

## BIOPHYSICS

**Heavy Water Cuts Down Respiration of Bacteria**

**H**EAVY water, containing double-weight atoms of hydrogen instead of the commoner single-weight ones, "chokes" bacteria, Prof. E. Newton Harvey and Dr. G. Wellford Taylor, of Princeton University, have found. When two species of luminous bacteria were kept in culture tubes containing mixtures of heavy water and ordinary or light water, the rates at which the organisms used oxygen were reduced, in approximate proportion to the percentage of heavy water in the mixture. A projection of the curve representing the respiration rates indicates that if the bacteria were put into 100 per cent. pure heavy water they would stop using oxygen altogether.

In a condensed summary of their results, Prof. Harvey and Dr. Taylor state that "86 per cent. heavy water containing peptone and salt was found to reduce the respiration of a salt water luminous bacterium 60 per cent.; 63 per cent. heavy water 30 per cent., and 36 per cent. heavy water 12 per cent. Luminescence was diminished markedly in the 86 and 63 per cent. heavy water.

"The respiration of a fresh water form, *Vibrio phosphorescens*, was reduced 30 per cent. in 86 per cent. heavy water and 12 per cent. in 45 per cent. heavy water with no appreciable reduction in phosphorescence."

Full details of the experiments are described in the April issue of the *Journal of Cellular and Comparative Physiology*.

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## PLANT PATHOLOGY

**Fungus' Instinct Aids Its Struggle For Existence**

**E**VEN the ignominious plant parasite is fearsomely endowed with an "instinct" which increases its chances of success in life, according to Dr. Thorvaldur Johnson, pathologist in the Dominion Rust Research Laboratory, Winnipeg. In a report to *Phytopathology*, he shows how a germinating wheat-rust spore crosses a wheat leaf in such a way as to give it the best chance to infect the plant.

The germ tube of the germinating rust "seed" crosses the wheat leaf, says Dr. Johnson, at right angles to the

veins. By that procedure the fungus has the maximum chance of arriving at a stoma or "breathing pore," the usual place for infection to take place, in the shortest possible time.

This tendency for a plant parasite to grow in the direction of the greatest number of chances for infection is, according to Dr. Johnson, rather general, so that it seems that there must be a correlation between the construction of the skin of the leaf and the direction in which a germ tube grows.

The motivating stimulus, Dr. Johnson feels, is that of contact. As the germ tube develops, there is developed on its lower surface a sort of hold-fast which in turn insures the development of the tube in the same general direction. Likewise, contact with the ridges of the leaf forces a continuance of growth in a more or less straight line.

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## SOCIOLOGY

**Japan Growing in Numbers Twice As Fast As U. S.**

**T**HE RATE of increase in population during 1933 for the United States was less than half what it was in Japan, it is announced by the Scripps Foundation for Research in Population Problems. The United States added six new souls for each thousand of population while Japan added 14 per thousand.

The actual gain in numbers was also greater for Japan, amounting to 942,600 during the year, while the increase in the United States was only 797,000. Yet the total population of the United States is estimated to be 126,144,000 on January 1, 1934 as against Japan's 67,470,000.

This situation is in marked contrast to the situation of a decade ago when the rate of population growth was as rapid in the United States as in Japan, and more than twice as many persons were added each year in the United States because of the larger population.

The 1933 death rate in Japan was about 19 per thousand or about 8 points above the United States rate of 11.

The 1933 birth rate of about 33 per thousand in Japan exceeded the United States rate of 18 by about 15 points. The difference in birth rate in favor of Japan has been increasing rapidly; the Japanese rate is as high now as it was 20 years ago while the United States rate has fallen by more than one-third.

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**IN SCIEN**

## ARCHAEOLOGY

**Men of Monte Alban Re-shaped Heads and Teeth**

**I**T HASN'T always been the woman who suffers for beauty, scientists can tell you.

Mexican archaeologists who are exploring the cemetery of ancient Monte Alban say that almost every human skull encountered this season has been flattened artificially. Teeth of Monte Alban's ancient inhabitants were filed to points or to other shapes, and inlaid with small round disks of contrasting minerals. Headaches and toothaches were undoubtedly just as painful a thousand years ago in America as they are today. But the Indian men acquired the distinction they coveted at any cost.

It was men alone who rated the honor of burial in the Monte Alban tombs, judging by the size of the bones and other anatomical criteria. In two cases bones from the cemetery are pronounced those of girls. But these, from their arrangement in the tomb, are believed to have been sacrificial child victims, not regular burials. They date from the early part of Monte Alban's history.

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## CHEMISTRY

**Chemists Study Toxin Of Chicken-Killing Weed**

**C**ONVICTED of poisoning chickens, a southern weed known botanically as *Crotalaria spectabilis* and in common English as rattle-box or rattlesnake-weed, has had its toxic principle extracted and made the subject of study by three University of Florida chemists, Dr. W. M. Neal, C. F. Ahmann and L. L. Rusoff. They reported their findings before the American Chemical Society.

The poisonous stuff belongs to the large group of poisons known as alkaloids. It is a white crystal, that melts at 197 degrees Centigrade, well above the boiling point of water. Experiments showed that it had harmful effects on isolated pieces of heart muscle and on red blood cells.

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# CE FIELDS

## CHEMISTRY

## Europium, Rare Element, Has Weight Re-Determined

**E**UROPIUM, one of the rarest of the chemical elements, weighs more than the books say it does. It has had its weight re-determined by two University of Illinois chemists, E. L. Meyers and Prof. B. S. Hopkins, who reported their results to the American Chemical Society.

Because of its extreme rarity and also because it has no present known commercial use, the element has been but little studied. The re-determination by the two chemists raises the figure for its atomic weight from an even 152 to 152.3. This is something over double the atomic weight of copper, which is 63.57, but materially less than the atomic weight of gold, 197.2, and lead, 207.2.

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## PUBLIC HEALTH

## Disease-Carrying Cup Changes Its Form

**Y**OU MAY have thought that dangerous disease-carrier, the common drinking cup, had disappeared. But it has merely changed its form and still endangers your health in a most insidious way. The editor of the *American Journal of Public Health* calls attention to its fresh menace:

"The common drinking cup has never really been abolished. We still have it, though not in the same form as before. Now it is in the form of glasses, dishes, and tableware inadequately cleansed between servings.

"Go to almost any soda fountain, in any city; watch the attendant pluck a glass from the counter, swish it about hastily in a basin of muddy-looking tepid water, rinse it quickly in cold water, then use it to serve another customer.

"That glass is worse than the common drinking cup! Its superficial washing has served only to bring it into contact with germs from many other

glasses 'washed' in the same water.

"Influenza, the common cold, tuberculosis, pneumonia, scarlet fever, diphtheria, whooping cough, and Vincent's angina, are among the principal diseases that can be transmitted by unclean eating utensils. Pathogenic organisms (disease germs) are not removed by common methods of washing. After they are used and hand washed, more than 20 per cent. of the organisms remain adhering to eating and drinking utensils.

"About 92 per cent. of all communicable diseases are transmitted through the mouth and nose. Surely there is no better place to break the chain of saliva-borne and food-borne infections than at eating and drinking places. . . ."

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## ETHNOLOGY

## "Fire Nation" Downfall Traced to Pontiac's Murder

**I**DENTITY of the mysterious Mascoutens or "fire people," that Huron Indians talked of intriguingly to early traders and missionaries, has at last been scientifically established.

Starting from a chance clue in the journal of a Frenchman, Dr. Truman Michelson of the Smithsonian Institution has solved the mystery of this lost Indian nation which lived in southern Michigan and Illinois.

Calling these Indians "fire people" has been misleading, Dr. Michelson said. The Hurons were really talking about the "prairie people," but words for fire and prairie were so similar in the Algonquian Indian languages that white men misunderstood.

From clues in old records, Dr. Michelson has established the fact that there actually was a Mascouten tribe, with whom the Hurons had contacts. They were members of the Illinois Confederacy of Algonquian tribes.

Disappearance of the tribe is traced by Dr. Michelson to the time when the great chief Pontiac was murdered by a Kaskaskia Indian, in 1769. Kaskaskias were members of the Illinois Confederacy, and in vengeance for Pontiac's death, four tribes massacred the Illinois group, to which the Mascoutens belonged, practically wiping them out of existence. Survivors of the "fire people" doubtless were absorbed into other tribes until no trace remained, Dr. Michelson believes, but the tribe itself never revived to any importance.

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## PHYSIOLOGY

## Carbon Tetrachloride Effects on Body Studied

**H**OW THE fumes of carbon tetrachloride, familiar as a cleansing agent, hookworm remedy and fire extinguisher, affect the digestion, liver and blood was reported by Dr. George M. Higgins of the Mayo Foundation, Rochester, Minn., at the meeting of the American Association of Anatomists.

Dr. Higgins worked with white rats, letting them breathe known concentrations of the chemical for one hour daily. He watched their growth, weight and the amount of food they consumed during this period. Test meals remained in the stomach 62 hours longer than normal. Frequent hemorrhages and inflammation of the digestive tract were observed.

After a single hour's inhalation of the carbon tetrachloride changes appeared in the liver. After 30 hours of inhalation cirrhosis involved the entire liver.

Changes also occurred in the number of red and white blood cells and the amount of hemoglobin, anemia gradually appearing.

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## CHEMISTRY

## Cotton Takes Most Dye From Weak Solution

**C**OTTON soaks up more dye when the dye solution is weak than when it is concentrated, it is shown by X-ray and photographic studies by Prof. George L. Clark and Dr. Julia Southard of the University of Illinois, reported in *Physics*.

Two common commercial dyes, Nile blue sulfate and methylene blue, were investigated. When the amount of dye in the solution is reduced, the dye molecules gather together in smaller clusters. The aggregations are so small that they get into the pores of the cotton fabric without changing the form of the cellulose that makes up the cotton.

X-ray photographs of dye solutions showed how the cotton picked out and absorbed the smaller clusters of dye molecules. In passing through a dye solution the X-rays are bent in proportion to the size of the clusters. Testing of the dye solution before and after it was used told the story of what happened.

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