

PHYSICS

# Eddington Reveals Details of His Theory of the Electron

If New Paper Stands Test of Scientists It Will Remove Chief Obstacle to Progress of Physics, American Thinks

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SIR ARTHUR EDDINGTON, the British scientist, has finally laid his mathematical cards on the table and offered in the *Proceedings of the Royal Society of London* what he claims is a rigorous proof of his contentions about the electron. He has, during the past three years, published seven other papers on this subject, none being complete. Each time he left some unsatisfactory gaps in his proofs but asserted, nevertheless, that he was sure all would be well and that the next paper would be conclusive.

The scientific world was decidedly incredulous. The theory did not appear plausible. It was difficult enough so that physicists who were capable of handling the material considered it would not pay to take the subject too seriously until Eddington himself had worked it through. They agreed it was a clever idea, but felt that a scientist ought to have more than a hunch before offering to publish a result.

Now Eddington is a brilliant man. He has made mistakes, it is true, but when he publishes an eighth paper, one can scarcely disregard it. Such persistence must be well supported. Moreover, this paper is attractively arranged. It begins by pointing out some of the errors of the previous papers. The premises are acceptable. The results claimed are of most extraordinary significance. Finally it does carry weight when a man like Eddington definitely says his calculations are rigorous.

Physicists, with the help of mathematicians, will now undertake to check the argument and in a few months we shall know whether there are any serious flaws in it. The difficulty in reading the article lies in the fact that two separate fields are involved, viz., quantum mechanics and relativity. There are not many sufficiently experienced in both of these to be able to read the proofs without hard work. The pre-

sentation is extremely concise and the reader will have to fill in many large gaps—certainly no statements can be accepted without verification. Prestige counts for little in these matters.

No matter how critical the previous attitude was, the proofs, if correct, will be readily accepted. Eddington will then have obtained undoubtedly the greatest results of both the quantum theory and of the relativity theory. The theory of the electric charge will have been improved to a degree of perfection unmatched in natural science. The chief obstacle in the path of progress of the last three years will have been removed and physics (*Turn to page 315*)

MEDICINE

## May Get Tularemia From Mosquito Bite

MOSQUITOES, which play an important role in the transmission of malaria and yellow fever, may also carry tularemia or rabbit fever, Cornelius B. Philip, Gordon E. Davis and R. R. Parker of the U. S. Public Health Service have found in studies made at the Rocky Mountain spotted fever laboratory at Hamilton, Mont.

The part played by the mosquito in carrying tularemia is purely mechanical.

If a mosquito is interrupted while feeding on an infected animal, and bites soon after, he can pass the infection along to his next victim. The disease may also be acquired when infected mosquitoes are crushed on the skin, with or without subsequent rubbing, and when mosquito excrement is deposited on the skin.

The investigations here were undertaken after a few cases had been reported in each of which a mosquito bite was thought to have given the infection. While this is possible, the scientists believe it would be a very rare occurrence.

"It is probable that at most only infrequent infection of man would occur in this manner," they concluded.

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ARCHAEOLOGY

## Eskimo Burial Mystery Cleared Up at Point Barrow

THE MYSTERY of whether Eskimos of Point Barrow had an old custom of burying their dead in houses of the villages, or whether they built house-like sepulchres for them, has been cleared up by the excavation of ancient graves.

The solution of the mystery is that Eskimo dead were not buried in house-like tombs at all, is the report brought back by James A. Ford, who has spent more than a year continuously in the Alaskan Arctic, on an expedition for the U. S. National Museum.

Digging into small natural knolls in prehistoric Eskimo graveyards at Nuna-vaak and at Utkiavik, on Point Barrow, Mr. Ford found burials of some very old, prehistoric Eskimos. Their earthen tombs were made by slashing off the top



SKULL OF A BOW-HEAD WHALE

of a knoll, laying a platform of planks on the flattened eminence, and then placing the dead, wrapped in caribou or musk ox skins, on the platform. An earthen covering was replaced on the mound.

The rounded mounds with the plank flooring inside resembled remains of Eskimo houses sufficiently to lead early explorers to believe that houses were built for the dead in ancient times in the Arctic.

The two graveyards excavated by Mr. Ford were of the period of Eskimo culture known to archaeologists as "Old Bering Sea." The villages to which the graves belonged have disappeared. It appears that they were close to the seashore, and that they have sunk beneath the sea.

#### Traced Evolution of Culture

Mr. Ford's expedition attained its goal of tracing the evolution of Eskimo culture in this northern tip of Alaska, far north of the Arctic Circle.

"Excavation of five sites around Point Barrow verified the sequence of Eskimo cultural history as it has been worked out in other parts of Alaska," Mr. Ford stated. "The graves yielded evidence of the oldest period, the Old Bering Sea culture, with some objects of a later development which we call the Birnirk stage.

"At the villages the sequence was carried up into later times. The older villages contained objects made by Eskimos of the Birnirk stage and in the later, upper levels of the remains there were evidences of the Thule type of culture well established. In another village which had a history extending into modern times, the early settlers had lived in days of Thule culture."

#### Only Bow-Head in Nation

Besides archaeological specimens of the old Eskimo culture history, Mr. Ford brought back to Washington the great skull of a bow-head whale, one of the largest of these sea-dwelling mammals. The skull is pronounced the only bow-headed skull ever brought into the United States. It will be exhibited at the U. S. National Museum.

The whale was killed in the fall whaling of Eskimos at Barrow. Mr. Ford, who was one of the crew in the Eskimo boat, assisted in the kill and received as his share a portion of the meat, and the skull, which the Eskimos thought quite worthless.

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#### MEDICINE-PHYSICS

## Electrified Particles in Air May Explain "Curative Values"

### German Worker Reduces Blood Pressure With Negative Ions; American Finds Fewest Ions in Occupied Room

**W**HEN DOCTORS write Rx for curative atmospheres or engineers design air conditioning apparatus to turn outdoors' frigid winter or torrid summer into an exhilarating spring day atmosphere indoors, they may need to specify one factor at present ignored: the electrical conductivity or ionization of the air.

Everywhere about us there are minute charged particles that act as bridges for electrical currents to cross. These ions, as they are called, start out in life as atoms or molecules from which an electron has been knocked. The removed electron becomes a negative ion and the rest of the atom or molecule has a positive electrical charge. Next in the life cycle of an ion is the coming together of some ten positive ions or electron-lacking molecules to form a positive aggregation called a "light ion" to distinguish it from a "heavy ion" which is sometimes formed by the attachment of either a positive or negative ion to a dust or water particle in the air.

From hour to hour and place to place the ions of the air vary. They increase under the influence of X-rays, radium, ultraviolet light, high voltage discharges, flames, red hot substances and even the breaking of waves on a sea beach. The radioactive matter in the soil is probably the largest factor in the ionization of the air.

In the current issue of the *Journal of the Franklin Institute*, Dr. Lewis R. Koller of the General Electric Company's Research Laboratory calls attention to the possible health importance of air ionization.

Ionization may take its place alongside pressure, temperature, radiation and humidity as an important physical factor present in the atmosphere.

Hints have accumulated in past years that atmospheric electricity may have beneficial and harmful biological effects on human health. Mountain or sea level climates seem to help some ills, radioactive springs have their advocates,

and rheumatism and the gout are influenced by the weather. It is possible that the ion content of the air may be the answer.

This theory is being tested in this country and in Europe. Prof. Friedrich Dessauer at the University of Frankfurt, Germany, constructed an ion-producing apparatus and subjected both normal and ill persons to high concentrations of both positive and negative ions.

His most striking therapeutic effects were obtained with patients suffering from high blood pressure, rheumatism, gout, neuritis, neuralgia, bronchitis, asthma and heart and arterial diseases. Inhalation of negative ions at frequent intervals over a period of weeks produced blood pressure decreases which persisted for a longer time and improvement in condition. Positive ions produced headaches and discomfort in healthy individuals.

At the Harvard School of Public Health, Prof. C. P. Yaglou found that occupied rooms have fewer ions than outdoors or rooms that are unoccupied. (*SNL, Feb. 6, '32, p. 84*)

Dr. Koller has developed methods of producing and measuring ions. If the ion content of the air is found to have a real effect on health, the next step will be to add an ion regulator to the heating, refrigerating, and humidifying equipments that promise to air-condition the buildings of the future.

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#### ASTRONOMY

## Compression of Hydrogen May Cut Guess at Sun's Age

**I**F THE SUN is a chemical factory in which the light element hydrogen is being turned into other and heavier elements by tight packing together of atoms, then its lifetime may be only a hundredth of the age now estimated by most astronomers.

This new and shorter estimate of the possible age of the sun is put forth in