

BOOKS

High energy beam optics, by K. G. Steffen (London, John Wiley and Sons Ltd., 1965; 72 sh.).

The invention of the strong focusing principle by Courant, Livingston and Snyder in 1952 not only opened up the possibility of constructing accelerators with much higher energy than before, but also revolutionized the design techniques of secondary particle beams. The use of various combinations of quadrupole lenses and bending magnets has given rise to a large variety of particle beams, each designed for a specific experiment. Although several books on accelerator theory have existed for a number of years, Steffen's book is the first to give, in a comprehensive way, all the theory that is required to design high energy particle beams.

The first chapter discusses the optical properties of systems of quadrupoles, including chromatic and non-linear aberrations. The second chapter gives a very complete treatment of bending magnets, with a homogeneous field and with a gradient, and also considers wedge-shaped and rectangular magnets. The third chapter applies the theory of the first two chapters to the design of non-dispersive beams and to several examples of spectrometers.

While the first three chapters follow the approach of classical optics, where individual rays are traced from object to image, the last chapter gives the theory of the envelope of particle beams. This approach is especially useful in the case of the external beam from an accelerator, but also gives a much better understanding of the possibilities and limitations of, for example, separated beams.

It is natural, that in giving practical examples, the author mainly refers to work done in his own Laboratory (DESY), but this may not always be entirely representative. Steffen uses several paragraphs to describe the use of an analogue computer to design beams. However, most Laboratories have much better digital than analogue computer facilities and therefore nearly all beams are designed with digital computers. The example on quadrupole design, results in a large power consumption and is therefore not very suitable as a general purpose quadrupole. The treatment of separated beams is kept rather short since they are used very little around electron accelerators but their considerable importance at proton accelerators makes a more extensive discussion desirable.

In conclusion, I can recommend this book to anyone who wants to set up particle beams. The mathematics is not difficult and the theory is sufficiently complete to enable a beam designer to understand specific beams described in the literature and to work out his own beam.

B. de Raad

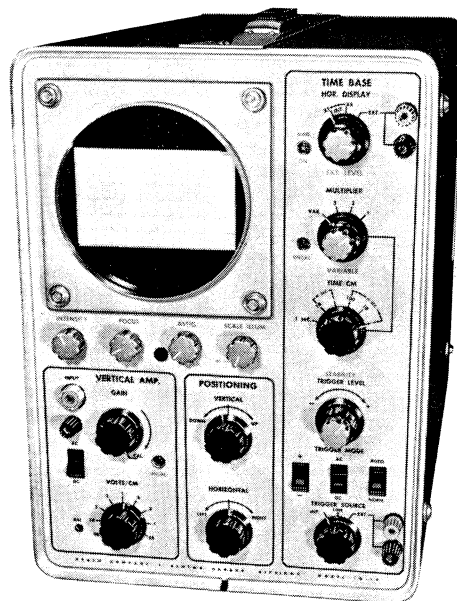
Also received:

Experimental reactor analysis and radiation measurements, by Donald D. Glower (New York, McGraw-Hill Book Company, 1965; \$ 13.50) — laboratory manual for graduate-level courses in nuclear science and engineering.

Concepts and models of inorganic chemistry, by Bodie E. Douglas and Darl H. McDaniel (New York, Blaisdell Publishing Company, 1965; \$ 10.50) — unifying course in modern inorganic chemistry for the advanced undergraduate student.



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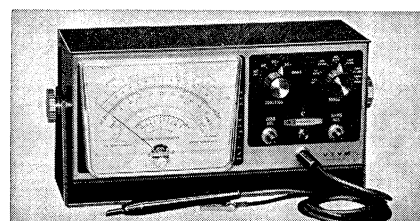
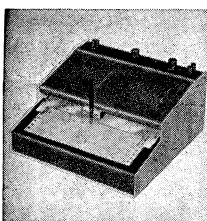
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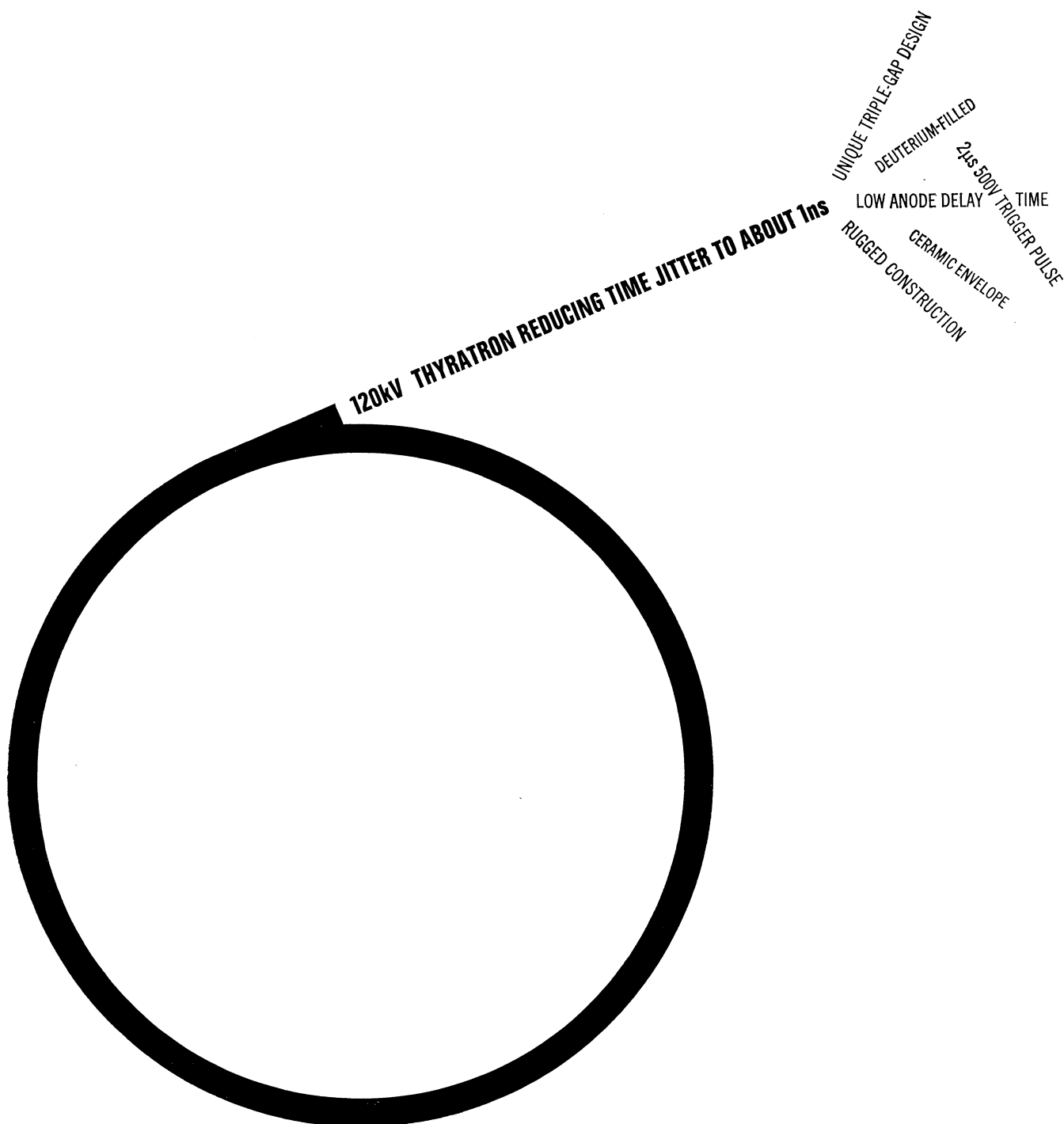
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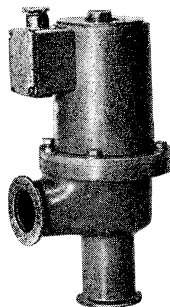
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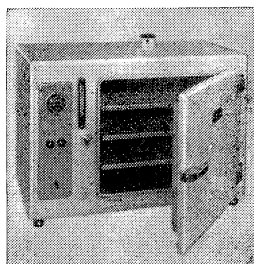
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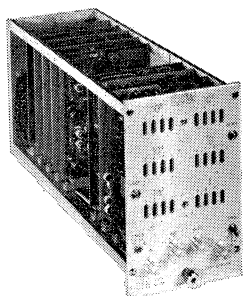
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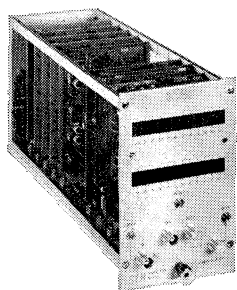
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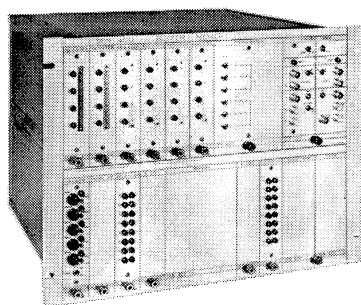
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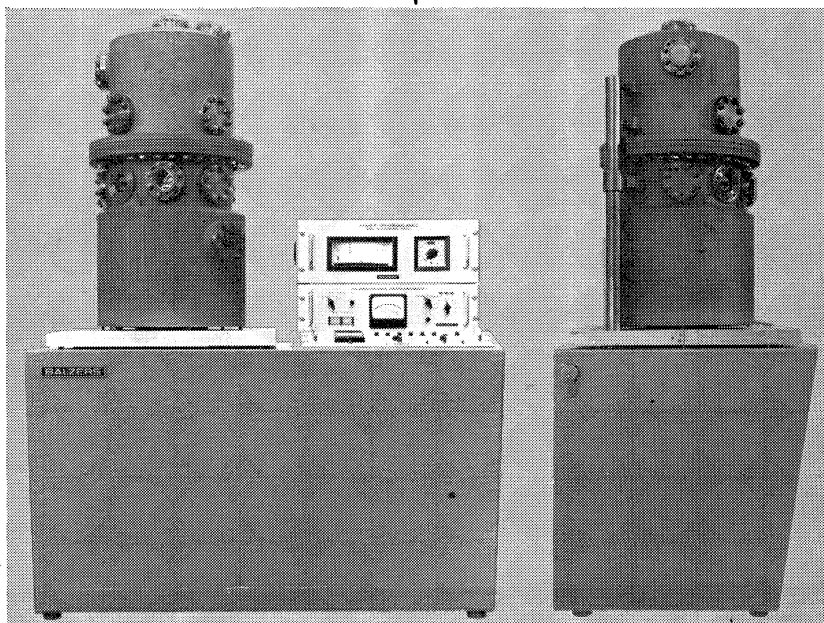
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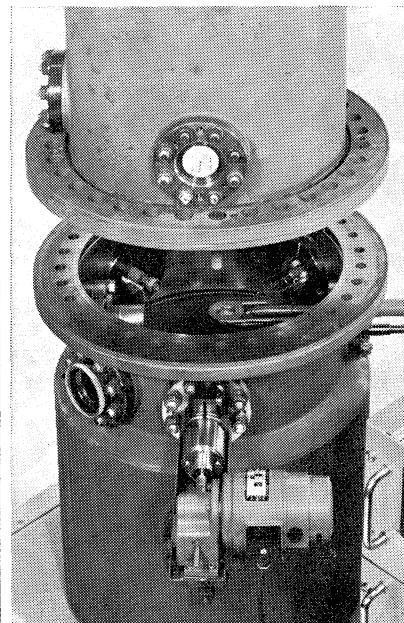
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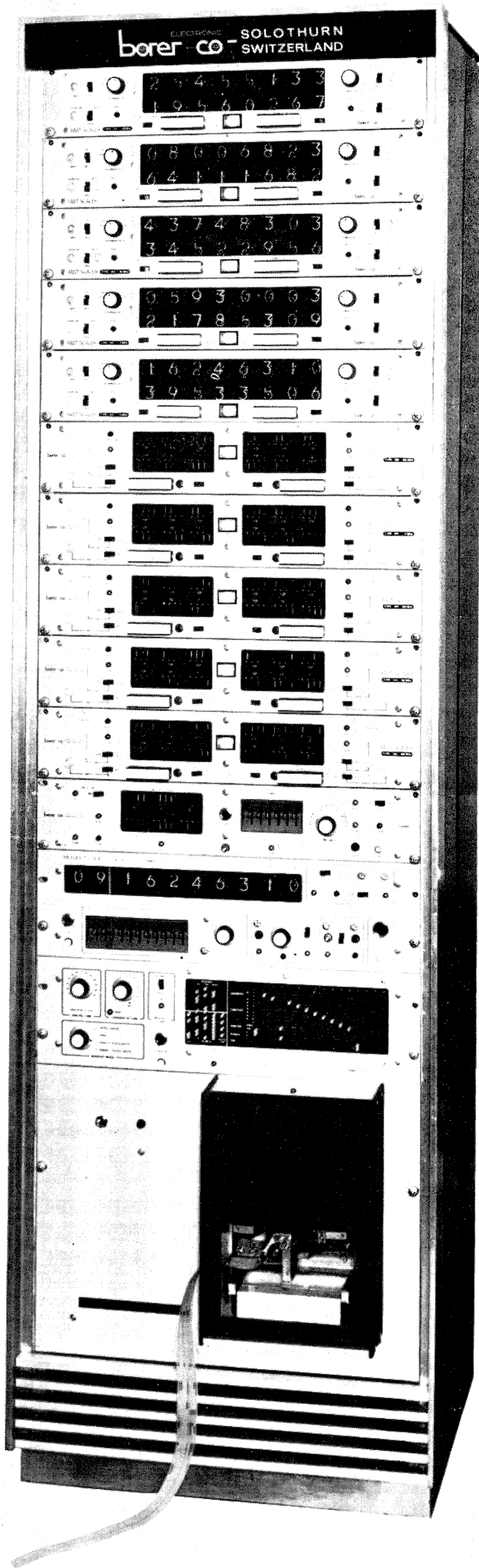
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