FROM OUT OF THIS WORLD

THE campfire had died down, and as a song came to an end, John looked up. Far overhead, the stars twinkled through the clean air. And then, suddenly, there was a flash of light.

"Look!" cried Johnny. "A star just fell down!"

"There's another one!" shouted the boy next to him.

"And another! Gosh, soon there won't be any left in the sky!"

But you don't have to worry about that. What Johnny and his friends had seen falling were not real stars, but "shooting stars," also known as "meteors."

A real star is like our sun, only so far away that it looks very small. There are trillions of miles between us and the nearest star, and even light takes many years to travel that distance.

But a shooting star is very much closer. Actually, it's usually very little. It may be no bigger than a lump of sugar, and is sometimes even smaller. It travels many miles a second, but not nearly as fast as light.

How, you ask, can we see a tiny thing that moves so fast? Because, when it enters the earth's atmosphere—that's the layer of air around the earth—it warms up. In fact, as it rushes through the air, it gets very hot, and that's why we can see the streak of light which looks like a star falling.

The earth's atmosphere not only lets us see the meteors, it protects us from them. Tens of thousands of meteors enter the earth's atmosphere every day. Imagine what it would be like if all of them landed around us! It would be like being in a battle that never ends.

But the air slows the meteors down, heats them up, and in a few seconds most of them vanish. They just change into gas and dust and we don't even realize that most of them have existed. For instance, you don't see shooting stars during the day, and yet as many hit the earth's atmosphere in the day as at night.

WHAT SHOOTING STARS ARE

How do we know what shooting stars are made of? Well, for one thing, not *all* of than vanish in the air. Some are so large that they get through the atmosphere and hit the ground. When that happens, people usually see a great streak of light, and hear a boom similar to a shell exploding.

A meteor is like a shell in other ways too. Either before it lands, or just after, the meteor may explode with pieces flying in every direction. If it doesn't explode, it may bury itself deep in the ground, burning up the trees and grass all around it.

About forty years ago, a great meteor landed in Siberia with a tremendous roar that could be heard miles away. In fact, people who were a long distance off saw a great ball of fire rushing through the sky. This meteor roasted everything within miles, and must have weighed thousands of tons. It did as much damage as an atomic bomb, although by good luck it landed in an unpopulated wasteland.

When a shooting star actually lands, and we see the pieces, they are not called meteors any longer, but "meteorites." Most of these meteorites are smaller than the one that hit Siberia, some weighing only a few pounds, others a good part of a ton. At any rate, they're big enough to be examined.

Practically all those found so far are of two kinds. The first kind is of stone, like the rocks you see all around you. The second kind is of iron and metals like iron. Some meteors have carbon in them and carbon is the element needed by all living things. But there's no life in a meteor. If there were any, the swift trip through the air would roast and kill it. The carbon, however, is sometimes changes into tiny diamonds. You can't get rich from a meteorite, because the diamonds are too small to be worth much, but the information a scientist can get from one is worth plenty.

WHERE SHOOTING STARS COME FROM

There are certain seasons of the year when meteors are most often seen. In the early and middle parts of August, for instance, you can see them every night in great numbers.

These meteors them to travel together swarms, and the reason we see so many is that the earth has entered the path of a swarm. Where did the swarms come from?

After many years of study, scientists think they know the answer. Many swarms come from *comets*. A comet is usually seen in the shy with a bright head and a long glowing tail. Some comets have a life of many centuries. But when they break up, we sometimes find a meteorite swarm in their place. Not all comets change into meteor swarms, and not all swarms come from comets, but many do.

Besides meteor swarms, there are many stray meteors, lone wolves that travel through space alone. When a swarm hits the earth's atmosphere, you have a "shower" of shooting stars. When a stray meteor hits, you see just one star at a time.

Now, most of the swarms and strays seem to come from our own solar system; that is, from the space between the sun and the different planets. Some may come from other stars, but scientists aren't sure of that yet, and they are still studying the question.

Cameras are being used that take a picture of a shooting star at the same time from two different points. From the pictures, it’s possible to figure out where the shooting star hits the air, and how fast it's traveling. Other pictures tell us what kind of light the hot meteor gives out. From the kind of light, we can figure what the meteor is made of, even if it never lands on the earth.

Radar is another method used for tracing meteorites. Radar follows the path of a meteor, and in some cases scientists have been able to watch how the meteor is slowed up by the friction with the air.

Still other fact-finders fly up to *meet* the shooting stars. At the time of year when showers of meteors occur, these scientists fly up in Army planes and take photographs with aerial reconnaissance cameras. They are able to watch what happens when the meteor hits the air, gives a flash of light, splits in two, and grows bright again.

All these methods help tell scientists what a meteor is made of, from what direction it comes, how fast it is going, and how big it is. As they get more information, they can figure out how old the meteor is, where it came from, and other important facts.

All in all, shooting stars have many messages for us, telling us a great deal about out what is going on in space millions of miles away. Same day, when men travel through space themselves in rocket ship, much of this information will be just as vital as information about icebergs is to the sailors on an ocean liner.

Until then, shooting stars are important chiefly because of the flashes of light they shed on our knowledge of the universe. They light up not only the night sky, but our minds as well.

—*William Morrison*