ASTRONOMY

Collision Theory of Earth's Origin Is Exploded

Hot Gases Torn Out of the Sun Would Quickly Dissipate And Not Cool Enough for Condensation, Harvard Man Says

THE widely-accepted collision theory of the birth of the solar system, including the earth on which we live, as the result of a star sideswiping the sun ages ago was attacked by Dr. Lyman Spitzer, Jr., of Harvard College Observatory, before the American Astronomical Society meeting in Berkeley, Calif.

Hot sun gases drawn out into a gigantic filament by such a glancing encounter between stars would explode just as a deep-sea fish bursts when brought to the surface and released from the high pressure surrounding it.

No alternative theory of solar system origin was offered by Dr. Spitzer, but he suggested that the planets may have been formed during the general chaos accompanying the formation of the Milky Way galaxy two billion years ago.

"According to the encounter theory," Dr. Spitzer explained, "one star sideswiped the sun, or possibly it was a hypothetical former companion to the sun. A thick cigar-shaped filament of hot gas formed between the two stars, and condensed into planets as the stars separated.

"It was generally assumed previously that such a filament would cool sufficiently quickly to allow condensation. Present calculations rule out this possibility. Hot gases inside sun are at enormous pressures and temperatures; if torn out of the sun by passing star they would not be subject to such pressure and would explode just as deep-sea fish, normally under heavy pressure, explode when brought to the surface.

"Filament gases would reach the velocity of escape from the filament in a few hours. During this time filament would radiate less than a thousandth of its internal energy and hence could not cool appreciably. Since the filament would accordingly dissipate into space, a collision process could, therefore, not lead directly to formation of planets."

Discover Expanding Shells

EXPANDING shells of gas surrounding bright blue-white stars, rushing away from the star at the rate of 30 to about 100 miles per second, were reported by Dr. Ernest Cherrington, Jr., of the Perkins Observatory, Delaware, O.

A close examination of visual-region spectrograms of Be and B stars revealed to Dr. Cherrington that a large percentage of stars with nebulous line had sharp lines also. The more familiar nebulous lines are formed in the usual surface or photosphere of the star, while the sharp lines are thought to be formed in the receding super-shell. The velocity of the expanding shell increases with increasing stellar luminosity. There is higher degree of excitation in the super-shell than in the photosphere, and the excitation in the shell declines with increasing luminosity while excitation in the photosphere increases.

Dr. Cherrington's preliminary results show that the pressure of an absorbing super-shell in a large number of B stars may be the fundamental cause of the limitation of brightness for high temperature stars.

Mysterious Luminous Bars

WHY SOME of the spiral nebulae, great galaxies of stars in outer space like our own Milky Way, have a luminous bar extending across their central portion remains an astronomical mystery, Dr. Edwin Hubble, of Mt. Wilson Observatory, told the meeting. About four-fifths of all the spiral nebulae are barred.

"In the fully developed barred spiral," Dr. Hubble said, "a luminous bar extends diametrically across the central lens, and spiral arms spring abruptly from either end of the bar. In all other respects, the two types of spiral appear to be strictly comparable, and to follow the same pattern of evolutionary development.

"Since the bars do not seem to be correlated with any other physical features, their origin is sometimes attributed to tidal action or other external forces. This interpretation, however, is not supported either by the orientation of the bars with respect to neighboring systems, or by the distribution of the nebulae themselves."

Nebulae present a wide variety of structural forms but they fall naturally into an ordered sequence which presumably represents the evolutional history of stellar systems. Dr. Hubble is making detailed studies of the various stages, based upon photographs of about 2000 of the brighter nebulae made with the large reflectors on Mt. Wilson.

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ENGINEERING—GENERAL SCIENCE

Engineers' Inquiry Asks: Are Patents Suppressed?

SO IMPORTANT are patents to American industry that engineers and industrialists feel they have "a vital interest" in the American patent system, 150 years old next year. Suggestions for changes in the patent status quo are scrutinized with suspicion and care, regardless of where they originate.

The patent system, grinding out the 17-year monopolies of invention at the rate of some 40,000 yer year, has been subjected to several recent inquiries and investigations. The Temporary National Economic Committee (monopoly investigation) under Congressional mandate dug into the patent problem as it stirred about for facts in several industries, notably glass and telephone service.

Now engineers and manufacturers are engaged in an inquiry of their own, asking engineers and inventors to volunteer recitals of their patent experiences. One objective of this volunteer testifying, sponsored by the National Association of Manufacturers, the National Industrial Conference Board, and the American Engineering Conference, is to discover whether there is any truth in the oft-repeated, and as often denied, accusation that valuable patents are bought up and laid on the shelf by selfish industries or otherwise suppressed.

Question 5 of the industrialist-engineer questionnaire asked about "any premeditated opposition from others to the working or use of your patents" for reasons not otherwise listed, which other reasons include: "No adequate market demand," "invention brought out ahead of opportunity for use," "awaiting commercial development," etc.

Another interesting question is: "What rewards or satisfactions, other than monetary have come to you through your patented inventions?"

And the inquiry also searches into the