

## ASTROPHYSICS

# Ionized Gases Suggested As Cause of Meteor Light

Trail Would Not Last If Heated Elements Caused Light,  
Declares Scientist in Debated Paper to French Academy

**J**UST WHY meteors shine with a bright white light is not known.

This surprising fact was brought out in a controversy over "shooting stars" between two French scientists.

Every schoolboy has been taught that when a meteor rushes into our atmosphere, the friction of the air raises its temperature until it begins to glow. Particles of the incandescent body are torn off and these form the fiery trail that is left behind.

Nothing could seem simpler or more obvious than this explanation. But, as frequently happens, the thing is not so simple when we examine it more closely.

One trouble is that the light of a meteor is white, even bluish. It is whiter than an incandescent tungsten filament. Now the temperatures at which bodies will glow with a red, orange, yellow, or white light are well known, and there are very few substances that can be heated to a white incandescence without melting or vaporizing—and they are not the stuff of which meteors are made.

Meteorites that have reached the ground have been found to be either stony or composed of nickel and iron. Rocks melt at a red heat. Anyone who has seen an active volcano will remember that the lava is red. Molten iron is orange, as anyone may see in an iron foundry. How does it come then that the light of a meteor is white?

## Would Cool Too Quickly

Another difficulty is the light of the trail. According to the orthodox theory it is due simply to incandescent particles torn off from the main body of the meteor. But calculation shows that these minute particles, even if they were originally at the 12,000 degrees temperature necessary to give a white heat, would cool to dullness in less than a second. But a brilliant meteor often leaves a trail that lasts for many minutes, and can be seen wafted about by the wind.

Confronted by these difficulties, Prof. P. Burgatti, an Italian physicist, and Prof. Ch. Fabry, University of Paris, and others have suggested that the

glow of a meteor is an electrical phenomenon. They pointed out that the Kennelly-Heaviside layer, which plays an important part in the transmission of radio waves, is full of ions or electrified particles, so that the rapidly traveling meteor is subjected to a terrific bombardment of ions. The very few spectra that have been obtained of flying meteors, they also pointed out, show the characteristics of a glowing gas, not at all of an incandescent solid.

The two French scientists who took part in the recent discussion before the French Academy of Sciences each pursued the rather dubious tactics of proving his point by disproving the opposite. Prof. Jean Mascart of the University of Lyon showed that meteors begin to glow long before they reach any dense portion of the Kennelly-Heaviside layer. The pressure due to air resistance on a swiftly moving meteor amounts to several hundred atmospheres. At this pressure combined with the high temperature, we do not know, he said, just what the spectrum

of a gas would be like, because the conditions are not reproducible in the laboratory. He therefore concluded that the simple mechanical theory is substantially correct.

Prof. Ch. Fabry, who took the other side, pointed out the difficulties of the mechanical theory which we have already described. However, he did not quite come to the conclusion that the electrical theory as at present formulated is therefore correct, but to the safe conclusion that after all we do not really know just what causes the light of a meteor.

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## CHEMISTRY

## Disagreeable Alcohols Come From Smothered Vegetables

**F**OOD handlers who zealously keep air away from fresh vegetables, on the theory that the oxygen will destroy their vitamin C content, are running serious risk of ruining flavor, Drs. E. F. Kohman and N. H. Sanborn of the National Canners Association told the food chemists of the American Chemical Society.

Normal access of oxygen does not hurt this vitamin, Dr. Kohman declared, while shutting off the air permits the plants' own enzymes, as well as those of alien bacteria and molds, to carry on "anaerobic" respiration, producing alcohols and other compounds that give the foods flat and disagreeable flavors.

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## MEDICINE

# Monkey Drug Addicts Act Like Human Dope Victims

**M**ONKEYS that became drug addicts in the cause of science appeared on the moving picture screen for the benefit of members of the Federation of American Societies for Experimental Biology. The monkeys had become addicted to morphine, codeine, heroine and dilaudid, Dr. M. H. Seevers of the University of Wisconsin reported.

They behaved just as human addicts do when the drug is withdrawn, with one exception. The monkeys never learned to crave the drug to which they were addicted. Neither did they learn to associate the drug with relief from the distress they seemed to suffer when human drug addict.

The symptoms of withdrawal which they showed were a pinched expression of the face as if they were in pain or distress; lack of appetite; general overexcitability; persistent chattering, yawning, shivering and trembling; and goose pimples, like the "cold turkey" of the human drug addict.

The obvious conclusion from the study of these animals, Dr. Seevers said, is that all the drugs used are capable of producing changes in body cells of such a nature that these cells demand a constant supply of the drug in order to function with apparent normality.

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