

The section on odontology and tooth morphology will delight the statistician and dental anthropologist, and the tables of comparative data given at the end of the book bear witness to the thoroughness of the investigator. It is to be regretted, however, that in such an investigation no provision for X-ray examination was made, and much interesting material must have been missed, such as buried or abnormal teeth. Lack of this facility tends to render problematical the value of any assessment of the caries factor, always an interesting study. For the same reason the fascinating condition of taurodontism, which is present in this community, receives only passing mention. Also, the value of the assessment of absent teeth, whether congenital or fortuitous, is obscured by the arbitrary criteria used in the assessment. Surely a tooth is either present or absent, and if the latter is the case the cause is worthy of further investigation. It was noted that the fluorine intake was low.

Tooth emergence, always a readily accessible means of assessing physiological attainment, is discussed without, however, any definite conclusions being reached as to whether or not the differences noted between Whites and Aleuts can be attributed to racial characteristics or environmental factors.

Angle's classification is used as the basis for assessment of mal-occlusion, but due to changed habits of the Aleuts during the last five decades, little of real value was obtained from this study. It is worthy of note that the pattern of periodontal disease in this community is similar to that found in other peoples.

The book is well written, the findings and deductions being well-proportioned, due allowance being made by the author for discrepancies between the two breeding isolates. The illustrations, charts and tables are most helpful in fully understanding the text, and the references are copious.

The author is to be congratulated on his work, and a copy of this book should be in every dental library.

F. TAYLOR MONKS

## MULTICHANNEL PULSE HEIGHT ANALYSERS

### Multichannel Pulse Height Analysers

Proceedings of an Informal Conference, Gatlinburg, Tennessee, September 26-28th, 1956. Edited by H. W. Koch and R. W. Johnston. (Nuclear Science Series—Report No. 20. Publication No. 467.) Pp. xi+205. (Washington, D.C.: National Academy of Sciences—National Research Council, 1957.) 2 dollars.

ONLY a decade ago multichannel pulse height analysers were a novelty used by a few nuclear physicists in investigating the spectral emissions of radioactive substances. To-day, many types are in regular commercial manufacture, and almost every laboratory concerned with nuclear physics, radiochemistry or nuclear energy work has at least one of these equipments and requirements for several more. The multichannel pulse height analyser has, in fact, become an essential tool for nuclear research and development.

To the uninitiated the sorting of pulses according to their height may not appear to be a difficult problem, but because of the statistical nature of the

phenomena under investigation, the wide range of pulse rates encountered, the extreme variation in pulse height and the high degree of accuracy and stability required, there are many difficulties. An authoritative publication on these and related matters has been lacking for some time, and so designers and users of multichannel pulse height analysers will welcome this new volume summarizing the proceedings of an informal conference on this subject held at Gatlinburg, Tennessee, during September 26-28.

The book is divided into four parts: the statement of the problem; systems; computer techniques; and calibration, *xyz* recording and future trends. Each of the four parts is prefaced by a chairman's statement (a valuable feature) summarizing the more important contributions, and apart from the written versions of the individual lectures, the publication also summarizes the ensuing discussion.

The first section of the book opens with a statement by P. R. Bell, for ten years a designer as well as a critical user of these instruments, who discusses the use of multichannel analysers in the analysis of beta and gamma spectra and indicates some of the main design problems. F. Axel contributes the second lecture, and he describes the various radiation and particle detectors used in association with these analysers, and considers, in particular, the pulse shapes encountered and their amplitudes. The later lectures in this first part of the book deal with the important subject of pulse shaping. Altogether this first section forms a most valuable introduction to the whole subject.

The second part of the book is concerned with 'systems'. At the present time the trend in the design of these analysers is away from systems employing multiple voltage discriminators. Most of the development effort is in the direction of applying digital computer logic and components in order to achieve reliability, lower cost, continuous visual display of the spectrum for monitoring and automatic digital recording of the memory content. The majority of modern designs employ pulse stretching with amplitude-to-time conversion in order to obtain 100 or more uniform channels which are free from interchannel boundary drift. This and many other aspects of the design of analysers are discussed in this second section of the book, which contains contributions from American and Canadian designers (C. J. Borkowski, G. C. Kelley, R. W. Schumann and F. S. Goulding) as well as from designers from laboratories in Great Britain (E. H. Cooke-Yarborough), France (J. Mey), Italy (E. Gatti) and Switzerland (D. Malder). It is well presented with a wealth of detail.

The later sections dealing with computer techniques, calibration and future trends are much shorter and deal with such techniques as analogue-to-digital conversion, storage, marginal testing, etc. Much of the information refers to analysers which are being developed at the present time, and so the opinions expressed are reasonably up to date, and the design data the latest available.

The book is one which can be thoroughly recommended to the specialist designer. Others, particularly the users of multichannel pulse height analysers, will find much of value in the book, but some of the later chapters dealing with the detailed circuit data may prove heavy going for such readers.

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