

AGRICULTURE

Vitamin C Spray Protects Plants Against Smog

► VITAMIN C sprays may be one answer to the multi-million dollar smog damage to agriculture.

After six months of preliminary field testing, two University of California scientists, Dr. Hugh T. Freebairn of the Citrus Experiment Station and Jackson Davidson of the Agricultural Extension Service, Riverside, Calif., reported that light application of ascorbic acid sprays prevented the burning and bronzing of leaves usually caused by the airborne oxidants in smog.

The spray also appears to increase the nutritive value of the crops, they said. Plants tested include lettuce, celery, pinto beans and petunias, while spray tests are now underway with orchids, roses, carnations, alfalfa, spinach and endive.

Plant cells already contain vitamin C and related compounds which, the scientists report, seem to help resist oxidant damage. The compounds work either directly, by destroying the toxic materials introduced with smog, or indirectly, by reversing the poisons' damaging effects on vital cell processes. Spraying increases the plant's ability to "fight back" against air pollutants.

The main significance of the success in field use of vitamin C is the demonstration that man can govern the effects on living cells of selective toxic agents in the air, Dr. Freebairn believes.

The University research is part of the statewide Air Pollution Research program being conducted at Riverside and was supported in part by funds from the Charles Pfizer Company.

Science News Letter, March 8, 1958

CHEMISTRY

Bactericidal Gas May Aid Sterilization

► A NEW BACTERICIDAL gas that promises to be highly useful as a sterilizer in operating rooms, hospitals and nurseries has been found.

The gas is known as beta-propiolactone. Developed by the U. S. Army Chemical Corps scientists, it was formerly used only in aqueous solutions.

The gas acts as effectively as formaldehyde vapor but works more rapidly and with fewer adverse side effects, Dr. C. R. Phillips, chief of the physical defense division, Army Chemical Corps., Fort Detrick, Md., said at Seton Hall College of Medicine and Dentistry, Jersey City, N. J.

Formaldehyde gas has many practical applications, particularly in treating large and relatively uncluttered enclosed spaces. Since it is not really acting as a gas, however, but traveling through the air in a gaseous form and condensing out only on all readily available and exposed surfaces, its use as a sterilizer has proved unsatisfactory.

A substance was needed that would sterilize woolen uniforms, potentiometers and articles requiring thorough sterilization.

Turning to ethylene oxide, Dr. Phillips

said that scientists overcame the old hazard of flammability by mixing the highly flammable gas with carbon dioxide and fluorinated hydrocarbons (Freons).

The list of materials ethylene oxide will sterilize is impressive. It includes penicillin, hospital bedding, ophthalmic, urological and other types of medical instruments, eggs (through the shell), whole barrels of spice and even artery sections used for surgical transplants.

But the gas has disadvantages, Dr. Phillips pointed out, such as its slowness to react and its reaction to plastics and some rubber. It dissolves and slowly evaporates on both substances.

Dr. Phillips and his colleagues, Robert Hoffman and Benjamin Warshowsky, hope the value of the newly developed beta-propiolactone gas will lie in applications much along the line of those discussed for formaldehyde rather than as a substitute for ethylene oxide.

Its advantages over formaldehyde lie in its rapid action and ability to sterilize small enclosed spaces in fewer hours.

Science News Letter, March 8, 1958

GEOPHYSICS

New Theory Explains Strength of Sea Ice

► A NEW THEORY that explains the strength of sea ice and gives good agreement with measured values was reported to the Arctic Sea Ice Conference meeting in Easton, Md.

Both the theory and tests disprove the long-held rule that sea ice is only one-third as strong as fresh water ice. Sea ice many times has more than twice the tensile strength of fresh water ice, reported Dr. A. Assur, physicist with the U. S. Army's Snow, Ice and Permafrost Research Establishment.

The rule that sea ice is less strong than fresh water ice was developed by the Russian, K. A. Moskatov, in 1938. The new findings by Dr. Assur show sea ice strength can vary by as much as 30 times.

Salt water ice crystals actually consist of parallel plates of pure ice between which are sandwiched pockets of brine, he told the conference, which was sponsored by the National Academy of Sciences-National Research Council.

The ice itself undergoes continuing changes as temperatures drop. Pure ice is formed at zero centigrade, 32 degrees Fahrenheit, while the various salts contained in sea water precipitate out of solution at specific temperatures below that.

Sea ice becomes a complete solid at a temperature of 54 degrees below zero centigrade, or about 65 degrees below zero Fahrenheit.

The theory also accounts for the increase in friction encountered by sleds being driven over bare ice as air and surface temperatures drop.

The parallel ice plates and brine pockets, Dr. Assur reported, can be analyzed mechanically as a perfect plate. The stresses sea ice can withstand depend upon the spacing of the holes and their shape.

Science News Letter, March 8, 1958

IN SCIEN

MEDICINE

Polio Shots Urged for Children Under Five

► A SPECIAL effort is being urged to have children under five years of age vaccinated against polio.

New evidence reveals this is the age group with the highest attack rate for paralytic polio, according to the U. S. Department of Health, Education and Welfare.

The highest polio attack rate, 5.7 per 100,000, during 1957 according to preliminary figures, was among children aged one year. The next highest rate was the two-year-old group with 5.5 and for all children through the age of four the rate averaged 4.4. Children between the ages of five and 19 averaged 1.4.

Over 30,000,000 cc. of vaccine, considered an ample supply, are available for the 40,000,000 persons in the 0-40 age group who have not yet had any of the shots.

Surgeon General Leroy E. Burney of the Public Health Service said he had called this information to the attention of the American Academy of Pediatrics and the American Academy of General Practice and that both will encourage vaccination of children under five.

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GENERAL SCIENCE

Scientists' Group Urges Civilian Space Agency

► DEVELOPMENT and control of outer space should be directed for peaceful purposes by a civilian agency, the Federation of American Scientists has urged.

The scientists' organization, which 12 years ago was effective in gaining civilian control of atomic energy from the military, further urged that "all outer space research" by scientists of any nation be carried out by an international agency under the United Nations.

Placing the U. S. space program in a non-military framework, the Federation's council said, would help to guarantee that efforts of nations crossing the space exploration frontier be limited to peaceful uses.

Sen. Clinton P. Anderson (D-N. Mex.) in January introduced a bill that would place U. S. space research under the Atomic Energy Commission. Hearings on this bill, which would also authorize a new national laboratory for space research, were held before the new Subcommittee on Outer Space Propulsion of the Joint Atomic Energy Committee.

The Federation of American Scientists is an organization of more than 2,000 scientists and engineers concerned with the inter-relations of science and world affairs.

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CE FIELDS

BIOPHYSICS

Brain Responds Positively When Noise Is Turned Off

► THE CENTER of hearing in the brain responds with an electrical signal when a noise is turned off, and this "off" response is quite different from the corresponding response when noise is turned on. This is indicated by studies of cat brains, Drs. Nelson Y. S. Kiang and Thomas T. Sandel of the Research Laboratory of Electronics, Massachusetts Institute of Technology, reported to the Biophysical Society meeting in Cambridge, Mass.

Drs. Kiang and Sandel had previously described an electrical response in the brains of unanesthetized cats when a burst of noise is turned "off." Analysis of the response with the help of an electronic computer showed that varying the characteristics of the burst of noise had a negligible effect on the "off" response. However, when the cat was anesthetized with Nembutal, the "off" response disappeared while the corresponding "on" response remained essentially unchanged.

New studies show that the "off" response is localized in a different area of the hearing center, or auditory cortex, from the "on" response. Also, when an "off" response occurs at the same time as an "on" response, the total pattern of response is markedly different from the pattern produced by two "on" responses.

This proves, the scientists believe, that the mechanism generating the "off" response must be different from that producing the "on" response. They say the "off" responses may prove to play an important part in the way that responses to sound are coded in the brain.

Science News Letter, March 8, 1958

MEDICINE

Tranquilizer May Not Be Habit-Forming

► MEPROBAMATE, a tranquilizer in wide use today, did not prove habit-forming in a study of 60 prison inmates, contrary to expectations.

The results of the prison study are reported by Austin R. Stough of McAlester, Okla., in the *Journal of the American Medical Association* (Feb. 22).

Meprobamate, marketed as Miltown and Equanil, was tested by Dr. Stough to evaluate the possibility of habituation among a prison population in which a high incidence of susceptibility might normally be expected.

The inmates in the Oklahoma state prison given the drug were considered to be highly unstable with a history of injury, illness or other physical or psychological abnormality. Several of the inmates had been former addicts to narcotics or alcohol.

The tranquilizer was given in two separate six-week tests. In the first, meprobamate was administered in dosages far in excess of amounts needed to allay symptoms. This was followed by abrupt withdrawal.

During the second phase, the drug was given in dosages more commonly used, and followed by gradual withdrawal.

None of the prisoners developed a true habituation to the tranquilizer. The results show, however, that prisoners with serious nervous disorders had an undesirable reaction to abrupt withdrawal of the drug. All returned to pretreatment status within 48 hours.

Dr. Stough recommends that withdrawal from any tranquilizer be graduated and extend over a period of time.

Earlier studies by other scientists in which mice were subjected to high dosages of meprobamate showed the animals became dependent upon increasing amounts of the drug in order to obtain the same effect as on original smaller doses.

An earlier study with humans reported by a Seattle physician, Dr. Frederick Lemere, showed several of his patients developed symptoms such as nervousness, "the jitters," and "that let down" feeling when they missed their usual dosage of meprobamate.

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MEDICINE

Liver Function Test Indicates Treatment

► SHOULD the patient with a liver disorder be treated medically or surgically?

This question can be answered by a new liver function test developed at the Atomic Energy Project of the University of California at Los Angeles by Drs. George V. Taplin, Orsell Meredith and Harold Kade.

The technique employs a radioactive dye, Rose Bengal, and a simple external radioactivity counting procedure.

The test measures liver vascularity, liver cell function, and biliary tract potency and/or bile flow interference directly.

Readings on these separate functions have proved valuable clinical aids in distinguishing whether jaundice is due to primary liver cell damage or indirectly to blockage of the biliary tract. The former would be treated medically, the latter surgically.

Accurate decisions on the type of treatment must be made as quickly as possible. With standard laboratory liver tests and clinical information, such a decision may require long periods of observation by the physician, up to several weeks in many instances.

In such difficult cases the new atomic liver test, which may be repeated frequently without harm to the patient, provides diagnostic clues much more rapidly than do indirect laboratory tests. In many instances it gives conclusive diagnostic data immediately.

The test is now being used in diagnosis of a variety of other liver disorders at many hospitals and clinics throughout the nation and in several foreign countries.

Science News Letter, March 8, 1958

BIOLOGY

Aging of Space Traveler Is Biological Problem

► WHETHER a fast-moving space traveler ages more slowly than his stay-at-home twin is actually a biological problem, not a physical one of measuring time.

Dr. Anderson Nettleship of the University of Arkansas' Medical Center recommends in *Nature* (Feb. 22), that the biological problem be tested by experiments.

If growth and aging are connected with high speeds in the way physicists assume, living processes could be modified almost at will by varying the velocity, Dr. Nettleship says. However, everything known about protoplasm shows it is not possible to retard or reverse living processes, although they may be temporarily suspended under certain, very limited conditions.

Dr. Nettleship suggests that biological systems function in a manner entirely different from the atomic particles thus far tested for differences in lifetimes when moving fast compared to when moving more slowly.

If biological time is not the same as time measured by the physicist, then the current arguments concerning whether or not space travelers would be as old as stay-at-homes upon their return are meaningless so far as biological processes are concerned.

The question of aging at high speeds, which arises from the so-called "clock paradox" of Einstein, has been the subject of much heated debate in scientific publications the last few years. Scientists who have studied Einstein's theories carefully have no doubt that one logical result would be that time is slowed when objects, either men, clocks or atomic particles, travel at speed close to that of light.

Science News Letter, March 8, 1958

GENERAL SCIENCE

Research, Development Done by 230,000 Persons

► THERE WERE 230,000 scientists and engineers engaged in research and development activities in the natural sciences in 1954, according to the latest information available and released by the National Science Foundation.

The NSF report, based on a series of surveys, shows the 230,000 persons represented only 25% of all engineers and 40% of all scientists employed in the organizations queried.

Of the total for 1954, 68,000 were physical scientists, 139,000 engineers and 22,000 life scientists.

Sixty-eight percent of the physical scientists were employed by industry as well as 84% of the engineers. More than half of the life scientists, on the other hand, found their bread and butter in colleges and universities.

The 230,000, the NSF reported, were engaged in research and development activities worth approximately \$5,400,000,000.

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