

BOTANY

"Hydroponic" Soilless Farm Created on Wake Island

WAKE Island, tiny dot of coral far out in the Pacific, is to be the site of the newest soilless "farm" for growing green vegetables according to the system originated by Dr. W. F. Gericke of the University of California. With a total surface area of only half an acre, it is expected to supply the table needs of passengers and crews of trans-Pacific clipper planes that use Wake as a way station on the long flight.

The "farm" will consist of a series of shallow tanks, now rapidly being installed. These will be filled with water in which mineral fertilizer salts are dissolved in the right concentration to feed green plants. Over the tops of the tanks wire netting will be stretched, on which, supported in sawdust, excelsior, or other suitable material, tomatoes, peas, beans, carrots, and other vegetables will grow, drawing their water and mineral nutrients out of the tanks in which their roots will be dangling.

Wake Island will represent the westernmost extension of Dr. Gericke's system of soilless farming, or "hydroponics." Similar set-ups of tanks for growing vegetables and flowers have been established under his supervision at a number of places along the Pacific coast

of the United States, and recently the system has been extended to the eastern part of the country. Dr. Gericke has just returned from an inspection visit to hydroponic "farms" in the East. He states that a number of European governments have expressed lively interest in his method of growing crops without soil.

Extensive experiments have been carried out with a large variety of economic plants, even including a full-sized banana tree. Results indicate that for the present at least profits cannot be expected from crops consisting of dry seeds, like wheat and other grains, particularly when these also depend for their value on high protein content. It appears more profitable to raise plants in the fresh vegetable class, which have high water content and are valued mainly for carbohydrates, vitamins, attractive flavor, and mineral salts. Tomatoes have thus far proved the most successful of hydroponic crops.

The system is used either in greenhouses, or out of doors where the climate of the growing season is favorable. In the continuously mild tropical climate of Wake Island, cultivation will be carried on entirely in the open.

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thermore, the blood supply, traceable through the grooves in which the arteries fitted under the skullcap, was relatively scanty and not elaborately distributed. This again is an apelike character; modern human cranial arteries that serve the forebrain are much more abundant and elaborately developed.

The jaws and teeth of Peking Man were the subject of another discussion when Dr. Weidenreich and a group of his American co-workers held a round-table.

Peking Man's teeth, like his brain, are undoubtedly human, yet show some interestingly simian features. They are bigger and longer-rooted than modern human teeth, and there is no sign of reduction or degeneration in the wisdom teeth. The pattern of the grinding surfaces on the molars is complex, like that of ape teeth, in contrast to the relatively simple, cross-grooved pattern of teeth in modern man.

Of especial interest is the total absence of dental caries, traces of pyorrhea, and other symptoms of tooth troubles practically universal among present-day human beings and frequent even among more recent Stone Age races. Among the 148 teeth of Peking Man thus far found, not one is defective.

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GENERAL SCIENCE—SOCIOLOGY

Propose Society to Study Science's Social Impacts

A MOVEMENT looking toward the formation of a Society for the Study of the Social Relations of Science (S. R. S. it is proposed to call it for short) has been launched by an inquiry undertaken by the British science journal, *Nature* (April 23).

Born of a growing interest in the profound effects of science upon society, this new organization would first be formed in Great Britain and then in other great nations.

The idea of S. R. S. is discussed with general approval by 38 leading British men of science who received *Nature's* proposal in advance of publication.

Three definite trends were cited as leading up to the S. R. S. proposal: 1. Resolutions of the American Association for the Advancement of Science last December stressing the social relations of science. 2. The British Association's move of several years ago for the discussion of social problems which science had helped to create and might help to solve. 3. Action by the International Council of Scientific Unions,

ANTHROPOLOGY

Brain of Peking Man Shows Many Apelike Features

CASTS made of the space once occupied by the brain, in the skulls of half-million-year-old Peking Man, show many remarkable apelike features, despite the indubitable fact that this Oldest Inhabitant was definitely human. Some of these features were described by Dr. Franz Weidenreich, leader of excavation work in the Choukoutien caves near Peiping, in the annual James Arthur Lecture, at the American Museum of Natural History.

Although the total volume of Peking Man's skull space is definitely in the human range and far above that of the

apes, the distribution of that space is not in accordance with present-day specifications, Dr. Weidenreich disclosed. The arch of the cranium is very low, and the greatest breadth of the skull lies low and toward the rear. All of this minimizes the forebrain, usually considered to be the center of the higher, more intellectual part of the brain's activities.

Not only in bulk but also in detail was the forebrain of Peking Man less developed than that of modern human beings. The folds and furrows were fewer and simpler, more on the ape pattern than those of modern brains. Fur-

which set up a committee on science and social relations last year charged with preparing a report to be issued in 1940.

As visualized by its proponents, S. R. S. would have individual membership not confined to scientists but dominated by them. It would receive, read, discuss, and, after consideration by suitable referees, publish papers submitted to it. It would not in general express group

opinions, but leave readers to accept or reject the statements in its publications. It would be a society for the advancement of knowledge, not a propagandist body.

H. G. Wells, Sir William Bragg, president of the Royal Society, Sir F. Gowland Hopkins, Prof. J. B. S. Haldane, are among the 38 scientists who commented favorably on the S. R. S. proposal.

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PHYSICS

New X-Ray Tube Arrangement May Reduce Cost of Treatment

Mysterious Radiation From Helium Reported to the Physical Society; Sunset Rays Inform on Upper Air

A NEW and simple arrangement of X-ray tubes which may ultimately reduce the cost of X-ray treatment in cancer therapy was reported to the opening sessions of the American Physical Society by Dr. G. Failla, chief radiologist of the Memorial Cancer Hospital, New York City.

Chief merit of the new system is that it uses existing apparatus and yet eliminates certain parts so that the cost of a superior X-ray therapy installation is cut. Moreover, the "life" of the expensive X-ray tubes—costing \$450 each—has been materially increased.

Dr. Failla, well-known American authority who has served on international committees on X-ray dosage standardization, told his fellow scientists that the key point in the new, cheap installation is the use of two X-ray tubes working on alternating current.

Part of the past expense of X-ray treatment has been the necessity of using rectifying tubes which turn the alternating current from high-voltage transformers into direct current for use in the tubes.

By the Failla setup alternating current is employed and each tube works on a "half-wave" of the cycle alternately. One tube is placed below the material, or patient, being radiated and the other tube above so that double the intensity is obtained. In tests a radiation intensity of 7,000 roentgens per minute has been obtained, as compared with the 50 roentgen per minute output of standard equipment.

"The surprising thing," said Dr. Failla, "is that the tube life with this arrangement is longer than usual. In the case of two such machines used at Memorial Hospital for routine treatment of patients, one of the tubes has been in actual operation for over 3,700 hours, and is still in good condition. This is an important item, considering that each tube costs about \$450."

Cosmic Rays in Cavern

Deep Linville caverns in North Carolina have been the latest laboratory of cosmic ray scientists, it was reported.

Prof. Walter M. Nielsen, Duke University, and Dr. K. Z. Morgan of Le-noir-Rhyne College, have been carrying their instruments down into the cavern blackness measuring the intensity of the penetrating component of the rays, which pierced the overlying rock.

The important finding of the research was the discovery that the effects observed can be produced by a cosmic ray having the nature of an electrified particle, like an electron. It is not necessary to assume the transmission of cosmic radiation to great depths by an uncharged particle such as the postulated neutrino.

Sunset a Clue to Upper Air

The fleeting rays of the setting sun are being used by scientists to study the temperature of the atmosphere at heights far above any possible balloon ascension, it was reported by Dr. E. O. Hulburt of the Naval Research Laboratory, Washington, D. C.

Direct measurement of the earth's atmospheric temperature and pressure have been obtained up to heights of 13.8 miles (the National Geographic Society-U. S. Army Air Corps) in manned balloon ascensions. Unmanned, smaller balloons have reached about 19 miles, said Dr. Hulburt.

Searchlights have been used to probe air and their rays have been detected, photographically at night, up to heights of 17 miles. However, Dr. Hulburt indicated, exact values of atmospheric density have not been obtained beyond a height of 14 miles by this searchlight method.

By the new system sunlight is used. "As the sun sets the earth's shadow above the observer moves upward and the region of the atmosphere illuminated by the direct rays of the sun moves to high levels," said Dr. Hulburt in his report.

At dawn, the reverse sequence occurs and the sunlight starts from high altitudes and gradually works down to the surface of the earth. Both dawn and dusk measurements were employed in the research.

The study involved the measurement of the brightness of the zenith sky for about an hour after sunset and an hour before sunrise. From these brightness studies, plus the known intensity of sunlight and the laws of scattering of light by air, the density (or pressure) and the temperature of the atmosphere was determined.

The temperature, said Dr. Hulburt, came out to be between -50 and -80 degrees Fahrenheit, from 8 miles to about 35 miles above the earth's surface. No important changes in upper air temperatures were noted in tests running from October to April.

"It must be remembered," Dr. Hulburt concluded, "that the results refer only to the atmosphere during conditions of twilight in a temperature latitude (Washington, D. C.). One would expect that the upper air grew warmer during the day and cooler during the night. However, the day and night change may not be very great."

Mysterious Radiation Found

A new type of yet-unexplained, continuous radiation has been discovered in the spectrum of helium, it was reported by Prof. A. G. Shenstone of Princeton University.

Prof. Shenstone set out to study the spectrum of helium in an attempt to produce, in the laboratory, some of the