stances. The original Russian text also included 126 pages of data from the *A.S.T.M. Powder Data File* (*c.* 1957) but very sensibly these have been omitted from the present English edition because more accurate and extensive data have become available from the American Society for Testing Materials and also because continuance of the *File* depends on its separate publication. For the cubic, tetragonal and hexagonal systems, however, there are Frevel's theoretical line-patterns for recognizing and indexing many structure types, with tables for identifying some hundreds of compounds in terms of structure type and cell dimensions. Tables of 'homologous pairs' for some two-phase mixtures, and others for the general conversion from weight per cent to atomic per cent, would, like so many of the entries, become useful if one knew they were there.

Precision measurement of lattice constants is another topic receiving special attention with tables of $\frac{1}{2}\lambda\sqrt{N}$, refraction corrections, charts for selection of most suitable wave-length, and description of the classical aspects such as extrapolation procedures and use of least squares. The relatively recent refinements in this field were, of course, only just appearing in the literature at the time of the original publication but, even so, brief mention is made and some references are given.

Three chapters are concerned with extra-structural features such as stress, crystal size, lattice distortion, preferred orientation. To aid stress measurement in iron, copper, aluminium and their alloys, for example, there are Zhmudski's tables (1953) for determining cell dimensions directly from the Bragg angles of certain high-angle reflexions. Investigation of crystallite size, lattice imperfections and lattice distortion are dealt with collectively and there are useful data for profile analysis. Chapters on diffuse and small-angle scattering and on the determination of preferred orientation complete the coverage of X-ray techniques, and the book concludes with short summaries on electron and neutron diffraction.

Dr. Mirkin's compilation, of necessity, overlaps the coverage for the *International Tables for Crystallography* and other established sources, but then extends to give a unique collection of data for the analysis of polycrystalline materials. Where it has drawn, for example, on the *International Tables* one will continue to use the original (which, in some instances, probably contain more complete or up-to-date data). It is for the compilation in English of material from Russian and other sources (notably Sagel's *Tabellen zur Roentgenstrukturanalyse*) not otherwise available in English that the book is so obviously of particular value. Furthermore, some of the tables are here published for the first time or have been expanded for this edition. Unfortunately there are a number of inconsistencies in the book and also a lack of critical assessment which could mislead the inexperienced user.

While easing the retrieval of data from scattered sources this book does, between its own covers, pose a problem in retrieval—especially of the less conspicuous items. The subject index is totally inadequate and there is no author index—the 464 references being listed only by number.

E. G. Steward

RESEARCH IN LEUKAEMIA

Current Research in Leukaemia

Edited by F. G. J. Hayhoe. Pp. xii + 306. (Cambridge : At the University Press, 1965.) 120*s*.

THIS book contains all but four of the papers delivered at a postgraduate medical course in Cambridge in August 1964 by workers mainly drawn from England and Italy, with a few from France, the United States, the U.S.S.R. and Germany.

In the first section of four papers, Merker considers the alkaline phosphatase score, the chromosomes, and neutrophil migration, particularly in chronic granulocytic leukaemia. The phagocytic studies in myeloid forms of leukaemia reported by Marmont and Damasio are interesting but restricted by inadequate quantitative methods. The excellent report by Dmochowski on electron microscopy applied to the viral and mycoplasma aetiology of human and animal leukaemia is unhappily marred by an incorrect order of the 75 clear, well-chosen photomicrographs (this is being corrected in later printings). Harris gives a sound outline of virological studies in avian and murine leukaemia and advises caution in attempting extrapolation to man.

Of the three reports dealing with cytogenetic investigations in leukaemia, that by Hayhoe and Hammouda is the most valuable; it correlates chromosome aberrations with clinical and cytochemical findings in leukaemia and other haematological malignancies. Tough compares the cytogenetics of chronic myeloid leukaemia with and without a significant radiation history, but there are few cases in the former group.

The eight articles in the third and longest section on cell growth and division indicate the recent exuberance of interest in this basic field. Hale and Cooper used autoradiography to investigate the DNA replication of leukaemia cells; Storti and Torelli speculate on differing metabolic types of RNA and its relation to protein synthesis, and Gavosto *et al.* used autoradiography to study DNA synthesis in the chromosomes, extra-chromosomes, and at different times in the *S*-period of mitosis in acute leukaemia.

In the papers dealing with *in vitro* culture systems and phytohaemagglutinin stimulation of leukaemic leucocytes, the metabolic correlations obtained by Quaglino and Hayhoe using autoradiographic and cytochemical methods, combined with the assessment of proliferative capacity by Astaldi *et al.*, form two valuable and complementary contributions. Elves discusses the transformation of lymphocytes to blasts and macrophages, and speculates on haematopoiesis, a subject discussed later by Loutit.

In the longest paper in this symposium, on biochemical aspects of leukaemic cells, Seitz reviews much work on nucleic acid and glycogen metabolism carried out in his laboratory, and published only in the Russian literature. Salvidio and Baldini suggest mechanisms for the differing patterns of enzyme-levels in lyophilized spleens in a variety of conditions. The 'therapeutic experiment' of allogeneic marrow grafting for the treatment of acute leukaemia in animals and man is discussed by Mathé and Amiel.

The final section relates to epidemiological aspects of leukaemia: it includes investigations of the 'summer peak' by Lee and Gardner; on the 'clustering' of cases by Knox; and on incidence and distribution of leukaemia by Doll.

The editor, contributors and publishers are to be congratulated on the speedy production of this volume, which can be recommended to those wishing to have up-to-date reviews in the different fields of leukaemia research. References and the index are good, but throughout one feels the absence of discussion despite the explanation on the cover.

R. Penny

ADHESION AND ADHESIVES

Adhesion and Adhesives

Edited by Dr. R. Houwink and Dr. G. Salomon. Vol. 1: Adhesives. Second, completely revised edition. Pp. xvi + 548. (Amsterdam, London and New York: Elsevier Publishing Company, 1965.) 135*s*.

IT is fourteen years since N. A. de Bruyne and R. Houwink produced the first edition of *Adhesion and Adhesives*, and it would, therefore, seem an appropriate moment for publication of a second enlarged edition in view of the tremendous developments which have occurred

in this period. Full appreciation of the present volume will await the publication of the complementary volume and will be tempered by the emergence over the years of a number of books on the same topics.

The general arrangement of the book is similar to that of the first edition with articles contributed by a team of American, British and Dutch authors, this time largely under the direction of G. Salomon, who writes the first chapter on 'Adhesion'. The subject-matter of this chapter ranges far and wide in order to provide a comprehensive survey of many aspects of adhesive and appropriate polymer science and, consequently, certain areas suffer a somewhat sketchy treatment. However, the subject-matter is well supported by a classified system of 296 references with a brief critique of a number of the more recent books on various aspects of adhesives and adhesion. The succeeding chapters concern themselves with specific classes of adhesives and contain a varying but minor emphasis on adhesion, leaving the subject of applications to Volume 2. Chapters on animal glue and related protein adhesives (A. M. Kragh and J. Wootton) and vegetable adhesives (K. W. Kirby) are followed by a long chapter on synthetic organic adhesives (C. A. A. Rayner), and the length of this and the first chapter, which together comprise more than half of Volume 1, reflect the enormous interest in these fields over recent years. Not only are the important adhesives in the class discussed and an account given of two-polymer adhesives, but again there is a monumental and classified system of references. Chapters on bituminous binders and coatings (R. N. J. Saal) and rubbers (W. C. Wake), the latter including a section on tack, complete the field of organic adhesives. The remaining chapters are on glass, enamels and ceramics (W. van der Colk), inorganic adhesives and cements (J. H. Wills) and, finally, metallic adhesives (W. R. Lewis), including welding.

The overall presentation of the volume is good, and textual errors appear to be few. It supersedes the first edition in that, with the exception of the final chapter, the majority of references given are post-1951. Some readers might have welcomed more chemical formulae in chapters outside their own experience and it seems a pity that, in a book which will no doubt be regarded as both reference and text-book, no author index is provided. All in all, although the present book will not stand out as much as its predecessor in view of other publications on the same subjects, nevertheless it is to be recommended to all interested in adhesion and adhesives, and I for one await publication of the second volume with interest.

R. P. Sheldon

PEASANT FARMING SYSTEMS IN AFRICA

The African Husbandman

By William Allan. Pp. xii + 505 + 7 plates. (Edinburgh and London: Oliver and Boyd, Ltd., 1965.) 63*s*. net.

At the present stage of agricultural development in Africa, William Allan could scarcely have written a more basic and pertinent book. African Governments, with the tremendous demands made on them by development, are turning to their countries' agricultural resources for a greater contribution to the economy. They are faced with an enormous proportion of their people dependent on subsistence farming, and increasing population pressures on the land which will rapidly reduce its productivity. It is a vital first step to assess the carrying capacity of land, to give not only a basis for the control of exploitation under existing systems, but also an indication of the potential of the land with regard to improved farming schemes.

Allan set out to measure the carrying capacity of the land, which he terms the "critical population density". He has calculated the critical population density for African peasant systems on the basis of his work and experience with the subsistence cultivators of Northern Rhodesia, now Zambia.

In Part 1 he discusses in detail how the formula for estimating critical population density is built up. He describes the method of classifying the land on an ecological basis, and shows how this relates to the systems of land use practised. He then calculates the critical population density, which is the maximum density that is consistent with the maintenance of the agricultural system without degeneration of the land. Allan describes the different cultivation practices of Northern Rhodesia, and shows how critical population densities were worked out and applied to these systems. This is a very important section and could well be regarded as a working paper for anyone involved in rural development in Africa.

In Part 2 the traditional farming systems of people in other parts of intertropical Africa are described. This section shows that the methods are still valid in widely varying conditions, and gives a basis for their more detailed use.

Perhaps some of Part 3, in the long chapter given over to hunters and food gatherers, could have been condensed, to make room for a more detailed treatment of the weight of information in Part 1. Part 3 also describes the pastoral systems and the relevance of population density estimates to this very significant section of African agriculture.

The final part of the book looks at the effect of change on the African farmer, the factors that have upset the balance of traditional systems, such as the introduction of cash crops, the imposition of peace, and improvement in health of both men and animals. Often the result is a higher standard of living for some, and increased population pressure and its accompanying problems for most. Change goes on, and Allan discusses the attempts being made to adopt systems of improved farming, and the demands that will be made on African agriculture by nations striving for economic development.

The African Husbandman is well written, with occasional delightful touches, such as the author's account (on p. 151) of the 'lawn' of Salvinia on Lake Kariba and the three kudu swimming out of it. He gives the impression of a man who was fascinated and excited with his work, who was also constructive and acute. The text is well documented, with a comprehensive bibliography, but for areas with which one is not familiar it would have been of considerable help to have more sketch-maps; that of Uganda is not particularly accurate.

It is worth noting that the work from which this book emerges was carried out by a team of four: Allan, the agriculturalist; M. Gluckman, the anthropologist; C. G. Trapnell, the ecologist; and D. U. Peters. This brings out the very significant contribution of Allan himself, his ability to view African agriculture in all its aspects, biological as well as economic, and, particularly, social. It is this which gives *The African Husbandman* its authority. Peasant farming systems in Africa are intricately bound up with the social customs and the way of life of the people. Any influence which brings change to the farming system will affect the social structure, and, further, any designs for improved farming are likely to be affected by long-established customs resistant to change. The developing countries are fortunate to have at their disposal a book which has consistently taken these factors into account.

The African Husbandman is a book to be used. Gluckman in his foreword, written from the anthropologist's point of view, says: "I dare affirm that it is equally essential to agricultural scientists". It is indeed equally essential. An agriculturalist would merely have said the reverse, that it was equally essential to the anthropologist. It is to be hoped that it will appear under both subjects in bookshops and catalogues.

H. L. Hutchinson