

In the past these problems have been treated either on the basis of the theory of integral equations or the theory of linear operators in Hilbert space. Prof. Titchmarsh has used the theory of functions of a complex variable, and makes no appeal to the methods mentioned. His method is to express the solution of the equation as a contour integral and then to get his results directly by the powerful methods of contour integration. The earlier treatments are perhaps more suitable for a discussion of mean square convergence, or for unifying the theory with that of integral equations and other linear operators, but are certainly more difficult to apply to the study of the problems here treated.

The book has the lucidity and mastery of analytical method which characterize the author's well-known books on the "Theory of Functions" and "Fourier Integrals"; but unlike these it gives not an exposition *ab initio* of the subject as a whole but only of results and methods for the problems mentioned above, which were very largely developed by Prof. Titchmarsh in his recent papers on the subject. It does not attempt an account of the physical background of the subject. All the important special cases are dealt with as examples, but without detailed accounts of the special functions involved which are dealt with in the standard treatises on differential equations. However, a reader with a knowledge of complex variable theory should be able to follow the analysis. As a whole, the book is an important contribution to analysis, and should prove of interest to mathematical physicists as well as to mathematicians.

NAMES INTO CIPHER

A New Notation and Enumeration System for Organic Compounds

By Dr. G. Malcolm Dyson. Pp. iv + 63. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1947.) 7s. 6d. net.

WHAT Dr. Dyson has given us in this volume is less a book on nomenclature than a 'blueprint' or a code manual for the professional indexer. Although the system of notation which he describes demands, and indeed merits, careful scrutiny and examination by organic chemists who are specialists in different fields, it can scarcely be regarded as a contribution to the problem of organic chemical nomenclature properly understood, and the ordinary organic chemist will find what he requires in Dr. Dyson's original lecture last October as since published by the Royal Institute of Chemistry rather than in the present book. The major part of the book is devoted to a careful and detailed exposition of Dr. Dyson's system of ciphering, in which the basic carbon skeleton is first ciphered by a linear series of letters and numerals, with the assistance of commas, stops and semi-colons. All fused-ring systems are enumerated in terms of six conventional ring systems. The functional groups are then similarly ciphered, and the system is logical as well as ingenious and concise. Dr. Dyson claims, moreover, that it has the advantage that there is only one possible cipher for any one chemical compound.

That is an impressive claim, and has to be weighed carefully against any doubts one might entertain as to the unfailing accuracy with which the ordinary organic chemist would apply the rules in practice; and equally, his unerring eye not merely for depar-

tures from the logical application of the rules but also for mechanical errors in the transcription of the cipher. An error in nomenclature is usually self-evident to an expert in a particular field, but this is scarcely true to the same extent of a cipher or indeed of a number; and that is probably one reason why the Universal Decimal Classification is unlikely ever to be adopted as a working tool in the indexing of organic chemical compounds.

Dr. Dyson appears, in fact, to have dismissed this question of nomenclature too summarily, and what he has to say under this head is much better put in his original lecture. He does not here show sufficient apprehension of the purposes of nomenclature, or of those relations between its users which are responsible alike for the introduction of trivial names and for departures from systems. Granting that such names as 'coronene', 'phthalazine', or 'rubicene' have been coined because there are no satisfactory systematic alternatives, regarded as symbols, for certain purposes, they may prove as satisfactory as the ciphers suggested by Dr. Dyson. It must be remembered that in particular fields, such as dyestuffs, or synthetic resins or other plastics, the organic chemist will think in the units of which the structure is built up: no dyestuff chemist would attempt to use the systematic name for dianisidine blue, any more than the plastics chemist would trouble with a systematic name for nylon. The trivial or systematic names of the substances brought together in practice in these complex molecules serve the needs of the chemist, even when he is accustomed to use the punched card technique as a regular tool.

The point has been elaborated because the future of the Dyson notation, once its logic and adequacy have been approved in a representative range of special fields, appears to depend on the use to which it is likely to be put. For the reason just given, its adoption by the industrial chemist is unlikely; and when we turn to consider its potentialities in regard to the production of a new lexicon of organic chemistry, a new 'Beilstein', or international indexing and abstracting, it should also be remembered that the present situation is unsatisfactory not only through confusion between different systems of nomenclature and failure to agree, but also for financial reasons. Empirical formulæ, for example, apart from the possible use of the Universal Decimal Classification, already provide a basis for such production if the necessary financial means to the end were willed. That financial aspect needs to be much more carefully examined before any decision is reached, or we may be in danger of finding that Dr. Dyson has prescribed a sledge-hammer to crush a nut.

Despite the ingenuity and logic of Dr. Dyson's notation, in this volume he appears to have missed an opportunity. He should have dealt much more persuasively with established systems of nomenclature, as he did in his original lecture, before proceeding to detail the new notation. A little more trouble in exposition of these systems and of present tendencies would have assisted him considerably to gain acceptance for his idea that a cipher rather than a systematic name is the best means for reference, classification and indexing. Finally, it might be observed that in production the volume compares badly with the lecture issued by the Royal Institute of Chemistry. Neither paper nor print are up to that standard, and to issue unbound at this price a volume which obviously demands close study and constant use is a serious defect.

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