GENETICS

Mother-Daughter Conflict Seen in Some Plant Seeds

➤ THE mother-daughter conflict often dramatized by playwrights and novelists has a curious counterpart in the plant world, where a plant will go through all the trouble of forming a seed—and then prevent the seed from ever sprouting. At the meeting of the National Academy of Sciences in Washington, Dr. H. A. Brink of the University of Wisconsin called attention to this peculiar situation.

A seed, Dr. Brink reminded his audience, is really a mosaic structure, composed of at least three different kinds of tissue from the genetic point of view. The tiny embryo plant within, waiting its chance to grow, is definitely the offspring generation. The tough outer coats that cover it are really parts of the mother plant's body-substance. And the "lunch" of stored food in the seed, technically known as the endosperm, is neither one nor the other, but an entity of its own.

It often happens, especially in the seeds of hybrid plants, that the maternal structures in the seed-coat do not make way when the embryo is ready to start developing and make its own way in life. Frequently, when some exceptionally valuable hybrid seed develops this difficulty, it becomes necessary to break down this "parental objection" by outright force, to give the new generation its chance to grow.

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PLANT PHYSIOLOGY

Piled-Up Food Checks Plant Growth Efficiency

➤ THE little green food factories in the leaves of plants have the same kind of difficulty that their larger man-made counterparts sometimes run into—their product tends to pile up faster than it can be removed and used up, with resulting interference with operational efficiency.

This picture of bottlenecks in natural production processes was presented before the meeting of the National Academy of Sciences in Washington by Dr. F. W. Went of the California Institute of Technology. The experiments he reported were made on tomato plants, but general conclusions based on the results are applicable elsewhere in the plant kingdom as well.

Green plants need a lot of light before they produce enough food to use in growth, Dr. Went found. An illumination of 1,200 foot-candles proves a limiting factor.

But this gets crossed up with a temperature effect, which cuts the amount of sugar transported within the plant as it gets warmer. Since the plant receives both light and warmth from the sun, simultaneous increases in both kinds of radiation often work at cross-purposes. If the temperature remains high at night, as it does in a greenhouse, night growth is seriously hampered because the necessary materials cannot reach the growing points fast enough.

A practical way to overcome this handicap is to sprinkle sugar solution on plants in the greenhouse at night. They readily absorb the sugar through their leaves, and thus have more food material which can be built into the substances needed by the plant for its growth.

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ELECTRONICS

New Cesium Vacuum Tube Changes Electric Current

➤ A NEW vacuum tube for changing alternating into direct current, applicable to 110 volt supply such as used in ordinary commercial service, was announced to the National Academy of Sciences, meeting in Washington, by Dr. A. W. Hull of the General Electric Company.

This rectifier uses cesium metal both as coating for the hot cathode and as current-carrying vapor. This double use of cesium gives the highest efficiency theoretically obtainable in a thermionic rectifier, combined with unlimited life.

For rectifying and controlling currents at high voltages, Dr. Hull also described a new high-voltage thyratron, which will be used in power supply for television transmitters and for direct current power transmission. A new and efficient long-life cathode for thyratrons, which will handle currents as high as 5,000 amperes, was also described.

A new method of detecting and measuring atomic disintegrations that are of such low penetrating power that they can not escape from the vacuum chamber was described by Dr. Samuel K. Allison of the University of Chicago. He compared this atom study to measuring what happens by observing the recoil of a gun instead of following the flight of the bullet. An electron multiplier tube is used and its recording depends upon electrons being ejected from metal surfaces when they are hit by the primary particles.

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IN SCIENC

PUBLIC HEALTH

We'll Be Lots Healthier Ten Years from Now

➤ AS a nation, we will be much healthier 10 years from now if we follow the 10-year plan expected to be drawn by the National Health Assembly, which held its meeting in Washington recently.

And if everybody gets together and cooperates on the plan, we can start showing improvement a lot sooner, Oscar V. Ewing, Federal Security Administrator, told a nation-wide radio audience. Mr. Ewing spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

More and better sanitation, more hospitals and health centers, more doctors, nurses and other health personnel, and more research to fight such chronic diseases as cancer, heart disease and mental illness are needed to improve our health, Mr. Ewing said.

"A breakdown of the statistics shows that good health varies widely among the states of the Union and even among the localities within the different states," he pointed out. "It varies also as to age-groups and income levels. As for public health services, federal funds, you know, are appropriated in relation to the money the various states and communities can themselves raise, and the poorer states and communities get the short end of it.

"Nearly a sixth of our entire population is afflicted with chronic disease. And outside of all the suffering and misery this entails, we have to realize that we are losing at least a billion workdays every year from this cause. Diseases of the heart alone cost the American people a billion dollars annually and mental diseases another billion and a half."

"We take sanitation too much for granted," Mr. Ewing continued. "More than six million persons live in towns and cities which need new sewerage systems. Over 79 million need improved systems. And today only about six and a half million people are served by systems that could be termed really adequate. And this doesn't include the even worse conditions in our rural areas."

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E FIELDS

GEOLOGY

Earth's Early Magnetism To Be Tested with Clays

➤ HOW the compass would have pointed a hundred million years ago—if the compass had existed then—will be discovered this year by an expedition of the Carnegie Institution of Washington to collect clays from the western United States from Colorado to Washington.

Just why the earth is a giant magnet is still one of the major mysteries of science, Dr. E. A. Johnson of the Carnegie Institution told the American Physical Society meeting in Washington, despite the fact that scientists are now sure that earth had a magnetic field at least a million years ago.

What amount to tiny magnets in the clay particles laid down in ancient glacier lakes or on the ocean bottom can be used to determine the strength and direction of the magnetic field when the clay beds were formed.

Glacial clays from New England and sediments from the bottom of the Atlantic and the Pacific formed a million years ago have been collected by the scientists. Pieces of the material are spun near a coil and extremely sensitive amplifiers are used to pick up the very small voltages generated. From these there can be figured the strength of the earth's magnetic field in which they were deposited.

A million years ago the earth's magnetism was just about what it is now. Seeking clays of earlier geological ages, the scientists will find records of the earth's magnetism still earlier.

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ENGINEERING

Radar Technique Enters Land-Surveying Field

➤ AN optical radar for surveying earth surfaces has been developed, the International Scientific Radio Union was told at its meeting in Washington by W. W. Hansen, Illinois Institute of Technology, Chicago. It sends out pulses of light which are reflected back from the point whose position is to be determined, and the distance is measured by the time the light takes to travel forward and back.

The light returning from the reflector falls on a photo-multiplier whose output is amplified to produce a pip, an illuminated spot, on a cathode-ray tube. Determining the distance by the transit time of the pulse of light is accomplished by auxiliary circuits which include a local crystal-controlled oscillator. The circuits produce timing markers on the tube which can be made to match the pip produced by the returning light.

Angles are measured as with the conventional surveyor's transit. The optical system makes use of a single parabolic searchlight mirror, the outer portion of which is used for the transmitted beam, while the inner portion is used for the returned beam. The equipment is portable and operates alternatively from storage batteries or from 110-volt alternating current.

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AERONAUTICS

Sound Waves Measure True Airplane Speed

➤ TRUE airplane speed may be measured accurately by high frequency sound waves, the Acoustical Society of America was told at its meeting in Washington by Victor B. Corey, of Frederic Flader, Inc., North Tonawanda, N. Y. The Mach number, the ratio of plane speed to the velocity of sound, can also be measured by the same means.

The instrument, developed for the purpose, was described by the scientist as using the convection refraction of high frequency sound waves sent out from an extensible boom carrying a device to give out sound waves. True air speed, which involves the ratio of distance to time, is proportional to the ration of boom extension to a measured acoustic transit time which remains constant excepting for temperature changes of the air.

The device is made automatic by what is called a servo-positioning mechanism which moves the boom in response to a signal from a dual receiver in a fixed parallel boom. The basic operating principles, he stated, are applicable in general to velocity or Mach number measurements on a body which moves through any fluid medium of low viscosity.

The measuring instrument, developed at Cornell Aeronautical Laboratory under contract with the U. S. Navy, is named STAMNI for short, the full name being Sonic True Air Speed and Mach Number Indicator.

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GENERAL SCIENCE

Two New Trustees Elected To Science Service

➤ DR. KARL LARK-HOROVITZ, chairman of the department of physics of Purdue University, Lafayette, Ind., and Charles E. Scripps of Cleveland, Ohio, have been elected new trustees of Science Service, the institution for the popularization of science, with headquarters in Washington.

Mr. Scripps represents the E. W. Scripps Estate of which he is a trustee, while Dr. Lark-Horovitz represents the American Association for the Advancement of Science of which he is general secretary.

The following officers were renamed in annual meetings just concluded:

Dr. Harlow Shapley, *President,* Director of Harvard College Observatory, Cambridge, Mass.; Dr. Alexander Wetmore, *Vice-President and Chairman of the Executive Committee,* Secretary of Smithsonian Institution, Washington, D. C.; O. W. Riegel, *Treasurer,* Director of Lee School of Journalism, Washington and Lee University, Lexington, Va.; Watson Davis, *Secretary,* Director of Science Service, Washington, D. C. Additional members of the Executive Committee are Frank R. Ford, Editor, Evansville Press, Evansville, Ind.; and Dr. E. G. Conklin, Princeton University, Princeton, N. J.

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MEDICINE

Medical War Crimes To Be Outlawed Internationally

➤ MEDICAL war crimes will be outlawed ethically, if the newly-organized World Medical Association carries out its present plans.

Doctors all over the world, according to this plan, will take an oath refusing to perpetrate experimental and non-experimental crimes and human barbarities such as German physicians were involved in during World War II. They will take this oath when they receive their degrees of doctor of medicine, just as U. S. physicians now take the age-old Hippocratic oath on receiving their medical degrees.

Adoption of this oath was urged in a resolution by the World Medical Association at its first meeting in Paris last September. Approval of the resolution is expected from the asociation's council at its meeting in New York.

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