



Biology of Development

An integrated, self-instructional,
programmed Audio-Visual Course
Under the Editorial Direction of
Dr Gaye Manwaring

Departments of Education and
Biology University of Glasgow

This course is designed for sixth forms, technical colleges and first year classes in universities and polytechnics. The course consists of 15 programmes each comprising a tape, a full-colour filmstrip, a workbook and a teachers' guide book. It provides the basic facts necessary to understand the types of changes that occur during development; the methods by which such phenomena are studied; current ideas about control mechanisms and their biological significance.

The programmes are an extremely flexible teaching aid, ideal for use with mixed ability groups and with students from varying academic backgrounds.

Contents

Cells and organisms - Cells in Action - Mitosis - Meiosis - Fertilisation - Cleavage - Gastrulation - The formation of organs - Developmental plant physiology - Growth - Nucleus and cytoplasm - Hormones - Regeneration and Development switches - Shape and pattern - Embryos and larvae.

For further information about this course please write to:

The Promotion Co-ordinator,
Room 502, Longman House,
Harlow, Essex CM20 2JE



Longman
1724 - 1974

ject to the correctness of guesses about the bare masses and angular momenta of the particle in their model. But at least three of the papers (by Kur-sunoglu, Salam and Blokhinstev) have a more didactic purpose and will be of great use to graduate students of particle physics.

The papers in the second section on atomic and molecular physics, one by Massey, one by Spruch and one by Herzenberg, are nearer to reviews than those in the first, but there are also two panel discussions. Three more speculative papers on X-ray astronomy, helium and biology make up the third section.

Despite the relatively high speed of the book's production the presentation is excellent and free of misprints. Thus a scattered but uniformly high powered, original but well written collection of papers make up a book which particle physicists will find stimulating and informative. I hope that university libraries (to whom the high price presumably restricts the book's sale) will make it available to them.

PHILIP ROE

Thinking protozoa

The Evolutionary Foundations of Psychology: a Unified Theory. By Felix E. Goodson. Pp. xi+228. (Holt, Rinehart and Winston: New York and London, 1973) n.p.

DR Goodson sets himself the Kantian goal (the parallel is mine) of effecting a transcendental deduction of the psychological factors necessarily involved if the evolution of complex organisms is to be possible. In other words, he aims for an integrated view of psychology derived by way of abstract arguments from a broadly evolutionary base.

Unfortunately, although he has some interesting things to say about the psychological necessities inherent in the earliest forms of life, his concepts are not sufficiently structured or precise to add much to one's understanding of mammalian and human psychology. To be sure, his stress on adaptive function for the sake of the organism as a whole is preferable to an excessively narrow conception of psychology that ignores man's evolutionary context. And he relates a wide variety of findings in empirical psychology to this overall perspective. But his remarks are too vague to be helpful, and leave most interesting substantive questions unanswered—or, worse, unasked.

For example, he identifies the paramount task of psychology as "an evaluation of apperception that focusses on the variables that affect the rapid shifting from one component to the next", where by "apperception" he means the process (often called "attention") by which inputs from the senses or the

memory come briefly into focus in the conscious mind (page 68). Whether or not accounting for the detailed course of the stream of consciousness is 'the' paramount task of psychology, it certainly is an important psychological problem. But what does Dr Goodson have to say on the subject?

"Thinking", he says, "is nothing more than fluctuation of apperception among available encodes and as such is a completely automatic and lawful process" (page 135). Readers of *Nature*, who are not prone to think of thinking as a random activity, can hardly demur with this—but what one wants is some indication of the nature of the laws involved. Precise specification, of course, is not to be looked for in a deliberately general and abstract discussion. But one might reasonably hope for a more powerful concept than 'equilibration' (which is involved in Goodson's most basic "evolutionary postulates of process") an indication of the psychological complexity of thought. Thus the characterisation of "thinking" quoted above continues: "Apperception is always the most equilibratory response possible to the myriad components dynamically interacting within the integration matrix, and when the components brought into sequential focus consist of encodes, thought is taking place".

If a generic concept of equilibration is to be applied equally to the specifics of chemical diffusion in protozoa and flights of fancy in human beings, more needs to be said about the differential aspects of the phenomena so confidently classified together. Even the social psychological theories of "cognitive consistency" and "cognitive balance", vague and unsatisfactory as they may be, make a better attempt than Goodson to state what constitutes "equilibration" in differing types of thought. Equally, Freud offered more substantive suggestions about the structure of the "integration matrix" and the varieties of "psychic disequilibrium" than can be found in this book. It is ironic that Goodson castigates psychoanalytic theory for "its reliance on vague terminology" (page 204).

I should perhaps admit my own conviction that the complexities of mental structure can only be satisfactorily approached by way of the concepts currently developing within artificial intelligence. My dissatisfaction with this book doubtless reflects the measure of its distance from this theoretical approach. But I think it unlikely that psychologists favouring other paradigms would find it a rich source of insights. Even Kant tried to show in detail how specific examples of human thinking (such as the metaphysical antinomies) were generated by the abstract forms of thought postulated by his transcendental deductions. MARGARET A. BODEN