY

Chemists Develop Most Sensitive Test for Metals

➤ A RAPID and convenient method for measuring the metal content of solutions has been developed. It is so sensitive it is affected by the tiny amounts of lead dissolved from the glass of much ordinary laboratory equipment.

Dr. Irving Shain, professor of chemistry, and Richard D. DeMars, research assistant, University of Wisconsin, Madison, reported the new electrolytic method that can measure one part of lead in five trillion parts of solution. The basis of the technique is an electrode consisting of a tiny drop of mercury hanging from a platinum wire. Any metal that will alloy itself with mercury can be tested.

Using this method, the Wisconsin chemists can measure concentrations as small as seven billionths of an ounce of lead or two billionths of an ounce of zinc in a quart of solution.

Science News Letter, August 24, 1957

ICHTHYOLOGY

Narcotic From Pistol Subdues Sharks in Sea

➤ FOUR HUNDRED pounds of ocean-swimming shark can be knocked out in one minute or less with a water pistol full of a narcotic known at M.S. 222, Dr. Perry W. Gilbert and F. G. Wood Jr. of Cornell University, Ithaca, N. Y., report in *Science* (Aug. 2).

Large sharks and rays were needed for a study of mating habits and of all the tranquilizers and anesthetics tried, M.S. 222 was the most useful.

The large fish are brought alongside of the boat and their heads are pulled up out of the water. Then a solution of the narcotic is squirted into the mouth of a shark or the spiracles of a ray and sprayed over the gill openings.

A water pistol, rubber-bulb syringe, or pump-type hand sprayer can be used, the authors report.

Within 15 seconds, the drug begins taking effect. The fish can then be safely handled either in or out of the water. The first stages of recovery take place within five to 30 minutes after the shark is put back in the water. After that, the drug wears off gradually and completely, and the fish are unharmed.

Science News Letter, August 24, 1957

TECHNOLOGY

New Conduit "Pipes" Microwave Radio Signals

➤ "PIPING" SHORT radio waves around corners and sharp angles is expected to be made easier by a new lightweight "traveling-wave" conduit tube announced by the Radio Corporation of America.

One property of the very short radio waves or microwaves, measured in inches or less, is that they can be "piped" for short distances through tubes and conduits somewhat like water. One disadvantage of present high-sensitivity microwave conduit systems is the need for 30-pound electromagnets to focus the waves precisely down the axis of the conducting tubes. The alignment of the large electro-magnets is affected by vibration, changes in environment and changes in temperature, and must be adjusted periodically.

The new tube, developed by Dr. K. K. N. Chang of RCA's David Sarnoff Research Center, dispenses with the huge electro-magnet, using instead a compact electrostatic focusing element built into the tube, and permanently aligned.

Dr. Chang explained that the focusing element in the "plug-in" traveling wave tube consists of two pairs of spiral windings. The larger outer pair carries the microwave signals, and the inner pair lies within a tubular electron beam and helps the outer pair in beam focusing.

Successfully operated in the research stage, Dr. Chang predicted the tube's future use as an electronic amplifier in airborne radar and countermeasures equipment as well as microwave communications systems.

Science News Letter, August 24, 1957