

PHYSICS

Nobel Prizes Awarded To Leaders in Theoretical Physics

1932 Prize Goes to Heisenberg; Prize for 1933 Divided Between Dirac and Schroedinger

THREE European leaders in the new physics will receive the 1932 and 1933 Nobel prizes in physics, it was announced in Stockholm. Prof. Werner Heisenberg of Leipzig was awarded the 1932 Nobel prize in physics for his development of quantum mechanics and its resultant discovery of the allotropic forms of hydrogen. The 1933 Nobel physics prize is divided between Prof. E. Schroedinger of Berlin, now working at Oxford, and Prof. P. A. M. Dirac of Cambridge, England, for their new forms of atom theory.

The 1933 Nobel prize in chemistry will not be awarded this year, it was announced.

Three Youthful Europeans

These three relatively youthful European physicists are the creators of physical theory that has had great influence upon philosophical ideas as well as science.

Prof. Heisenberg is now only 32 years old. Still younger is Prof. Dirac who is 31 years old, while Prof. Schroedinger, formerly of Berlin and now of Oxford, who shares the 1933 physics Nobel award with Prof. Dirac, is the senior member of the group with an age of 46.

These three new Nobelists, two Germans and an Englishman with a French name, all have picturesque personalities and their erudite adventures in physics pursued in both European and American centers of research have been accompanied by happy companionship among the trio and with other researchers in physics.

Famous At Twenty-One

Prof. Heisenberg was the son of a professor of Greek philology. He studied with Prof. Arnold Sommerfeld and Prof. Niels Bohr. By the time he was 21 he was beginning to acquire an international reputation for his studies of atomic theory. His great achievement, the development of quantum mechanics,

began in the fall of 1925. Then the young Heisenberg presented the scientific world with a new mathematical method adequate for describing how the electrons revolving about atomic hearts stick to their orbits.

The famous Heisenberg principle of indeterminance or uncertainty was a further development of his theory. This affirms that in picturing the physical world to ourselves we must consent to certain limitations; for instance, we should not try to imagine a flock of electrons all having nearly the same position and nearly the same velocity.

The citation of the Nobel award to Prof. Heisenberg states that it is for his development of quantum mechanics "and its resultant discovery of allotropic forms of hydrogen." One of Prof. Heisenberg's countrymen, then of the Kaiser Wilhelm Institute at Berlin, demonstrated ex- (Turn to Page 333)

EMBRYOLOGY

Unborn Gorilla Baby Offers Unique Study

A GORILLA baby that never lived because its mother was accidentally shot shortly before the baby's birth was due is affording a unique opportunity for study at the Western Reserve School of Medicine, Cleveland.

The gorilla fetus, to give it the scientific term for such unborn offspring, is

the sixth known to scientists and in by far the best condition of all of them, according to Dr. W. M. Krogman, associate professor of anthropology, who will study it under the direction of Dr. T. Wingate Todd.

It was sent to Dr. Todd by a medical missionary, Dr. W. H. Lehman of Abong Mbong, French Cameroun, Africa. It is extremely valuable to scientists because the claim has always been made that there is an even closer resemblance between the fetuses of humans and apes than between adult humans and apes, Dr. Krogman explained.

Science News Letter, November 18, 1933

METEOROLOGY

Ball Lightning Apparently Connected With Dust

BALL LIGHTNING, one of the least understood of the electrical phenomena of the air, seems to be connected with the clouds of dust blown before a "line squall" wind or a tornado. Such at least has been the observation of Prof. J. C. Jensen of the physics department at Nebraska Wesleyan University as reported in *Physics*.

One ball lightning display observed by Prof. Jensen took place during an August thunderstorm while he was getting photographs and scientific records of ordinary lightning and the other phenomena accompanying it.

The cold air rushing ahead of the storm cloud was filled with a swirling mass of dust, he says. Brilliant lightning flashes were seen descending in rapid succession from the cloud to the earth. In the wake of one of these flashes there appeared a shapeless mass of lavender color which seemed to float slowly downwards. The mass seemed most brilliant near the ground, and gave the impression of a gigantic pyrotechnic display. Two or three glowing globular structures seemed to roll (Turn Page)



HEISENBERG



SCHROEDINGER



DIRAC

From Page 323

perimentally the two molecular arrangements of varieties of ordinary light weight hydrogen (atomic weight 1) which are known as parahydrogen and orthohydrogen.

To a large extent the work on atom theory for which the 1933 physics Nobel prize is divided between Profs. Schroedinger and Dirac is built upon the foundations of Heisenberg's work. The French physicist de Broglie, also a Nobel prize winner, conceived the idea of the wave mechanics brand of physics which was utilized by Prof. Schroedinger who, by a different route, carried that idea much further.

Prof. Dirac was doing his graduate work at Cambridge when the great blaze of theoretical advance was set alight by Heisenberg's first paper of the autumn of 1925. Developing his

own mathematics, using unconventional methods of remodeling the mathematical methods of physics, as exemplified by his invention of "q numbers," Prof. Dirac produced a still more advanced system of quantum mechanics. Perhaps his most strikingly original and successful contribution is his relativistic theory of the electron. When just over 30 years of age Prof. Dirac was appointed to the highly prized Lucasian chair of mathematics at Cambridge.

Although until recently the Viennaborn Prof. Schroedinger held the chair of theoretical physics at the University of Berlin, to which he was appointed in 1927, he now finds work at Oxford more congenial than in the present atmosphere of Berlin. He made an enforced departure from Germany due to the present political regime and last month he was elected to fellowship in Magdalen College at Oxford.

Science News Letter, November 18, 1933

ARCHAEOLOGY

149 Old Shoes Found in One Prehistoric Apartment

A ROW of 149 old shoes would make an impressive sight, anywhere. When you find 149 old shoes worn in prehistoric times, and all collected from a single dwelling, that is something to stir the imagination. Who wore all those shoes, and when?

This exact number of worn-out sandals has been discovered by University of Texas archaeologists who explored the earthen floor of a prehistoric rock shelter apartment. The address of the apartment, which has long been unoccupied, is in Seminole Canyon, near the Texas border, in Val Verde County.

Trenching into the floor, through suffocating clouds of dust, the archaeologists brought up long-buried skeletons of some of the old inhabitants of the apartment, and various scraps and remnants of their clothes and useful possessions—including the large stock of their footwear.

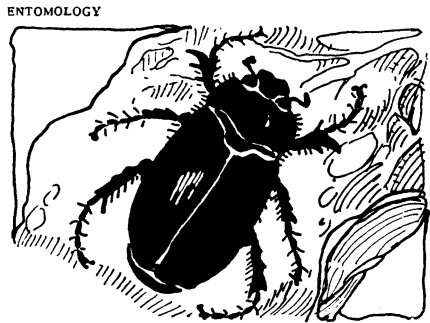
Square toes were the style in this Texas canyon, a thousand years more or less before Columbus found America. Shoes were made of sandal fashion, and were of fiber from the yucca plant. Many of the sandals still had tie strings in place when found.

As for the wearers, it is reported that most of them pretty well wore out their shoes. The sizes range from a child's five-inch foot to an Indian brave's ten-inch foot. The archaeologists found only a few obvious "rights" or "lefts."

The people who wore these shoes are so new to science that they have not yet received a name. Prof. J. E. Pearce and A. T. Jackson, who reported their exploration of the apartment in the canyon wall, consider this canyon a sort of melting pot for several kinds of early Indian culture. Here were blended ideas from the Basket Maker Indians in Arizona and other parts of the Southwest, ideas from the Big Bend region, and from Central Texas.

Besides the shoes, almost 5,000 articles in all stages of dilapidation have been recovered from the depths of the cave floor. The trash ranged from flint axes and hoes, wooden fire drills, and bone needles, to mussel shell spoons, baskets, a grass bed, and pieces of fiber string. From such fragments of household belongings, many time-worn almost beyond recognition, the life and the appearance of the ancient Texans begins to be understood.

Science News Letter, November 18, 1933



Insects, Bugs and Such

THE WORDS "insect" and "bug" are most persistently made to carry more than their legitimate loads of meaning.

Probably the widest understanding of these two terms is that insects and bugs are the same thing, and that any small creeping thing with a lot of legs is an insect or bug. Thus spiders, centipedes, ticks, and sometimes even worms and small crustaceans are lumped as insects. The bigger crustaceans—lobsters, crabs, shrimp and crayfish—we usually exclude from this classification, yet with a feeling that they are "something like insects," too—a sympathy with the Irishman of the anecdote who refused to eat a lobster, because it was "a boog."

It is too bad that this confusion should have arisen, for the words have clear-cut and exact meanings, and properly designate groups of creatures much smaller than their common use covers. An insect is, properly speaking, a small animal with an outside skeleton, six legs, one pair of antennae or "feelers" and four wings. The wing item is a little troublesome, for some insects have but one pair of wings and some none at all; but the basic insect pattern calls for four, and insects with fewer may be regarded as having lost them in the course of evolution. But the three pairs of legs and the one pair of antennae are sure marks of an insect.

All bugs are insects, but not all insects are bugs. In the strict sense of the term, a bug is an insect with a piercing bill folded back under its chest when not in use, and its outer pair of wings modified and usually somewhat shortened, so that the name of the group in the older classifications was Hemiptera, or "half-wing." Typical true bugs are