

Meteor Swarm Produced Famous Crater

Astronomy

Formed With Force of 400 Million Tons T. N. T. Says Theory

THREE HUNDRED thousand tons of meteors, in a close swarm, exploding as they hit the earth and producing effects as violent as 400 million tons of T. N. T., could have produced the famous meteor crater, nearly a mile in diameter, near Winslow, Arizona.

At the meeting of the American Astronomical Society at Chicago, Dr. Forest R. Moulton, former professor at the University of Chicago and now a public utilities official, told of his conclusions, which leave little hope that there may be any of the original meteors left.

It has been thought that a much larger meteoric mass, perhaps ten million tons or more, would have been required to produce the effect, and that this great mass, possibly containing many rare elements, was near the crater, just below the surface, where it could be mined. Large sums of money have been spent in efforts to locate the mass, but so far they have not been successful.

Dr. Moulton, who is one of the country's leading astronomers, presented the following argument. A small meteor, perhaps weighing a pound or so, would enter the earth's atmosphere at its initial speed of around 10 miles a second. At first it would be retarded very little, but as the atmospheric resistance increased to the point where it was greater than the gravitational attraction, then the meteor would slow up. Most of the energy is radiated away as light and heat, and the meteor burns up, producing an ordinary shooting star.

2,400,000 H. P. Per Square Inch

But a meteor of large mass, say a thousand tons, encounters very little resistance as it passes through the atmosphere, and when it hits the earth, it encounters a very high resistance. For a thousand ton meteor hitting rock, Dr. Moulton calculates that the resistance is 50,000 tons per square inch and that it does work at the rate of 2,400,000 horsepower for each square inch. Even nickel iron is scarcely more resistant to these enormous forces than tissue paper, and so the meteor would be completely broken up and destroyed with explosive violence.

He also called into question the theory that many meteors come into our solar system from outer space. This has been suggested because some of the meteors have been thought to move at speeds which would carry them in the curve called a hyperbola. Meteors originating in the solar system would move in a parabola and it has been thought that many might come from the region of other stars where they might have originated in the same way that the home-made product was made. Dr. Moulton, however, expressed doubt that meteors, except in very rare cases, are moving along hyperbolas, and that therefore most of the shooting stars we see in the night sky, and the occasional meteorites that land on the earth, are members of the solar system, like the sun and earth.

Ultraviolet Light and Sunspots

An astronomical mystery as to why ultraviolet light from the sun failed to vary with the number of sun spots during the year from June, 1928, to June, 1929, was put before the members of the Society.

Dr. Edison Pettit, Mt. Wilson Observatory astronomer, told of his researches on the variation of the sun's ultraviolet radiation since May, 1924. When three month averages of the number of sun spots are plotted against the intensity of the ultraviolet light during the past six years, they are found to agree very closely, except during the year mentioned, when the curves run counter. Dr. Pettit believes that there was nothing wrong with his instruments to produce this affect.

He has also found, he announced, that in June, 1924, the ultraviolet radiation was less than during any month since then. Taking the average for that month as the unit, he finds that the highest intensity was during the month of November, 1925, when it was 1.57. In February and April, 1927, it was 1.51 and last January 1.52. The lowest monthly averages have been January, 1928, with 1.18; September, 1928, with 1.12; June and November, 1929, with 1.19 and April, 1930, with 1.15. The ultraviolet rays from the sun are the ones that produce sunburn, are mainly

concerned in taking photographs, and produce certain other bodily effects, such as the prevention of the disease rickets.

Uses Quartz Lenses

Dr. Pettit's method is to observe the sun through lenses of quartz, as glass is opaque to the ultraviolet rays. He uses two lenses, one covered with a thin film of silver, the other with a similar film of gold. The former is transparent to the ultraviolet, while the latter is opaque, but transmits visible light of a green color. By means of a vacuum thermocouple, which converts radiant energy into an electric current, he measures the intensity of the sun image as made by each lens. The green light remains relatively constant, so the difference is due to the change in ultraviolet.

Though he has used the same lenses and films of silver and gold ever since he began the measurements he finds that their constant exposure to sunlight has not made them more or less transparent.

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Europe's Muskrats

EUROPE has muskrats. American muskrats; for the animal is native to the New World. And like the old woman who lived in a shoe, Europe doesn't know just what to do with them.

Muskrats were imported to be "farmed" for their fur, when the furs from Siberia, China, Canada and other northern lands began to become scarcer. Like all rodents, they multiply enormously.

But in the more thickly populated countries, especially in western Europe, they are beginning to be looked upon as nuisances and treated accordingly. Germany and Switzerland prescribe the animals and encourage their extermination. In France, the animal is both desired and feared; desired for its fur and feared because of the possible mischief its burrowing habits may do to the embankments enclosing fish-ponds and protecting lowlands from flooded rivers.

But farther east, where there is more room and also more small bodies of water, the muskrat is hospitably received and encouraged.

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