Book Reviews


The term ‘hominids’ is used for animals that are sufficiently specialised for us to be confident that they are ancestral to modern humans and not to our close relatives, the chimpanzees. The earliest hominin fossil evidence comes from East Africa between 4 and 5 Myr ago. For more than 2 million years, until around 2 Myr ago, our ancestors retained an ape-like body shape. This group, which is made up of the earlier australopithecines, the australopithecines and the more specialised paranthropines, is known from evidence found at East and southern African sites, but recent discoveries in Tchad confirm that the australopithecines, at least, probably ranged across Africa. The first evidence of animals that are more human-like in body size and shape also comes from Africa. These fossils are a good deal younger, ~ 1.9 Myr, than their australopithecine precursors and are the first hominids that are sufficiently like modern humans to be confidently included in our own genus, Homo. It is one of these species, Homo ergaster, which is a variant of *Homo erectus*, that is the first hominin species to be found outside Africa.

Overlapping in time with *H. erectus*, which in some parts of the world persisted as late as 200 Kyr, is a substantial collection of fossils which are more modern human-like than *H. erectus*, yet which are not fully modern in their appearance. The earliest evidence of such material is known from Africa, at Ndutu and Kabwe, from Europe, at Mauer and Arago and from China, at Dali and at Jinnuishan. Perhaps the best known materials in this ‘archaic Homo’ category are the remains that have been attributed to *Homo neanderthalensis*. This species has a characteristic appearance, which includes a large, globular-shaped cranium, jaws and teeth which are set well forward in the face, and particularly robust limb bones with large joint surfaces. The earliest evidence of crania with neanderthal-like characteristics comes from Spain, with some evidence perhaps being as old as 700–800 Kyr ago.

Populations of ‘archaic Homo sapiens’ peoples from other regions are not so characteristic in their appearance, but all have some distinguishing features. It is the extent to which those regional characteristics are continued within the regional populations that succeeded them that lies at the root of ongoing debates about the origin of anatomically modern humans, or *Homo sapiens*. It is a paradox that the hominid species which is the least well defined is *H. sapiens*, the one to which the reader and the writer belong. Whereas other hominid species have a ‘type specimen’ to which the species name is irrevocably attached, there is no designated type specimen of *H. sapiens*. In addition, because we belong to a ‘polypotypic’ species, that is one that incorporates a relatively large range of continuous variation, a spectrum of skull shapes and limb proportions have to be taken into account when considering whether fossils can be included within *H. sapiens*. The variation within our own species is not random, however, and a good deal of it is related to climate. For example, modern human populations follow Allen’s Rule, which stipulates that populations in warmer climes will have longer extremities, while those in colder climates will have shorter, stockier limbs. The tall, long-legged and narrow-waisted Nubian, and the short, stocky, Eskimo are much used, but still relevant, illustrations of the effects of climate on body shape. Head shape responds in the same way, with long heads predominating in warmer climates, and people with rounder heads and smaller noses, more common in colder climates. Thus, what is an example of ‘anatomically modern’ *H. sapiens* in one region of the world will differ from an example taken from a region with a different climate.

Two hypotheses for the origins of modern humans have been put forward. One, called the ‘Out of Africa’ or ‘Noah’s Ark’ hypothesis, suggests that the genetic modifications that were responsible for the shift to an anatomically modern morphology only occurred once, and in Africa. The rival ‘multiregional’ hypothesis purposes that the shift to an anatomically modern human morphology was a process that occurred several times, but only once in each of the major regional population centres. A ‘weaker’ version of the multiregional hypothesis allows for gene flow between the regions, but maintains that this gene flow was not sufficient to obscure the presence of regionally distinctive morphologies. The two extreme hypotheses make different predictions about, for example, the degree to which a regionally distinct population like the Neanderthals relates to the people that succeeded it. The ‘Out of Africa’ hypothesis predicts that the population that succeeded the Neanderthals would have had no direct connection with them, so that it would be unlikely that any Neanderthal traits would persist in the later population. Conversely, the ‘multiregional’ hypothesis would predict that there would be morphological continuity across the ‘archaic’/‘modern’ boundary in each of the main regions.

What is badly needed in modern human origins research is the input of individuals who can set aside the ‘conventional wisdom’, define simple research questions, take a fresh look at the primary evidence, be rigorously quantitative and not be afraid of acknowledging that for some questions the quality of the evidence simply cannot support unambiguous conclusions. In the recent past Martha Lahr’s research strategy has come closest to meeting these criteria. Her strategy was to examine, in as objective a way as possible, one of the central predictions of the multiregional school. This is that there is evidence in the hominin fossil record of morphological continuity between the archaic and modern peoples in each of the main regions of the world. Lahr pursued her tests of this prediction in 5 regions—Europe, the Middle East, Africa, East Asia and South-east Asia. In the event 25 traits were chosen to test whether the samples from 2 of the regions, East and South-east Asia, are compatible with the regional continuity model.

Her investigation showed that it is only in the Australian record that Lahr finds any substantial evidence for regional continuity. Even that she discounts because it is claimed that several of the characters are correlated within the same ‘functional context’. I am wary of the proposal that such variables ‘do not count’, for while I accept that they may not all behave as independent variables, and thus a ‘head count’ of variables should be interpreted with caution, their significance as proxies for genetic relatedness is not lessened because they are susceptible to a functional interpretation. Phylogenetic valency and functional relevance are surely not incompatible.
Armed with this ‘refutation’ of the Regional Continuity Model Lahr then searches for clues about how an ‘Out of Africa’ scenario might have worked by turning her attention to investigating the nature of modern human cranial variation. In doing so she finds, but does not really address, the interesting result that Middle and Upper Pleistocene African crania are not especially closely linked morphologically with modern Africans. Would that not be an important prediction of the ‘Out of Africa’ model? The multivariate part of this study shows interesting links between overall cranial size and robusticity as well as links between tooth size and facial robusticity. In the last section of the book the author develops several different scenarios to explain how modern human cranial variation might be linked to successive dispersals from Africa and to dispersals to and from West Central Asia.

This is a work of genuine originality and scholarship and as a contribution to this field it stands head and shoulders above its competitors. It is so full of material that its qualities cannot be appreciated in one reading. The pity is that the bulk of the competition is so far behind, for with the exception of Wadde’s (1994) work and recent attempts to take a fresh look at the primary evidence (Churchill et al. 1996), much of the recent literature about the origins of anatomically modern humans is disappointingly predictable and pedestrian.

BERNARD WOOD

REFERENCES


Measurements of cerebral blood flow and metabolism were central to studies of hypoxic brain damage in the 1970s and the early 1980s. Partly driven by the available technology, such investigations were predicated on the belief that restoration of blood flow to an ischaemic at-risk volume of tissue was likely to not only halt or delay the onset of irreversible damage but was also likely to improve functional outcome. This indeed turned out to be true in practice, but it was not until there was a much greater appreciation of presynaptic and postsynaptic events during hypoxia that it became apparent that a whole series of receptor and nonreceptor mediated events were occurring at cell membranes and that these in turn were capable of triggering a variety of cascades that could culminate in irreversible cellular death. Various mechanisms that are indeed capable of initiating irreversible cell death have now been recognised, principal amongst which are calcium mediated events, lipid peroxidation and free radical formation. The investigation of these various mechanisms by pharmacological means (both proprietary and nonproprietary) has clearly demonstrated the potential for neuroprotection.

In the event of structural damage it is now appreciated that the associated cellular changes in astrocytes and microglia constitute a form of inflammatory reaction which, under certain circumstances, may by itself be deleterious. What converts a reparative process into one that is actually autodestructive is not clear, but presumably is due to a sequence of molecular and cellular responses that at least in part are determined by the genetic make-up of the individual.

The last few years have therefore seen a change in the emphasis of studies in hypoxic damage away from the role and significance of neurotransmitter and the neuropeptide changes in hypoxia, to one that increasingly has emphasised the importance of stress responses and their relationship to changes in gene expression. The fascinating insight that has been provided by such studies has opened up the opportunity of therapeutic intervention at different time points in order to influence the sequence of events that has initiated by the various mechanisms.

This volume in the well known Advances in Neurology series is based on the proceedings of the Eric K. Fernström Foundation Symposium held in Lund between 13 and 16 June 1994, to which there were over 100 contributors. The proceedings have been divided up into 6 sections: excitotoxic mechanisms; calcium and cell death; temperature, pH, and free radicals; inflammatory reaction involving free radicals, cytokines, nitric oxide; trophic mechanisms and protein synthesis; and changes in gene expression. The contributions are well written and liberally illustrated by various figures and tables. References are provided at the end of each contribution and the volume has a good index.

All in all these proceedings are to be recommended as an in-depth review of cellular and molecular mechanisms of hypoxic brain damage up to the time of the symposium. Herein lies the potential weakness of such a proceedings, given that inevitably matters have advanced between the time of the symposium and the publication of its proceedings. In this case almost 2 years have elapsed. Nevertheless the book is a fund of information and is therefore an excellent starting point on which to build more recent advances. A test of the popularity of the book has already been shown by the avid way in which it is being sought by the PhD students and research fellows in our group, most of whom work in areas concerned with cerebral blood flow and metabolism.

D. I. GRAHAM


Interactions between fetal and maternal cells are obviously an essential part of the establishment of a successful pregnancy. Ever since Medawar first posed the question, scientists have been fascinated to discover how the fetal tissues survive in what might be expected to be a hostile maternal environment. In this book the two distinguished authors carefully lead the reader through the events taking place and present their interpretation of a vast volume of complex and often conflicting data concerning the mechanisms involved. Being a written rather than an edited text, the book has a natural flow and coherence which is sadly becoming increasingly rare.

Although the book is almost exclusively devoted to the human situation, it opens with a fascinating review correlating the evolution of placentaion with the evolution of the immune systems. Parallels are drawn between the collagen plates that are laid down between apposing colonies
of sponges having no common genes and Nitabuch’s layer of fibrinoid at the feto–maternal interface. The message comes through clearly that the tissue interactions underpinning viviparity rely on phylogenetically older mechanisms than those on which transplantation immunology depends. This pervades the whole text and in later chapters the authors carefully explain and rectify common and persistent misconceptions that have dogged research in this field.

After this illuminating introduction, subsequent chapters cover the process of decidualisation, the development of the trophoblast, the cell types present within the early pregnant uterus and experimental techniques which can be used to study their interactions. The bias here is obviously immunological and some sections are for specialist readers. However, in the last chapter the authors point out the clinical relevance of the work, and how aberrations of the normal cell interactions may manifest themselves in terms of faulty placentation and complications of pregnancy such as pre-eclampsia.

Anyone interested in human pregnancy should find this a useful and stimulating book. Despite the title the subject matter really covers events throughout the first trimester of pregnancy. The tables of cell markers provide a valuable reference source, and common pitfalls of their usage and interpretation are clearly exposed. The text is well presented and there are numerous illustrations, which are generally of good quality. Inevitably the authors rely heavily on their own data, but the reference list is long and up-to-date. Although this is a fast-moving field the clarity of the text will ensure that this book will serve as a reference work for students and researchers for many years to come.

GRAHAM BURTON


These volumes provide a series of wide-ranging revision tests in body systems, basic science and clinical science, designed for those preparing for US National Licensing Examinations. In fact, they could readily be adapted to other purposes.

The approach is consonant with the move towards vertical integration in medical curricula, and could be appreciated by senior medical students and medical practitioners. Unfortunately, there is no index of question topics which might increase the usefulness of the text for younger medical undergraduates, and aid rapid revision of specific topics.

The volumes are prefaced by an extremely helpful Study Guide advice section. The questions themselves employ a variety of formats, including the interpretation of visual material and graphs, and require the exercise of deductive skills as well as memory. The very full answers provide sufficient background explanation and reminder of basic principles to allow the user ready comprehension of the reasoned basis for the correct response. However, some of the answers might benefit from a greater use of diagrams and illustrations. Unfamiliar pharmacological nomenclature might be a problem for some, as might the use of unfamiliar units of measurement unaccompanied by normal reference values/ranges.

GORDON MCPHATE