

## ANALYSIS BY CHROMATOGRAPHY AND ION EXCHANGE

### Inorganic Chromatography

By Orsino C. Smith. Pp. x+134+5 plates. (New York: D. Van Nostrand Company, Inc.; London: Macmillan and Co., Ltd., 1953.) 37s. 6d. net.

Chromatographic Methods of Inorganic Analysis With Special Reference to Paper Chromatography. By Dr. F. H. Pollard and Dr. J. F. W. McOmie. Pp. viii+192+4 plates. (London: Butterworths Scientific Publications, 1953.) 30s. net.

### Ion Exchanges in Analytical Chemistry

By Prof. Olof Samuelson. Pp. xviii+291. (New York: John Wiley and Sons, Inc.; Stockholm: Almqvist and Wiksell; London: Chapman and Hall, Ltd., 1953.) 52s. net.

IT is natural enough that, when subjects assume such prominence in scientific research as ion exchange and chromatography, there will follow attempts to systematize the known facts by the publication of text-books. These three books should be considered against the background of the vast amount of unco-ordinated data to be found in the scientific journals. The only reasonable answer to the problem is for the text-book writer to confine himself to a portion of the subject, and to avoid so far as possible the tedious repetitions to which the reader is constantly subjected.

Mr. O. C. Smith, clearly, is overwhelmed with the complexity of his subject, as this sentence from p. 96 of his book, "Inorganic Chromatography", shows. "In this work many combinations were found to exist, and where several factors are present they are a multitude; for instance, whether the solution is acid, neutral or alkaline: type of solvent: type of adsorbent: kind of reagents and whether the developer is used before the sample or after: and ad infinitum". This has, no doubt, led him to overlook the almost complete unintelligibility of the last sentence of his paragraph on "Adsorption on Paper" (p. 5). In his discussion of "Apolars Adsorption" (p. 9) he does not distinguish between alumina and silica, which are normally regarded as instances of adsorption and partition, respectively.

Chapter 4 of his book suffers from the arrangement: the paragraphs are headed by authors' names instead of subjects, and constant reference to the index is necessary. In Chapter 5, although most paper chromatography has been done on filter paper *per se*, he begins by a description of the preparation of alumina-impregnated paper, which is a special case. Chapter 8, "Laboratory Procedures", is useful, but would have been better if more attention had been paid to the standardization of adsorbents. There is no attempt to describe alumina in chemical or physical terms, and, as variable amounts of water are added and the initial activity is not stated, it is possible that the activity is varying throughout an experiment. The packing of a column by a wet slurry process will not necessarily give the same results as a dry column. Magnesium silicate is difficult to define chromatographically, and as Mr. Smith himself states in relation to starch (p. 118), the results obtained with different batches of material are not always reproducible.

As regards the other two books, by Drs. F. H. Pollard and J. F. W. McOmie and by Prof. Olof Samuelson, respectively, the exposition is clear and

the presentation logical. Pollard and McOmie give a review of inorganic chromatography which is as comprehensive as is possible on a subject that receives additional published researches daily. There are occasional slight obscurities; thus, the table of "Order of Adsorption" (p. 7) is too compressed and the word "column" in the text is ambiguous. The new qualitative analysis schemes are ingenious and sound; but before the 'classical' analysis is scrapped we should ask ourselves whether there is, in fact, a real advantage in the chromatographic method. It may well be that many laboratories will adopt some part of the scheme as a supplement to their normal methods, and in this case they will find the tables in the appendix of Pollard and McOmie of great help.

Ion-exchange materials form the subject-matter of Prof. Samuelson's book, and with these substances the analyst is completely in the hands of the manufacturer. It is a good sign for Anglo-American co-operation that the tables (pp. 261-264) list ion exchangers of British and European manufacture as well as those of American origin. It is clear that a selection of examples must be made if the book is not to reach encyclopaedic size, and therefore specialists in subjects such as alkaloids and proteins may find the information too sparse; however, a reasonable bibliography points the way to further sources.

The book by Pollard and McOmie and that by Samuelson should find a place not only in every technical library but also at the practical analyst's desk.

E. Q. LAWS

## INTRODUCTION TO VECTOR AND TENSOR ANALYSIS

### Vector and Tensor Analysis

By Prof. G. E. Hay. Pp. viii+193. (New York: Dover Publications, Inc., 1953.) 2.75 dollars, cloth; 1.50 dollars, paper.

THE emphasis in this book is mostly on vector analysis, which is covered by five chapters, whereas but a single chapter is devoted to tensors. This, I think, is unfortunate for three reasons: published studies in vector analysis have already been considerable; tensor analysis is the generalized and therefore broader aspect of the vector-tensor approach; and there is a far greater need for an elementary-to-intermediate standard of book on tensors really suited to beginners working in the applied sciences. Moreover, in respect of tensors particularly, it is likely that there will be some measure of disappointment in engineering circles that the book is confined to the classical approach instead of supplementing the latter by the method initiated and developed by Gabriel Kron primarily for engineers. The point is worth making because there should be a greater measure of mutual recognition by pure and applied scientists of each other's needs and aspirations, coupled with effective joint action to obtain the best of both worlds.

Chapter 1 describes elementary vector operations up to the level of differentiation and integration with respect to a scalar variable and to linear vector differential equations. Chapter 2 gives applications of vector principles to solid analytic geometry and to differential geometry. Chapter 3 relates to the application of vectors to mechanics within the scope of motion of a particle and of a system of particles.