PSYCHIATRY

New Theory on Mental Illness Is Proposed

➤ AN ORGANIC THEORY of mental illness, in which antibodies attack a person's own brain, is proposed by a San Francisco psychiatrist in the Archives of General Psychiatry, Feb., 1962, published by the American Medical Association. Natural antibodies are substances produced by the body to counteract invading foreign substances, a process termed autoimmunity.

Dr. W. J. Fessel of the University of California School of Medicine, Los Angeles, suggests that although the evidence is "admittedly slim," his theory could explain some of the many biochemical abnormalities of the blood discovered in the mentally ill.

Further support for the autoimmune theory is found in investigations revealing an abnormal immunity response to various vaccines among mental patients, he says.

In explaining why antibodies would attack a person's own cerebral material, Dr. Fessel states, certain components of the nervous system, because of their relatively late development before birth, might not be recognized by the body's immunity mechanism and act like a "foreign" substance.

Studies during the past 10 years, the psychiatrist states, show that there is a large body of scientific evidence showing that blood protein abnormalities occur in the mentally ill. Primary causes as well as secondary effects can be seen in the numerous abnormalities.

Dr. Fessel makes it clear that his theory does not rule out the importance of other factors such as psychological and genetic in the cause of mental disease. He advises laboratory testing to determine the interdependence of the various factors.

• Science News Letter, 81:104 February 17, 1962

METEOROLOGY

2,000 Balloons Planned To Scan Earth's Weather

➤ SOME 2,000 balloons circling the earth high in the atmosphere will be used to survey the world's weather as it is being made.

The balloons will be, in effect, satellites of satellites, since information from them will be collected by orbiting satellites, then telemetered to earth.

The plan to launch the 2,000 balloons is now under intensive study by the Joint Meteorological Satellite Advisory Committee of the National Aeronautics and Space Administration. It is also reported that the plan receives strong support in a National Academy of Sciences study on weather not yet public.

The balloons would be lightweight, super-pressure ones that shatter harmlessly if hit by an aircraft. They are planned to fly at altitudes of from 20,000 to 100,000 feet and remain in orbit for at least 60 days.

The very thin plastic shell of the balloon would carry what is known as "two-dimensional electronics," electronic systems so thin they have, in effect, only length and breadth. The electronic system is designed to note the temperature and relay this information to satellites upon request. The satellites would store the information until passing over a check point when it would be telemetered to a surface station.

This system is nicknamed GHOST, for Global HOrizontal Sounding Technique. Using it would eliminate the necessity of instrumenting satellites with complex devices to make indirect measurements of high atmospheric weather data.

Vincent E. Lally, now at the National Center for Atmospheric Research, Boulder, Colo., has calculated that eight satellites circling the globe in polar orbits every 90 minutes would give complete coverage of the world's weather every three hours. Four satellites would give six-hour coverage in the tropics and three-hour coverage at higher latitudes.

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MEDICINE

New Drug Developed To Fight Smallpox

➤ A NEW ANTI-SMALLPOX drug that has been found effective in tests on mice will soon be tried in India and Pakistan where the dreaded disease is still killing thousands of people every year. Pressed into service prematurely during the current outbreak of smallpox in Britain, the drug looks very promising.

Previously, vaccination provided the only protection against this killer. Once the symptoms appeared, a victim could not be helped and as many as one out of every two persons died. This high mortality rate caused the strict vaccination requirements imposed at the borders of many countries.

The new anti-smallpox drug to be tested —a yellow powder known as 33T57 or, more precisely, as N-methylisatin beta-thiosemicarbazone—was discovered in the laboratories of Burroughs Wellcome & Company, London. The drug protected mice against a hundred doses of variola and alastrim viruses. Variola is smallpox and alastrim resembles the disease.

The objective of the trials is not only to see how well 33T57 works but also to determine the proper dosage and the best means of administration.

A number of persons were given the drug during the recent outbreak in Britain but it is still too early to evaluate the results because the incidence of smallpox was too low.

Considerable progress is being made by mass vaccination programs. Between 1951 and 1961, the total world incidence dropped from 489,000 to an estimated 60,000. But the disease is still running rampant through southeast Asia.

During the first 32 weeks of 1960, there were 23,100 cases and 5,800 deaths reported in India, a weekly average of 720 cases and 180 deaths. During this same period, there were 1,495 cases and 504 deaths in Pakistan, a weekly average of 47 cases and 16 deaths. More recent statistics are still incomplete

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IN SCIEN

SPACE

Spacecraft Altimeter For Ranger Moon "Bus"

See Front Cover

➤ THE ALTIMETER, shown on the front cover, was designed to initiate the last phase of the landing of the Ranger vehicle's capsule on the moon. Ranger III, launched Jan. 27, was the first to carry the moon ball developed to measure "moonquakes" and meteor impacts and send information back to earth. Ranger III overshot the moon by 22,862 miles and is now in orbit around the sun.

Another six and a half-pound altimeter, developed by Wiley Electronics Company, Phoenix, Ariz., will have another chance to guide the moon ball to a lunar landing in future Rangers. It determines when the space "bus" is at the correct distance for the moon landing.

• Science News Service, 81:104 February 17, 1962

GENETICS

X Chromosome Blamed For Hereditary Diseases

➤ HEMOPHILIA, the disease that causes profuse bleeding, and other hereditary diseases may be caused by an inactive X chromosome in human females, according to a new theory by a California doctor.

The new theory is based on a test system using an enzyme called glucose-6-phosphate dehydrogenase (g-6-pd) found in red blood cells.

Dr. Ernest Beutler, chairman of medicine at the City of Hope Medical Center in Duarte, Calif., explained that his theory about the X chromosomes of women may shed new light on the biochemistry of heredity.

Chromosomes, thread-like bodies found in reproductive cells, carry the genes or units of heredity like beads on a string. The 46 chromosomes in each cell of a male include an X and a Y chromosome while female cells contain two X chromosomes. These are the sex determinants of a child.

Although the X chromosomes in female cells have been thought to be equally active, Dr. Beutler believes that one chromosome becomes genetically inactive during the embryonic stage of life, leaving only one active X chromosome to carry on. The active X chromosome is, at random, either the one inherited from the father or the mother.

Thus, every woman represents a mosaic of cells in terms of her X chromosome, the doctor reports in the Proceedings of the National Academy of Sciences, 48:9, 1962. Mary Yeh and Dr. Virgil F. Fairbanks, also of the City of Hope Medical Center, assisted in the studies.

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SCIENCE FIELDS

AGRICULTURE

Farms of Future to Be Run by Computers

➤ FARMS OF THE FUTURE will be handled largely by computers, it has been predicted.

Computers will be used by farmers to tell them when to plant crops, what to feed the animals and how much water is needed by the crops, two agricultural experts reported. This technological revolution in farming will be needed to offset increasing food demands of the skyrocketing population.

Computers are already being used on some university research farms, it was reported at a three-day symposium on agriculture conducted by the International Business Machines Corporation (IBM) in Endicott, N. Y. Forty of the nation's top agricultural experts attended the meeting.

Animals will be monitored and pampered by computers that could determine the animals' health and when feeding would be best. Data obtained from transmitters placed on cows would be fed to a computer and a report would be made outlining the animal's needs.

Other promising applications of computers in farming include the regulation of irrigation water and the automation of processing plants for farm products.

By the year 2000, not enough food will be available to feed the increasing population based on present technological knowledge. The use of computers to make farming more efficient is expected to fill the gap, L. P. Berriman and O. J. Kelley, Stanford Research Institute scientists in South Pasadena, Calif., said.

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BACTERIOLOGY

Bacteria Able to Survive Mars-like Conditions

➤ AT LEAST two kinds of bacteria have been laboratory tested to show they can survive under conditions like those believed to exist on Mars.

Some probably very low form of life exists on Mars, many scientists have suggested. They have shown that some kinds of bacteria are able to survive in a simulated Martian atmosphere, but no studies have been reported on the effects of these conditions on bacteria.

Three U.S. scientists reported in Nature, 193:497, 1962, that they have tested the effects of a simulated Martian atmosphere on the physiology and virulence of two microorganisms. They used *Klebsiella pneumoniae,* which causes some cases of lobar pneumonia in man, and *Clostridium botulinum,* the agent responsible for the type of food poisoning known as botulism.

The organisms, neither of which need oxygen to survive, were grown, then divided and placed in test tubes containing a small amount of crushed lava. The samples were then subjected to different conditions of temperature—from 13 degrees below zero Fahrenheit to 77 degrees above—for varying periods of time, and atmospheric conditions of vacuum, nitrogen and air.

The tubes were opened from four days to ten months after treatment, and the number of organisms still alive compared with the original number of a million.

The scientists found that conditions of vacuum and alternating temperature were detrimental to survival of *Klebsiella pneumoniae.* However, these organisms did survive for several months, although they were considerably less deadly than before treatment.

For the *Clostridium botulinum* organisms, constant temperature was less favorable to growth than alternating temperature. Nevertheless, these spore-forming organisms, and perhaps the tetanus and gangrene organisms, will survive the Martian atmosphere, the scientists found.

Drs. Ervin Hawrylewicz, Betty Gowdy and Richard Ehrlich of Illinois Institute of Technology's Armour Research Foundation, Chicago, report the research.

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HERPETOLOGY

Surviving "Dinosaur" Lives at Peace on Islands

➤ THE TUATARA, a reptile relative of the giant dinosaur, has recently been observed in his natural domain on small islands off the coast of New Zealand.

Few persons have seen the tuatara in its natural habitat, but Dr. W. H. Dawbin, zoology professor at the University of Sydney, has led 60 people to the islands to study the tuatara in the past 20 years. His studies are reported in Endeavour, 21:16, 1962, published in London by Imperial Chemical Industries, Ltd.

The tuatara, he reports, is found on 20 tiny islands around the New Zealand coast. Nearly all of the islands are bounded by cliffs and contain low forest or scrub cover.

Great colonies of marine birds live on these islands. The small forests are broken by the birds and kept open, which is necessary for the existence of the tuatara.

All of these features contribute to the success of the reptile in these locations.

An adult tuatara grows to a maximum length of 21 inches, according to Dr. Dawbin's studies. It is similar to a lizard but has ribs like a bird, the ribs extending under the abdomen. It has a pineal or third eye, covered and surrounded by petal-like scales.

The animal can replace a tail when it is lost.

Measurements taken by Dr. Dawbin and his staff indicate the tuatara continues growing at least 50 years, longer than any lizard. In fact, many of the larger animals could be more than 100 years old.

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MEDICINE

Shaking Palsy Inherited As Dominant Trait

➤ MORE EVIDENCE showing that shaking palsy, or parkinsonism, can be inherited is reported in the Journal of the American Medical Association, 179:372, 1962.

Physicians read in their journal that shaking palsy has been traced to the great-grandfather of a 36-year-old woman with the disease.

Dr. George G. Spellman, St. Vincent's Hospital, Sioux City, Iowa, states the incidence of parkinsonism in this one family is so high that it suggests a dominant characteristic, that is, one that can be handed down by a gene from only one parent.

Dr. Spellmann reports investigations by other scientists, showing "familial" parkinsonism to occur in from 5% to 16% of the cases studied. This nervous disorder is not generally considered to be hereditary.

Cancer of the colon and rectum, one of the most prevalent types of the disease in the United States, appears to be increasing, an editorial in the Journal pointed out (p. 369). In a series of articles in this issue, all the investigators agree that the large bowel polyp is common but they disagree on the danger of malignancy.

"Frankly invasive carcinomas may mimic polyps (gourd-like tumors) very closely," the editorial says, explaining that microscopic examination is the only way of showing the presence or absence of cancer.

"We believe that the best surgical policy is the removal of polypoid lesions when discovered," the editorial advised.

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BIOCHEMISTRY

Chemicals Relieve Pain; No Ensuing Addiction

➤ A COMBINATION of two chemicals was reported to relieve pain in monkeys without causing addiction.

The new chemical in the combination considerably reduces addiction associated with the widely-used pain relievers such as morphine and meperidine in animals, John J. Lafferty of Smith Kline and French Laboratories told chemists at the Fourth Delaware Valley Regional meeting of the American Chemical Society in Philadelphia.

The most useful combination observed to date in animals employs phenazocine, a pain reliever whose chemical structure is distantly related to morphine, and the new antagonist, similar to phenazocine, stated Mr. Lafferty.

The synthesis involved replacement of a methyl group attached to nitrogen by a three-carbon chain containing one double bond. Strange as it may seem, the new antagonist has no significant analgesic activity in animals.

Extensive clinical trials in man will be necessary to establish diminished addiction properties of the combination. Mr. Lafferty states these trials are under way.

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