

PHYSICS—METEOROLOGY

# Weather Reports of Future May Predict Ozone Amount

## Would Be of Interest to Sun-Bathers, Physicians And Farmers, For Ozone Screens Out Ultraviolet

**I**N THE weather reports of a few years hence there may be a line running something like this:

"Ultraviolet radiation increasing due to less ozone in the upper atmosphere; sun-bathers should expose themselves with care."

Predictions and records of ozone promise to be important not only to bathers exposed to sunshine but to physicians who use sunlight as medicine, farmers whose crops are influenced by sun energy, weather experts who must make forecasts and others.

To the American Association for the Advancement of Science, Dr. Brian O'Brien of the University of Rochester announced a new instrument that measures and records the ozone in the upper atmosphere. It may soon be standard equipment in weather stations in various parts of the world.

Ozone is oxygen in very active form

and a very little of it has vast influence on the quality of the solar radiation that gets to the earth's surface. If all of it were eliminated from the air, all of us on the earth would be killed in a short time, so powerful would be the ultraviolet radiation that would be allowed to come to earth.

Yet all of the ozone in the earth's atmospheric blanket, situated mostly at an altitude of 25 miles, would be sufficient to make a layer only two millimeters thick, about the thickness of two ordinary pencil leads.

The ozone absorbs part of the solar radiation, the invisible ultraviolet area of the spectrum that lies in the neighborhood of Angstrom units.

While it was assumed in early researches that the ozone was more or less constant in amount, new work indicates that it may vary from day to day and year to year.

There may be clouds of ozone analogous to the clouds we see in the sky. These may affect weather and knowledge of them may help the accuracy of weather predictions in the future.

The intensity of the ultraviolet light is known to vary with the solar cycle, with more getting through to earth when sunspots are more numerous. Since we are now at about the peak of the sunspot cycle or a bit past it, bathers probably should expose themselves to the sun with greater care now than was necessary some years ago.

Dr. O'Brien's ozone recorder measures the ultraviolet light, charts it upon motion picture film and allows a continuous record of the changes in the ozone layer in this way. Since it costs only about \$2,000 there is hope that these instruments can be scattered over the world at principal weather stations.

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### DOCUMENTATION

## Preserving Business Files Called Useful to History

**T**HOSE files of orders, business letters, ledger accounts and other business records of yesteryear are being eyed jealously by a rather new kind of historian. There is a campaign on to persuade business men that some of their records should be kept as archives that will help them conduct their activities on a long-time basis.

Wholesale destruction of business records only a few years old is deplored by Dr. Ralph M. Hower, executive secretary of the Business Historical Society. The firms themselves will benefit from the permanent preservation of selected material. Without the records, historians will be unable to assay the course of business as an important aspect of human experience. And the public at large needs to know the history of business for if it does not its ignorance may result in the destruction of institutions and practices necessary to our present civilization.

Some business men throw up their hands hopelessly when it is suggested that their growing files be preserved. Storage space is costly and the out-of-date records are needed so infrequently. But the business historians argue that if properly handled, the regular retention of useful material, together with systematic destruction of the remaining records, will not increase office expense materially. In many cases it will actually save money and make records more accessible.



VEST-POCKET LABORATORY

*Microchemistry, a new branch of chemistry, makes use of tiny apparatus such as can be carried in the palm of the researcher's hand, for carrying out exact analysis of exceedingly small amounts of hard-to-get organic chemicals. This beaker, funnel, porcelain crucible and flask duplicate almost exactly their big brothers on laboratory shelves throughout the world. The photograph was made in the laboratories of Westinghouse.*

Practical suggestions for the handling of records have been compiled to guide business firms, libraries and others who wish to put the written record of commercial progress in order for the future.

Microphotographic duplication of records which has been developed in the last few years promises to allow large

volumes of records to be photographed on little rolls of permanent film and stowed away in small space. Even if the original records are to be preserved in full size, the experts recommend that film copies be made as a safeguard of the originals against destruction by fire or other catastrophe.

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## BIOLOGY

## Drinking Heavy Water Brings Death or a Faster Life

### When Mice Are Kept One-Fifth Saturated With Heavy Water They Are Not Poisoned; Cancers Slowed

**D**EATH or a faster life are the effects of drinking heavy water (deuterium oxide to chemists) instead of ordinary water, depending upon amount of heavy water consumed.

Dr. H. G. Barbour of Yale University School of Medicine reported to the American Association for the Advancement of Science experiments in which white mice die in about a week if all their ordinary drinking water is replaced by water whose hydrogen is the heavy or double-weight sort.

Ever since 1935 when the existence of heavy hydrogen was discovered, scientists have been wondering what would happen if a person drank heavy water instead of the ordinary natural kind. When a European professor drank a small amount it made the headlines a few years ago.

Until recently it was difficult to produce enough of the heavy water to use in large scale experiments.

When animals like mice are kept only one-fifth saturated with heavy water, they are not poisoned but their life processes are kept going at a faster rate, Dr. Barbour found. Chemists theorized quite the contrary because of the fact that the chemical energy of heavy water is low.

The heavy water stimulates the sympathetic nervous system, raising the hair of the animals as though they were frightened and producing pop-eyes. Dr. Barbour found that this effect is produced by heavy water protecting and preventing the decomposition of the epinephrine which is poured into the body, usually disappearing too fast to sustain these effects.

The growth of cancer in mice is slowed when the fluids of their bodies

contain one-fifth heavy water, but unfortunately for any possible use of this effect the mice do not survive as long as ordinary mice with the same tumors.

A condition of catalepsy was induced in rats, cats, and a monkey by direct application of deuterium oxide to the outside of the brain. This impairment of physical and mental action is the first effect of heavy water to be observed on an animal closely related to man.

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## ASTRONOMY

## Theory of Life on Mars Is Dealt a Blow by Spectra

**T**HE THEORY that there is life on the planet Mars is dealt a new blow by astronomical observations that show the greenish or bluish color of its so-called "seas" cannot be due to vegetation.

Dr. Peter M. Millman of David Dunlap Observatory at Richmond Hill, Ont., described to the American Association for the Advancement of Science, 200 photographs, wave length maps of the light coming from the planet, that confirm the bluish-green color seen by the eye but rule out chlorophyll of green leaves as the cause.

A favorite idea has been that the dark seas (not bodies of water) become darker with the melting of Martian polar snows and are therefore due to vegetation growth. But Dr. Millman's spectra show that the Martian seas' light is uniformly and progressively stronger toward the short or green-blue-violet end of the spectrum, whereas light from leaves is relatively weak in violet, blue and blue-green, but strong in yellow-green and yellow.

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## ENGINEERING

## New "Jet" Pulverizer Produces Finer Powder

**F**INER face powder, made at less cost, is one immediate application of a new super-pulverizing device which has been introduced to the chemical engineering profession.

The new pulverizer will grind particles to a size finer than the finest sieves. Particles can be obtained, economically and on a commercial scale, which correspond to 2,500 theoretical mesh, or only 5 microns in size. A micron is the scientists' unit of length which equals a thousandth of a millimeter, or about four one-hundred-thousandths of an inch (.00003937 inch).

The new machine blows particles of a material together until they attain minute size by mutual fracture. Besides finer face powder, the device makes better mineral fillers for writing paper, finer insect and fungicide powder, paint and rubber pigments and the powders which are turned into the useful and beautiful plastic products.

A sealed pancake-shaped container is the grinding unit. One-eighth inch diameter particles enter this unit for pulverizing. Multiple jets, around the peripheral wall of the chamber, shoot in streams of compressed air, or superheated steam, at pressures of from 100 to 500 pounds to the square inch.

The direction of the jets creates a rapid whirling motion of the material within and a small amount of material placed in the air jet stream, does the grinding, by impact, as it strikes the inner mass.

Because of the whirling motion centrifugal forces are set up in the chamber which move the larger particles out to the peripheral region and into the severe blasts of air. As the particles become smaller they gradually work toward the center and fall, downward and off, into a collecting receptacle.

Surprisingly enough, the tremendous pulverizing action is obtained almost without action by the confining walls of the chamber. The grinding is between particles themselves.

The new device, known as a "Micro-nizer," was developed from the invention of Norwood H. Andrews, by the International Pulverizing Corporation of Camden, N. J. It is not sold, but is used under license. The first technical description of its design and operation, outside of the original patent specifications, appears in *Chemical and Metallurgical Engineering*. (May)

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