ELECTRONIC MUSIC SYNTHESIS, by Hubert S. Howe, Jr. Norton, New York
Dent, London, 1975 (£6.50).

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This book's claim to attention resides in its thoroughness and in its presentation of facts in an abstract and logical form. For this reason it could prove a useful reference book for students undertaking a course in electronic music. The author certainly envisages this, for he says in the introduction: "The book is divided into three major sections in order that it may be used in a variety of ways and in a number of different college-level courses." His material seems to have been developed over several years while teaching electronic music at the City University of New York and in summer schools at Southern Illinois University, Dartmouth College and the University of New Hampshire.

The first of the book's three main sections consists of two parallel chapters examining respectively the physical and psychological properties of sound. Here is not an exhaustive treatment of these subjects, but one intended to present those aspects relevant to electronic music. It is a valuable attempt to distinguish the physical facts of acoustics from the perceptions of psychoacoustics, and tends to make the reader more aware of the difference between, for example, frequency and pitch or intensity and loudness. (Loudness, as the author states, is a function of both frequency and intensity). There is an unevenness in the treatment of certain topics, however. I feel the section on 'Sound Intensity' is in need of some clarification, while the definition of white noise as a "mixture of all frequencies in equal proportions" is a gross oversimplification; on the other hand, the short, non-technical passage on 'Sound Absorption and Reverberation' is excellent.

The next major section, on electronic music equipment, discusses recording and playback equipment, signal generating, processing and control equipment and concludes with a chapter entitled 'How to Design an Electronic Music Studio'! Though photographs of the best-known synthesizers are included, the text makes no reference to specific systems. The difficulty with all generalised descriptions of equipment is precisely that they *are* general; a user always works with a particular machine and comes to know its strengths and its limitations through usage. So the author's decision not to refer to specific systems inevitably leads to riders like "It will be necessary to check out the precise characteristics of your system in order to understand exactly how these devices work." (p.102) But here as elsewhere, the clear heading of each topic under discussion and the informative, though general description of equipment functions would make it a very

useful resource for teaching or learning situations. 'How to Design an Electronic Music Studio' turns out to be a collection of useful tips: the maintenance of constant temperature and humidity, sound insulation, lighting, placing of loudspeakers, layout, cleaning and so on. A brief but practical guide.

While in the secondsection every effort has been made to remain general and perhaps neutral with regard to synthesizer systems, in the third and longest section, 'Computers and Electronic Music', the opposite decision has been made. Here the specific rather than the general dominates. For after an introductory chapter on basic concepts follows a long chapter which is, in effect, a reference manual for the use of the computer programme MUSIC4BF. This is a Fortran translation of MUSIC4B, a programme written by Hubert Howe and Godfrey Winham during 1964 and 1965, which is in turn an expanded derivation of MUSIC4 by Max V. Mathews and Joan E. Miller of Bell Telephone Laboratories.

This detailed and specific documentation of a computer programme for sound synthesis is probably the most useful thing Howe could have done, for even though MUSIC4BF will be superceded by more flexible and powerful programmes, the text will remain valuable as a source reference. I doubt whether the text as presented contains enough information for a 'layman' composer to begin work, but I do not see this as a major disadvantage, since no-one entering a new field could possible expect to derive all the information he requires from a single source. A feature of this chapter is the use of the first six bars of the fourth movement of Webern's Five Pieces for String Quartet, Op. 5 for a transcription showing the preparation of data. The chapter ends with four 'worked examples' of arbitrary problems, showing the flowcharts and the Fortran code in each case.

The final chapter of the book, entitled 'Systems of the Future', is where we find at least some attention paid to hybrid systems where digital control is applied to analog equipment through a converter. One feels that the chapter is necessary for the sake of completeness, though in its five pages it can do no justice to its subject.

Let me now summarise my main adverse criticisms of the book. First, there seems to be a philosophical dilemma in having chosen to present electronic music equipment in such a generalised way on the one hand, and computer music in such a specific way on the other. Though I would resist the tendency, as the author has done, to make it into two books, the present volume seems compromised. Secondly, there is a great urge towards an impersonal, factual style which would be more suited to an encyclopaedic form, though the content is not comprehensive enough for this. This approach is often in conflict with the author's opinions, which (when he lets them through) are interesting but little argued. Finally, for one reading an author who avowedly emphasises the importance of musical experience, the lack of discussion of musical ideas is a severe disappointment. I will end with a quotation (from p.29) with which I can wholeheartedly concur: "It must be recognised that the nature of music is such that the discovery and recognition of any property of sound is a conceptual process that can never be concluded, but must be renewed continually as new observers and new music come to the fore. Some ideas may be of importance only to certain musical works and not to others. In fact, if the focus of attention could be directed more toward individual works rather than toward sounds in the abstract, the conclusions reached would be of much more importance to distinctly *musical* experience."