

hours. It also has applications outside the radio transmission field.

The other device is an improved form of the "long film" oscillograph, ordinarily used in pulse transmission experi-

ments. Innovations in its construction are a magnetic clutch, shock absorber and magnetic brake which increase the resolving power without wasting or tearing the photographic tape.

*Science News Letter, July 2, 1932*

ASTRONOMY

## Astronomer Suggests Comets Born of Eruptions From Jupiter

**M**ANY of the comets that appear in the night sky to the telescopes of astronomers may really be the product of eruptions from the surface of the planet Jupiter within the last few centuries, if the theory just proposed by S. Vsessviatsky is correct. In a communication to *The Observatory*, British astronomical journal. Dr. Vsessviatsky, who is connected with the Astronomical Institute of Moscow, renews this suggestion, which was originally made a number of years ago by Richard Proctor, a famous English astronomer.

The "capture theory," held by many astronomers, supposes that these comets originally came into the solar system in parabolic orbits from vast distances. When one happened to pass close to Jupiter, that planet, with its great mass, pulled it out of its former path by gravitational attraction. After that the comet moved in an elliptical path, between the region of the sun and the orbit of Jupiter. Dr. Vsessviatsky points out that if this were the case it would be very rarely that a comet entering the solar system would happen to pass close enough to Jupiter to be pulled into the elliptical orbit. He estimates that it would only happen to something like one in 100,000 comets, but actually, he declares, there are about sixteen of these short-period comets to a hundred parabolic ones. Also, he says, the diminution in brightness of the short period comets indicates that their age is a matter of only a few centuries.

"The conclusion follows," writes Dr. Vsessviatsky, "that the date of birth of a short-period comet does not precede by very long the date of its discovery, whereas captures by the giant planets would occur only at very long intervals." He also points out that all of these comets are moving around the sun in the same direction as Jupiter, and the other planets, whereas if they were captured some would probably be moving the other direction, of "retrograde."

"The connection between these comets and Jupiter can be fully explained by the hypothesis that they are the product of eruptions taking place on Jupiter's surface," he states. In support of this he points out that comets ejected at low speeds would probably be more common than ones of high speeds, and that these would move in orbits not very different from that of Jupiter itself. Their orbits would be more nearly round, and they would not come as close to the sun, as those expelled at greater velocities. Actually, the rounder orbits are more common, though those with the roundest ones would probably not approach close enough to the sun to permit us to observe them at all.

Besides the family of comets related to Jupiter, there are others apparently connected with Saturn, and possibly with Uranus and Neptune.

"The theory," says its proponent, "suggests that very active processes are in progress on the surface of the large planets, resulting in the frequent expulsion of matter. It would be well to study the surfaces of these planets from this point of view, in the hope that traces might be found of the phenomena attending the expulsion of a comet."

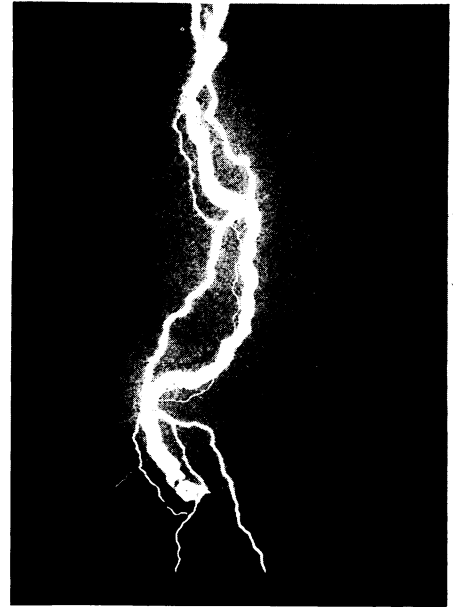
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OCEANOGRAPHY

## Tiny Organisms in Sea Soak Up Much Sunlight

**S**TRIKING evidence of the extent to which the upper layers of the ocean are filled with life has been presented to the American Geophysical Union by Dr. E. O. Hulburt of the U. S. Naval Research Laboratory.

Following observations made by William Beebe of the American Museum of Natural History of the way the sun's light dimmed out as he descended to a depth of 1400 feet in his "bathysphere," Dr. Hulburt made calculations of the



### LIGHTNING STRIKES A POSE

Paul F. Overdier of Kenosha, Wis., had unusual luck at catching lightning. He shot at a streak of it with his camera, and got two flashes on the same exposure. While he had the shutter open, two bright flashes occurred overhead, causing the skyline to register twice, but failing to spoil the excellent picture he got of the double flash in front of his lens.

light that theoretically should have been there. Good agreement between the candlepower observed by Mr. Beebe, and the candlepower that should have been there according to the calculations, could be found by making the assumption that observed and calculated candlepower fell off at the same rate below a depth of 200 feet; but that in the water layers above that level the actual dimming proceeded five times as fast as the calculations called for.

This could be accounted for by assuming a certain amount of opaque matter in the upper layers of the sea—objects, mostly living organisms, whose bodies absorbed the light falling on them. An absorption as great as this could be accounted for if only 25 millionths of the total bulk of the sea water was occupied by such opaque objects. One small fish, of less than sardine size, per cubic yard of water, would suffice; or the same amount of light-stopping stuff, animal, vegetable or mineral, in smaller but more widely distributed bits.

The color of the light observed by Mr. Beebe just before all light went out was a bluish green. This agreed quite closely with the value calculated by Dr. Hulburt, who found that theoretically the light should have been just a little more bluish than it actually was.

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