

MEDICINE

Genes May Cause More Diseases Than Suspected

► SCIENTISTS are pointing the finger of suspicion at the gene as the cause of many more diseases these days, the retiring president of the American Association for the Advancement of Science said.

Vitamin-deficiency causes pellagra, a skin disease that results in body sores. However, now it has been found that genes, those units of heredity found in body cells, can cause the same disease, Dr. Laurence H. Snyder, president of the University of Honolulu, Hawaii, explained. This particular pellagra is called the genetic form.

One function of the gene is the control of the enzymes of the body. If the gene mutates, the step-by-step process by which enzymes perform their duties may become interrupted. Thus a shortage or excess of some vital substance may occur within the body, causing a disease, he explained.

At least four genetic dysfunctions are now known among the six enzymes necessary to the body for the manufacture of glucose and glycogen. These dysfunctions result in four distinct forms of glycogen disease.

Dr. Snyder also pointed out that the recent discovery of a substance labeled malignolipin, found only in malignant tumors and never in normal body tissue, may eventually lead scientists to prove that cancer is caused by a gene "jinx" or mix-up.

Each individual has his own unique assembly of genes. Each individual also has his own pattern of response to diseases, whether presented through infection, trauma, stress, malnutrition or from biochemical error.

There would appear to be a residue of diseases resulting from gene mutants, for which there is at present no apparent "cure" in the usual sense. Yet, with increased ability to identify the carriers of genes that cause disease, scientists will be better able to devise practical applications to prevent gene mix-up, he concluded.

Science News Letter, January 10, 1959

ICHTHYOLOGY

Sea Hitch-Hikers Trace Habits of Game Fish

► OCEAN-GOING hitch-hikers are helping to solve some of the problems facing a multi-million dollar business: sport fishing.

The remora, or disk fish, which attach themselves to other marine animals by suction cup-like disks, can provide some clues to the habits and life histories of game fish, Dr. E. A. Lachner, associate curator of fish at the Smithsonian Institution, said.

It is easier to study the small remora which may be about 10 or 12 inches long than it is to study a huge marlin or sailfish, Dr. Lachner pointed out. And, fortunately, where there are disk fish there usually are swordfish, marlin or sailfish. With further research into the biology of the disk fish, he believes, it should be possible to make significant contributions to the

conservation and management of important game fish.

It is likely, Dr. Lachner said, that the disk fish hitch-hike rides to feeding or breeding grounds shared with their hosts. There is no evidence that the remoras injure the game fish or their other hosts.

These curious fish also interest scientists from an evolutionary point of view.

The sucker disk that makes it possible for the remora to "hang on" to its host is actually an evolutionary development of the spiny dorsal fin. Through the ages it has become flattened, divided laterally and moved up to a forward position over the fish's head.

A fossil fish from the upper Eocene Age, about 50,000,000 years ago, looks much like an X-ray picture of a modern disk fish, Dr. Lachner said. The disk is smaller and farther back on the fish's head, however. Study of the fossil fish and the young disk fish, which also have their disk farther back on the head, point to the evolution of an interesting organ, a powerful, muscular suction cup.

Dr. Lachner, who has studied hundreds of the fish, has requested fishermen and others to send him details of any disk fishes they find.

Science News Letter, January 10, 1959

ENGINEERING

Cloverleaf Cyclotron Has More Power, Less Bulk

► "MORE ATOM-SMASHING power in a smaller package."

That was how a new type of cyclotron to be built at the University of California at Los Angeles was described to some 700 physicists attending the Pacific Coast winter meeting of the American Physical Society at UCLA.

Currently under construction at UCLA, the "spiral cloverleaf cyclotron" was designed and described by Profs. J. R. Richardson, Byron T. Wright, and Kenneth R. MacKenzie of the UCLA physics department.

The spiral cyclotron presents a promising design for getting around the voltage limitations of the conventional cyclotrons.

With the 49-inch spiral cyclotron, the UCLA physicists will be able to accelerate particles to 50,000,000 electron volts (MEV). In contrast, the famous and larger 60-inch conventional cyclotron at the University of California at Berkeley operates at a maximum of 20,000,000 electron volts.

The key feature of the UCLA cyclotron is a spiral cloverleaf, shaped like a child's pinwheel, with each of its four magnetic iron shims weighing 50 pounds and with a radius of 20½ inches.

The spiral ridge design will allow continuous acceleration of particles, in contrast to the bursts of acceleration in present synchrocyclotrons.

Continuous acceleration is possible because the atomic particles are kept in orbit and in step at constant angular speed, so that the particles stay in step with the electric field that boosts their speed each time they make a cycle.

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IN SCIENCE

GEOLOGY

Ohio's Geological History Being Redetermined

► GEOLOGISTS at the University of Cincinnati and Ohio State University are cooperating in a massive restudy and modernization of geological history of parts of Ohio, Indiana and Kentucky 400,000,000 years ago when the area was a vast inland sea.

The study might help in discovering unknown resources of oil and gas.

As the first step, Dr. William F. Jenks, head of the University of Cincinnati's department of geology and geography, announced receipt of a \$23,250 grant from the National Science Foundation. This will finance reorganization of a fossil fauna collection from this Upper Ordovician period.

Under direction of Dr. Kenneth E. Caster, University of Cincinnati professor of geology, the University's 50,000-specimen collection will be restudied and reorganized as a preliminary move in determining the detailed sequence of rocks and making a more complete record of marine animals living at the time the rocks were formed.

Plans for the cooperative study have been made by Drs. Jenks and Caster representing the University of Cincinnati, and Drs. Malcolm P. Weiss and Walter C. Sweet, assistant professors of geology at Ohio State. The project will take at least ten years and probably longer.

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GENERAL SCIENCE

Neglect Pure Science in Research Spending

► OUT OF the Federal Government's estimated fiscal 1959 research and development budget of \$3,909,000,000, basic research, considered by many as the progenitor of science advances, is receiving eight percent.

A National Science Foundation report on Government research expenditures makes it clear that basic research, which bears the least immediate relation to the practical application of science, is the "poor relative" in the budget.

Development, which puts research knowledge to practical use, gets an estimated 67% of the total budget. Applied research, the study of specific subjects for fuller knowledge, is marked for an estimated 25%.

Some 86% of the total goes to the Department of Defense, the Atomic Energy Commission and the National Aeronautics and Space Administration. The remaining 14% is spread among other agencies, some of them being the Department of Health, Education, and Welfare; Department of Agriculture, and the National Science Foundation.

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E FIELDS

PHYSIOLOGY

Soft Tissue Hardened Into "Bone" in Laboratory

► SCIENTISTS have turned skin into "bone," apparently duplicating in the test tube the processes by which bone and teeth are believed made.

Soft tissues such as rat-tail tendon, calf skin and guinea pig skin were studied and hardened in a process that might be called "molecular civil engineering," Dr. Melvin J. Glimcher of the Massachusetts Institute of Technology's School of Advanced Studies reported.

This work, the biophysicist told scientists at the American Association for the Advancement of Science meeting in Washington, could lead eventually to new methods of promoting the reunion of broken bones and the treatment of such diseases as arteriosclerosis which result from abnormal hardening of the normally soft tissues.

Crystals deposited within the macromolecules, long threads of groups of atoms linked together, are responsible for the hardness of bones, shells and other hard parts of animals. Comparing the processes by which the soft tissues are hardened to create a skeleton to the ways chemists have strengthened materials, Dr. Glimcher said the crystals are formed with the introduction of foreign matter.

In the MIT laboratories, he explained, threads of macromolecules taken from soft tissue have been hardened by deposition of crystals within them. Although they are too small to be seen, the man-made bone-like bits of material resemble real bone. Its hardness has been established by electron and X-ray diffraction studies.

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MANPOWER

White House Advised to Help Develop Manpower

► A PRESIDENTIAL committee has advised the White House to assume responsibility for coordinating and stimulating the development and utilization of the nation's scientific and engineering manpower.

In releasing its final report, the President's Committee on Scientists and Engineers made two additional recommendations:

1. Key programs developed by the committee should be continued as being of vital importance to the further development of manpower potential.

2. A committee of Cabinet members should examine the problem and recommend to the President a suitable White House organization to assume the responsibility for the program.

The President's Committee was organized in 1956 to stimulate non-Federal activity and to develop an effective, integrated approach among the many organizations concerned with technological manpower.

In a letter to President Eisenhower, Committee chairman Howard L. Bevis cited the "unmistakable evidence" that the Soviet Union is "making an all-out effort to profit from the scientific revolution," as are the leaders of Communist China.

He emphasized that our scientific and technological manpower has been intensified rather than diminished in the last two years. Dr. Bevis, president emeritus of Ohio State University, added that this is why the committee "strongly recommends" the Chief Executive's office to take action.

Some of the moves already undertaken by the committee are:

1. A program for the conservation and effective use of existing supplies of scientists and engineers in cooperation with industry, universities and professional societies.

2. The organization of local and state groups to work toward improvement of primary and secondary education with emphasis on science and mathematics.

3. A wider public understanding of the vital need for highly qualified scientists, engineers and supporting technicians and wider recognition of the fact that development of these skilled people depends largely on the effectiveness of the educational system.

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GENERAL SCIENCE

U. S. Needs Better Inch To Rescue Measurements

► WHAT THIS country needs is a better inch. Either that, or Europe needs a better meter. But something has got to be done, or the U. S. is in for "foot" trouble.

Dr. Chauncey D. Leake, new president of the American Association for the Advancement of Science, told an engineering session at the AAAS meeting in Washington that Great Britain and the U. S. have diverged in measurements since 1876 when the U. S. originally defined its inch, foot, and yard in terms of the metric system.

Today, he said, there is a discrepancy of three parts in a million between U. S. and British measurements of the same thing. In this day of critical measurement, three parts in a million may soon be a big error.

What is needed, he said, is a "scholarly study of the history and psychology of measurement." He said the study could be as important to the world as any argument advanced by any single person in favor of one system or another.

The big idea of such a study would be just to get people to agree on what is an inch, or what is a meter. "We could define the meter in terms of wavelengths of light," he suggested, but even so, the inch would still be based on the metric system.

Some critics of the metric system argue that the meter is really not a meter. Originally it was supposed to be one ten-millionth the distance from the North Pole to the equator. Some engineers argue it is not one ten-millionth this distance at all.

"So what?" said Dr. Leake. "The important thing is that the length of the meter be a standard that everyone recognizes."

Dr. Leake is professor of pharmacology at Ohio State University, Columbus.

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ENGINEERING

New Purifying Method Found in Electricity

► A NEW WAY to purify substances is being studied by scientists at Princeton University's plastics laboratory.

Herbert A. Pohl, head of the laboratory's dielectrics section, told the American Association for the Advancement of Science meeting in Washington that liquids, powders, or mixtures of them can be pumped around, lifted, mixed, and even separated into their components by subjecting them to nonuniform electric fields.

Dr. Pohl said the method works at high efficiency, and that it offers new ways to grade and purify solids.

The method is based on theoretical knowledge that nonuniform electric fields exert a force upon neutral matter, pulling it to the region of highest field density. Experiments at Princeton showed particles of different sizes are pulled to the central electrode at different rates, and that particles of the same size are pulled at varying rates if they differ in electrical nature.

A "curious" new phenomenon also has been observed, said Dr. Pohl. As the voltage is increased the rate of pull-out of particles suspended in a liquid steadily increases. Then suddenly all pull-out stops; particles already pulled out fly off the electrode. This "critical voltage," he said, is sharply dependent on the size and nature of the particles.

This offers another possible way of grading and purifying solids in suspension, he said.

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PSYCHIATRY

Psychologists Need Help In Handling Clients

► WHAT CLINICAL psychologists need is help in handling the "reluctant client."

The techniques of psychotherapy assume the patient wants to be helped. But this assumption is not met by the person, either adult or juvenile, who is referred by a court. Other reluctant clients are the "behavior problems" referred by schools, the parents of children receiving treatment, married persons forced by husband or wife to see the psychologist, sex deviants and alcoholics.

One boy declared flatly that he was "going to run his own life." When he grew tired of the psychologist's efforts to help him, he would unravel his socks, form a ball, and run about the office playing catch.

Before such persons can be helped by psychotherapy, it is necessary to "motivate" them. Psychologists are working with some such reluctant clients, but essentially it is on an individual "groping in the dark" basis, reports Dr. Sidney I. Dean of the Mills Clinic, Fort Lauderdale, Fla., in *The American Psychologist* (Nov., 1958).

He urges his colleagues to conduct research on this problem.

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