

COSMOGONY

# Lost in Space: Our Sun's Twin

## New Theory Sees Origin of Solar System in Star That Whirled Itself Into Dumb-bell Shape, Then Tore in Two

By D. LINDSAY WATSON

**M**ILLIONS of millions of earth-like planets exist throughout the heavens.

Living things, even intelligent beings like ourselves, must be present on many of these. Our little company of life is then, not alone in the universe but is one of a vast number of colonies which have arisen where physical conditions are favorable.

This possibility of life scattered everywhere throughout the universe is made likely by a new theory advanced by Dr. Ross Gunn of the U. S. Naval Research Laboratory. Unlike his fellow-scientists, he believes that our solar system was formed by the catastrophic splitting of a large star, half of which became our sun while the other half lost itself in space.

This cosmic cell-division must be happening all the time among the stars. The double stars which form twenty-five per cent. of all the bodies we can see in the heavens, Dr. Gunn has shown, were born in exactly the same way. A planetary system is, therefore, the result of an orderly evolution—not just lucky chance.

The present accepted view among astronomers holds that the earth was formed in the course of a very rare accident. Another larger star is supposed to have collided with our own sun.

This is extremely unlikely. The stars are so very far apart that such a collision could have occurred only once in a million, million, million years. Probably not more than a thousand encounters of this kind have taken place in the whole history of the universe. If this theory is true the probability of there being other inhabited worlds is small.

On the other hand, if Dr. Gunn is right, many groups of planets similar to our own have been formed and it is not unreasonable to suppose that life has developed on these bodies as it has on the earth.

Our sun, according to the new idea, was once a liquid star about one and a half times as large as it is now. Electromagnetic forces made it rotate with

constantly increasing speed until it could no longer hold together. It then burst in two. The fragments skyrocketed apart, one becoming the sun and the other going off into the depths of space never to be heard of again. Before saying goodbye, however, the sun and its departing mate left a cigar-shaped ribbon of debris between them, which later cooled and formed the planets.

The story of the creation in the first chapter of Genesis can be interpreted as agreeing with Dr. Gunn's ideas. Verses six and seven read:

"And God said, Let there be a firmament in the midst of the waters and let it divide the waters from the waters.

"And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so."

### Fascinating Possibility

The resemblance of this old Hebrew account to Dr. Gunn's is still closer when we read for the word "firmament" its literal meaning, expansion, and read "waters" as fluid (or gas).

It is too early, yet, to speculate when and how we shall communicate with the near-human inhabitants of these earth-like bodies in distant space. However, this possibility is a fascinating one to a generation of men just becoming conscious that no limits can be set to human achievement.

Two new ideas have been introduced by Dr. Gunn's view of the birth of the solar system—his explanation of the kind of force that caused the old parent star to rotate to its destruction and his reasons for the excessive speed with which the two halves shot apart.

Old theories of this spin have been unable to explain how the sun could have come to turn so fast that some of its matter blew off at its equator.

Experiments with the discharge of electricity in vacuum tubes have supplied the clue that was missing. It is possible to explain a star's rotation, Dr. Gunn has found, not on gravitational grounds, but because of the operation of electric and magnetic forces on the electrically charged atoms known to exist in large quantities in hot stars.

Thus the present rotation of the sun, a problem which had baffled physicists and astronomers, has been given a new explanation by what Dr. Gunn calls an "electromagnetic wind." He has been able to explain not only the average speed of the sun's rotation but also the fact that it turns at a different speed at its equator from that observed at the poles.

The same theory applied to a larger mass such as the imagined parent of our sun, shows that the speed must have increased until the huge star made a complete turn in about six hours. Spinning still faster, the primeval star became unstable. It flattened into an oval shape; later assumed the form of an unequal dumb-bell, and eventually split in two—still spinning.

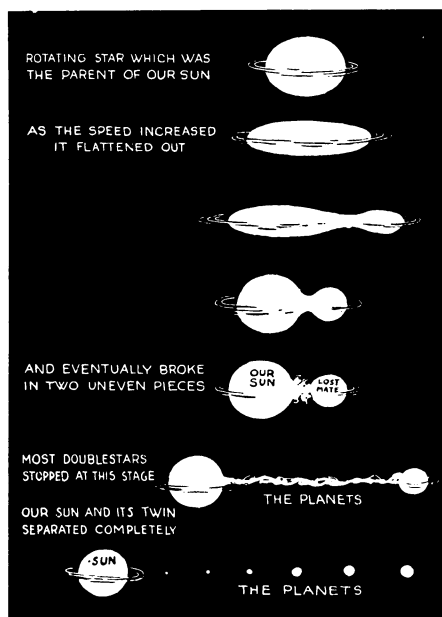
Now the inner surfaces of the two suns were temporarily much hotter than the outsides that had formed the skin of the parent star. Such hot surfaces must have radiated their heat and matter out much faster than the rest of the surface. This is just the way a skyrocket works. By shooting its exploding gases out behind it, the rocket flies forward.

Our sun and its departing mate pushed themselves apart like a couple of



**DR. ROSS GUNN**

—of the U. S. Naval Research Laboratory, whose new theory revives the possibility of the existence of inhabited worlds beside our own.



### SOLAR TAFFY

*The new theory about the origin of our solar system, showing how the sun increased its speed, split in two, and sent out a "twin"; and how the planets were formed from the trailing streamer of matter connecting the two bodies.*

skyrockets. While they were still close together, however, large bulges or tides were raised on each of the twins by the gravitational pull of the other. Our own moon pulls the sea around on the surface of the earth in exactly the same manner.

These tides, together with the swirling motion, caused the shooting out of a long stem of matter between the two new born suns. After a while this cooled and gathered together into lumps. These lumps were the planets, one of them the earth.

### A Heavenly Divorcee

It was all over in a few hours. By this time our sun's mate was dashing off to some distant corner of the heavens, leaving King Sol custody of the children and, so far as Dr. Gunn knows, leaving no address by which we can hope to reach her. Whether the departing divorcee also carries around with her another retinue of planetary brats, there seems no way of knowing now.

In Dr. Gunn's words:

"Just as the parent liquid star divided into two component stars, tidal and centrifugal forces broke off small sections and these cooled and formed the planets. Immediately after the planets were formed, the same tidal forces broke off even smaller sections, the planetary satellites or moons. The entire solar system was compact when formed. The

lost component, however, attracted the newly formed planets and succeeded in carrying them well away from the sun. Thus the present open structure of the system is due to the original presence of the lost mate of the sun."

Dr. Gunn is a late comer in a field which has occupied many distinguished minds. Contemporary astronomers are to be pardoned if they regard his revolutionary doctrine with some hesitation, if not hostility.

Accepted by scientists until the beginning of the present century was the notion that the sun and planets were condensed by cooling and contraction from a luminous cloud of gas spread throughout the space occupied at present by the whole solar system. As this nebula cooled, rings of gas were thrown off by its rotation somewhat like the rings of Saturn. These rings were supposed to have condensed into the compact masses that we now know as planets.

This idea of the nebular origin of the planetary system was proposed in 1775 by the German philosopher, Kant. Twenty years later the great French mathematician Laplace gave the nebular theory its mathematical form.

Sir James Jeans, one of the modern contestants in this arena, has now shown that, though Laplace's nebular evolution does take place in the heavens, it is on an incomparably grander scale. The great nebulae which can be seen through powerful telescopes thousands of light-years away, do indeed evolve by a very similar process.

A small mass of hot gas such as our primeval sun must have been 3000 million years ago, could not, however, break up in this way, scientists believed till now. It could never pick up enough speed, unless the new type of motion suggested by Dr. Gunn were in operation. Jeans has also shown that a ring of gases could not under the force of its own gravitation condense into a spherical planet. For these and other reasons the grand conception of Laplace has been in the wastebasket for the last twenty years.

Other scientists, however, have not been idle. Two of these, Drs. T. C. Chamberlin and F. R. Moulton of the University of Chicago, in 1905 propounded the theory which first replaced the nebular theory—the "planetesimal" hypothesis. Accepting the idea that a single star left to itself could never have given birth to the planets, they were forced to assume that another celestial body must have cooperated in the process.

Another wandering star, they believed, must have come so close to our sun at some remote time, that by gravitational force it drew lumps and a great mass of diffused gas and small particles out from the sun. The two stars swung around each other once, like country dancers, and never saw each other again. Those stray lumps were much smaller than our present planets. But as they whirled through the debris created by the glancing collision, they gradually picked up more and more matter. The planets had then reached their present size and they moved in nearly circular orbits.

### Great Tides Raised

Sir James Jeans and Dr. Harold Jeffreys of Cambridge University, England, have made further modifications of this collision theory. They believe that the new born planets were liquid and shot out from the parent practically full grown.

In Jeans' theory the two stars did not actually come into contact but passed so close that great tides were raised in the sun. These tides must have become so powerful that the gravitational pull of the sun was no longer able to hold it together. Liquid matter was ejected from the sun in a stream which subsequently broke into pieces. These condensed to form the planets as in Gunn's theory.

Dr. Jeffreys criticizes this theory, saying that tidal and gravitational forces could not have caused the rotations and revolutions that astronomers observe of the planets. Tidal disruption of the primitive sun would leave it rotating as before and the planets should now be rotating at the same speed as the sun, he holds. Actually the sun rotates in twenty-five days, while Jupiter, a planet, turns around once in ten hours.

These difficulties can be avoided, says Dr. Jeffreys, if the two suns actually collided. A glancing blow from a heavier star would have given our sun a jolt which could have produced the desired rotation. Then the new-born planets would also have been dragged around sufficiently fast by the visiting star.

Explanations of the satellites of the planets can be given on these theories, but on any theory yet devised our moon remains extraordinary and unexplained. With respect to the size of its planet, the moon of the earth is one of the largest satellites in the solar system, yet the earth is one of the smallest planets. The moon has a mass one-eightieth as great as that of the earth.