

significance of his discovery of the conditions under which proteins and viruses could give detailed X-ray diffraction effects, work which opened the way to the elucidation of their structures and to much more, the solution of the structure of DNA and the understanding of molecular biology as we know it now. I read again the review Bernal wrote in 1968 of Watson's book, *The Double Helix*, and did not find it embarrassing as Goldsmith suggests. Bernal says specifically: "My name does not appear, and rightly, in the double helix story". That he should feel, all the same, that he had so many clues that he should have been able to see the solution himself was only natural — Pauling felt just the same on reading the book; and Bernal had an added reason in that he had himself taken X-ray photographs of nucleic acids as long ago as 1937. Incidentally, the remark that Furberg established the structure of DNA is so wrong it must be a misprint.

Other Goldsmith comments: the implication of the sentence "his own major, purely scientific contributions were made before 1939" that Bernal's work was either not his own or not major — is surely wrong. After the war Bernal set up a

number of very good research groups at Birkbeck, which he left much to themselves — he strongly believed, from his early work with Sir William Bragg, that independence was a good thing — he himself working mainly on the liquid state; it was from this research that his 1959 paper on the structure of liquids emerged, arguably the most brilliant he ever wrote. Another serious misunderstanding: "he had a hurting yet non-deliberate blindness about key work done by members of his staff". Characteristically, Bernal was the most generous of colleagues, generous with ideas, help and credit (as indeed is said elsewhere). Any blindness of the kind mentioned was extremely rare with him — as with children in many large families, his scientific children sometimes felt they had less than they would have liked of their parents' attention. To most he seemed kind beyond their deserts.

Many of the failings of Goldsmith's treatment of his scientific work apply to other sections; his judgement seems to me often very wrong. He relies too much on casual, sometimes malicious, gossip. John Desmond Bernal's life and work deserves a very much more serious study and appraisal. □

More *Drosophila*

Peter Lawrence

The Genetics and Biology of Drosophila, Vol.2d. Edited by M. Ashburner and T.R.F. Wright. Pp.702. (Academic: 1980.) £54, \$124.50.

THIS volume is the last in the series dealing with the genetics and biology of the individual fruit fly. Volume 3, which is in preparation, will take us away into the biology of populations, taxonomy, ecology and evolution.

I have already taken the opportunity this multi-authored work has given me to malign multi-authored works in general (*Nature* 283, 116; 1980). One criticism of the earlier volumes was the way topics are jumbled up, which makes it necessary for the specialist to buy several volumes when he may only want to read a chapter or two in each. Another was that there appeared to be a lack of discipline which led to chapters being over-long and containing evanescent material, making the individual volumes unnecessarily bulky and expensive. Although I think Vol.2d is a legitimate target for the same attacks, it contains several good chapters which cover related topics and is therefore easier to defend.

This volume covers lampbrush chromosomes, sex determination, dosage compensation, oogenesis and spermatogenesis. There are chapters on the structure and

development of the epidermis, nervous system and tracheal system and three chapters which appear eccentric in this company — on neuromuscular physiology, fly pigments, and even one on viruses.

Most chapters are strong, concentrating in the main on useful facts rather than idle discussion. There are many good things, for instance tables of enzyme activities in flies bearing different X-autosome ratios, pictures and drawings of the central nervous system and new illustrations of the larval cuticular sensilla, tables referring the reader to papers on the structure of the imaginal discs, discussion of the types of cell junctions found in epithelia, drawings of the ramifications of the tracheal system, and a very useful compendium of the effects of eye colour mutants. Examples of idle discussion of the abstruse are much of the chapters on sex determination and viruses, and the sections on the rate of oogenesis in umpteen species of *Drosophila* and on cell lineage in ommatidial development. This volume, like bits of its predecessors, will be a valuable resource. Editing huge books like this is no delight, so please raise your glasses to Ashburner and Wright! □

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Gut reactions

G.J. Dockray

Gastrointestinal Hormones. Comprehensive Endocrinology. Edited by George B. Jerzy Glass. Pp.1008. (Raven: 1980.) \$85, \$115.60 outside the USA.

TEN years ago secretin, gastrin and cholecystokinin were the only hormonal peptides to have been isolated from the gut and characterized. Today we know the structure of over a dozen distinct biologically active gut peptides. The function of most of these is still uncertain. However, it seems likely that while some function as true hormones, others may act locally by diffusion to nearby cells (paracrine effects), and still others are secreted by nerves and have neuro-regulatory roles. The editor of this book has rightly taken a broad view of gastrointestinal hormones, and has included chapters on both the classical hormones (secretin, gastrin, cholecystokinin) and a wide range of other active peptides.

Gut endocrinologists have not been reticent about reviewing the rapid advances in their field, and at least five other books (generally conference proceedings) devoted to the gut endocrine system have appeared in recent years. The value of the present book lies in its comprehensive approach to the subject, and in this it lives up to the title of the series.

There are 42 chapters contributed by workers from 33 different laboratories, all active in this area. The division of the chapters into sections has been rather arbitrary and the greater part of the book is essentially a systematic coverage of the localization, isolation, characterization, biological properties, receptor binding, physiology and measurement of gut peptides. A final series of chapters deals with those "candidate" hormones which have not been isolated but whose existence is inferred from physiological studies, and also with new peptides which are in the process of being isolated from hog intestine by Viktor Mutt and his collaborators.

In the not too distant future it seems probable that we will know of 20 or 30 chemically defined and biologically distinct peptides which may control digestion. This field is obviously moving quickly, and it is therefore welcome to see that the publishers have managed to produce the book quite rapidly (some references are barely a year old). Although it is inevitable that much of the book will soon be out of date, it is still essential reading for anyone who wants to keep up with advances in this area. It will also provide an invaluable source for understanding developments not just in gut endocrinology, but also in the study of peptides in central and peripheral nerves. □

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