

inadequate discussions of computed tomography and ultrasound, it is difficult to see what is added to the literature by Sprawls's book.

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Celestial Masers

A. H. Cook
135 pp. Cambridge U.P., New York, 1977.
\$15.95

Maser radiation—microwave amplification by stimulated emission—was first detected from galactic sources in 1965. More than ten transitions of the molecules OH, H₂O, and SiO have now been found to be strong masers. Observations with very long baseline interferometry indicate that the individual masers are very small, approximately 10¹³–10¹⁵ cm in diameter. This information, and the observed maser intensities, require very high brightness temperatures, around 10¹⁰–10¹⁵ K, of the radiation. In the most spectacular source, the rate of energy output in a single H₂O line is equal to one-tenth that of the Sun. The maser phenomenon indicates departure from thermal equilibrium. How it arises in space presents an interesting question. Many of the observed masers are located in dense clouds where stars are formed, and a study of them may also help reveal the physical conditions and kinematics in those regions of star formation.

In *Celestial Masers* Alan H. Cook reviews the literature on masers. He gives an introduction on the structure and spectrum of the OH molecule, summarizes the observations on the intensities, sizes, polarization properties and time variations of the OH and H₂O masers, and gives an account of the published pump mechanisms. To illustrate the principle of amplification by stimulated emission, Cook considers a linear maser in detail and summarizes the results for cylindrical and spherical masers. The author has contributed to the literature on a study of an interesting property of the OH masers, which is that many of them are 100% circularly polarized. He discusses this property at length and explains it as due to a combined variation in both the magnetic field and velocity motion of the gas such that one Zeeman mode is preferentially amplified.

A major shortcoming of the book is that it draws mostly from literature published before 1974. In view of the considerable development in the field since, the book is out of date. Thus Cook does not discuss the interesting SiO masers, which arise from rotational transitions in the first and second excited vibrational states. He does not incorporate or barely men-

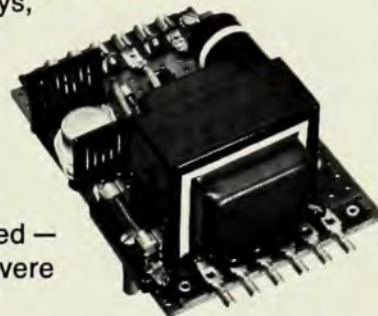
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tions many recent theoretical ideas on the pump mechanisms of OH and H₂O masers. The book also lacks a discussion of the regions where the masers are found, and lacks an emphasis on the relationship between the masers and their environment.

Celestial Masers can best be used as a guide, at the graduate level, to the early literature on masers. Its summary of the observations of OH and H₂O masers is adequate. Its review of published theoretical work is, however, uncritical. Cook takes note of this in the preface, aiming to bring out what is not known and to stimulate further study in the field of masers.

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book notes

The Once and Future Star: Exploring the Mysterious Link Between the Great Southern Supernova (Vela X) and the Origins of Civilization. G. Michanowsky. 149 pp. Hawthorn, New York, 1977. \$7.95

On 4 October 1968, astronomers at the Molongo Radio Observatory in Australia discovered a pulsar in the southern constellation Vela. Subsequent investigation showed that the associated supernova explosion occurred between 9000 and 4000 B.C. and at a distance (1300 light years) that is far closer than any other known supernova. Prior to 1968, however, George Michanowsky, an explorer and linguist, had already found evidence, in rock carvings and local star lore, that indicated a vestigial memory of some kind of dramatic event occurring somewhere in the Vela region. The author argues (and states that other scholars "agree without reservation") that "the mere sighting of this gigantic Vela starburst would have an organizing effect on humanity's cultural evolution." Among the evidence that Michanowsky cites for ancient observation of the Vela event is the tiny clay tablet BM-86378 in the British Museum. Among its cuneiform symbols, which form a star catalogue, is a reference to a "giant" star at the location where the Vela pulsar was found.

Newton and Newtoniana 1672-1975: A Bibliography. P. and R. Wallis. 362 pp. Dawson, Folkestone, UK, 1977. £30.00

In 1907 George J. Gray published the second edition of his *Bibliography of the Works of Sir Isaac Newton Together With a List of Books Illustrating His Works*, containing 412 main entries. As the present authors note, "the upsurge of interest in the history of science has produced a vast flow of new material in many

languages, relating to him [Newton], his background and the significance of his ideas." This has resulted in a new *Bibliography* with ten times as many items. Gray's sectional arrangement has been kept; thus the items are organized around such topics as the *Principia*, optics, fluxions, and chronological and theological works.

A Perspective of Physics, Volume 1. Selections From 1976 Comments on Modern Physics. R. Peierls, ed. 243 pp. Gordon and Breach, New York, 1977. \$30.00

This volume contains 27 selections (eight from *Nuclear and Particle Physics*, five each from *Solid State Physics*, *Astrophysics*, and *Atomic and Molecular Physics*, and four from *Plasma Physics and Controlled Fusion*) from the 1976 volumes of the five *Comments on Modern Physics* series. In his 27-page introduction Rudolph Peierls gives background information on the state of each of the five fields in 1976.

Illustrated Glossary for Solar and Solar-Terrestrial Physics (Astrophysics and Space Science Library, Vol 69). A. Bruzek, C. J. Durrant, eds. 204 pp. Reidel, Boston, 1977. \$26.00

"The Glossary is designed to be a technical dictionary that will provide solar workers of various specialties, students, other astronomers and theoreticians with concise information on the nature and properties of phenomena of solar and solar-terrestrial physics." So state Anton Bruzek and Christopher J. Durrant of the Fraunhofer Institute at Freiburg, Germany, in the preface to a book that they have written along with twelve collaborators. The terms are organized into 14 chapters, each dealing with a separate aspect of solar physics such as solar interior, solar corona, spots and faculae, prominences, and solar radio emission. The volume is amply illustrated; as the editors state, "The pictures reproduced here are often more than illustrations; they are, in a very real sense, the phenomena themselves Physics cannot as yet construct *a priori* a model that reproduces these pictures, so the attempt to understand these patterns, their evolution and relationships is still very fruitful and worthwhile. Starting from this premise the Glossary attempts to define these patterns" —CBW

The Quest for Absolute Zero: The Meaning of Low-Temperature Physics, 2nd edition. K. Mendelssohn. 281 pp. Halsted (Wiley), New York, 1977. \$11.50.

The second edition of this popular little paperback (the first edition appeared in 1966) contains new or updated chapters on superconductivity, on superconducting technology and on superfluidity, as well as having been completely reworked in SI