

## ASTRONOMY

# New Stars Are H-Bombs

Theory proposes that part of a large cloud of hydrogen gas becomes unstable and a star is born in a cosmic explosion that hurls non-ionized gas outward at 12 miles per second.

► STARS BEING born are cosmic hydrogen bombs, exploding in dense interstellar clouds, according to a new theory on the results of star formation presented to the American Physical Society meeting in New York by Dr. Malcolm Savedoff of the University of Rochester, Rochester, N. Y.

He drew a mathematical picture of stellar birth within one of the vast clouds of hydrogen gas that dot the reaches of space between stars. Dr. Jan H. Oort of Leiden Observatory, The Netherlands, and Dr. Lyman Spitzer of Princeton Observatory, Princeton, N. J., proposed the ideas that triggered Dr. Savedoff's investigation of "the gas dynamic effects of star formation."

Dr. Savedoff suggests that in a big cloud of hydrogen gas, part of the cloud becomes unstable and a star is formed. Ultraviolet radiation from the star ionizes the gas immediately around it. This ionized gas pushes the neutral, or non-ionized, gas around it away at the high velocity of 12 miles per second. Speed of sound in air being about one-fifth of a mile per second, the velocity of this expanding gas is at least 60 times as fast as present-day jet planes.

In front of the expanding gas is a shock wave, an invisible wall rushing ahead in warning of the high pressures behind it. Beyond the shock wave is a region, still within the great hydrogen cloud, that does not know anything is going on.

The effect can be likened to the difference between lighting a match and a firecracker. The match is designed to burn slowly, a little at a time. When a firecracker is set off, a comparatively large amount of matter is excited very quickly, resulting in an explosion. Dr. Savedoff's cosmic bombs are hydrogen firecrackers of gigantic proportions exploding now.

Best evidence for current stellar formation, Dr. Savedoff told a symposium of the Physical Society's division of fluid dynamics, is the fact that the brightest stars radiate energy so furiously their fuel supply, which is hydrogen, would be exhausted in ten million years.

Recent studies of the apparent motions of stars have revealed groups that seem to be expanding from a point, and the age of such stellar clusters is estimated at only two million years. Currently, the age of the universe is thought to be about five billion years. These infant stars are bright blue stars, a million times brighter than our sun, found in what astronomers call "O" associations, always seen close to dense interstellar clouds.

Dr. Savedoff worked out this theory in collaborating with John Greene, who is

studying for his Ph.D. at the University of Rochester.

When a star is formed outside of a hydrogen cloud, Drs. Spitzer and Oort have proposed that ionization of gas on the side of the cloud close to the intense stellar ultraviolet light leads to a rocket-like effect, the cloud losing protons and electrons from its surface, and gaining momentum. Large velocities would result when a large fraction of the original mass of the cloud is thrust away.

Dr. F. Kahn of Manchester University, England, after further investigation concluded that this "rocket" effect would occur.

Science News Letter, February 12, 1955

## ENGINEERING

## Fight Machine Noise By Adding More Noise

► ENGINEERS HAVE taken a roaring electric power transformer and quieted it down by adding more noise.

This feat, disclosed in New York at a meeting of the American Institute of Electrical Engineers, was made possible by the phenomenon of wave cancellation. Two identical sound waves can completely wipe each other out when they are out of phase, that is when the crest of one corresponds to the valley of the other. Thus, under certain conditions two noises, no matter how loud they are, can be combined to produce complete silence, at least theoretically.

The experiment with the noisy transformer has not gone that far, W. B. Conover and R. J. Ringlee of the General Electric Co., Pittsfield, Mass., explained, but they have produced what they called a "beam of silence."

The beam eliminates much of the noise from the transformer in a 30-degree angle. They called the effect "astonishing" and said that once the electronic adjustment had been made they could turn the transformer noise off or on at will merely by switching their loudspeakers on or off.

The equipment, they said, was much cheaper than conventional sound barriers and it promises to be "by far the most economical and satisfactory solution for noise problems where a limited area only is involved."

The direction of the "beam of silence" could be changed by adjusting the synco-pated phase of the loudspeaker noise. It was pointed out, however, that although noise is reduced in one direction there is more noise in other parts of the room.

Science News Letter, February 12, 1955

## PHILOSOPHICAL LIBRARY BOOKS

□ **ELECTRONS, ATOMS, METALS AND ALLOYS** by William Hume-Rothery. An introduction to atomic theory with special reference to metals and alloys. The subject matter is presented in the form of a dialogue between an Older Metallurgist and a Younger Scientist, bringing out clearly the contrast between the old and new viewpoints. Revised edition. The author is Lecturer in Metallurgical Chemistry, University of Oxford. 171 Illustrations. \$10.00

□ **DOWN TO EARTH**, A Practical Guide to Archaeology by Robin Place. Fundamentals of dating, recording, and interpreting are described and there follows a detailed account of all the main kinds of "digs" and "finds," actual examples being drawn upon in each case. The author is Lecturer in Archaeology at the City Literary Institute. 90 Illustrations. \$7.50

□ **SPIES AT WORK** by Ronald Seth. Here are all the great names of espionage, and a host of lesser ones. Mr. Seth illustrates the development of the technique of spying with story after story of cunning, daring, resource and personal courage—and often abject failure—which makes the most exciting and complete account of espionage ever written. The author of *A Spy Has No Friends*, and a Secret Service agent during the last war, Mr. Seth brings to this work authentic knowledge of his subject. \$4.75

□ **TWO YEARS IN THE ANTARCTIC** by Kevin Walton. This is the first personal account of two years spent in British Antarctica since the war. Kevin Walton went to the Antarctic as a member of the newly formed Falkland Islands Dependencies Survey and during his first year he trained himself and his dogs to live and travel in difficult country. The next year, an American expedition arrived and later both parties combined to complete an extensive survey of the East Coast of the Antarctic Land Peninsula. \$4.75

□ **BABA OF KARO**, A Woman of the Moslem Hausa by Mary Smith. This remarkable book contains what is probably the first full-scale autobiography of an African woman. Mrs. Smith, who speaks fluent Hausa, became Baba's friend while her husband, Dr. M. G. Smith, a social anthropologist, was engaged in field work in Nigeria. After many conversations between the two women, Baba agreed to dictate the story of her life. Dr. Smith contributes an essay on Hausa life and sociology to provide the background. \$7.50

□ **CAPRICORN ROAD** by Francois Balsan. An unusual travel book, telling the story of the first expedition to cross Southern Africa from the Atlantic Coast to the Indian Ocean in 1951, sponsored by the Societe Panhard and its South African representative, Union-French Industries. The expedition rediscovered the Lost City to the east of the Nosop River, reported by Parini in 1885. This is a faithful account of the penetration of practically unexplored territory by man and machine. The team consisted of nine men led by the author of this book, a well-known explorer and geographer. Illustrated. \$4.75

□ **ETRUSCAN ART** by P. J. Riis. This book is what might be called a collection of archaeological essays on the art from which Roman art was gradually developed, the art of the Etruscans, and the art of early Rome. The principal aim of the book is to widen the circle of knowledge already established by the university world and modern scholars in this particular field. Bibliographical notes added to the individual chapters will make the book useful to the student as well. The author is Professor of Archaeology at the University of Copenhagen. Illustrated. \$10.00

□ **EUROPEAN FIREARMS**. A richly illustrated history covering arms of the 16th and 17th centuries. Compiled by J. F. Hayward of Victoria & Albert Museum. \$7.50

□ **A DICTIONARY OF LAST WORDS** by Edward S. Loring. This unique book gives the last dying words, spoken or written, of more than 1600 famous persons, from the earliest centuries of history to the present, from Cyrus the Great and Jacob and Buddha, Confucius and Pericles, to Franklin D. Roosevelt, Joyce, and Petain, Lehar, Gandhi, and Hillman. \$6.00

□ **CONCISE DICTIONARY OF ANCIENT HISTORY** by P. G. Woodcock. Provides within a reasonable compass as much information concerning classical history as is likely to be of service to the general reader. \$4.75

□ **THE MICROPHYSICAL WORLD** by William Wilson. The greater part of the book is devoted to present day knowledge about atoms and molecules, their structure and behavior and about still smaller things such as protons, neutrons, electrons, positrons, etc. \$3.75

□ **POMP AND PESTILENCE**, Infectious Disease: Its Origins and Conquest by Ronald Hare. A realistic and readable treatment of a dramatic episode in the history of medicine. The author, Professor of Bacteriology at St. Thomas' Hospital in the University of London, discusses the origins of parasitism in prehistoric man and follows the spread of infectious diseases over the world throughout history. Vividly described in detail are some of the great epidemics of history—ancient and modern. \$5.75

□ **THE ART OF PRIMITIVE PEOPLES** by J. T. Hooper and C. A. Burland. Primitive Art, bizarre and beautiful, is presented here, with the magic and mystery which lie behind the mental processes of the artists of other civilizations. 116 Illustrations. \$7.50

□ **FORBIDDEN LANDS** by Gordon Cooper. It is a tragic anomaly that in these days of mass travel, half the world is still out of bounds. In this vivid and striking book Mr. Cooper is not concerned with political barriers, but with the secrets of the remote corners of the world, guarded by mountains and deserts, and hostile peoples. \$4.75

### MAIL THIS COUPON TODAY

Mail to your favorite bookseller or directly to  
**PHILOSOPHICAL LIBRARY, Publishers**  
15 E. 40th St., Desk 35, New York 16, N. Y.  
Send books checked. To expedite shipment I enclose remittance \$ . . . . .

NAME . . . . .  
ADDRESS . . . . .