

BOTANY

Radio Impulses Help Germination of Seeds

➤ EXPOSURE to electromagnetic waves in the radio frequency range stimulates the germination of certain seeds.

The U. S. Department of Agriculture reports that exposure increased the germination of alfalfa seed 35% in laboratory studies.

Smaller germination increases were observed in other plants. There was a 12% increase in the germination of red clover exposed to electromagnetic energy, and the germination of treated unhulled crown vetch almost doubled. Corn germination was not consistently affected, but in some cases, exposure stimulated it considerably.

It is not known yet whether the improved germination due to radio waves at a frequency of 39 megacycles per second and a field intensity of 3,000 volts per inch results from chemical or physical changes in the seed or from both. However, scientists do know that exposure to radio frequency waves changes the sugars of certain varieties and increases the capacity of some hard seeds to absorb water.

This treatment might also be effective in killing weeds in crop seeds and certain pests of stored grain without damage to the grain itself.

Stuart O. Nelson of the U. S. Department of Agriculture conducted the experiments with the cooperation of Nebraska Agricultural Experiment Station scientists at Lincoln.

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ARCHAEOLOGY

Patina on Flints Can Indicate Age

➤ WHEN archaeologists dig up the flint tools of an ancient people, they can, by studying the crust or patina on the flint, get an idea of the age of the tools.

Attempts to correlate the thickness of the patina with age have, in the past, been disappointing because many other factors besides mere age must be taken into account.

What these factors are and how they affect the flint is reported in Science 134:251, 1961, by a geologist-anthropologist team of the University of Georgia, Athens, Dr. Vernon J. Hurst and Dr. A. R. Kelly.

The rate of patination varies, they report, with the texture and microstructure of the flint; its permeability; the kind, proportion, and distribution of impurities; and environmental factors such as temperature and soil chemistry.

The thickness of the patina also varies with time.

The first three of the factors affecting patination can be evaluated by regular petrographic techniques, the scientists report. Environmental factors can be assumed to be constant for objects found in the same type of soil in a given climatic region.

Color is important in the study of flints. In most flints, the color is the result of repeated refraction and reflection of the

light at numerous intergranular surfaces where part of the light is absorbed and part is reflected. Color changes during patination come about as weathering agents attack impurities in the flint, leaching out carbonates, loosening quartz crystallites and dispersing clays. These all affect the reflectivity of the flint and its capacity to absorb preferentially.

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PUBLIC SAFETY

Young Amputees Used Power Tools on Farm

➤ YOUTHFUL USERS of power and farm tools formed the largest group of amputees in 203 persons under 21 seen at a Midwestern clinic. The average age of the 53 amputees in this group was 11.

Also averaging age 11 were amputees that had suffered gunshot and explosion wounds. Fifty young people aged 10 months to 20 years had to have amputations for these reasons.

Third on the list were 41 young amputees between the ages of 2 and 20 who were involved in vehicular accidents. Railroad accidents accounted for 28 amputees. Household mishaps accounted for 16, the average age of the victims being under four years.

Childhood recreation accidents caused eight amputations and burns caused seven.

Dr. George T. Aitken, medical codirector of the Area Child Amputee Center in Grand Rapids, Mich., reports findings of the study in The New England Journal of Medicine, 265:133, 1961.

He concluded that a large number of the injuries could have been prevented, and especially called attention to indications that children living in rural communities are permitted to do chores "possibly too early" that require the use of power-driven tools.

The clinic from which the figures were drawn serves not only Michigan but surrounding areas.

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PHYSICS

Fire Extinguished by Spraying Empty Air

➤ NEARLY ALL FIRES can be put out quickly by spraying the air surrounding the fire with a chemical extinguishing agent.

The method is as much as 20 times more effective than spraying the fire itself, research conducted by E. C. Creitz at the National Bureau of Standards fire research laboratory in Washington has shown.

Why spraying the surrounding air extinguishes fires is still unknown. The present study covered fires in which air and fuel are not mixed prior to combustion, such as in match and candle flames.

The study has also re-kindled the controversy of what happens within hot flames. Mr. Creitz believes the extinguishing agent (inhibitor) breaks an "ionic" chain process in the flames, whereas most scientists hold that the chain links are hydrogen atoms and not ions.

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IN SCIENCE

GENERAL SCIENCE

U.S. and U.N. Urged To Set Up Science Agency

➤ A STRONG RECOMMENDATION that the United States and the United Nations each create an Institute of Scientific Information has been made by a political scientist, Prof. Bertram M. Gross of Syracuse University, Syracuse, N. Y., as a partial solution to the current information crisis.

He called the information crisis "a world problem" and "a tragic waste of human knowledge" resulting from man's ability to produce more information than he can assimilate, analyze, store or distribute.

"It is estimated that every minute 2,000 pages of books, newspapers or reports are published somewhere in the world . . . enough to fill a thousand feet of bookshelves every day," Prof. Gross said. This "paper flood of information," will continue to rise, he predicted.

Prof. Gross therefore urged "full exploitation of modern technology to develop a large-scale program of information retrieval." He outlined plans for assembling and disseminating scientific and technical information by the proposed Institutes of Scientific Information.

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GEOLOGY

Great Lakes Created By Ancient Rivers

➤ THE GREAT LAKES were carved out of rock by ancient rivers and not by the glaciers that periodically blanketed North America many thousands of years ago.

Drill cores taken from the depths of Lake Superior strongly indicate that glacial deposits on the bottom of the Great Lakes were laid down in deep rocky valleys existing long before the last ice sheet retreated northward 10,000 years ago. The drilling conducted from ships was the first such attempt to probe into the geological history.

A complex river system that either emptied into Hudson Bay or cut through the St. Lawrence River Valley was largely responsible in forming the pre-glacial valleys, University of Michigan geologist Dr. James H. Zumberge believes. Ice sheets, gouging out the land as they crept along, later piled up dam-like deposits in the valleys, backing up the waters to form the Great Lakes.

University of Michigan and University of Minnesota geologists teamed up on the Lake Superior project, which was supported by the National Science Foundation.

Anchored in nearly 1,000-foot deep water, the scientists once drilled 684 feet into the softer deposits without reaching the ancient bedrock valley. Another drilling site brought up a 500,000,000-year-old rock, the oldest taken from any Great Lakes bottom.

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E FIELDS

TECHNOLOGY

Three Machines Linked To Speed Editing Chores

► A COMPUTER, a tape-punching typewriter and a photographic typesetting machine have been linked at Massachusetts Institute of Technology, Cambridge, Mass., in a system capable of handling the mechanical details of editing a 400-page book in a few hours.

The typewriter is first used to produce a draft of the material and, at the same time, a paper tape with the text punched in code. When the draft is proofread, typing simple editing instructions also produces a correction tape.

Both tapes are fed to the computer, which makes the requested changes at high speed and produces a master tape of the corrected text.

The master tape, including orders for letter size, printing style and format, then goes into the typesetter. This machine turns out a finished positive ready for immediate printing by offset or letter press methods.

The system was developed by Dr. Michael P. Barnett and Kalon L. Kelley during their work with electronic computers as part of research in theoretical chemistry. They used an IBM 709 computer, made available through a grant from International Business Machines Corporation, New York, and a typesetter developed by Photon, Inc., also in Cambridge.

MIT library officials are interested in the system as a means of updating books that must be revised periodically, such as catalogues and directories. The computer can sort random catalogue entries into proper sequence while simultaneously constructing elaborate indexes.

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MEDICINE

Excess Salt Can Cause High Blood Pressure

► EXCESS SALT appears to cause high blood pressure, but a salt-free diet is not always a cure for it.

Only about one-fourth to one-third of patients with high blood pressure respond to salt restriction. Because their blood pressure does not fall, it has been thought that excessive salt intake was not a cause of the hypertension.

However, animal experiments indicate that the initial cause can still be excess salt. Dr. Lewis K. Dahl of the Medical Research Center, Brookhaven National Laboratory, Upton, N. Y., reported in *The Journal of Experimental Medicine*, 114:231, 1961, that all 35 female rats he tested became hypertensive during a year of continuous excess salt feeding.

When the salt was withdrawn from the

diet, about two-thirds of the animals failed to show a significant fall in blood pressure.

"The hypertension so induced appeared to be self-sustaining," Dr. Dahl said.

The results of these experiments are in accord with other studies of hypertension that was brought on by different means but continued after the original exciting cause was removed.

In humans, hypertension sometimes develops after one kidney is involved, Dr. Dahl said, but removal of the affected kidney may fail to diminish the blood pressure, particularly if the condition has been of relatively long duration.

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PUBLIC HEALTH

Sports Not Enough To Assure Youth Fitness

► STUDENTS in junior and senior high schools who take part in athletic programs, train with the ROTC or march with the school band should not be allowed to substitute these extracurricular activities for regular class work in physical education, says the President's Council on Youth Fitness.

In grades 7 through 12, "an athletic program alone does not constitute a basic (physical education) program," the Council believes. It urges, however, that intramural sports be available to all as supplemental "builder-uppers," along with interschool sports for the "athletically gifted." Weekends, vacations and after-school hours "should be replete with a variety of organized teams, leagues, tournaments, games and special features."

Council members suggest that no less than 30 minutes daily be devoted to physical education in elementary grades, and no less than "one standard class period per day" in secondary schools.

At the high school level, health education teachers should have either a major in the field or an undergraduate minor bolstered by graduate study, the Council said. Elementary teachers should be "properly prepared" to add health and safety education to other duties, and should have access to a specialist in the field for help and consultation.

Also recommended are enough facilities such as gymnasiums, swimming pools and tennis courts to keep one-sixth of a school's pupil population busy at the same time. Generally, classes should not exceed 35, and the teaching load should not exceed 200 pupils daily.

Tests to measure achievement and diagnose weaknesses should be scheduled regularly. A suggested test battery for schools with limited facilities includes pull ups, sit ups, a shuttle run, a standing broad jump, a soft ball throw, a 50-yard dash and a 600-yard "fast walk."

In its report, "Youth Physical Fitness: Suggested Elements of a School-Centered Program," the Council stresses that fitness programs should be geared to include "girls as well as boys."

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PUBLIC HEALTH

Contaminated Tannery Seen Causing Anthrax

► WALKING PAST a tannery that processes imported goat skins was seen as a possible cause of fatal inhalation of anthrax.

Air dissemination of *Bacillus anthracis* could have caused the death of three Philadelphia patients, physicians from the U. S. Public Health Service's Communicable Disease Center, Atlanta, Ga., reported in *The New England Journal of Medicine*, 265:203, 1961. Three anthrax cases due to inhalation were found in 105 anthrax cases in Philadelphia during a period of nearly 12 years.

Anthrax is an infectious disease of sheep and cattle that may be transmitted to man. Most cases result from occupational exposure to *B. anthracis*. It is unusual to find cases such as the three reported in this study, in which the infecting organism is not evident. A further complication in one of the cases, a 28-year-old Negro man, was the presence of sarcoidosis, a chronic infectious disease of unknown cause.

The investigators said they were unable to explain the association of the particular tanning plant with the three cases of inhalation anthrax. Two of the cases occurred eight years apart, but the contaminated tannery could have been the place of exposure for both.

Drs. Philip S. Brachman, Joseph S. Pagano and Wilhelm S. Albrink, all connected with the Communicable Disease Center, said at least 7,500 persons in the Philadelphia area have "closer daily contact with *B. anthracis* than the three patients" who died of inhalation anthrax. Yet none of the 7,500 have gotten the disease.

Also there are at least 150 individual industrial companies in the Philadelphia area that process animal products contaminated with *B. anthracis*, which results in the production of air-borne infectious material. Yet none of these employees have become infected.

Staff members from the Department of Public Health, Philadelphia, and from several institutions cooperated in supplying information in this rare study.

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GENETICS

Genetic Basis for Food Requirements

► JACK Sprat and his wife had some basis for their difference in food taste. There are genetic differences in nutritional requirements.

Dr. F. B. Hutt of the N. Y. State College of Agriculture, Cornell University, Ithaca, said in *Nutritional Reviews*, 19:225, 1961, that the "genetic differences in nutritional requirements may be much greater among races and individuals than has been recognized." His suggestion is based in part on discrepancies between results of experiments on hens in different laboratories.

More studies are needed, Dr. Hutt said, to discover familial differences.

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