

Highlights of National Academy of Sciences Sessions

The National Academy of Sciences held its fall meeting at Philadelphia, Nov. 8 to 10. The following articles report some of the papers presented at its scientific sessions.

PHYSICS

Light's Speed Determined

The speed of light is 299,796 kilometers per second (186,284 miles per second). This is the final determination for the velocity of light as announced to the National Academy of Sciences by Prof. A. A. Michelson, of the University of Chicago, and president of the academy.

This figure is the culmination of years of effort on the part of Prof. Michelson. He made his first experiments when a young officer on duty at the U. S. Naval Academy at Annapolis. Within the past three years he has been working at the Mount Wilson Observatory refining the figure for the velocity of light. The most accurately measured base line in the world, about twenty-two miles long stretching between Mt. Wilson and Mt. San Antonio, was used. Prof. Michelson projected a powerful light through a narrow slit onto a mirror which was spinning at the rate of about 30,000 revolutions per minute, which in turn projected it on a reflecting apparatus at the far station. The reflector returned the light to the original source. With an accurate knowledge of the rate at which the mirror is revolving and the distance between the two stations, the velocity of light can be calculated.

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PHYSIOLOGY

Embryo Determines Growth

The development and behavior of an animal is clearly foreshadowed before its birth in the way its nervous system grows. That the nervous system is the most precocious of all the parts of the body, is indicated by the studies of Prof. G. E. Coghill of the University of Kansas, who spoke before the National Academy of Sciences.

Experiments on the embryos of some of the lower vertebrates have shown, he said, that certain foci or points of intense growth of the formative nervous system later on become the controlling points in the behavior of relatively advanced or even adult life. Furthermore, where various parts of the body later act together, this cooperation is foreshadowed by the previous growth of coordinating nervous mechanisms.

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GENETICS

Man Has Long Old Age

Compared with some other mammals, man has a relatively brief prenatal life, a long childhood, a short reproductive period and a long old age.

Thus declared Dr. C. B. Davenport of the Genetics Laboratory of the Carnegie Institution of Washington in summing up before members of the National Academy of Sciences his conclusions from studies made of growth in laboratory animals and man.

"The maximum length of the ordinary human life span," said Dr. Davenport, "may be taken as 295 hundred days, that of the guinea pig at 15 hundred and that of mice as 10 hundred days. Reducing these life spans each 100 per cent, we may determine the percentage of the whole constituted by each of four periods; intrauterine, prepubertal, reproductive and senescent. The most striking contrast in this comparison is the prepubertal life of the child, relatively two or three times as long as in the other mammals plotted. The second outstanding fact is that the reproductive period in man is relatively short, only about two thirds that of the mouse. On the other hand, man's post-reproductive period is correspondingly prolonged."

"Evidently this state of affairs," continued Dr. Davenport, "permits of prolonged training for the period of maturity when a man's best work is done. It tends to lead man to minimize the real importance of reproduction to the species. It tends to emphasize training and achievement and the accumulation and transmission to the next generation of the results of experience which are possible where life is prolonged beyond the reproductive period. The tendency of modern, intensive training and the stress on economic status is to extend the pre-reproductive period throughout the first third of life, so that practically only about 25 per cent of the maximum life span is available for reproduction."

Man's high development along intellectual and social lines has been favored by his slow growth and comparatively short reproductive period. The social and economic pressure on the more advanced of the intellectual types of people, however, he warned, cuts into their reproductive period to such an extent that they are threatened with extinction.

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ASTRONOMY

Sun's Heat Varies

The sun is a variable star. This can be proven even though the variation of transparency of the earth's atmosphere at different times of year produces apparent changes in the brightness of the sun, Dr. Charles G. Abbot, director of the Smithsonian Institution's Astrophysical Observatory, told members of the National Academy of Sciences.

The trouble with measurements of the sun's radiation in the ordinary way is in this diminution of the light by varying degrees by different conditions of the atmosphere, Dr. Abbot told the scientists, and some critics have expressed the belief that previous efforts to show the sun variable were in error because the observer was unable to properly allow for the atmospheric changes.

Now, by selecting data obtained in the same months in successive years and when all the other conditions, as the height of the sun above the horizon, and the humidity, were similar, Dr. Abbot has been able to compare the light of the sun at various times as if there were no atmosphere. As a result, he finds a marked variation, in close agreement with the variations previously found. Both this and the earlier series of observations have indicated that the radiation from the sun is greater when the sun spots are most numerous.

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ARCHAEOLOGY

Newest Pueblo Discovery

Discovery of a crudely built prehistoric pueblo, was formally announced by Dr. J. Walter Fewkes, of the American Bureau of Ethnology, to the National Academy of Sciences.

The newest pueblo find, known as Elden Pueblo, lies only six miles from Flagstaff, Arizona, and the National Trail Highway passes within 200 yards of it. Residents of Flagstaff long ago recognized that the clearing in the pines was a site of some ancient settlement, Dr. Fewkes said. But the ruins were practically unknown to scientists until this summer.

The prehistoric inhabitants of Elden Pueblo were related to the modern Hopi Indians, it is believed.

"Both the architecture and ceramics point to a respectable antiquity of 500 to 800 years, as the decorations are archaic and the masonry crude," he said.

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