

occur when the animal's sensory nerves are stimulated, and from this observation the scientists hope to find how the brain activity is linked with the world outside, for example, what happens in the brain when you feel a touch on your arm. A difference between the electric messages picked up from the brain and those of nerves was found by the British scientist, Dr. Adrian.

The electrical disturbance which travels as an impulse along a nerve fiber spreads along the fiber as a momentary wave—a brief impulse followed by a brief interval of rest and recovery. In the cerebral cortex, the gray matter of the brain, on the other hand, instead of the abrupt spikes observed in a record from an active nerve fiber, there are more gradual large electric oscillations

which form a series of waves of smooth contour. These are the brain waves.

The information being obtained about the brain and nerves by electrical means is expected to revolutionize our whole knowledge of the way the human mechanism works, in the opinion of some scientists. Commenting on these advances, Prof. C. Judson Herrick, of the University of Chicago, recently said: "I venture the prediction that the electrobiological era now beginning will yield as revolutionary changes in our conceptions of the physiology of the nervous system as the invention of the microscope inaugurated in anatomy."

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Science News Letter, July 6, 1935

## GEOLOGY

## Earth Is Between 1850 And 3500 Million Years Old

**H**OW OLD is the earth? Write it down in the family album that its age is between 1850 and 3500 million years. This is the verdict of scientists speaking at the symposium in Los Angeles on "The Geologic and the Cosmic Age Scales."

The meeting, sponsored jointly by the American Physical Society and the Astronomical Society of the Pacific and held at the University of California at Los Angeles, disclosed the different ways science dates the approximate "birthday of the earth" over a thousand million years ago.

One technique is called the "hour glass" method since it is based on the amount and rate of sedimentation laid down by erosion over millions of years. It is comparable to measuring time by using the flow of sand through an hour

glass. The difficulty is that no one can be sure that the rate of sedimentation was anywhere near constant through the long periods of time involved, said Dr. George D. Louderback of the University of California.

Much more accurate is the radioactive "time clock" method described by Dr. Robley Evans of Massachusetts Institute of Technology. Certain rocks of the earth contain the elements thorium and uranium, which continually disintegrate and finally form lead. The rate of doing this is unchanged by any natural phenomena yet found by science. Thus, the ratio of the lead to the thorium or uranium present shows how old the rock is.

Still more accurate is to measure the amount of the gas helium present in the sample. This gas is formed as the radioactive elements break down and shoot off alpha particles which are really the cores of helium atoms.

Finally, the impact of the alpha particles on the surrounding material forms, over long periods of time, very small haloes or rings. Some specimens of mica show these rings very well. The age of the sample can be determined by studying the size and fineness of these haloes.

All these methods, as well as others based on astronomical considerations, point to the earth's age—between 1,850,000,000 and 3,500,000,000 years.

Science News Letter, July 6, 1935

## ASTRONOMY

## African Astronomer Discovers New Comet

**A** NEW object in the heavens has been reported to astronomers throughout the world by the International Astronomical Union bureau.

The object is a comet and was discovered by Dr. Cyril Jackson of the Union Observatory, Johannesburg, South Africa.

Of the thirteenth order of astronomical brightness when found (June 19), the object was much too faint to be seen with the naked eye. It appeared low in the southeast sky just north of the bright star Antares, in the constellation of Scorpius. The astronomical coordinates were right ascension, sixteen hours, forty-four and three-tenths minutes; declination, minus nineteen degrees and forty-eight minutes.

The new comet was later sighted (June 24) by astronomers at Harvard College Observatory, Dr. Harlow Shapley reports.

Dr. Fred L. Whipple and Dr. L. E. Cunningham of the Observatory staff find that the brightness of the newest comet is diminishing. On June 24 it had dwindled to the fifteenth order.

Science News Letter, July 6, 1935



**A CLOSE-UP**

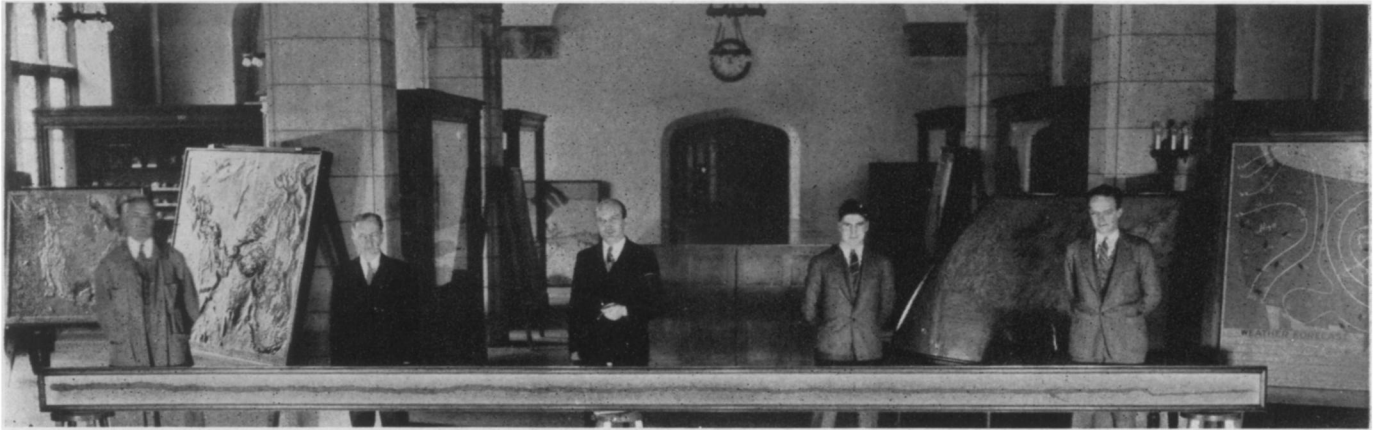
Showing the appearance of a section of the huge fulgurite shown on the facing page.

### ● RADIO ●

Tuesday, July 9, 3:30 p. m., E.S.T.  
THE GEOLOGY OF THE DIAMOND,  
By Dr. F. L. Ransome, Professor of Economic Geology, California Institute of Technology.

Tuesday, July 16, 3:30 p. m., E.S.T.  
WASTE BY WIND AND WATER, by H. H. Bennett, Director, Soil Erosion Service, U. S. Department of Agriculture.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.



## AVIATION

## Daily Seaplane Service To Europe Forecast by Sikorsky

DAILY transatlantic trips, by seaplanes triple the size of today's largest, are forecast for "the immediate future" by Igor I. Sikorsky, noted aircraft designer.

Speaking before the meeting of the Society of Automotive Engineers, Mr. Sikorsky backed his prediction by citing the extremely rapid progress in seaplane design.

Here is the comparison between the Sikorsky "S-40," which set payload seaplane records in 1931, and the "S-42," now about to go into regular commercial service between Hawaii and California:

	S-40	S-42
Weight . . . . .	21,000 lbs.	19,764 lbs.
Gross weight . . . . .	34,000 lbs.	38,000 lbs.
Equipment . . . . .	1,000 lbs.	2,181 lbs.
Pay load . . . . .	3,200 lbs.	8,363 lbs.
Cruising speed . . . . .	115 m.p.h.	157 m.p.h.
Top speed . . . . .	137 m.p.h.	182 m.p.h.

The important part of the development, Mr. Sikorsky pointed out, is the increase of 5,163 pounds in pay load. Or, said another way, if equal pay loads are considered, that is, 7,500 pounds, the range of the S-40 is 479 miles while the range of the S-42 is 1,130 miles, an increase of 651 miles.

Even more striking for economical commercial flight is a comparison by what the aircraft engineers call the ton mile. If an airplane can lift a one-ton payload and cruise with it at 100 miles an hour for one hour, it is credited with a rating of 100 ton miles.

The Sikorsky S-40, on this basis, every flying hour receives credit for (1.65 tons x 115 miles) 189.75 ton-miles. The S-42 however, receives credit for (4.25 tons x 145 miles) 616.25 ton-miles.

On this comparison the new S-42 is over three times as efficient.

Discussing how the future of transatlantic flying lies in the use of larger seaplanes, Mr. Sikorsky said:

"Several conditions point to the usefulness of increased size of future flying boats as compared with land transports. In the latter case, the great frequency of departure is of value because of the relatively short distance to be covered, and it has been generally found that small ships can be used successfully. In the case of North Atlantic trans-oceanic flying boats, the frequency of departure is of less importance, as a tremendous saving in time is made, reducing perhaps the time involved from four or five days to 24 hours per trip. Needless to say, daily departures will be made.

"Eight professional men will be required for such 24-hour flights, not counting the stewards. Furthermore, the improved efficiency and seaworthiness with respect to the increased size of flying boats are indicative of the possibilities offered. Therefore it is probable that in the immediate future we will see flying boats of up to 100,000 pounds; and in a decade or so flying boats of several hundred tons will probably make their appearance."

*Science News Letter, July 6, 1935*

## MADE BY LIGHTNING

*This fulgurite, 23 feet long, was formed when a stroke of lightning hit a sand dune in the Lake Michigan dune area. It is a hollow tube of rough glass.*

## GEOLOGY

## 23-Foot "Lightning Stone" Displayed at Chicago

A "LIGHTNING stone," or fulgurite, 23 feet long, has been placed on display in the geology museum of the University of Chicago. It consists of a hollow tube of rough glass, formed when a stroke of lightning hit a sand dune in the famous Lake Michigan dune area, fusing the sand momentarily into liquid which immediately hardened again into its present form.

Subsequently the wind blew the sand away, and the exposed slender tube of natural glass broke off piece by piece. The fragments were found a year ago by Prof. George S. Monk of the University physics department. The fifty or more pieces, from two to twelve inches in length, were all found in a limited area, about fifteen by thirty feet, in a pocket in the "blow-out" side of the dune.

Fitting the fragments together was a laborious task, but by persistence Assistant Curator Paul C. Miller finally got them all assembled and mounted for permanent display. Although longer fulgurites have been reported, the Chicago specimen is believed to be the longest and most complete specimen accessible to the general public.

The inside of the tube is smooth glass, but the outside is corrugated, with ridges running lengthwise, with a generally clinker-like appearance.

*Science News Letter, July 6, 1935*

Strawberries rank as an "excellent" source of Vitamin C.