

SPECULATIVE IMMUNOLOGY: NEW MAPS FOR OLD

The Integrity of the Body

A Discussion of Modern Immunological Ideas. By Sir MacFarlane Burnet. (Harvard Books in Biology No. 3.) (Cambridge, Mass.: Harvard University Press and London: Oxford University Press, 1962.) Pp. vi+189. 30s.

SIR MACFARLANE BURNET is at once the selder statesman and the *enfant terrible* of immunology. No one knows better than he how to assume an imposing air of magisterial authority while cutting the most outrageous capers.

His latest book, *The Integrity of the Body*, is a new triumph for his special blend of magniloquence and mischief. The general scientific reader, if unprotected against the exhilaration of Burnet's style by any special knowledge of the topics discussed, is assured of having the time of his life. The professional immunologist, if he is worth his salt, may derive a benefit of a different kind: in all likelihood he will be goaded into fresh experimental attempts to refute, once and for all, this irrepressible sage.

The first four chapters cover in a clear and breezy style the elementary background of disease-resistance, antibodies, blood groups and hypersensitivity reactions. Chapter 5, which is about cells, suffers from a misfortune of timing. Important recent advances made by J. L. Gowans and others in charting the life-histories and metamorphoses of the cells responsible for immune reactions were made public after Burnet's book went to press, and the same is true of much of our new knowledge of the immunological role of the thymus gland. A similar mishap, which overtakes the following chapter on "Self-recognition", reveals the unwisdom of dogmatism in scientific exposition. The chapter contains among other things a gallant attempt to expound the principles by which protein primary structure can be coded in the base-sequence of the DNA molecule. The description appears, however, to be based on the now disproved 'comma-less code' of Crick, Griffith and Orgel. The account of immunological tolerance given in this same chapter constitutes a more serious case of the same nature—more serious because it is a topic on which Burnet may claim a special title to have his views heard. The statements that "tolerance must be induced in the first day of life or before birth" and "no animal can produce antibody till it is at least 14 days old" are both incorrect. First, states of immunological unresponsiveness which are indistinguishable from tolerance can be induced in adult mice. Secondly, in sheep and opossums antibody-formation has been successfully elicited in embryonic life. These facts are exceedingly damaging to Burnet's own particular theories, according to which tolerance results from confrontation with antigen during a special 'self-recognition' process supposed to occur at a critical phase of ontogeny. Indeed, they suggest a quite different interpretation of tolerance in terms of the well-known phenomenon of 'immunological paralysis' first demonstrated in adult mice by Felton. Yet Burnet omits from this book all mention of Felton's work.

In the next chapter, "The Clonal Selection Theory of Immunity", Burnet vaults astride his own special hobby-horse, which soon, Pegasus-like, carries him far away from earthbound mortals. In the remainder

of the book a few interesting descents to Earth are made, notably in the discussion of auto-immune diseases. He remarks, for example, on the occurrence of these diseases in patients suffering from congenital agammaglobulinæmia, and makes the important point: "Since in agammaglobulinæmia antibody in the blood is never produced, we can feel sure that rheumatoid arthritis and the other so-called auto-immune diseases are not primarily due to anomalous antibody production, even though it may be easy to show in most cases that abnormal antibodies are present." But in the final chapter, entitled "The Deeper Problems", contact with established fact ceases, for we have come to the peroration. This takes the form of a plea for Burnet's present ideas concerning the evolution of immunological systems. He sees their function not primarily as that of a defence force against microbial invasion; rather they constitute a sort of secret police for the liquidation of deviationist (for example, cancerous) cellular elements which may arise from within by somatic mutation. This is, Burnet admits, "no more than a hypothesis. But it is in accord with the whole trend of modern immunology that it should be true". This statement has surprise value, if nothing else, and the book concludes on a lively note. DONALD MICHIE

ADVANCES IN STEREOTAXIS

A Stereotaxic Atlas of the Cat Brain

By Ray S. Snider and William T. Niemer. Pp. 132. (Chicago and London: University of Chicago Press, 1961.) 95s.

A Stereotaxic Atlas of the Monkey Brain (Macaca Mulatta)

By Ray S. Snider and John C. Lee. Pp. 132. (Chicago and London: University of Chicago Press, 1961.) 95s.

THE brain is one of the most inaccessible of the body's tissues and in both the clinical and experimental fields means have been sought of gaining access, without excessive trauma, to its deeper parts. An early attempt to take advantage of the reasonably close relationship between the bony landmarks of the skull and intra-cranial structures was made by R. A. Clarke in 1908, who built the first stereotaxic instrument based on rectangular co-ordinates for use by Sir Victor Horsley in the study of cerebellar function in the monkey. The potential of this technique for the localization and study of discrete cerebral structures was overlooked until 1936, when the late S. W. Ranson stimulated a renewal of interest in a tool which has since proved invaluable to the neuro-anatomist, neurophysiologist, neuropharmacologist and neurosurgeon. Though originally designed for the positioning of circumscribed electrolytic lesions the stereotaxic method has more recently been used for the administration of focused ultrasound and ionizing radiations and for the study of changes in neuronal activity following the electrophoretic application of drugs.

Several atlases have been designed for studying, by stereotaxic methods, such species as the cat, rat, rabbit, dog and monkey, and among these the present volumes are quite the most complete and sophisticated to date. Presentation is in the form of paired photomicrographs of beautifully prepared coronal sections of the brain extending, at intervals of 0.5 mm,