GENERAL SCIENCE

Brainpower Spread Equal Throughout Population

➤ THE DISTRIBUTION of scientific brainpower in the United States, often called our most important resource, almost parallels the distribution of Americans in general, the National Science Foundation has found.

The numbers of scientists in each state varied, depending upon the population and volume of scientific activity: California and New York each had more than 20,000 of the nearly 215,000 scientists polled. California claims the most agriculturalists, mathematicians and physicists, including astronomers, while New York had the most biologists, psychologists and chemists.

Four other states, Pennsylvania, New Jersey, Texas and Illinois, claim more than 10,000 scientists each. At least one person representing each of the 10 major scientific fields resides in each of the 50 states.

The median age of professional scientists is 38 years, and 93% of them are men. More than half of them have at least a master's degree. Eight times as many speak German as a foreign language than Russian.

Industry employs almost half of the scientists in this country. Government and educational institutions each take about one-fourth. But 40% of the researchers receive at least part of their support from Federal Government funds. Physicists, biologists and mathematicians take home the best salaries.

This information is based on final results of a roll call of U.S. scientists started by the NSF two years ago. Another count was started this year.

• Science News Letter, 85:232 April 11, 1964

TECHNOLOGY

Material for Smaller, Faster Computers

➤ A NEW MATERIAL promising to make electronic computers both smaller and faster has been successfully tested.

A computer having a memory unit made from the material would not have to convert the usual figures of the decimal system, based on ten, to the computer's language of only two digits, 0 and 1.

The material is a ceramic made from a mixture of lead, zirconate and titanate, with niobium, bismuth or potassium. It is made into memory units, either a bar or a disk, by a new method of forming ceramics at high heat and pressure.

The new memory element can store information in at least ten stable states, allowing direct use of the decimal system. Its development was reported to the international convention of the Institute of Electrical and Electronics Engineers meeting in New York.

Information is put into the element by applying voltage pulses to change the characteristics of tiny areas within the small ceramic disk or bar.

The most important property of the new ceramic is the stability of the tiny areas so changed. This means that information stored at a certain point or level can always be found at precisely that point.

Storage levels in ceramics produced by other methods are affected by temperature changes and other factors, so that the stored information is not always available when needed.

The new computer memory element was developed by C. E. Land, G. W. Smith and I. D. McKinney of Sandia Corporation's laboratory in Albuquerque, N. Mex. The combined heat-pressure method of producing the ceramic was developed by G. H. Haertling, also of Sandia.

Although the memory unit as it now operates has only ten storage levels, it could have many more. It also has three other imporatnt characteristics:

1. The state of information in each level can be determined simply and repeatedly without destroying the level.
2. Very little energy is required to switch from one storage state to another.
3. Little time is required to switch from one state to another.

A substantial reduction in switching speeds could result in a faster computer since there are many thousands of switchings in an ordinary computing operation.

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CHEMISTRY

New Russian Fertilizer Has Several Advantages

➤ A NEW TYPE of water soluble fertilizer has been developed by Russian chemists.

This new fertilizer, called KAF which is short for potassium and ammonium phosphate, contains 74% plant nutrients, including 50% phosphoric pentoxide (P_2O_5), 18% potash (K_2O) and 6% nitrogen. The chlorides which can be harmful to crops are present only in traces.

Developed at the Institute of General and Inorganic Chemistry of the Russian Academy of Sciences, the fertilizer does not readily absorb moisture, and does not become caked in storage. It is water soluble and easily granulated.

So far only a few tons of the promising KAF fertilizer have been produced, according to a report of chemist F. Perelman in the Soviet monthly, Nauka i Zhizn (Science and Life).

The formula of KAF is $mKH_2PO_4nNH_4H_2PO_4$ where m and n are nearly one.

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PHYSICS

'Hot' Wastes Buried With Concrete in Rock

➤ A NEW METHOD of burying radioactive wastes in rock beds is being tested at Oak Ridge National Laboratory, Oak Ridge, Tenn.

The waste is mixed with concrete and injected under pressure down a well where it creates and fills a horizontal crack in the shale. Parallel layers of these man-made fissures in the rock can hold millions of gallons of grout.

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IN SCIEN

VETERINARY MEDICINE

Live Virus Vaccine Authorized for Cattle

➤ VACCINATION of 5,000 cattle in Chile with a new, weakened live virus has been authorized by an agreement signed in Washington, D. C., by the Pan American Sanitary Bureau.

The vaccine, which is expected to protect livestock against foot and mouth disease, or aftosa, for much longer periods than any in present use, was developed by the Pan American Aftosa Center outside Rio de Janeiro, Brazil.

• Science News Letter, 85:232 April 11, 1964

PUBLIC HEALTH

Leprosy Least 'Catching' Of Infectious Diseases

➤ LEPROSY, or Hansen's disease, is probably the least communicable of the infectious diseases. Early treatment allows some patients to leave the hospital in about a year.

Overcoming the social stigma still associated with this ancient disease, however, is one of the hardest public health jobs, even in the United States, where the number of lepers probably does not exceed 2,500.

Complete frankness with employers after leprosy patients are discharged is recommended by the former chief of social services at the Public Health Service Hospital, Carville, La., Willard E. Cannon, (now in Anchorage, Alaska).

One patient who had worked in a large store as a clothing salesman returned to work as a night maintenance worker temporarily until he could regain his self-confidence and overcome prejudices of his fellow workers and employer.

Since the hospital at Carville was founded 69 years ago, no known cases have been contracted by staff members, Mr. Cannon reported in Public Health Reports, 79:320, 1964. Prolonged and intimate skin-to-skin contact with an infected person seems to be the method of transmission.

The cause of leprosy is the bacillus *Mycobacterium leprae,* discovered in 1873 by Dr. G. Armauer Hansen, a Norwegian physician. Up until the 1940's when the sulfone drugs were discovered and found to be an effective treatment, lepers had to remain in hospitals for many years—some for the remainder of their lives.

The PHS's National Leprosarium at Carville established a social service department in 1950, which has helped in rehabilitating patients as well as guiding them during hospitalization.

About 310 patients are cared for at Carville. Their ages range from seven to 93 years, with the average about 40. Male patients outnumber females two to one, a ratio found also in other leprosy hospitals throughout the world.

• Science News Letter, 85:232 April 11, 1964

CE FIELDS

MEDICINE

Clay-Eating Habit Prevails in Southern U.S.

➤ THE CRAVING for odd foods during pregnancy is known to extend to eating dirt, principally clay, a habit called geophagia, or pica, by physicians.

Two cases of clay-eating women who had never been pregnant, however, were reported in the Journal of the American Medical Association, 187:955, 1964. They ate handfuls of clay daily, explaining only that they like the bitter-sour taste.

Dr. Charles E. Mengel and William A. Carter of Duke University Medical Center, Durham, N. C., who reported the cases, said dirt eating is prevalent in many areas of the United States, particularly the South.

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PSYCHOLOGY

Highest Anxiety Level Found Among Newsmen

➤ NEWSPAPER EDITORS and writers have the highest anxiety level of any United States professional people studied, a University of Illinois psychologist reported.

They are "somewhat" more anxious than Navy frogmen (underwater demolition experts), aviators in training or business executives, Dr. Raymond B. Cattell said. University administrators are least anxious of all.

"Anxiety may well turn out to be a by-product of conflict," Dr. Cattell said at a meeting in New York on anxiety, called after a decade of tranquilizer therapy.

Minor anxiety often has been linked with ambitious achievement, but the psychologist said anxiety is a disorganizing factor. It may be a result of "certain motivation strengths," but it is no longer "available energy."

Generalizing from data on ten countries Dr. Cattell has studied, it would seem that anxiety is higher where standards of living are lower, but he said America and Great Britain have the least anxiety, with the greatest found in India and other underdeveloped countries.

The first anti-anxiety drug was introduced to the public 10 years ago, when Dr. Frank M. Berger, president of Wallace Laboratories, Cranbury, N. J., discovered meprobamate, or Miltown, the first specific tranquilizer.

Since then other tranquilizing drugs have been developed, but meprobamate continues to be a standard drug for treating anxiety symptoms.

Dr. Chauncey D. Leake of the University of California Medical School, San Francisco, defined tranquilizers as producing a calm and relaxed mood in anxiety states. Tranquilizers are distinguished from drugs such as chlorpromazine and reserpine, which are used to control severe mental illness.

Dr. Berger said he looked on his discovery of Miltown as a forerunner of other drugs that would have more effect on deep depression, thus making it possible to prevent suicide by taking a pill. Another pill might counteract criminal behavior due to chemical imbalance and a third cause people to use the full capacity of their brains.

It has been estimated that the average person uses only 10% of his brain in ordinary life, but electrical stimulation in brain surgery has shown revival of long-forgotten memories. The right drug might do the same thing.

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GENERAL SCIENCE

First Woman Appointed AEC Commissioner

➤ MARY I. BUNTING, president of Radcliffe College, has been appointed the first woman to serve on the U. S. Atomic Energy Commission.

Dr. Bunting, who holds many honorary degrees, is a well known microbiologist and widow of the late Dr. Henry Bunting of the Yale School of Medicine.

She was appointed to the $22,500 a year post by President Lyndon B. Johnson on March 28 to serve the unexpired term of Robert E. Wilson, who resigned.

Dr. Bunting has been granted a leave of absence through June 1965 from Radcliffe.

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PSYCHOLOGY

Liking for Alcohol Halted by Radiation

➤ A DOZEN male mice that had learned to like alcohol turned away from it and drank tap water instead after being exposed to gamma rays for a short period.

This sharp aversion for alcohol was caused by exposure to about 48 roentgen units of gamma radiation administered by Dr. Lelon James Peacock and J. A. Watson of the psychology department at the University of Georgia, Athens.

The distaste for alcohol in the mice lasted for about six days, Dr. Peacock noted.

Two dozen mice were used during the whole experiment which lasted several weeks, Dr. Peacock reported in Science 143:1462, 1964. After the mice learned to like alcohol, half of them were given one radiation dosage of 12 roentgens per hour for four hours and half received no radiation. The mice not subjected to radiation drank more alcohol than water.

Radiation has been used on other animals to induce aversion to various foods and non-alcoholic drinks, Dr. Peacock said. For instance, radiation dosages reduced the taste that experimental rats and mice acquired for saccharin solutions and made cats shy away from chocolate-flavored milk.

In some of these animals the aversion to their preferred food lasted 30 days, Dr. Peacock said. There is no definite explanation for the more rapid six-day return to alcohol by Dr. Peacock's mice.

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PHYSICS

Atomic Plants Seen For Power, Freshwater

➤ THE UNITED STATES can economically build huge atomic reactors to convert seawater into freshwater and simultaneously provide cheap electricity for cities and deserts near the sea, Government experts believe.

Southern California was selected as an example of an area where building such a double-barreled plant might be feasible. However, a study group representing many Government agencies concluded that other areas, such as the Gulf Coast and New York, could profitably use both the electricity and the freshwater made by a large atomic power plant.

The energy of atomic fission in the reactors would provide heat to turn seawater into steam for distillation into freshwater. The steam would also be used to turn turbines to produce electrical power as a by-product.

The heat produced from such a plant also would heat up a strip of ocean water near the shore which would provide warm water vacation areas and better sports fishing without radiation hazards, the experts reported.

Dr. Roger Revelle, dean of research at the University of California, headed the special group that investigated the simultaneous conversion of saltwater to fresh and production of electricity for President Johnson's Office of Science and Technology.

Included in the group were representatives of the Atomic Energy Commission, Department of Interior, Federal Power Commission, Office of Saline Water and Bureau of Reclamation.

In its report, the group concluded that producing both freshwater and electricity in the same plant would be practical. However, the reactors, eight times larger than those now operating, and distilling equipment required still must be designed. Distillation is now the only practical method of desalination.

By 1975 a power-water plant could produce 1,500 million watts of electrical energy and 800 million gallons of water per day at a price competitive with other methods. The water would cost 20¢ to 25¢ per 1,000 gallons and the eltctrical power not more than 2.5 mils per kilowatt hour.

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SPACE

Space Pilot Can Navigate With Small Plastic 'Ball'

➤ A SMALL PLASTIC ball installed in an Apollo spacecraft will enable an astronaut to maneuver the ship should its automatic system fail.

The device, called a Flight Director Attitude Indicator, provides the pilot with an artificial horizon and informs him of the position and motion of his ship.

Honeywell is making the device under a North American Aviation contract with the National Aeronautics and Space Administration.

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