PHYSICS

Pictures of Spinning Model Demonstrate Atom Structure

California Scientist Photographs Unique Mechanism To Show How Electricity is Spread Out in Simplest Atom

PICTURES of what an atom looks like inside, according to the new theory of wave mechanics, have been made by Dr. H. E. White of the University of California, Berkeley. Recently scientists have used only a mathematical formula for this purpose, as a visible picture was supposed not to give a true representation of the atom.

Dr. White has made a rotating mechanical model, which, when set in motion and photographed, gives a good idea of how electricity is spread out inside the simplest known atom, that of hydrogen. These photographs show beautiful designs which differ according to the amount of energy the atom has.

Formerly Like Solar System

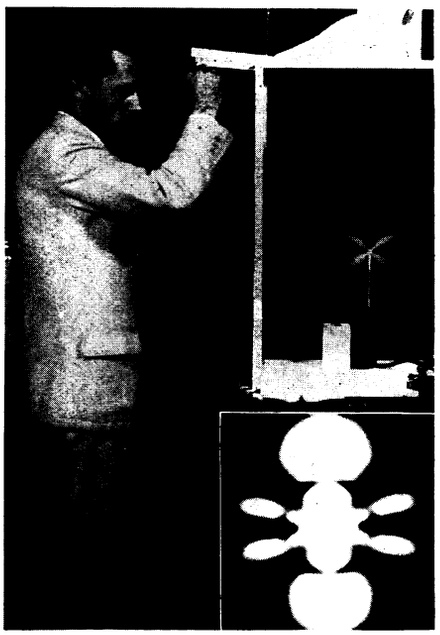
Before the now-accepted theories of Heisenberg, Schroedinger and Dirac, the atom was thought to be somewhat like the solar system: the electrons were imagined as particles whirling around the positive nucleus in the center of the atom like the planets around the sun. Now the atom is thought of as being more like a swarm of bees around hive, when the observer is too far away to see the individual bees. The thickness of the cloud represents the average density of electricity at any point.

The electron has thus been replaced by a cloud of electricity of variable density, which is more difficult to imagine than the path of the particle-like electron.

A mathematical formula, according to the newer physics, gives a much better representation of how an atom is built than a model or picture. Since the formulation of the famous new quantum theory, it has been considered rather a step backward to make a picture of the atom. However, Dr. White has ignored this belief and made pictures which are both beautiful and interesting.

Dr. White's model consists of a spindle which can rotate at any angle to the horizontal. One of the ends of the spindle vanes is connected by a string to a little ball which moves steadily back and forth in a groove of curious shape. The string controls the angle that the rotating spindle makes with the horizontal. Thus an accurate representation of the electron density in the atom can be obtained by photographing the rotating spindle.

Science News Letter, July 4, 1931



LOOKS LIKE AN ATOM

Dr. White is spinning his mechanical model of the hydrogen atom to get the flat "X" shape which represents the distribution of electricity of the simplest atom for one of its energy states. For the various states, many interesting figures are obtained. Another is shown in the lower right insert.

ENTOMOLOGY

7,000,000 Acres of Locusts Hatching in East Africa

THE KENYA Agricultural Department reports that locusts are hatching over an area of seven million acres in the Kenya district of East Africa. In addition to this the laying of locust eggs is proceeding over hundreds of miles of dense tropical vegetation in Uganda. The town of Masindi was recently inundated by locusts, forcing all shops to close.

In the Kenya district the Agricultural Department is effectively combatting the locusts, twelve hundred bags of poisoned bait being issued daily, while there is also spraying and trench trapping. In the Uganda district there is no adequate policy of destruction and great fears are expressed by the neighboring districts regarding the damages anticipated when the eggs mature. Fortunately for Kenya, the crop damage will be comparatively small, since a greater part of the infested seven million acres is not under cultivation.

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ARCHAEOLOGY

Seven Times Rebuilt Pyramid Explored at Tenayuca, Mexico

SEVEN SEPARATE TIMES enlarged or reconstructed, and perhaps as many different times the center of distinct occupations—this is the story the Aztec pyramid at Tenayuca has unfolded. Mexican archaeologists under the direction of Jose Reygadas Vertiz have continued to open up structure within structure until they at last feel they have reached the core.

While tunnelling last year through the older of two superposed pyramids, a third pyramid within the second was discovered. This new structure was different from all other Mexican pyramids previously known, for it was formed of practically vertical stepped-back bodies instead of the usual inclined ones. Now within pyramid three, remains of a number four have come to light.

Study of the architectural features reveals that in addition to the four structures, one within the other, some of these in their time had been enlarged. So that in this pyramid that was once the capitol building of an Indian city of unknown history but which was Aztec at the time of the Conquest, seven

major modifications have taken place. Seven, according to present findings, says Mr. Reygadas, mindful that two, three, four, five and six was what he once believed in.

From a maguey-covered hill several years ago, the pyramid of Tenayuca has come out of its chrysalis as one of the most interesting sites near Mexico City, and the most important Aztec site in the country. The final report now in preparation will add more positive knowledge in the field of Aztec archaeology than that of any other one site.

The pyramid is now honeycombed with tunnels that circumviate and penetrate, and which are lighted with electric lights, protected by corrugated metal roofing, and sustained by beams, so that a model silent lecture on archaeology may be safely had while going through.

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ASTRONOMY

1932 Total Eclipse Will be Attraction for Vacationists

VACATION planners who look a whole year ahead can now figure on adding a total eclipse of the sun to the other thrills they seek. The eclipse of August 31, 1932, will cross considerable parts of New England and the Province of Quebec, both favorite vacation lands.

The official calculations of the path of the eclipse, together with weather information to aid in the selection of the best place, and a large scale map of the path, have just been issued by the United States Naval Observatory, Washington. The material has been published in pamphlet form, as a supplement to the American Ephemeris, which is the astronomer's bible. The supplement can be obtained for 25 cents from the Superintendent of Documents, Washington, D. C.

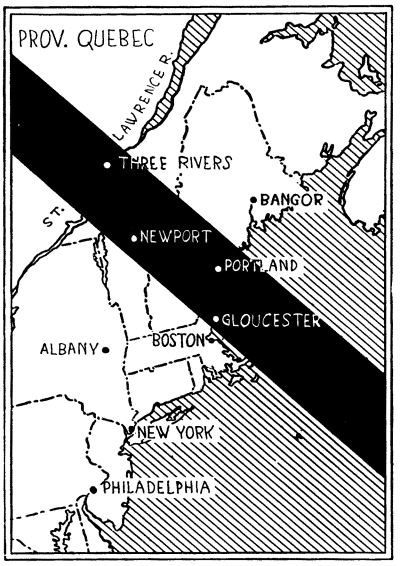
The exact path over which the moon's shadow will sweep has been calculated by Prof. James Robertson, director of the Nautical Almanac Office. It will cross Cape Cod, the northeastern corner of Massachusetts, all of New Hampshire but the southwestern third, the southern and western part of Maine, the northern part of Vermont and a large section of the Province of Quebec. Montreal and Portland are the largest cities within the path.

Other places near the center from which a good view should be obtained, are Saco and Alfred, Me.; North Conway and Lancaster, N. H.; Guildhall, Vt.; Waterloo, St. Gabriel and Sorel, P. Q. At these places the sun will be obscured by the moon for nearly the full duration of one minute and forty seconds.

Places a little farther from the center line where the eclipse will last for about a minute or more are: Gloucester and Newburyport, Mass.; Auburn and Paris, Me.; Dover, Rochester, Farmington, Ossipee, Wolfeboro, Littleton and Colebrook, N. H.; St. Johnsbury and Newport, Vt.; Sherbrook, Farnham and Three Rivers, P. Q.

On the afternoon of Wednesday, August 31, the shadow of the moon will sweep down from the northwest. About 3:23 p. m., eastern standard time, it will reach the St. Lawrence River. At 3:32 p. m., it will reach Cape Cod, which will be the last land to see it. Then the shadow will sweep on over the ocean, leaving the earth in mid-Atlantic.

The Naval Observatory astronomers believe that little choice is afforded, and there is probably an even chance of clear weather at any point along the path from the St. Lawrence River to the coast.



PATH OF COMING ECLIPSE

Which has just been calculated by astronomers at the U. S. Naval Observatory.

Another chart in the supplement shows the stars and planets that will be visible near the eclipsed sun. The planet Jupiter will shine brilliantly just to the right, and a little farther over will be the star Regulus and the planet Mercury. The star Spica will appear at a somewhat greater distance to the left, and two second magnitude stars, Denebola and Alphard, will be above and below.

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ENGINEERING

Jordan River, Ideal for Power, Is Made to Yield Electricity

PALESTINE is being modernized. With the completion of three hydro-electric power stations now being erected on the historic river Jordan, with the ribbing of the long, narrow valley of the Holy Land with concrete canals, and the utilization for a storage reservoir of the Sea of Galilee on whose waters Christ walked two milleniums ago, the Holy Land is becoming modern and industrial.

The Jordan is readily adaptable to hydro-electric power, with its 3,000-foot drop from its source on Mount Hermon to its mouth in the Dead Sea, a saline lake 1,300 feet below the level of the Mediterranean and farther below the sea level than any other body of water in the world. And with the diversion of seasonal flood waters of the Yarmuk and the Jordan rivers into the Sea of Galilee as a huge reservoir, and with the building of suitable dams and canals, 5,000,000 tons of water will be at the disposal of engineers every day during both the wet and dry seasons. These three power stations will total 48,000 horsepower output, and are the first step in a plan for the complete electrification of Palestine.

The first of these power stations is now completed at Jisr-el-Mujameh, drawing its water power from a canal carrying waters from the Yarmuk River,