attempt to give a complete historical coverage but each section has a broad historical framework. As he says, "we are interested in the logical development of ideas rather than tracing their history". Such an approach can be fraught with hazards, and it says much for the author that many of the most obvious pitfalls are avoided. Certainly we have Galileo at the Tower of Pisa, Newton's apple and a few other items from scientific mythology but these tend to be confined to the early centuries. More serious is the "whiggish" view of historical progress that is implicit in much of the book. The unfolding of science is seen as having "all the elements of a good detective novel" with "a solution of the mystery through sheer perseverance". But of the non-rational elements in scientific development, of the false starts and of the brilliant "hunch", little is said. This would not matter so much were it not the avowed aim of the book to emphasize how the scientist develops his theories and how he approaches a problem.

As a reliable historical guide, therefore, this book is inadequate. But it may well turn out to be a valuable companion to those concerned to communicate modern science within a non-scientific culture. C. A. RUSSELL

Unravelling Interactions

Migration of Interacting Systems. By L. W. Nichol and D. J. Winzor. Pp. x+166. (Clarendon: Oxford; Oxford University: London, November 1972.) £5.50.

BIOCHEMISTS classify electrophoresis, sedimentation and gel chromatography as migration processes. If these methods are used straightforwardly for separating biological macromolecules, only a relatively simple grasp of underlying principles is required, as long as the migrating material is confined to a thin zone. Nevertheless, this simplicity is paid for by a loss of information about macromolecular interaction, a matter of strong topical interest.

If the zone is made broad with a plateau of constant concentration intervening between its extremes, the conditions for interaction are preserved. Qualitative indications of interaction may then be obtained by comparing leading and trailing boundaries. Even at this level not much depth of theory is required. It is in moving to a quantitative measure of interaction that a new dimension of difficulty emerges.

In part this difficulty is inherent. Complexes have to be studied under conditions determined by the circumstances in which they are stable, ruling out such usual simplifications as extrapolation to zero concentration. Indeed, measurements have often to be made at sufficiently high concentrations for non-ideality factors to be dominant. Quite apart from this, very complicated effects of re-equilibration and diffusion within the boundaries need to be understood. Consequently a biochemist finds himself in the situation he has met before over X-ray crystallography and nuclear magnetic resonance spectroscopy, where he can feel himself diverted completely from his subject of study in order to master the tools needed to pursue it.

It is here that a monograph of the right kind could lead to a great economy of effort. Biochemists are likely to agree that for them this means one which begins at a very simple level with an account of the basic theory of interacting systems, but which then takes them step by step to a point where they are able themselves to deal with real systems.

The most recent advances turn out to be quite helpful in this respect, for much of the forbidding complexity of interaction theory has been due in the past to attempts to find analytical solutions of the basically simple flux equations. It is now quite obvious that all this can be by-passed and that answers of any desired precision will be obtainable by numerical methods without having to lose sight of the underlying physical situation and without having to neglect non-ideality factors, diffusion effects, pressure effects or any factors which can be clearly defined. A distinction can then be made between the initial very difficult job of writing the necessary computer programs to carry out the numerical work, and the subsequent use of these programs to analyse experiments.

This monograph does not adopt this point of view. In particular the introduction is very difficult for beginners to whom, after all, the editors address their monographs. Perhaps the authors felt that the well-known review article by Nichol *et al.* published in 1964 already provides a sufficient introduction. So readers have to do a great deal of hard work right from the first page, including mastering very general ideal cases of which a self-associating acceptor interacting with a self-associating ligand is a key example. One soon realizes that the book is patterned on the thirty or so papers written over the last ten years by the authors, and as they say in their preface, their choice of examples is "guided by the interests of the authors in protein research".

Even so, most areas of interest are touched upon, for example monomer-polymer systems in rapid equilibrium, and related "sigmoidal" ligand binding, protein–protein association and hybridization, protein interactions with buffer constituents, frictional effects and charge effects in sedimentation. Also considerable attention is paid to the quantitative side of gel chromatography in which the authors have played a prominent part. For those familiar with the subject, it is particularly useful to have an exposition summarizing the authors' point of view in a subject in which there remain many areas of controversy. One of these areas is clearly that of the effect of pressure on the sedimentation of myosin, for one notices that the authors' interpretation contradicts that of the American editor of the monograph who made the original discovery of this effect. G. A. GILBERT

Hormones on the Brain

Steroid Hormones and Brain Function. Edited by Charles H. Sawyer and Roger A. Gorski. (Proceedings of a Conference held in May 1970, California.) Pp. 388. (University of California: Berkeley, Los Angeles and London, 1971.) £13.50.

ABOUT fifty authors contribute thirty-two papers to these proceedings of a conference sponsored by IBRO and by the UCLA Brain Research Institute and Forum in Medical Sciences. The hormones of the book's title comprise those of the adrenal and gonads; brain function is appraised by electrophysiological and behavioural characteristics and elucidated by a variety of techniques including metabolic and histochemical ones and the placing of surgical lesions.

It is encouraging that in the brain, as in peripheral target organs, attachment has been found of steroid to cytoplasmic and nuclear components. W. E. Stumpf, basing his observations on the cerebral occurrence of oestradiol-binding proteins similar to those of the uterus, reports autoradiographic localization of the cells concerned. After systemic administration of [^{3}H]-oestradiol to rats, uptake was found to defined neurones of the diencephalon and amygdala, and not to glial and ependymal cells. It is suggested that the neurones concerned produced the pituitary secretions which in turn acted on the peripheral target organ. R. A. Gorski concludes, from implantation of actinomycin D in the hypothalamus of rats, that oestrogen action in inducing aspects of female sexual behaviour proceeds through RNA and protein synthesis. The RNA content of cerebellar explants is shown by A. Vernadakis to be increased by both cortisol and oestradiol, while B. S. McEwen describes excellently the differential localization of corticosterone and oestradiol in the rat brain.

In his "overview" of the conference,