

## ARCHAEOLOGY

# Grave of Prehistoric Chief's Daughter Excavated

**A** GIRL of twenty, almost toothless! This is the pathetic picture of prehistoric Alaska revealed in the skeleton of an Eskimo chief's daughter.

The grave of the girl, discovered in southwestern Alaska by Dr. Frederica de Laguna of the University of Pennsylvania Museum, yielded the skeleton. An osteologist at the Museum has examined the bones and pronounced the smooth surfaces of the joints typical of a young woman in the early twenties. But at the time of her death, only three or four teeth were in the upper jaw and not many more in the lower jaw. The others had fallen out some time before, leaving her with the shrunken cheeks of an old woman.

The expedition, whose discoveries are now being studied at the Museum, has been conducted jointly with the Danish National Museum represented by Dr. Kaj Birket-Smith.

The chief's daughter was discovered at an old village site near Cordova, Prince William Sound. The grave was just outside a house, Dr. de Laguna explained. The cover picture shows the archaeologists carefully opening it. They found the Eskimo girl on her right side in a wooden coffin rotted to the consistency of wet cardboard. More than 800 beads of shell, ivory, and bone lay between the legs of the skeleton, and are evidently remains of an elaborately decorated apron-like garment. The beads are of a type worn only by the wife or daughter of a chief.

The house site is marked by a few large corner posts and stakes, which the archaeologists dug out. Marks of stone adzes used by the builders can still be made out on the wood.

"Skeletons of three new-born infants, one shoved roughly under a stone, were found," said Dr. de Laguna. "This suggests that infanticide was practised by these Eskimos, as among some Eskimos farther north.

"In a burial cave near the village we found the skeleton of a man, perhaps a chief, with whom had been buried two other individuals who may have been slaves.

"With this man we found some fine

objects, including a handful of very long, slender needles, laid across his chest, two adze blades put under his shoulders, two bear teeth and two ivory buckles carved in the shape of bears near his hand, and at his side a bone dagger and long bone bayonette.

"The antiquity of this Eskimo culture is shown by the sinking of the land. The oldest villages are being washed away by the sea. Some are already destroyed."

Assistants on the expedition were Norman Reynolds, anthropology student from the University of Washington, and Wallace de Laguna.

*Science News Letter, January 20, 1934*

## PHYSICS

## Neutron Study Leads to New Cosmic Ray Theory

**T**HE most important constant in the theory of the nucleus, namely the mass of the neutron, can now be determined with greater precision than before, and its value is 1.0062. This conclusion has been reported to the American Physical Society by Dr. R. M. Langer of the California Institute of Technology. The calculations are based on disintegration experiments in Lord Rutherford's laboratory in Cambridge, England.

The mass 1.0062, which is somewhat lower than is generally accepted, has some remarkable implications. It means that the deuteron can be split up into a proton and a neutron with comparatively little effort. It means that a proton can be split into a neutron and a positive electron even more easily. It means that two neutrons might join together into a stable molecule. But all these and other conclusions will be very much strengthened if the precision of the value 1.0062 is slightly increased.

Dr. Langer explains that the constituents of the atomic nucleus join together as though they were little magnets. The groups might be magnets or not according to the number of constituents. The groups might also spin like tops and this property could also be deduced from the number of neutrons and protons. The famous Pauli principle is in-

voled in this matter and seems always to give results in agreement with experiments. The principle states that a group of particles never forms a whole but each particle retains its individuality. This simple and remarkable statement has cleared up a great deal of the science of chemistry and now promises to elucidate some of the mysteries of the nucleus.

Dr. Langer presented a new theory of the cosmic rays. He begins with the assumption that a proton in the nucleus may sometimes lose its electrical charge. This happens so rarely that the proton can on the average expect to live over a million, million, million years. But still there is always enough shortage of positive charges in our galaxy to attract roaming positives from outside. Some of course reach our earth. Their velocity is high enough to permit them to penetrate our atmosphere. They would show a change with latitude and direction exactly as observed.

The excess of negatives on the earth would also try to escape just as they are found to do in the currents of atmospheric electricity. Other terrestrial and cosmic phenomena find explanation along the same lines.

Previous theories have misled people, in Dr. Langer's opinion, into conclusions about the amount and character of cosmic ray energy in space. Apparently the energy is rather local. Other galaxies may also have cosmic rays in them but if their electrons are positive their cosmic ray charged particles will be negative. According to Dr. Langer's theory there will be very few energetic rays in intergalactic space. He claims that while other theories were constantly losing in experimental support, his is constantly gaining.

*Science News Letter, January 20, 1934*

## PHYSICS

## Energy Turned Into Matter When Electron Divides

**N**OT ONLY cosmic and gamma rays but also fast electrons may give rise to pairs of negative and positive particles when they hit the heart of an atom. This new discovery is mentioned by Dr. D. Skobel'tzyn of the Leningrad Physical Technical Institute in a communication to *Nature*.

The Soviet physicist has made stereoscopic photographs of the tracks which these electrical particles make when under the influence of (*Turn to Page 46*)

a strong magnet, which turns the moving positive and negative particles in opposite directions.

In one pair of photographs, the nearly straight original track of a fast moving electron is seen to give rise to two oppositely curved tracks. The velocity of the particle causing the track may be estimated from the curvature of the path, the slower the movement the greater being the curvature. Thus it can be calculated that the formation of positive and negative electrons in the above mentioned instance was accompanied by a loss of energy equal to their mass multiplied by the square of the velocity of light—just as is the case when cosmic and gamma rays are changed into matter.

The fundamental law of the transformation of energy into matter seems therefore to have been exemplified for a second time, in a different manner.

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interest on his debts, and the science investment is less than 36 per cent. of the increase of next year's interest over this year's.

This small fraction of the federal expenditure that is being spent for scientific research will pay into the purses of the public, in savings, better living and increased earnings, dividends of thousands per cent. in the coming years. Some of the most outstanding industrial developments of today had their roots in Uncle Sam's delving into science in past years and the contributions made to human health and happiness, not always to be evaluated in dollars and cent. are legion.

*Science News Letter, January 20, 1934*

PHYSICS

# Advanced Physics Theory Lags Behind Experimentation

**T**HE MOST highly developed parts of that highly developed field of the new physics, quantum mechanics, are not good enough to predict the results of clever experimenters. The Zeeman effect, which describes the behavior of an atom in a magnetic field, and the light given out by the hydrogen atom are the subjects under fire.

So complacent is the physicist about these matters that the discrepancies would not be believed were they not put forward by the highest authority in the field. Prof. V. W. Houston, who has announced these results obtained at the California Institute of Technology with the collaboration of Prof. Y. M. Hsieh of Yenching University in China and L. E. Kinsler, a graduate student, is known to have done the best experimental work in both these fields. He is at the same time one of the country's foremost theoretical physicists so that his interpretations must be considered as quite reliable.

Prof. Houston had worked up a method based on the supposedly sound theory of the Zeeman effect for measuring the specific charge of an electron. His results were accepted and revised all previous work. Now with Mr. Kinsler he has found that in the simplest and apparently surest case, namely that of helium, the specific charge seems to come out wrong. Any physicist would

have bet a hundred to one against this result.

In the other experiments with Prof. Hsieh on the fine structure of the hydrogen spectrum the results are startlingly different from the predictions of the equation of Prof. P. A. M. Dirac, British physicist. This equation represents the pinnacle of achievement in theoretical physics and was the main contribution of Prof. Dirac, who recently was awarded the Nobel Prize. But Profs. Houston and Hsieh show that even this equation is not good enough for exact work.

The difficulty with the theory seems to be that it treats the atom as if it were alone in space. Actually it is connected with its surroundings through electromagnetic fields. In other words it is part of the whole universe. How to take this interaction into account is likely to prove a highly difficult problem.

*Science News Letter, January 20, 1934*

PSYCHOLOGY

## Stuttering Children Found to be Talkative

**C**HILDREN who stutter are more talkative, and use more words when they talk, than do children in an "average" group, Dr. H. Meltzer of the St. Louis Psychological Service Center has discovered. He applied the same test, consisting of the imaginative identification of the shapes of a number of ink blots, to fifty child stutterers and an equal number of children of the same ages taken from the general population.

The small stutterers were found to be nearly forty per cent. more talkative than the "control" group, that they averaged 200 words apiece as against 135 for the other children, and that they responded to the question "What could that be?" quite as quickly as did those without speech impediments.

"If the number of words used in the total time taken is considered as an index of rate of talkativeness, the mean rate for stuttering children is 51.08 per cent. greater than it is for the control group," Dr. Meltzer commented.

*Science News Letter, January 20, 1934*

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