

Astronomy for astrophysicists...

Gamma-Ray Astrophysics. Edited by Floyd W. Stecker and Jacob I. Trombka. (A symposium held at NASA Goddard Space Flight Center, April, May 1973, sponsored by NASA and the American Physical Society.) Pp. xvi+412. (Scientific and Technical Information Office, NASA, Washington, DC, 1973.) \$2.90.

ASTRONOMY has been one of the most prolific of modern sciences, but the gestation period of one of its offspring— γ -ray astronomy—has been painfully long. The conception was in 1958 but it was not until 1972, after many false alarms, that birth finally occurred. This book is the report of a symposium on γ -ray astronomy which was held at the Goddard Space Flight Center in April 1973, and, therefore, marks a significant stage in the subject.

The papers read at the symposium illustrate very clearly the current situation in γ -ray astronomy and the great differences between that subject and the neighbouring X-ray astronomy. X-ray astronomy began in 1962 with the unexpected discovery of an X-ray source outside the Solar System. This discovery was made with a detector of modest size on a short rocket flight; experimentalists immediately realised that, with the use of larger detectors and the much longer exposure times provided by satellites, a rich field was waiting to be exploited. By contrast, few results were forthcoming in γ -ray astronomy until the experimental techniques had been stretched almost to their limit. This aspect of the subject is illustrated by the experimental contributions to the symposium, many of which contain a great deal of discussion of the statistical significance of observations, and of the reality, or otherwise, of differences between experimental results.

Conference reports inevitably reflect the vices and virtues of conferences and this one is no exception. One of the worst aspects of conferences is the superficial manner in which each topic has to be treated because of the limitations of time; nearly all of the contributions to this symposium, both experimental and observational, have been treated much more fully in various journals. Many scientists believe that the real value of conferences are the discussions which take place outside the formal sessions. Obviously, this activity is not recorded in a report but something is retained in the reporting of the question time at the end of each session. Here, one finds a genuine element of criticism and dis-

cussion by Schwartz and Gursky of the mally in journals. A very valuable paper at the symposium was the discussion by Swartz and Gursky of the experimental problems encountered in measurements of the spectrum of the diffuse flux of cosmic γ rays. This feature was discovered as early as 1964 but the problems of eliminating the effects of atmospheric background radiation and the effects of cosmic ray interactions in the detector still have not been solved. A critical discussion of the experiments in this field was long overdue.

One of the breakthroughs in 1972 was the discovery by Chupp and his coworkers of γ -ray spectral lines from a flare on the Sun. A paper by Ramaty, interpreting these results, illustrates the potential value of measurements of this type to our understanding of the role of high energy particles in flares. There is a contrast between this theoretical contribution and others which discuss subjects such as the decay of radioactive nuclei in supernova remnants, the interactions of cosmic rays in intergalactic space, and the possible effects of large scale regions of antimatter in the Universe. These discussions lack the discipline imposed by reliable experimental results and the more hardened experimentalists will look upon them with a degree of cynicism.

The second breakthrough—the discovery of γ -ray bursts from outside the Solar System—was not published until after this symposium, but it was thought to be sufficiently important for two papers on the subject to be in-

cluded in the report.

The final session of the symposium was a discussion of future trends in γ -ray astronomy. This discussion leaves one with the impression that all γ -ray astronomers are aware of the difficulties facing the subject but that some, at least, are optimistic. The low price of this report, its clear format and its quick publication combine to make it an attractive summary of the current state of this branch of astronomy.

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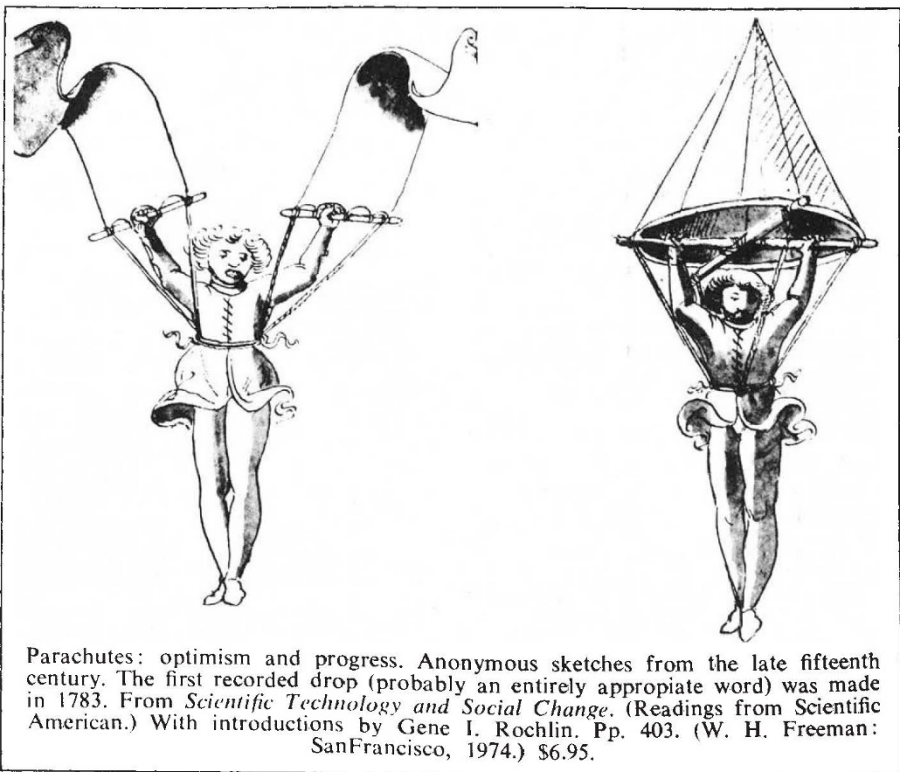
... and for arts students

Concepts of Contemporary Astronomy. By Paul W. Hodge. Pp. viii+547. (McGraw-Hill: New York, 1974.) \$9.95; £5.45.

Fundamental Astronomy. By Franklyn W. Cole. Pp. xiii+476. (Wiley: New York, 1974.) £5.30.

WITH deafening regularity new books on astronomy hit the librarians' tables, all aimed at that enormous amorphous bunch of students known as "non-science majors" who annually flock to American universities to take degrees in liberal arts and letters. One gets the impression that no American publisher worth his salt can produce the yearly book list without at least one *Introduction to Astronomy*, *Fundamental Astronomy*, *Modern Astronomy*, *Principles of Astronomy*, *New Horizons in Astronomy*, *Stars and Galaxies we Ought to Know and Love*, *Concepts of the Universe*, *The Universe and Beyond!*, *Mysteries of Space*, and so on.

The teaching of science to arts students is obviously a good thing.



Parachutes: optimism and progress. Anonymous sketches from the late fifteenth century. The first recorded drop (probably an entirely appropriate word) was made in 1783. From *Scientific Technology and Social Change*. (Readings from Scientific American.) With introductions by Gene I. Rochlin. Pp. 403. (W. H. Freeman: San Francisco, 1974.) \$6.95.