Put in the picture

D. R. Higgs

Hemoglobin: Molecular, Genetic and Clinical Aspects. By H. Franklin Bunn and Bernard G. Forget. Saunders: 1986. Pp. 690. \$85, £98.

CAPTAIN Marryat may have been a little hasty when he wrote "There is no getting blood out of a turnip". Haemoglobin and related haem proteins have now been identified in a wide variety of animals and more recently, to our surprise, in the leguminous nodules of lupins and in the lowly bacterium Vitreoscilla.

Since the relationship between haemoglobin and oxygen transport was established at the turn of the century, this widely distributed molecule has become one of the most intensively studied proteins and with it have been established many of the important landmarks in molecular biology. The abundance of haemoglobin and its messenger RNA in a highly enriched state within red blood cells made it a readily accessible model for studying protein structure, function and synthesis at a time when few other proteins could be examined in this way. Similarly, complementary DNAs and genomic DNA segments encoding haemoglobin genes were amongst the first eukaryotic genes to be characterized. As luck would have it for the molecular biologist, there are also a very large number of naturally occurring mutants of the globin genes which have greatly enhanced our understanding of the haemoglobin molecule and its expression. Unfortunately, these mutants give rise to genetic disorders such as sickle cell disease and thalassaemia that are major causes of morbidity and mortality in many areas of the world.

The enormous literature on haemoglobin is reflected in the fact that Index Medicus contains 2,000-3,000 new references on the subject every year. In addition to the traditional categories, studies on haemoglobin genes are playing an increasingly important role in subdisciplines such as molecular evolution, population genetics and anthropology. To marshal this amount of data into good order within a single book is a herculean task, requiring both breadth and depth of knowledge. Franklin Bunn and Bernard Forget make a formidable team to perform this task. Both are medical graduates whose initial interest was kindled by the clinical problems presented by the mutants of haemoglobin. Bunn's special interests tend towards understanding the structurefunction relationships of haemoglobin and are complemented by Forget's expert knowledge of the molecular genetics of the globin genes.

The book under review is a follow-up

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to a similar, successful edition entitled Human Hemoglobins, published nine years ago. The new volume contains all the familiar chapters on haemoglobin structure, function and synthesis, updated as appropriate, but also new chapters featuring animal haemoglobins and their molecular evolution, minor haemoglobin components, methaemoglobin and carboxyhaemoglobin. The sections on the clinical aspects of thalassaemia and sickle cell disease have also been expanded. In addition, "in an attempt to humanize" the material, Bunn and Forget have included a brief history of the major discoveries in the field, and biographical sketches and photographic portraits of a few chosen contemporary investigators. George Orwell observed that "At 50 everyone has the face he deserves" - given the undoubted contribution of these quinquagenarians to the field, I think that they deserved more flattering photographs!

The book is well written and meticulously referenced. Each subject is taken

Conscious efforts

D.M. MacKay

The Evolution of the Soul. By Richard Swinburne. Clarendon: 1986. Pp.323. £25.

RICHARD Swinburne is a "dualist" philosopher who believes that we can only make sense of the interdependence of mental states and brain states by supposing that "mental states are states of a soul, a mental substance in interaction with the body". Aware that this is an unfashionable view, he sometimes shows more of the aggressive assurance of a debater than the impartiality of a judge; but it is a pleasure to watch a methodical craftsman's mind at work, and I do not know a better or more persuasive statement of the case for dualist interactionism in the sense he defines. The great merit of the book is that it "takes seriously the fact of human conscious experience, its continuity and its causal efficacy" (p. 3).

Neglect of the primacy of conscious experience has indeed blighted most attempts to see man in purely material terms (the materialist position is remotely plausible only when the materialist is talking about people other than himself). But is dualist interactionism the only reasonable alternative? Among Swinburne's main reasons for thinking so are (a) that sensations are distinct from, not identical with, brain events (Chapter 3); (b) that thoughts are "causally efficacious" (p. 82); (c) that planning with purposes in mind is active and efficacious, conferring evolutionary advantages (Chapter 5); (d) that various imaginary experiments in from simple first principles through to the most complex aspects of our current knowledge, making it of value to novices and *cognoscenti* alike. The illustrations are very clear and the stereodiagrams are outstanding (*sic*). The stereo specs that came with my review copy were essential for my enjoyment of the book, and I feel that with such a relatively expensive publication they should not come as an optional extra.

If I had to pick on anything with which to disagree, it would be in the preface where Bunn and Forget state that our "understanding of hemoglobin is approaching an apogee". On the contrary, I predict that they will be rewriting this book again in ten years time, and including chapters on developmental regulation, tissue-specific expression and maybe some advances towards gene therapy. \Box

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which brain hemispheres are transplanted create dilemmas showing that "talk about persons is not analysable as talk about bodies and their parts" (pp. 151, 160); (e) that there is no logical impossibility that a person (suitably defined) could continue to exist without his body; (f) conversely, that knowledge of brains and their states, and knowledge of which mental events were occurring, would not tell you that mental events were states of the same subject (p. 158). Swinburne would "explain" the problem generated by the behaviour of "split-brain" patients as "the problem of discovering the number of souls connected to a given brain" (p. 160).

It has to be said that the notion espoused by Swinburne, that transplantation of an isolated cerebral hemisphere could be sufficient to bring a new person into being, is technically unwarranted. There are structures essential to personality and consciousness in indivisible subcerebral brain tissue. But there are many neuroscientists today who would accept and indeed insist upon points such as (a) to (f) as vital and neglected indicators of the complexities of what it means to be human, and as showing the intellectual bankruptcy of traditional materialism.

No doubt, at the cost of generating a host of further problems, to speak of man as made up of two "parts", a body and a soul (Chapter 8), is a possible way of accommodating such facts. It seems a pity, however, that before advancing this as his only possible conclusion Swinburne did not make a more serious effort to reckon with the expansion of our concepts of causality that has come with developments in the theory of information and control. In an information system, we can recognize