

spleen colony technique and the isolation of the associated mouse sarcoma virus, should lead to rapid progress in the coming years. The possible role of viruses in human cancer was only dealt with specifically in two papers, which stress the difficulty of interpreting the meagre findings. Progress obviously awaits a better understanding of the experimental systems. In addition to the papers directly concerned with tumour viruses, there was a scattering of other papers, some of which are particularly relevant to the tumour virus field, for example the account of bacterial conversion.

This book, which is a credit to Professor Ito and his Japanese colleagues, constitutes a useful and up to date collection of findings by leading virologists—or rather subviral oncologists.

MICHAEL STOKER

TUMOUR ANTIGENS

Specific Tumour Antigens

Edited by R. J. C. Harris. (A Symposium organized by the International Union Against Cancer and the USSR Academy of Medical Sciences.) (UICC Monograph Series, Vol. 2.) Pp. 366. (Copenhagen: Munksgaard, 1967.) 126 D. kr.

THIS report comprises thirty-four articles which in the main are summaries of groups of papers published in detail elsewhere and of which half emanated from laboratories in the United States or Soviet countries. The terminal discussions reflect the general doubt as to whether our available techniques are yet capable of defining completely the antigenic structure of normal tissue and therefore of differentiating tumour specific antigens. Thus Grabar appears convinced that azodye induced hepatomas in rodents are marked by specific antigens of which one component is an embryonal antigen (C.A.), but Deckers, working in the same field, notes the absence of embryonal antigens.

The significance of virus infections in experimental neoplasia and in the subsequent antigenic variation of the infected host cell is considered for a wide range of agents, including those associated with Rous sarcoma, Maloney lymphoma, Graffi and Gross virus-induced leukaemia, SV40 and the adenoviruses. Melnick and Rapp analyse the complexity of virus transformation of cells by the use of metabolic inhibitors, such as cyclosine arabinoside which permits the synthesis of tumour antigen but arrests the production of SV40 viral antigen in monkey cell cultures. These authors and others report the formation, during cell transformation, of viral hybrids such as adeno-SV40 virus. The concept of immunity with regard to cancer is closely examined from the viewpoint of experimental pathology. Thus Harris, by the prior use of chicken tissue antigens for the induction of acquired immunological tolerance, reversed the normal rejection of Rous sarcoma virus-induced tumours in turkeys.

The sections of the report on human cancer studies include the immunological analysis by Korngold of serum gamma and macroglobulins. Sabin describes an unsuccessful search in the sera of children with early childhood tumours for complement fixing antibodies for antigens extracted from these tumours, but emphasizes the need for similar investigations using cytoplasm-modifying antibodies.

Throughout the report doubts are expressed as to the validity of claims based on the use of immunologically heterogeneous systems for tumour specific antigens. Hence the interest which arises in the clinical report by Southam on the homotransplantation of human cell lines, including tumours, in healthy volunteers, the experimental production of hypersensitivity to autologous cell extracts in leukaemia patients and the effect of autologous leucocytes or plasma on auto-transplants of cancer cells

in patients. Southam concludes that this approach has provided some support for the hypothesis that patients may develop an immunological defence mechanism. Surgeons have not infrequently come to a similar conclusion on clinical grounds, such as the occasional recovery to full health and survival for many years of patients with lesions so gross at operation that further surgical treatment other than a confirmatory biopsy was deemed unjustifiable.

The report conveys successfully the impact which cancer research has produced on the cross-linkage of experimental pathology, immunology, virology, biochemistry and genetics, and provides a valuable reference source. Perhaps of greater importance is the clear and refreshing demonstration that nations of different ideologies cooperate successfully in at least one area of human endeavour. Fitting tribute is paid in the foreword to the work of the Symposium organizer, Professor L. A. Zilber, who died in his laboratory in Moscow shortly after the meeting.

C. A. GREEN

HAEMS AT HOME

Hemes and Hemoproteins

Edited by Britton Chance, Ronald W. Estabrook and Takashi Yonetani. (Proceedings of the Third Colloquium of the Johnson Research Foundation of the University of Pennsylvania, Philadelphia, April 16 and 17, 1966.) Pp. xv + 624. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1966.) \$13.75.

THE haemoproteins have been subjected within recent years to very intense study by physico-chemical techniques. They are peculiarly suited to the variety of approaches which are now available and progress in the field is rapid. It is important, therefore, that at suitable intervals the whole corpus of knowledge concerning them and their enzyme properties should be reviewed and related one to the other.

The first colloquium on haems and haemoproteins was convened by Professor M. R. Lemberg and held in Canberra in 1959. It was a great success and set the pattern for future conferences. The second colloquium took place in 1964 at Amherst and now the third has been held at the Johnson Research Foundation of the University of Philadelphia and is recorded in the volume being reviewed. In the words of the editors, "The colloquium was organized to honour M. R. Lemberg, H. Theorell, D. Drabkin and D. Goddard and especially to celebrate two landmarks in the study of haemoproteins—the late David Keilin's book on cell respiration and cytochrome and the fortieth anniversary of the studies by R. Hill and H. F. Holden on the resolution of haemoglobin". There were sixty-five participants, fifty-six presented papers and a number of specifically arranged discussions.

The range of subject matter covered may be gathered from the titles of the topics presided over by individual chairmen: "Structure and Reactions of Haem", "Reactions of Haem with Proteins", "Ligand Binding to Myoglobin and Haemoglobin", "Intermolecular Interactions of Crystalline and Soluble Myoglobin and Haemoglobin", "Structure and Reactivity of Hydroperoxidases", "Physical Properties of Cytochromes *c* and *b₅*", "Ligand Binding and Reaction Mechanisms of Oxidases", "Kinetics of Electron Transfer Reactions in Cytochrome *c*", and "Theoretical Interpretations".

Contributions and discussions are at a high specialist level. The emphasis throughout is upon the physico-chemical approach except for the three papers and discussion debating the structure of haem *a* and cytochrome *c* oxidase. In a characteristically witty and penetrating postscript, entitled "The Forgotten Cell", D. L. Drabkin reminds us that biological systems have properties and present problems which are inherently important and he