

PHYSICS

Mesotron Is Shortest-Lived Thing in Whole Universe

New Extension of Life Span Still Leaves It With Only 2.8 Millionths of a Second; Born in High Air

THE LIFE of the mesotron, middle-weight atomic fragment, is probably the shortest span of existence in the universe, despite new measurements, reported to the American Physical Society in Baltimore which have given it quite a boost. Experiments carried out at Echo Lake and at Denver, Colo., last year gave it a life of 1.6 millionths of a second, in substantial agreement with previous estimates. New and more accurate measurements this year give it a life of 2.8 millionths of a second.

The experiments were made by Drs. Bruno Rossi and Kenneth Greisen of Cornell University, Drs. Joyce C. Stearns and Darol K. Froman of the University of Denver and Dr. Phillip G. Koontz of Colorado State College.

Mesotrons are born high in the atmosphere through some action of the incoming cosmic rays. But few of them live to reach the earth. In fact, many of them expire in passing from the level of Echo Lake to the level of Denver, a drop of about 5,000 feet.

However, the new experiments confirmed what was previously found, that the faster the mesotron travels, the longer it lives—as measured in our time. But measured in its own time, mesotron time, all have about the same life span, 2.8 millionths of a second. This is called the “proper” lifetime of the mesotron, and is obtained from the experimental times by correcting them for the relativity effect of velocity on time.

Thus for a mesotron a fast life means a long life, contrary to the case for human beings. But if you were a fast-moving mesotron you would know nothing about this. Consulting your own watch—a perfect timepiece—you would find that you lived not a whit longer than if you stood stock still—2.8 millionths of a second in either case.

But observers on the earth, consulting their own timepieces—also perfect—would find that your watch was ticking more slowly—also that your little heart was ticking more slowly.

And if, doubting your own watch, you stopped to compare it with that of

one of the observers, you would find both going at exactly the same rate. Thus, by your own heart beats, your “proper life” is always the same whether you travel or stand still, supposing you’re a mesotron.

Science News Letter, May 9, 1942

Grating Made in Sections

A DIFFRACTION grating that distinguishes between a new star and a planetary nebula was described by Dr. R. W. Wood of the Johns Hopkins University. The grating, 18 inches in diameter, has been made to fit the 18-inch Schmidt photographic telescope at Mt. Palomar, California, where the 200-inch telescope, the world’s largest, is to be located. The grating throws a rainbow spectrum like a spectroscope, and shows a nitrogen band for the nebula very near the bright hydrogen line. This band is not seen with an objective prism.

The whole surface of the 18-inch

disk is covered with straight parallel grooves or lines, accurately spaced and 1,500 to the inch. The grooves are so shaped that nearly all of the light is thrown into the spectrum and the highest intensity is in the red region.

A novel feature of this grating is that it is built up in sections like a mosaic. These sections measure 4 x 6 inches and are replicas of one master grating.

The grating when placed over the object glass of the telescope, draws out into a spectral streak every object in the field of the telescope.

Another 18-inch grating has been made with but 800 lines to the inch in order to give short spectra; this is required when the field is crowded with many stars, for otherwise the spectra overlap. This grating throws most of the light in the blue end of the spectrum, and will be used for classifying faint stars according to their spectra.

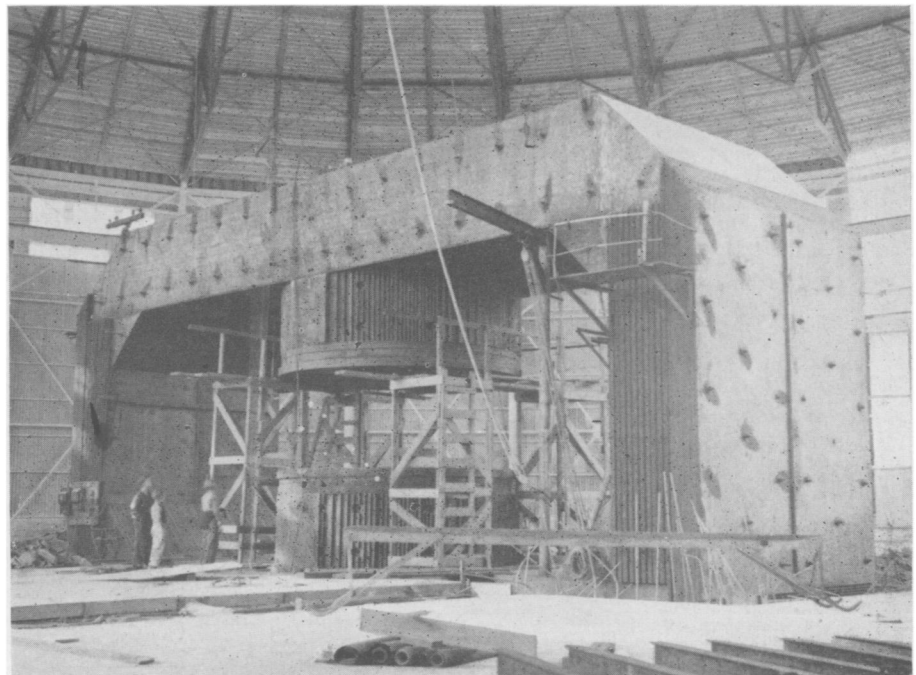
Dr. Wood is to make a 36-inch grating for the Mount Wilson Observatory.

Science News Letter, May 9, 1942

PHYSICS

Berkeley 100,000,000-Volt Cyclotron Now Has Roof

FOR some time the great 100,000,000-volt cyclotron being constructed for the University of California has stood out in the open. Now it has a roof over its head. The heavy work of erecting the



GREATEST CYCLOTRON

4900-ton magnet is finished, and the installation now of the more delicate parts of the apparatus requires shelter.

When finished, this machine will whirl deuterons, the central cores of heavy hydrogen atoms which are twice as heavy as the protons or central cores of ordinary hydrogen atoms, up to a velocity of 60,000 miles per second. It will also whirl alpha-particles, the central cores of helium atoms, up to the same velocity. But since these are twice as

heavy and have a charge twice as great as the deuterons, they will emerge with twice the energy or with 200,000,000 electron volts each.

If the new cyclotron is as efficient as those of the past have been, the issuing atomic beam will contain 3 to 5% of the electrical energy put into the machine. Simple steam engines, like those used for hoisting, do not do much better.

Science News Letter, May 9, 1942

PLANT PHYSIOLOGY

New Synthetic Plant Hormones Induce Seedless Fruit Formation

Addition of Halogens to Weak Organic Acids Produces Compounds With Unique Properties

NEW synthetic growth-promoting substances, or plant hormones, many times more powerful than those now in use experimentally and by greenhouse-men, have been prepared at the Boyce Thompson Institute for Plant Research by Dr. P. W. Zimmerman and Dr. A. E. Hitchcock. Applied to plants in the form of vapor, spray, emulsion, lanolin paste, or added to the soil, they induce

profound changes in growth, and they can also induce the formation of seedless fruits from unpollinated flowers at points on the stem a foot or more from the place of application. Treated plants are so changed that sometimes they look like quite different species.

The new hormones are prepared from various mild organic acids, which have no effect on plants in their ordinary

state, by the addition of atom-groups containing chlorine, iodine or bromine, either singly or in combination. One very effective compound of this sort is known as dichlorophenoxyacetic acid. It has been found to be fully 300 times more effective in inducing formation of seedless fruit than indolebutyric acid, one of the synthetic plant hormones now widely used. Solutions as weak as 10 to 25 parts (by weight) in a million parts of water have been found most effective as seedless-fruit inducers.

In all, eleven different compounds of the new class have been prepared. All of them seem to share the same great power over the growth and development processes of plants, and all seem to depend on the addition of one or more of the chlorine-iodine-bromine triad of elements (halogens, the chemists call them) to weak organic acid foundations.

Drs. Zimmerman and Hitchcock warn against rushing into attempts at practical application without further experimentation: "Considering the activity of these new growth-modifying hormones and their capacity to cause extreme types of distortion, caution should be exercised in their practical application. In view of the tendency to include various types of hormones in fertilizers, fungicides, insecticides, and other commercial preparations, the use of these new compounds should be preceded by extensive experimentation to make sure that they will not be detrimental to crops. Phenoxy compounds are known to have insecticidal value and now that they are also known to be plant hormones there might be a tendency to incorporate them in commercial sprays and fertilizers. The idea would be good but the results might be disastrous."

Science News Letter, May 9, 1942



EFFECTS BOTH BAD AND GOOD

The new halogenated compounds cause both abnormal leaf growth and the setting of seedless fruit from unpollinated flowers remote from point of application.

PSYCHOLOGY

War-Blinded Men Employed In British Aircraft Works

BLIND men, some of them war-blinded in this war, are making good on jobs in the British aircraft industry, it is revealed in a British journal, *Aeroplane*.

So great is the concentration of these men on their jobs, that they work faster than men with sight, it is reported. The men were employed by Philips and Powis Aircraft, Ltd., as an experiment. Now they are being kept on because they are doing really valuable work, and the employment of the blind is recommended to other aircraft concerns.

Science News Letter, May 9, 1942