Artificial Atmosphere Is Better

Physiology

Helium, the gas that makes the American non-inflammable airships possible, may prove of value in helping submarine crews to work more efficiently, if a suggestion made by Dr. J. Willard Hershey, of McPherson College, is adopted. Speaking before the chemists attending the meeting of the American Association for the Advancement of Science, he told of his study of artificial atmospheres. Some mixtures of gases, quite different from the mixture that forms the air we breathe, supported life of mice and guinea pigs even better than ordinary air, he discovered.

Natural air contains 21 per cent. oxygen, 78 per cent. nitrogen and 1 per cent. of a mixture of gases, including carbon dioxide, helium, argon, krypton, neon and xenon. One series of experiments on white mice showed that a mixture of nitrogen and oxygen, in the same proportion as in air but without the other gases, only supported life for a few days. This demonstrated that the rare gases are necessary for life, said Dr. Hershey.

In pure oxygen, the animals lived only two to five days, while a similar group of animals, also kept in a large bottle with normal food supply, but supplied with ordinary air, suffered no ill effects whatever. With a mixture of 60 per cent. oxygen and 40 per cent. nitrogen, however, the animalse lived as well as normally, if not better.

A mixture of 79 per cent. helium and 21 per cent. oxygen, practically ordinary air with the nitrogen replaced by helium, supported the life of mice in a normal manner. Using argon instead of helium and in the same proportion, the mice did not survive. Dr. Hershey pointed out that the argon mixture does not diffuse through the living cells as rapidly as natural air, while helium diffuses more rapidly. As the helium-oxygen atmosphere is considerably lighter than air, it would doubtless be possible for a person to live inside the gas bag of an airship containing it.

However, Dr. Hershey found that a mixture of 25 per cent. oxygen and 75 per cent. argon supported the life of mice, and that at the end of ten days in it they appeared better than at the start.

"In the field of practical application of prepared atmospheres there is a wide range of commercial uses and values," said Dr. Hershey. "Medical men have a fair knowledge of the action of oxygen in the air, but nothing is understood by them concerning the other gases. It is quite possible that a knowledge of atmospheres may aid in the control of diseases.

"In deep-sea diving, mines, and in submarines, foul air is encountered and is not sufficient in amount to sustain life. A prepared atmosphere for such activities would broaden their respective range of usefulness. An artificial atmosphere in a submarine that sustained life even more effectually than the normal air would bring about a safer and more efficient submarine. A prepared atmosphere would be of great advantage to the high-altitude flyer."

Dr. Hershey believes that the widest field of prepared atmospheres will be in the treatment of disease.

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Good Radio—*Continued*

the year 1930 should show a general decrease in sun spot numbers as the year waxes, with a corresponding increase in radio signal strength in the broadcast zone. By the very end of 1930 and the beginning of 1931, the general rise of a secondary sun spot maximum should be evident. By 1931, however, it is believed that we shall be so far from the maximum of the 11-year period that the secondary maximum will have no effect upon radio reception and allied electro-magnetic phenomena as have the sun spot maxima of 1928-29. The general lifting of the ionization level in the earth's atmosphere should continue, with the fluctuations noted, through the next six years, but in 1934 solar activity should be as quiescent as at the last minimum of 1923."

Dr. Stetson believes that these radio changes are produced by variations in the height of this ionized layer of the atmosphere, known as the Kennelly-Heaviside layer. Long waves of 18 kilocycles show an opposite effect. Their reception is best when sun spots are most numerous.

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Entomology—*Continued*

Aldous of Kansas State Agricultural College talked on the effect of different frequencies and heights of cutting on the yield and vigor of prairie grass vegetation. In general, his experiments showed that too frequent cropping off at the tops of the plants discouraged them from coming back with new herbage.

Dr. J. E. Weaver of the University of Nebraska discussed the effects of grazing on roots and other underground parts of plants. To obtain his data it was necessary for Dr. Weaver and his associates to become scholarly ditch-diggers, for the roots of prairie plants are frequently several times as long as their tops, and deep trenches have to be driven for considerable distances to get an idea of the form and distribution of roots.

Weather of course has as much effect on prairie vegetation as it has on plant life everywhere. Dr. W. G. McGinnies of the University of Arizona discussed the value of measuring the physical factors of weather and soil condition, such as evaporation rates, available soil moisture, intensity of sunshine and so on.

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