

absolute position of the input-output current characteristic to be estimated and gives, for square loop materials, theoretical current waveforms which differ widely from those observed in practice.

The specialist will find the discussion on push-pull circuit operation, three-phase magnetic amplifiers and the effect of inductive and capacitive loads on general magnetic amplifier performance most informative and enlightening. The chapter devoted to magnetic amplifiers with a.c. control is too limited in scope to be of much value to the design engineer. The reader will find the design criteria for maximum power gain, which is of prime importance in this type of operation, overlooked. There is a similar lack of clear-cut design statements in the chapter on voltage reset and transistor magnetic amplifiers. However, the research worker will find these chapters stimulating for future development work.

The information given on magnetic amplifier applications and associated magnetic core devices enables the reader to get a very good appreciation of the practical state of the art. The four-limbed core magnetic amplifier, the magnetic modulator, ferro-resonant devices, magnetic counting and storage are a few of the topics discussed.

The mathematical treatments are of undergraduate level and have been kept to a minimum. The discussions are well supported with self-explanatory diagrams. The full-plate photographs give completeness to the descriptive details on magnetic amplifier construction and practice.

The diverseness of the information contained in this book cannot but broaden the reader's outlook in this field. Particular aspects of the subject can easily be followed up from the excellent appended bibliography. The theoretical treatments are sound, and give the student and specialist a valuable insight into magnetic amplifier operation. Engineers will find much useful design information. Although practical experience plays an important part in this matter, it is felt that the fundamental issues at stake could be more clearly stated, especially in the case of high-speed magnetic amplifier design.

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POPULARIZING THE INTERNATIONAL GEOPHYSICAL YEAR

Once round the Sun

The Story of the International Geophysical Year, 1957-58. By Dr. Ronald Fraser. Pp. 160 + 19 plates. (London: Hodder and Stoughton, Ltd., 1957.) 16s. net.

IN recent months members of national committees for the International Geophysical Year have been increasingly embarrassed by requests for information—from the Press, radio and television—about the organization and aims of this great scientific enterprise. These demands have been a challenge, not always easy to meet; for geophysics includes many interrelated sciences and the programme of the International Geophysical Year is necessarily directed towards the boundaries of existing knowledge.

In this little volume we have the first popular and comprehensive account designed to meet the

needs of a wide public. The author, Dr. Ronald Fraser, is well equipped for his task, being the administrative secretary of the International Council of Scientific Unions—the parent body which sponsored and set in motion the project of the International Geophysical Year some six years ago.

The book is divided into two parts. In the first the reader is skilfully introduced to some of the real problems which now confront the geophysicist. These discussions range over such topics as fossil magnetism, continental drift, climate and weather, the ionosphere and solar-terrestrial relations. The second part deals with the planning of the Geophysical Year from its inception. There is a fascinating chapter on Antarctica. This is illustrated with fine photographs and describes the setting up of the various bases by the nine different countries which are now operating in that inhospitable and largely unknown continent. Another chapter tells of the plans for the rocket and satellite programmes. The language is everywhere simple and concise; the style humorous and imaginative.

Here and there one comes across statements which require correction or modification. Thus we read (p. 88)—“solar flares, no matter how intense, that occur far out towards the periphery of the sun's disc, are *not* followed by magnetic storms in the earth's upper atmosphere; whereas there is a practically one-to-one coincidence between the number of flares near the centre of the sun's disc and that of great magnetic storms on earth”. It has been shown by H. W. Newton in his celebrated papers on this subject that the “one-to-one coincidence” between flares and subsequent storms applies only to intense (Class 3+ and 3) flares; the relationship breaks down for the much more numerous flares of Classes 2 and 1. Again, it is the probability that a great storm will follow an intense flare which decreases as the flare is located nearer to the Sun's limb. There have, indeed, been a few examples of great storms following upon flares near the limb (for example, that of January 25, 1938), but this sequence is rare. We infer that the emission of the magnetic storm particles from a flare takes place within a cone-shaped beam, the semi-vertical angle of which is normally less than 45°, but may be as great as 90°.

Commenting on the present wastage of the northern glaciers (p. 119), the author mentions that if the ice sheet covering Antarctica were to melt the average sea-level would rise by nearly 200 feet. Then follows the statement: “This might conceivably happen in say 10,000 years, but an initial rise in the average sea-level of, say, 30 feet in 10 years is not impossible”. The reader may find so great a difference between what is “conceivable” and “not impossible” both puzzling and alarming.

On p. 137, and again in the illustration opposite p. 140, the auroral all-sky camera is said to employ a “convex lens”. This should read “convex mirror”. On p. 118 the author refers to two cosmic galaxies which “collided tens of millions of light-years ago”. The light-year, of course, is a unit of distance, not of time.

However, these are trivial blemishes in what is at once a most entertaining and illuminating account of a great scientific venture. We can confidently recommend Dr. Fraser's “Story of the International Geophysical Year” as an admirable piece of popular exposition.

M. A. ELLISON