

references have been published since the first edition, which is more a reflexion of how much the book rather than how much our knowledge of the subject has changed. The treatment of the subject remains descriptive, whereas an analytical approach would now be more helpful. Thus we are told of certain common kinds of chimaera structure and bud variation, but not of how many kinds of structure and structural changes are possible, even though these are now well described in the literature. The descriptions of the principal chimaeras could be improved by more illustrations, and it is surprising to find so little mention of flower and fruit chimaeras, and the complete absence of the interesting work on potato chimaeras. Two or three references have been misunderstood, and the very impressive work of the Berganns in Germany has received far too little attention. These criticisms apart, the descriptions are accurate and examples of many of the most interesting chimaeras are well discussed. One of the triumphs of chimaera studies, properly emphasized by the author, has been to show how between species, and even between varieties of a species, the rigid arrangement of two or three germ layers in the shoot apex can each make remarkably varying contributions to the tissues of the leaf, and also how the growing points themselves may vary markedly in their stability.

A significant portion of the book gives an admirable account of the principal arguments, observations and experiments in one of the great debates of botanical history, the evolution of which spanned over fifty years particularly from the late nineteenth to the early twentieth century. It centred around the idea that artificial hybrids were produced by the fusion of vegetative cells after grafting just as natural hybrids were produced by the fusion of sexual cells after pollination. The graft hybrid hypothesis assumed that fusion took place between vegetative nuclei of stock and scion resulting in the production of a homogeneous hybrid growing point, and any bud variations were thought to be a consequence of somatic segregation. At the turn of the century the hypothesis provided an explanation for the odd behaviour of several cultivated trees normally propagated by grafting. But profuse description in support of the hypothesis was soon to be given a severe jolt by the new experiments of Winkler and Baur, and the radically different chimaera hypothesis that Baur proposed. There followed a classic example of prolonged resistance by exponents of the old hypothesis in the face of mounting evidence and widespread support for the new.

Taken as a whole, Professor Neilson-Jones has written a worthy account of plant chimaeras. Many botanists will certainly enjoy this book, but I would also recommend it to all who would like to know a little more about some of the fascinating plants that are to be seen every day in our own as well as public and botanic gardens.

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INFORMATION RETRIEVAL

Information Retrieval Systems

Characteristics, Testing and Evaluation. By Wilfred F. Lancaster. (Information Sciences Series.) Pp. xiv + 222. (Wiley: New York and London, January 1969.) 84s.

THIS very clearly written book provides an analysis of the basic elements of an information retrieval system from the viewpoint of an information system evaluator. Lancaster, in his work at the National Library of Medicine, Washington, has been deeply involved in the evaluation programme of MEDLARS (Medical Literature Analysis and Retrieval System), one of the largest mechanized information retrieval systems in the world and the source of many of the excellent concrete examples which are a notable feature of this book.

The NLM produces, in *Index Medicus*, a conventional "pre-coordinate" index for visual scanning, and the computerized search of the MEDLARS "post-coordinate" index complements this. As is commonly the case, the development of computerization has impressed on systems designers and operators the need to be thoroughly conscious of their objectives, of the exact nature of the actions they are taking to meet them, and of the need to be clear and explicit in communicating their intentions. This is very apparent in Lancaster's treatment.

The book deals primarily "with those 'intellectual' factors that significantly affect the performance of all information retrieval systems; namely, indexing policy and practice, vocabulary control, searching strategies, interaction between the system and its users". It does not deal, except indirectly, with equipment for the implementation of retrieval systems. Lancaster states forthrightly his contention "that the importance of 'hardware' and 'data processing' aspects of information systems has been exaggerated in the United States".

The book divides into roughly two halves. The first describes in very concentrated fashion the essentials of indexing and searching; that is to say, describing succinctly the information content of documents and organizing these "index descriptions" so that they indicate with maximum efficiency that set of documents most likely to contain information relevant to the user's need when he puts a question to the index. The nature of "index devices" is considered—the various ways, fundamental and common to all indexing systems, conventional or mechanized, of defining document sets so that a search can be adjusted rapidly and effectively to the needs of the situation. The latter may be one of too many documents thrusting forward, or too few appearing—and those not quite what the questioner had in mind. Particularly valuable features of this book are the detailed descriptions of searches and the interaction between index and user. *Inter alia*, these demonstrate the extraordinary difficulty that many scientific workers, like people in general, find in saying exactly what they really want.

The second half considers the problems of evaluating the efficiency, both operational and economic, of an IR system. This draws heavily on the findings of Cleverdon and the Aslib-Cranfield team (of which Lancaster was once a member), while confining itself strictly to the problems of an operational system.

It shows very clearly indeed the constant interaction of the various factors determining recall and precision; for example, index language ("the quality of the index language is probably the most important single factor . . ."), indexing policies as to exhaustivity and specificity, competence of indexing personnel, and the search prescription.

One might quibble over a few details; for example, the size and characteristics of the "code vocabulary" (the basic set of working terms, used singly or in combination, in index descriptions) have more influence than is implied (page 82). There are narrow limits to the degree to which a specific class (for example, a botanical species) can be defined by coordination of broader terms. The use of the term "entry term" seems unfortunate—"lead-in term" would be less ambiguous. One might agree with Saul Herner in his foreword that retrospective search is by no means the whole story in IR—but that is another story and one which Lancaster doesn't claim to tell. These are minor points and are far outweighed by the host of invaluable points for anyone engaged in IR. A small example is the surprising fact that for a large system the best search performance tends to be on requests arriving by mail—that is to say, with minimum system-user interaction.

This book should prove an excellent introduction to a newcomer to the subject of IR as well as stimulating and instructive to those already engaged in it. J. MILLS