

CHEMISTRY

World's Heaviest Water Exhibited on Scales

THE WORLD'S heaviest water was shown to scientists at the meeting of the American Association for the Advancement of Science in Atlantic City. Two flasks of water were exhibited on a sensitive weighing balance and the visitors saw for themselves that one of them was heavier than the other.

The U. S. Bureau of Standards at Washington where this heavy water was obtained under the direction of Dr. E. W. Washburn, head of the chemistry section, sent the exhibit. Scientists have realized that there are two kinds of water, one lighter than the other, only since the discovery about a year ago of an isotope or atomic form of hydrogen that has an atomic mass practically twice that of the more prevalent sort of hydrogen.

In nature one out of about 30,000 atoms of hydrogen is double weight. It was discovered at the Bureau of Standards that when water is broken into hydrogen and oxygen by passing an electric current through it, the hydrogen gas given off contains more of the lighter or isotope one hydrogen than normal. When this light hydrogen is burned it produces a water of lower specific gravity than the water of nature.

But the chemists found that the water left in the electrolytic cells contained increasing amounts of the heavy-weight hydrogen as the electrolysis continued. It is possible to secure in this way water that is one part in a thousand heavier than ordinary water. Later the government chemists hope to obtain by the same method water that is even heavier.

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PLANT PHYSIOLOGY

Though Dead, Plant Roots Continue to Drink Water

ROOTs of plants do not need to be alive in order to take in water. Experiments still further shattering the broken theory of "vital activity" or "pumping" by roots were reported to the American Society of Plant Physiologists by Dr. Paul J. Kramer of Duke University.

Dr. Kramer killed the roots of potted plants by heating them, but did so in

such a manner as to leave the green tops still alive and demanding water. Then he supplied water to the dead roots. He found by careful weighing that the roots still took in water, though not at as high a rate as they did while they were alive. This decrease however, he ascribed to partial injuries to the upper parts of the plants by the root-killing process.

When a vacuum pump was attached to the stems of plants from which the tops had been removed it was found that water passed in more rapidly from the soil through dead than through living root systems. The reduction of the moisture content of the soil brought about by living and by dead roots attached to a vacuum pump was approximately the same.

"Since in these experiments water was so readily absorbed through dead roots it seems that the importance of the role played by the living cells of roots in absorption has been over-emphasized," Dr. Kramer concluded. "It appears that the intake of water by transpiring plants is due largely to the tension or negative pressure developed in the hydrostatic system by the removal of water in transpiration and other processes. It is probable that the tension produces a purely physical gradient of decreasing pressure between the water in the soil and the water in the xylem vessels and it is largely as a result of this gradient that water moves from the soil into the roots."

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PHOTOGRAPHY

Old Process Improved To Enlarge Photos Better

AN IMPROVED revival of the old wet collodion process photographic plates promises to make available to scientists and photographers enlargements that do not lose sharpness and detail.

Dr. Allan F. Odell, chemist with the duPont Viscoloid Co., reported the method to the American Association for the Advancement of Science. He has perfected a method that develops in 35 to 90 minutes contrasted with 6 to 48 hours necessary before. Many plates and films can be processed simultaneously whereas the old method handled one plate at a time. In the process of physical development used, the silver for the image is obtained from the developer solution and not from the plate.

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IN SCIEN

GEOLOGY

Earth Had Glacial Age Billion Years Ago

WHEN LIFE on the earth was very young, in the Proterozoic Age, which was perhaps from two-thirds of a billion to a full billion years ago, the planet was already chilly enough at times to support a full-fledged glacial epoch.

Evidence to this end was presented in a paper sent to the Geological Society of America by Dr. A. N. Tchurakov, Leningrad geologist. Dr. Tchurakov has found, in the southern part of Middle Siberia, an area of about a quarter of a million square kilometers, in which rocks of Proterozoic Age contain erratic pebbles and boulders which in his opinion represent glacial materials rafted and dropped there by icebergs when that land was part of the sea bottom.

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PUBLIC HEALTH

"Flu" Epidemic Expected To End in January

THE INFLUENZA outbreak is expected to end in January. Although an enormous increase in the number of cases was reported from state health officers throughout the country to the U. S. Public Health Service for the week ending December 24, health authorities believe that the end is now in sight.

The epidemic has about reached its height in Washington. New England will be the last section to feel the outbreak, which should be over even there by the end of January. Subsequent outbreaks of milder intensity may follow, but the major one, which started on the West Coast early in November and worked its way across the South and now is reaching northern states, is about played out.

For the week ending December 24, the latest for which figures are available, a total of 123,138 cases was reported. This is more than three times the number recorded the preceding week.

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CE FIELDS

COSMOGONY

Astronomer Suggests New Earth Origin Theory

THE EARTH and the moon were born out of the parent spiral nebula that fathered not only the sun but all the other stars of the Milky Way, is the suggestion of Dr. Harlow Shapley, of Harvard, made at the meeting of the American Association for the Advancement of Science. This scrapping of the most widely accepted theories of the origin of the earth and other planets of the sun's family is sure to create great interest and fresh thought among astronomers.

The Shapley theory makes the moon, planets and sun all the same age, the progeny of a "secondary swirl or eddy of the parental spiral nebula out of which the local galaxy or Milky Way may be supposed to have generated." The conventional theory is that the earth and planets were born when a passing star pulled matter like gaseous taffy out of the sun, and some have theorized that the moon was cleaved off the earth at an even later time.

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PUBLIC HEALTH

Diphtheria Protection Should be Given First

GIVE CHILDREN toxoid to build up their resistance to diphtheria before vaccinating them against smallpox, is the advice suggested by studies of Dr. Charles Armstrong of the U. S. Public Health Service. This should make the reaction to the smallpox vaccination comparatively mild and should avoid such complications as postvaccination encephalitis.

Furthermore, diphtheria is now a greater hazard to children in the United States than smallpox, so it would seem logical to protect against it first. In recent years the diphtheria death-rate has been 70 times as high as the smallpox death-rate in this country.

Dr. Armstrong's studies of postvaccination encephalitis, a serious complica-

tion which has appeared in recent years, led him to advise that all first vaccinations should be done in infancy, in order to avoid the encephalitis.

His latest studies seem to show that the defensive mechanism which is called into play by vaccination or immunization needs a certain amount of preliminary exercise before it is equal to coping with the smallpox vaccine. Diphtheria toxoid apparently furnishes this exercise without causing encephalitis. Therefore Dr. Armstrong believes that the first vaccination in children over one year of age should follow and not precede immunization against diphtheria or some other disease for which the immunizing agent is inanimate.

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PLANT PHYSIOLOGY

Poison Gas Stimulates Plants to Form New Roots

CARBON MONOXIDE, notorious as a poisoner of incautious motorists who start engines in closed garages, can play an opposite and beneficial role for propagators of plant cuttings. It has a specific action on plant tissues, causing them to sprout new roots in shorter time, or even to produce roots where otherwise no roots would grow at all.

Researches by which this fact was demonstrated were reported before the physiological section of the Botanical Society of America by Drs. P. W. Zimmerman, William Crocker and A. E. Hitchcock of the Boyce Thompson Institute for Plant Research.

A wide variety of plants, both woody and herbaceous, were tried. Among others were tobacco, marigold, balsam and hydrangea. New roots were induced to form on young portions of the stems of all plants tried, and on three of them roots even formed on the leaves.

In addition to stimulating the formation of entirely new roots, the gas also spurred into vigorous activity the already existing beginnings of roots in twenty different plant species.

The gas was effective over a wide range of concentrations ranging from 0.05 per cent. to 50 per cent. The time of exposure necessary to induce the response varied with the species from two days to twenty.

Three other gases, acetylene, propylene and butylene, have been found effective for inducing roots to form somewhat as reported for carbon monoxide.

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MEDICINE

One-Way Light Reveals Viruses to be Rod-shaped

FOR THE FIRST time, evidence on the possible shape of the active particles in the filtrable viruses that cause such diseases as smallpox, yellow fever, hog cholera and plant mosaics was placed before a scientific body, when Drs. William N. Takahashi and T. E. Rawlins of the University of California presented their report to botanists attending the meeting of the American Association for the Advancement of Science.

If the invisible, filter-passing particles in these viruses have the shape of tiny rods, the two researchers reasoned, they should present a bright appearance if light waves arranged all in one direction fall on them at the proper angle. Accordingly, they directed a beam of polarized light, in which all wave-fronts are parallel, upon a solution of a virus flowing from a small tube. The solution did present a bright appearance, confirming the experimenters' hypothesis.

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ENTOMOLOGY

Insects' Blood Coagulates Like That of Man

THE BLOOD of insects, though widely different from the blood of man and the other backboned animals in appearance and makeup, has at least one thing in common: it coagulates or clots. At the meeting of the Entomological Society of America, Dr. J. Franklin Yeager and Dr. Harry H. Knight, of Iowa State College, presented data on their experiments with blood samples from 47 different species of insects.

Their method was to put a drop of insect blood into a drop of oil on a glass slide, and then observe changes through a microscope. The blood of different insect species displayed wide differences in behavior, they found. Some species have blood that coagulates in its plasma, or fluid part; while the blood of others shows only blood cell coagulation. Still other species have blood that will hardly coagulate at all. The two experimenters were unable to trace a correlation between blood coagulation behavior and classification of insects, or between coagulation and stage of development in any given line.

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