

## METEOROLOGY

## Flying Weather Stations Planned by Air Force

► PLANS to probe the world's weather with jet-borne weather stations flying at about 50,000 feet have been outlined.

The flying weather stations will continuously communicate atmospheric data to a ground network as the planes make continent-wide sweeps at close to the speed of sound.

Although data gathered is intended primarily for the Air Force's Air Weather Service, it will also be supplied to the Weather Bureau, commercial airlines and other interested agencies.

Plans are for the planes to measure cloud formation and look inside storms with radar sweeps extending 150 miles from the aircraft. At intervals, rockets will be launched to investigate the jet stream and other atmospheric phenomena at altitudes up to 150,000 feet above the earth's surface.

Sensing equipment will also be dropped by parachute to obtain data closer to earth.

The University of Michigan meteorological laboratories and Bendix Aviation Corporation co-sponsored the meeting in Ann Arbor attended by some 150 scientists.

Science News Letter, November 22, 1958

## CHEMISTRY

## Suspect "Human" Life On Millions of Planets

► MILLIONS of planets in the known universe probably support life similar to that on earth, Dr. Melvin Calvin, a University of California chemist, believes.

Speaking at inaugural ceremonies for University of Washington President Charles Edwin Odegaard, Dr. Calvin cited recent development of knowledge about how inorganic molecules can be transformed into complex organic molecules by radiation, electricity and ultraviolet light.

Chemical knowledge is now such, he said, that given the starting materials of the primordial earth the course of chemical evolution from inorganic materials up to and through the formation of a living cell was predictable and inevitable. The evolution of higher forms of life could also have been predicted, but the precise pathways could not be predetermined. Thus, Dr. Calvin said, plants and animals were inevitable developments although their physical appearances were not.

Dr. Calvin cited the estimates of Dr. Harlow Shapley, former director of Harvard College Observatory, that there may be 100,000,000 earth-like planets in the known universe. Each of these would have begun with comparable chemical make-ups, atmospheres and distance from an energy-giving star like the sun.

The scientist concludes that earth-like life, including plants and thinking animals like man, must have developed on millions of these planets.

The precise form of species might be

different than those on earth; yet animals, for example, would have eyes, hearing apparatus and be otherwise capable of responding to an earth-like environment.

Although the planets are all presumably about the same age, evolution would not take place at the same speed on all, he said. Therefore, some animal life might be prehuman, some posthuman and some comparable to man in development.

An important implication, he said, is that life is a major cosmic influence in the universe, rather than a trivial accident on an insignificant planet, and that thinking creatures may be altering the environment of astral bodies through the universe even more profoundly than man has altered the earth.

Science News Letter, November 22, 1958

## MEDICINE

## Computer Aids Physicians In Circulatory Diagnoses

► A COMPUTER that would enable physicians to make early diagnoses of hardening of the arteries and high blood pressure has been developed by a biophysicist at Ohio State University.

A year of experimenting with it has convinced Dr. Ralph W. Stacy of the computer's value as a diagnostic instrument in detecting most circulatory diseases.

The machine can be used to measure the three mechanical properties of the arterial system: mass, elasticity and viscosity. By checking the elasticity of the circulatory system, it will be possible to foretell the onset of such cardiovascular difficulties as high blood pressure and hardening of the arteries.

The computer consists of a pulse-wave form generator, a Donner analogue computer and a cathode ray oscilloscope. Being able to digest and remember countless case histories in complete detail, the computer can be a great aid to the physician in assembling information. It would never, however, be capable of making a diagnosis by itself.

For the past year, Dr. Stacy has made graphs of pulse beats taken at the heart and at the wrist, converted them into electrical signals of the same frequency as the heart beat by the pulse-wave form generator, and fed them into the computer. The output was observed on the oscilloscope screen.

Delicate adjustments, said Dr. Stacy, make it possible to reproduce the arterial system electronically and observe how it would react under almost any given set of conditions.

He said the next step would be to obtain pulse beat graphs of patients who have been diagnosed as having an arterial ailment and to check them on the computer to determine any possible margin of error.

Development of the machine was co-sponsored by the Central Ohio Heart Association and the U. S. Department of Health, Education and Welfare in connection with the University's Research Foundation.

Science News Letter, November 22, 1958

# IN SCIEN

## PUBLIC HEALTH

## Deer Antlers Accumulate Radioactivity in 5 Years

► DEER CAN offer mute testimony to the increase in radioactive fallout.

Their antlers may be good warning signals of possible danger to man.

Analysis of deer antlers indicates there has been approximately a ten-fold increase in radioactivity since 1952. Studies were made with deer that normally graze on upland pastures known to contain relatively high levels of fallout radioactivity, J. Hawthorn and R. B. Duckworth report in *Nature* (Nov. 8).

The radioactivity as measured by strontium-89 plus strontium-90 was 126 micro-microcuries per gram of calcium present in the antlers of a deer shot in November, 1957. In contrast, the strontium activity found in the antlers of a deer shot in 1952 was only 11.2 micro-microcuries per gram of calcium.

Exposure of a thin cross-section of the antlers to X-ray film resulted in a clear autoradiogram, indicating zones of high and low activity, for the more recent specimen. However, the radioactivity was too small in the 1952 specimen to yield a strong image.

The scientists, both with the department of food science at the Royal College of Science and Technology, Glasgow, Scotland, also obtained autoradiograms of grass and of a sheep's premolar tooth taken from areas known to contain high levels of radioactivity.

Science News Letter, November 22, 1958

## BOTANY

## Australian Trees Yield Blood Pressure Reducer

► THE BARKS of certain trees that grow in Australia have been found to contain substances that act as a potent blood pressure reducer.

They may prove to be more effective than the now commonly used reducer, reserpine.

The substance or substances (the exact active principle has not yet been isolated) are contained in the alkaloids extracted from the barks of trees that belong to the species *Alstonia*, Dr. R. C. Elderfield, professor of chemistry, University of Michigan, said at a Society of the Sigma Xi lecture.

The *Alstonia* species includes trees or shrubs whose leaves grow in a circle or whirl around particular points on the stem. They are native to Malaya and the Pacific islands. Their alkaloids are organic basic salts.

Science News Letter, November 22, 1958

# CE FIELDS

## PHYSICS

### Develop New Design For Atom Smashers

➤ A NEW DESIGN for use in high-energy atom smashers has been reported by eight scientists who developed a model of the accelerator while working at the Oak Ridge National Laboratory.

Studies with the model "strongly indicate the feasibility" of building large machines of the same type with protons instead of electrons as the accelerated particles, the scientists concluded.

The new concept for the cyclotron involves using a magnetic field that, on the average, increases with radius. Imposed on this field is another to focus the particles in a beam.

The Oak Ridge scientists dubbed their cyclotron the AVF, for azimuthally varying field. It was developed by Drs. R. E. Worsham, C. D. Goodman, R. S. Livingston, J. E. Mann, G. T. Trammel and T. A. Welton, all of Oak Ridge National Laboratory, Oak Ridge, Tenn., and Dr. H. G. Blosser, now at Michigan State University, and Dr. H. M. Moseley, on leave from Texas Christian University.

The scientists report their design of the magnetic field shape in the *Review of Scientific Instruments* (Oct.), publication of the American Institute of Physics.

Science News Letter, November 22, 1958

## DENTISTRY

### Gum Diseases Cause Most Tooth Loss Among Adults

➤ DISEASES of the gums cause a loss of five times as many teeth as dental decay in Americans aged 35 or over.

This means that after age 35, for every tooth lost from caries, five will be extracted due to a breakdown of tooth-supporting tissues, Dr. Evert A. Archer of Chicago reported at the 99th annual session of the American Dental Association meeting in Dallas.

These gum ailments, known as periodontal diseases, can usually be detected in the early stages when inflammation changes the healthy pink color of the gums to a red color in tissue around the neck of a tooth.

Collections of tartar on the teeth at the gum line are the major cause of gum irritation, Dr. D. Walter Cohen of Philadelphia explained at the panel discussion on gum diseases.

Impacted food, faulty mouth breathing that causes abnormal dryness in the mouth, faulty toothbrushing, and incorrect use of dental floss and toothpicks were also mentioned as causes of irritation or softening of gum tissues.

Diabetes, nutritional deficiencies, gastrointestinal disorders and certain allergies can affect gum tissues.

Raw fruit is a good "detergent" food that helps to keep the gum tissues and teeth in sound condition, Dr. Harry Roth of New York University College of Dentistry said.

Prolonged and severe stress from such habits as grinding and clenching the teeth have serious effects on the conditions of the gum tissues as well as on the teeth. In addition, when the upper and lower teeth fail to meet correctly, regular jaw movements place unbalanced pressures on gum tissues, the panel concluded.

Science News Letter, November 22, 1958

## PLANT PHYSIOLOGY

### Plants May Survive Heat With Diet Supplements

➤ A SMALL amount of the B vitamin riboflavin may answer the problem of growing food crops in desert regions of the world.

Scientists investigating how high temperatures kill or damage a plant have found there are several chemicals that enable heat-resistant plants to survive. One of these is riboflavin, Dr. Edwin B. Kurtz Jr. of the University of Arizona's College of Agriculture reports. A small fraction of an ounce could treat many plants.

Other chemical compounds that increase heat resistance in some plants include adenine and pyrimidines and gibberellic acid. Most of the effects of high temperature in reducing or stopping plant growth can be prevented by adding the compound, Dr. Kurtz says in *Science* (Nov. 7).

Apparently these compounds are essential metabolic compounds whose activity is seriously affected by high temperatures. If this is true, chemical control of climatic diseases of plants may be possible.

As an example of current research in the field, Dr. Kurtz describes one study of two pea plants, one heat-resistant, the other heat-susceptible. The heat-susceptible plant was found to contain the same amount of adenine at both high and low temperatures. However, the resistant variety contained double the amount of adenine at 26 degrees centigrade that it had at 14 degrees centigrade. This study points to the possibility of "adapting" peas or similar crops to cultivation in warmer environments, Dr. Kurtz explains.

Gibberellic acid was found to take the place of the cold treatment biennial plants require at the end of their first year's growth if flowering in the second year is to take place. Although the way gibberellic acid acts here is unknown, the compound may make possible extension of the normal growing range of these plants.

The implications of this research are exciting, Dr. Kurtz concludes. Knowledge of how desert plants tolerate high temperatures may help solve the world's critical food problem by "permitting agriculture to extend into new lands and by increasing yields of presently cultivated areas."

Science News Letter, November 22, 1958

## BIOCHEMISTRY

### Find Potato, Eggplant Inhibit Cholinesterase

➤ "SOMETHING" in potato inhibits the activity of cholinesterase.

The exact nature of the inhibitor is still unknown, a team of Iowa State College scientists report in *Science* (Nov. 7). However, it has been found to have strong inhibitory effects on test tube preparations of human plasma cholinesterase. Cholinesterase is a compound that plays an important role in the activity of the brain and nervous system.

Several plants were tested to see if they contained the inhibitor, with those in the nightshade, or Solanaceae, family giving positive results. Tissue from potato, eggplant, tomato leaves and roots, tobacco leaves and petunia leaves and flowers was found to inhibit cholinesterase activity. The inhibitory substance does not appear to be related to any of the alkaloids known in the nightshade family, nor does it react like a weak acid, phenols or other known chemical compounds in plants. It is highly water soluble, the scientists report.

Wallace H. Orgell, Kunda A. Vaidya and Paul A. Dahm of Iowa State College's department of zoology and entomology reported the research.

Science News Letter, November 22, 1958

## PHYSICS

### Use Electron Beam For Magnetic Writing

➤ MAGNETIC WRITING using an electron beam, particularly suitable for electronic computers, has been found feasible.

The method could also be used to make magnetic half-tone images, reports Dr. Ludwig Mayer of General Mills, Inc., Minneapolis, Minn. He says the magnetic picture so obtained would be similar to one obtained by conventional printing.

The method is based on Curie-point writing, in which the direction of magnetization in a premagnetized film is reversed by elevating the temperature. The energy of a focused electron beam is used to raise the temperature. It gives "quite well defined traces," Dr. Mayer reports in the *Journal of Applied Physics* (Oct.).

The traces can be erased magnetically. Writing speeds equal to 30,000 binary digits each second were found possible in the first experiments, and "considerably higher writing speeds" could be achieved.

The magnetically stored information could also be retrieved by electronic read-out, Dr. Mayer reports.

Electronic writing of magnetic half-tone images is accomplished by controlling the size of the spots of reversed magnetization.

The magnetic film upon which information is to be stored is set up as an anode in a television tube-like device. A focused electron beam heats this film in those areas where electrons impinge. The heated areas become non-magnetic if the temperature rises above the Curie point.

Science News Letter, November 22, 1958