

## PHYSICS

## Scientists Reconcile Two Conflicting Atom Ideas

**A**N IMPORTANT inhabitant of the universe has sat for his portrait. Two very different and conflicting canvasses, painted in scientific terminology, have resulted. Neither the sitter (the atom, to scientists) nor the artists, who are the physicists studying the composition of matter, are worried much about the conflict.

"Modern physics instead of deciding between them links them with the help of the statistical method," explained Dr. Edward Teller, Hungarian theoretical physicist, who has made his first public appearance in America as visiting professor of physics of the George Washington University.

Using mere figures of statistical theory as a microscope with which to view the atom is necessary because the idea that it is indivisible is a paradox, contradicting our ideas gained from everyday experience. Moreover, Dr. Teller observes, atoms can be probed only with other atoms used as tools, so that actions of individuals cannot be determined.

The compromise picture of the atom painted by mathematics is still opposed by some of the best physicists, Dr. Teller said, but the drastic procedure is accepted by most because it is successful and the philosophy of its method is satisfying. Studying atoms in bulk instead of trying to understand the behavior of individual atoms has also given scientists information about average actions of atoms and thus it is possible to understand properties of matter as a whole.

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## ENGINEERING

## Race Between Steam and Diesel Engines at Peak

**W**ITH the fate of millions of dollars' worth of new railroad equipment at stake, the race between steam and oil-burning Diesel locomotives reached a new peak in 1935, it is indicated in the progress report presented by a committee of the American Society of Mechanical Engineers.

Steam, old standby of railroad propulsion, brought out fifteen new locomotives either streamlined or semi-streamlined for sustained high speed.

Three new Diesel-driven locomotives were put into service during the year, while twelve lightweight Diesel-electric

articulated trains went into operation in the same period.

Steam-driven trains ranged from the crack "Hiawatha" of the Chicago, Milwaukee and St. Paul to the "Asia," built in Japanese railroad shops, running between Dairen and Hsinking in Manchukuo.

Diesel locomotives included those for the Union Pacific's Super Chief, and the Baltimore and Ohio's Royal Blue and Diplomat. In the lightweight, high-speed field were the four Zephyrs of the Burlington, the New York, New Haven and Hartford's Comet, and the first of the southern flyers, the "Rebels" of the Gulf, Mobile and Northern.

In Germany, where high-speed lightweight articulated trains started, the original Flying Hamburger has two new colleagues, the Flying Frankfurter and Flying Koelner.

More significant in Germany, however, was the arrival of three streamlined steam locomotives capable of pulling full-weight heavy trains at 110 miles an hour.

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## PHYSICS

## Cosmic Rays Aid Study Of Nature of Magnetism

**C**OSMIC rays, no longer the mystery they once were, are now used as highly valuable working tools in the scientific laboratory. Their newest use is to help investigate the nature of magnetic forces inside a magnet, according to reports to the American Physical Society.

The nature of such internal magnetic forces has heretofore been almost impossible to investigate. Scientists could easily study the forces outside the magnet with great precision, but what was happening inside the magnet remained a mystery.

High speed and piercing cosmic ray particles, however, are capable of passing right through great thicknesses of iron. By seeing how much their paths are bent in going through the magnet, physicists are now able to acquire knowledge of the magnetic field strength in the magnet's interior.

The technique is similar to the way one might estimate the force of a hurricane storm by the extent to which a ship has been driven off its course.

Two reports describing the theory and experimental studies were presented to the Society by Prof. W. F. G. Swann of Bartol Research Foundation and his colleague, Dr. W. E. Danforth.

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# IN SCIENCE

## BIOLOGY

## Heavy Water's Discovery Hampers Biological Study

**R**EPERCUSSIONS of the discovery of heavy water in the science of biology were described to the meeting of the American Physical Society. Heavy water contains the double weight isotope of hydrogen.

Extremely delicate tests checking the effects of powerful drugs and poisons on the animal and human body must now be carefully watched to see what kind of water is used for making the weak testing solutions, said Dr. David I. Macht, pharmacological scientist of Baltimore.

The solutions, Dr. Macht explained, are injected into animals and their effects studied.

What complicates these biologic tests, says Dr. Macht, is his discovery that the effects obtained depend on how much of the water in the solution is of the heavy variety. If only one part in 2,000 of the water is composed of the heavy kind, such important biological products as enzymes react in a vastly different way than they do normally.

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## PLANT PATHOLOGY

## Squirrels, Chipmunks Aid In Fight Against Rust

**S**QUIRRELS, chipmunks and other small rodents appear to be unwitting allies of man in his fight against the white pine's most destructive disease, blister rust. J. L. Mielke, of the U. S. Forest Service, states (*Journal of Forestry*, Dec.) that he has observed these little animals eating the fungus-caused blisters on the twigs of the afflicted trees.

Since these blisters produce the millions of spores that aid in spreading the rust to other trees, their destruction is decidedly advantageous, from the human-economic point of view.

What the squirrels and chipmunks are after, Mr. Mielke does not know. He conjectures that they may like the taste of the fungus itself, or that they may be after the starchy food-substances that collect in the blisters.

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# CE FIELDS

## PALEONTOLOGY

### Ancient Fossil Animals Mistaken for Hickory-Nuts

**P**ECULIAR fossilized animals, taken by uninformed collectors to be fossil flower buds and hickory nuts, and believed until recently to be very rare in the region of Buffalo, N. Y., have been found in relative abundance there following the researches of Irving G. Reimann, curator of geology at the Buffalo Museum of Science.

Called blastoids, the fossils are related to the so-called meat-eating lilies, or crinoids. They grew upon stalks, like plants, in the waters of a shallow tropical sea that 250 million years ago, in Devonian times, washed over the present site of Buffalo.

Some twenty different varieties of these curious fossils have been identified by Mr. Reimann, including many species new to science. These studies have made Western New York an outstanding locality for Devonian blastoids.

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## ICHTHYOLOGY

### Fish Smother in Lake—Plants Steal Oxygen

**H**ORRORS of a city suddenly blanketed with a suffocating gas, with all its citizens gasping and choking to death, were realized in the world of water recently, when a lake full of fish lost all its oxygen, and all the fish agonizingly died.

The story is told with a considerable sense of drama, by David Tomlinson of Wallingford, Conn. (*Science*, Nov. 1)

About eighteen miles north of New Haven, Mr. Tomlinson states, is a lake between 125 and 150 acres in extent with an average depth of four feet, known locally as the North Farms Reservoir. Its bottom is muddy and very full of weeds, and until the disaster Mr. Tomlinson records its water swarmed with fish.

On a warm morning in late summer, fish were seen crowding to the top in large numbers, evidently in great distress. There were all kinds of them: pickerel, perch, calico bass, bullhead,

sunfish and pond shiners, and they were all gulping air.

By early afternoon the fish were dying by thousands and sinking to the bottom, while those that had been first to die, probably during the preceding night, began to rise to the surface. In the meantime the water began to assume an abnormal milkiness in appearance. In their desperation the fish flopped out of the water, to die gasping on the bank. Even the eels and crawfish crawled ashore to die. About 400,000 fish thus perished, and apparently not one was left alive.

Several scientists from nearby universities examined both the dead fish and the deadly water. They could find no evidence of poison in either; but the fish gave evidence of having died of sheer suffocation — lack of dissolved oxygen. And when the water was tested for oxygen, that necessary element was found to be almost totally lacking.

The cause seems to lie in the sudden death and decay of the thick vegetation in the pond. There had been severe rains, accompanied by abrupt temperature changes, several days before the catastrophe, and the pond had been observed to be "working." Mr. Tomlinson suggests that the water-plants had been killed, and that in the course of the fermentation and decomposition of their dead tissues all the oxygen in the pond had been absorbed by the bacteria and other microorganisms of decay. Disaster to the oxygen-requiring fish immediately followed.

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## ASTRONOMY

### Millions of Square Miles In Great Sunspot Group

**T**HE LARGEST group of sunspots in the past five years was recently visible on the sun. Greenwich Observatory in London found that the area of the sunspot group reached 2,000,000,000 square miles on Sunday, Dec. 1, with a greatest length of 140,000 miles.

The rotation of the sun carried the gigantic group out of sight on Dec. 9. The group was relatively small when it first appeared on Nov. 26.

Greenwich Observatory astronomers under the direction of Dr. H. Spencer-Jones, the astronomer royal, photographed the group several times.

Observations by Mt. Wilson Observatory astronomers revealed the sun had 69 spots upon it, in two groups, on Friday, Nov. 29. Saturday's observations showed 47 spots in two groups.

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## SEISMOLOGY

### Panama Earthquake Was Centered Under Caribbean

**T**HE earthquake felt in the Canal Zone late on Friday night, Nov. 29, had its epicenter under the Caribbean Sea somewhat to the north of the Isthmus. Seismologists of the Coast and Geodetic Survey of Washington, and of the Jesuit Seismological Association in St. Louis, made independent determinations of its location, on the basis of data collected telegraphically by Science Service.

The location of the epicenter is given as in latitude 10 degrees north, longitude 79.5 degrees west. Time of origin was 10.39.8 p. m., E. S. T.

Observatories reporting to Science Service were those of Canisius College, Buffalo, N. Y.; Georgetown University, Washington, D. C.; St. Louis University, St. Louis, Mo.; the University of Wisconsin, Madison, Wis.; the Dominion Observatory, Ottawa, Ont.; and the stations of the U. S. Coast and Geodetic Survey at San Juan, Puerto Rico, Tucson, Ariz., and Chicago, Ill.

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## ARCHAEOLOGY-SURGERY

### Alaska Indians Had Brain Surgeons 2,000 Years Ago

**I**NDIANS in Alaska 2,000 years ago had brain surgeons available. They needed them, too, what with battles in those days being fought with slingshots and clubs.

A specimen of this ancient surgery, the first unearthed in Alaska, is the discovery announced by Dr. Ales Hrdlicka of the Smithsonian Institution. Digging on Kodiak Island, he found the skull of a man who had a cavity about two inches long and half an inch wide scraped in his skull down to a thin film of bone left over the brain. The wound healed perfectly, showing that the Indian brain doctor knew his business.

This skull cutting operation, called trephining, was popular in Europe 10,000 years ago, and was later done by Indians of Peru and some other parts of America. Whether the intention was to relieve brain pressure or merely to let out disease spirits, modern science is not certain.

Finding the operation practised in Alaska indicates strongly, Dr. Hrdlicka said, that the operation was brought to America from Asia by some of the early waves of immigrants who crossed Bering Strait.

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