

## BIOCHEMISTRY

**Plant Building Substance Discovered by Japanese**

► THE SUBSTANCE that makes living matter out of chemicals in plants has been discovered and successfully extracted by a noted Japanese scientist in Tokyo.

Chlorophyll-protein 666 may play a leading part in making higher forms of test tube life, Dr. Eijiro Yakushiji, dean of the faculty of science at Toho University, said. The substance helps plants create organic matter out of carbon dioxide and water with the aid of the sun's rays.

Last month scientists at the University of California, Los Angeles and Utah State University, Logan, prepared a living virus from non-living substances (SNL 82:131, Sept. 1, 1962).

Scientists have known that photosynthesis occurs within the chloroplasts of the cells of leaves, using compounds of chlorophyll and proteins, but the compounding material had not previously been extracted. Dr. Yakushiji experimented with goosefoot leaves, grinding them and observing their coloration through a spectroscope. He found an absorbent zone at the point where the ray wavelength was 666 millimicrons. The material was found to be a protein.

The discovery disproves the theory that chlorophyll and protein combined would not dissolve in water, he said. Actually, the combination will dissolve in water enough to be seen under the spectroscope. The find was later repeated on another plant.

Photosynthesis can be proved step by step by compounding materials in chloroplasts with chlorophyll-protein 666 in a test tube, he believes. Chlorophyll-protein 666 plays a leading part in photosynthesis and may open a way for man to make organic matter in a laboratory.

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## MATHEMATICS

**Madison Found Author Of Federalist Papers**

► MATHEMATICAL ANALYSIS involving high-speed computing has shown James Madison extremely likely to have been the author of the disputed historic Federalist papers. Their authorship has been in doubt for many years.

The problem of who wrote the famous papers, 77 in number, was used as a case study in a test of methods of discrimination. The papers were published anonymously in 1787-1788 by Alexander Hamilton, John Jay and James Madison to persuade New Yorkers to ratify the Constitution.

Dr. Frederick Mosteller of Harvard University and Dr. David L. Wallace of the University of Chicago reported results of the case study at a joint session of the American Statistical Association, the Biometric Society and the Institute of Mathematical Statistics at Minneapolis.

They found that Madison is extremely likely to have written the 12 papers whose authorship has been in dispute between Hamilton and Madison. The weakest odds were 80 to 1 in favor of Madison, for paper

No. 55. Two papers that historians were most uncertain about, Nos. 62 and 63, are strongly assigned by the mathematical studies to Madison.

Of the three papers that may have been written jointly by Madison and Hamilton, the figures show that Nos. 18 and 19 were written almost entirely by Madison. The shares of the third, No. 20, are in doubt, because in it Madison often used the words of historians Felice and Temple.

High speed computations, such as were programmed for the Federalist studies by Miles Davis, Harvard Ph.D. candidate, allow investigators to use known writings to choose words and weights for them that are likely to discriminate between authors. They found that simple words such as conjunctions, prepositions and articles were best in discriminating these authors.

Problems of classification and discrimination are widespread in medicine, social science and military research, and Drs. Mosteller and Wallace believe their methods will apply to these wider classes of problems when word counts are replaced by the variables relevant to these fields.

More than 50 colleagues of the mathematicians are credited with cooperation. The Ford, Rockefeller and National Science Foundations, the Office of Naval Research, and Harvard's Laboratory of Social Relations gave support.

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## MEDICINE

**Skin Test Seen for Penicillin Allergy**

► INVESTIGATORS in Switzerland and the United States are hopeful that a patient's allergy to penicillin can soon be determined by a simple skin test.

Physicians from 51 countries attending the International Congress of Dermatology in Washington heard two viewpoints on a skin test substance known as penicilloyl-polylysine, which creates a reaction in some individuals with immediate-type allergies to penicillin without sensitizing normal individuals.

Dr. W. G. Sampson, Washington, D. C. a U.S. Public Health Service epidemiologist, told dermatologists that test results with the reagent are significant enough "to warrant optimism on the eventual usefulness of this test in determining penicillin sensitivity."

However, Dr. Simpson feels that "a more comprehensive evaluation" is necessary before it is used generally by physicians.

The Swiss report, in the form of a scientific exhibit at the Congress, was more enthusiastic.

Dr. A. L. de Weck and Dr. H. Kuske, from the department of dermatology, University of Bern, reported on experiences with penicilloyl-polylysine, administered as an injection or as a scratch test on 2,000 patients.

This investigation showed that 75% of 86 patients with a history of penicillin allergy tested positive; in a group of 1,317 patients without such a history, three percent tested positive.

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**IN SCIENCE**

## SOCIOLOGY

**"Criminal Therapy" A Major Breakthrough**

► THE USE of ex-criminals to treat those who violate the law, known as "criminal therapy," is a major breakthrough, Dr. Lewis Yablonsky, visiting associate professor of anthropology and sociology at the University of California, Los Angeles, writes in the September issue of Federal Probation, a leading criminology publication of the Federal Government. This important new treatment for criminals is the technique originated at Synanon House in Santa Monica, Calif., a unique self-help community for rehabilitation of drug addicts, of which Dr. Yablonsky is research director.

Over the past year several "graduates" of Synanon have effectively introduced "criminal therapy" at the Federal Terminal Island Prison near Long Beach, Calif.

Dr. Yablonsky found that former addicts with long criminal backgrounds and prison experience often make the most effective therapists for younger addicts and delinquents who have embarked on similar criminal careers.

The ex-criminal therapist cannot be "conned" or outmaneuvered by his "patient." He quickly gains grudging respect and there is rapport.

The result is communication that penologists and others in authority find difficult to establish with those who, by their criminal background, are defiant of authority.

In this new approach "being clean" (of crime, drugs, and violence) becomes the status symbol. A reverse of the criminal code occurs and any slip back into criminality means great loss of face in the group.

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## BIOLOGY

**Insects for Biological Control Found in Tropics**

► INSECTS for biological control of insect pests may be available in the tropical areas of Latin America.

The rapid population expansion in Latin America, however, is destroying these insects, other animal life and plants before scientists have a chance to study them, Dr. David D. Keck, National Science Foundation scientist, said in Washington, D. C.

Dr. Keck stated that only a fraction of the fast-disappearing vegetation with its insect and bird life has been described properly.

"There are hundreds of species of *Drosophila*, the genus containing the common fruit fly, which we need to study," Dr. Keck said.

Dr. Keck, with Dr. Walter Hodge, program director of systematic biology at the National Science Foundation, recently made a study of tropical biology in the Americas, which he discussed at an NSF colloquium.

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# E FIELDS

## TECHNOLOGY

### Portable Pump on Market To Revive Stopped Heart

► **STARTING** a stopped heart by hand massage was reported some months ago by Johns Hopkins University, and now a Johns Hopkins surgeon has developed a portable pump to take over the manual labor. The price is about \$600.

Dr. Marvin M. Nachlas, aided by Melvin P. Siedband, a Westinghouse Electric Corporation engineer, developed the unit which was demonstrated by Westinghouse at the American Hospital Association meeting in Chicago.

The device, called the Iron Heart, is driven by pressure from a tank of compressed gas, stands 28 inches high and weighs about 25 pounds. It can be used in rescue operations as well as in hospitals.

One person could put the Iron Heart to work on a patient and then perform mouth-to-mouth respiration until further help is available, Dr. Nachlas said.

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## RADIOLOGY

### Radiation Protection Outlined by Physician

► **PHYSICIANS** were told how to reduce drastically harmful doses of radiation normally received by vital human organs.

Following on the heels of the United Nations report emphasizing there is no "safe" dosage of radiation for humans, Dr. Victor H. Witten of the New York University Medical Center outlined ways of protecting the public from unnecessary exposure to a common source of radiation: X-ray therapy.

New and effective shielding materials and methods, such as rubber-lead belts and girdles, must be used during X-ray therapy to lower the total dosage of radiation a person receives, he said.

The maximum permissible radiation dose is set at one-half roentgen per year for the whole body and critical organs. This standard is an arbitrary figure, based on estimates by experts in several scientific fields.

The United Nations report, however, pointed out that even small doses of radiation can cause physical changes, including cancer (leukemia) and can cause mutations which will be passed on to future generations.

Worldwide concern has been expressed about the adverse effects of ionizing radiation on the general population and future generations. Stress has been placed on keeping dosages to the gonads, or reproductive organs, at a minimum, Dr. Witten said.

If X-ray treatment for acne and other skin disease could be more closely controlled, dosages to these vital organs could be reduced from 50% to nearly 100%, he explained.

This would be done by using softer and less radiation during treatment, he said.

He also stressed that the distance of the treated area from the vital organs must be increased, the size of the X-ray field must be reduced, the apparatus must be directed away from the gonads, shielding must be used and that the patients should be positioned so that these areas will receive the least amount of radiation possible.

Even stray and scattered radiation, the rays bouncing off rib cage and skull and reaching the reproductive organs, must be considered in the overall maximum dose and must be reduced, he said.

One of the biggest problems, however, Dr. Witten pointed out at the 12th International Congress of Dermatology in Washington, D. C., is the terrible fear that the public has of radiation. To calm these fears would greatly aid the medical profession.

"Where there is ignorance and fear, there is need for knowledge and understanding," he explained. "With the proper knowledge and understanding, in the case of ionizing radiation, much can be accomplished for the benefit of mankind in sickness and in health."

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## TECHNOLOGY

### Environment of Planets Studied by "Black Box"

► **AN ELECTRONIC** "black box," the size of a box of paper napkins, may precede man to the moon and planets to check the safety of their environments, SCIENCE SERVICE learned.

In a pre-manned probe to the moon, the small device would be set down to automatically gather samples of moon dust into a tiny tube, and insert it in one of its 50 compartments. A built-in electronic scanner then would view the contents of the tube and transmit coded information about the substance back to earth.

The contents of the tube would be read as a tracing or pattern on a graph. Scientists in the earth-based receiving laboratory station could then compare this pattern with those of the many thousands of known living organisms. The characteristics of the pattern would indicate to a biologist whether the space sample resembled terrestrial matter ranging from bacteria up to pieces of animal matter, and whether it was dangerous to human life.

The sample gathering and scanning would be controlled by a signal from earth from 35 million to 250 million miles away. If bad reception interferes with transmission from space to earth, no harm is done since the scanner also stores the data on tape and scans it back when conditions improve.

The instrument, named Bio-telescanner by its designer, Dr. William G. Glenn, immunobiologist with the School of Aerospace Medicine at Brooks Air Force Base, Texas, also can be used by the astronaut in flight to analyze samples of his blood or urine to monitor the level of his resistance to possible infections. Wesley E. Prather, electronics engineer at the School, worked with Dr. Glenn on the design of the Bio-telescanner.

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## MEDICINE

### Blood Transfusions From Dead Seen in Emergencies

► **THE PROBLEM** of blood shortages for necessary transfusions in disasters and other national emergencies may be solved by using the blood from dead bodies.

A study of the Russian experience with postmortem blood, which has been successful for more than 30 years at the Sklifosovskiy Institute in Moscow, was reported by three American physicians. They pointed out the following advantages:

1. Multiple units (from four to six pints from one cadaver) would allow fewer mismatches of minor blood groups.

2. No anticoagulant is needed to prevent clotting, and therefore no reactions to anticoagulant occur.

3. Autopsies may be performed on the donors, to make sure dangerous hepatitis, syphilis, bacterial infection or cancer, are not present.

The investigators said that cadaver blood should be obtained within the first six hours after sudden death of patients free from lacerations, abrasions, infection and cancer. The serum proteins in the blood remain unchanged for the first few hours after a person has died.

Drs. Charles L. Moore, John C. Pruitt and Jesse H. Meredith reported the study from the department of surgery, The Bowman Gray School of Medicine, Winston-Salem, N. C. Drs. Pruitt and Meredith have been working under the U.S. Public Health Service. Their report appeared in the Archives of Surgery, 85:367, 1962.

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## GENETICS

### Intelligence Level Is Constant, Study Shows

► **FEARS** that the national intelligence level is declining because "the larger the family size, the lower the average intelligence of the children in it" appear to be without solid foundation.

A massive study of 1,016 families reported in *Eugenics Quarterly*, 9:84, 1962, pointed out statistical shortcomings of previous investigations.

Past studies of the relationship between intelligence quotient (IQ) and reproduction have almost always been faulty and "open to bias" because of failure to include brothers and sisters (who never had children) of the parents studied.

In the present investigation, the lower IQ groups who have large families are balanced by the low IQ individuals who never marry. When single brothers and sisters of the parents were included, the study showed no more children per person in the lowest IQ groups than among those of higher intelligence.

The study, which required 12 years, was done at the Dight Institute for Human Genetics, University of Minnesota, Minneapolis, by Dr. J. V. Higgins, now at Michigan State University, East Lansing; and Elizabeth W. Reed and S. C. Reed.

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