The secret life of the Neanderthal

Ancestral Images: The Iconography of Human Origins

by Stephanie Moser

Sutton: 1998. 200 pp. £25

Nicolaas A. Rupke

Boring pages of text can be brought to life by illustrations. This is an old and widespread view. Pictures — in this perception — add to the readability of verbal communication and provide additional clarity. Scientific illustrations are no exception to this rule, elucidating and animating what in many instances is dense and turgid prose. Drawings, woodcuts, engravings, lithographs and photographs have successively found their way into mediaeval illuminated manuscripts, Renaissance anatomy texts, early-modern natural philosophy books and late-modern scientific literature.

In recent years, scientific illustrations have begun to be looked at in a different way, however. Historians of science, art historians, palaeontologists, archaeologists and others have started to pay more serious attention to pictures and to regard them as not merely a means to elucidate and enliven the written word, but as a significant form of communication in their own right.

Illustrations have their peculiar iconographic idiom and communicate information that may be different from that of the accompanying text and, what is more, may enter territory that is off limits to verbal communication. Visual images, moreover, can have a powerful impact on the mind and insidiously impart cultural and other prejudices, not fit to be expressed in words, or reveal details for which no scientific evidence is available. The recognition of these and other functions of non-verbal communication in the sciences has led to the lively new discipline of 'visual communication', encompassing, in addition to illustrations, three-dimensional models and such museum displays as habitat dioramas.

One archaeologist who has taken a lead in the study of science's visual language is Stephanie Moser, who teaches at the University of Southampton. Having become sensitized to the subtle power of visual communication by an interest in the gender assumptions of archaeological reconstructions, she extended the range of her expertise to include the topic of visual representation of human prehistory in general. The fruit of this is this splendid book, which focuses on Victorian and twentieth-century scientific illustrations of the origins and early history of humans.

Among the examples Moser discusses are illustrations by Emile Bayard for Louis Figuier's *L'homme primitif* (1870), by Cecil

Naked aggression: artistic tradition has governed the way primitive peoples are depicted over a long period, as in this sixteenth-century watercolour.

Aldin for H. N. Hutchinson's *Prehistoric Man and Beast* (1896) and paintings by Zdenek Burian for his and Josef Augusta's *Prehistoric Man* (1960). We may think that our perception of human prehistory is based on excavated fossils, artefacts and other prehistoric remnants — that the classic works by T. H. Huxley, Carl Vogt, Charles Darwin or Charles Lyell on human antiquity and evolution shaped our ancestral images. Moser, however, maintains that the way we visualize 'primitive man' is significantly conditioned by artistic representations that draw on a multitude of different and pre-scientific iconographic traditions.

One important question in studying visual representation in the sciences has been that of the relative importance of 'form' and 'function'. In other words, are features of apparent scientific content not, in fact, a product of artistic style and iconographic tradition? Moser emphatically comes down on the side of the formalists. Her fascinating and challenging thesis is that late-modern, scientific visualizations of human origins retained emblematic or iconographic elements from pre-scientific traditions of representation, going back to early-modern and Renaissance, mediaeval, early Christian and even Graeco-Roman imagery — "As early as the classical period the roots of a visual tradition for depicting prehistory were established."

There was an artistic tradition of showing primitiveness that existed millennia

before Victorian palaeoanthropology. Various elements entered the visual language about primaeval humankind that served to construct a relationship of progress and of superiority of 'us' over 'them'. Among these elements were nakedness, the wearing of animal skins, hirsuteness and the presence of gnarled clubs. How many of us know that there is no factual evidence for the club "that any design-conscious Neanderthal simply must carry as an accessory"?

It might seem churlish to point out omissions in a book that offers such a rich and colourful palette of topics. Yet inasmuch as chapter one professes to present the main developments in scientific visualization, it might for the sake of completeness be appropriate to mention an oversight, namely that of the Humboldtian revolution in scientific visualization. Alexander von Humboldt's altitude–latitude representations of the distribution of vegetation, his reinvention of the isoline and his insistence on the significance of landscape perception led to a proliferation of scientific visual representations, in atlases, textbooks and so on. Ethnology and archaeology, too, were caught up in this maelstrom of Humboldtian visualization.

This is an enjoyable piece of scholarship in which the author convincingly argues that our ideas about the human past have in part been shaped by the visual arts. Moser's book is complemented by a spirited foreword by Clive Gamble, who stresses the independence from scientific discoveries of pictorial reconstruction in palaeoanthropology and points to their gendered, male-centred nature. Moser's lavishly illustrated book is accessible to a wide readership and would make a fine Christmas present. □

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An army of zombies

Phantoms in the Brain: Probing the Mysteries of the Human Mind

by V. S. Ramachandran and Sandra Blakeslee

William Morrow: 1998. 326 pp. \$27, £17.99

Raymond J. Dolan

A pervasive optimism is evident in the cognitive neurosciences, which is no doubt a very good thing for publishers. Like Hollywood movie studios, publishers have a distinct preference for the happy ending when it comes to science. For "hero gets the girl" read "scientist solves the mystery". Not unexpectedly, this optimism receives a resounding endorsement in *Phantoms in the Brain* by

V. S. Ramachandran, a neuroscientist, and Sandra Blakeslee, a journalist.

In all fairness, it has to be said that an upbeat tone is, almost without exception, a unifying feature in the mass of recent books concerning the human brain. The thinking behind this optimism goes as follows: understanding the human brain more or less adds up to understanding the human mind. The exponential growth in knowledge about the brain means that at the dawn of a new millennium we are close to a neural account of mental life. There is nothing inherently wrong with this except that it hides the fact that there is an enormous gulf between neurons and thought processes. We have no real idea of the computations performed by the former that enable the latter.

Phantoms in the Brain is structured around the life histories of patients with unusual, often bizarre, neurological disorders. This case-history approach has, of course, been popularized by Oliver Sacks, who contributes a foreword to the present volume. The narrative structure of biography has undoubted pedagogic value, but it is worth remembering that the worst examples of the genre come uncomfortably close to modern-day equivalents of a travelling freak-show. To their credit, this shameful pitfall is skilfully avoided by Ramachandran and Blakeslee, who keep the ideas they are seeking to communicate centre stage.

The book's overall message is that current knowledge of brain function has reached a point where even the strangest psychological and neurological disorders are amenable to neuroscientific explanation. This argument is most convincing for the phenomenon of 'phantom limbs', in which a person, following an amputation, continues to sense the limb's presence. Movement, itching or pain may still be experienced. Ramachandran claims "to have genuinely solved the mystery" of what is happening here.

The putative solution, which represents the accumulated work of many distinguished scientists, can be summarized as follows. The cortex of the human brain contains 'maps' that represent bodily sensations and movements. In the absence of sensory inputs to these maps, as is the case after limb amputation, for example, the maps undergo extensive reorganization. This rearrangement involves progressive encroachment from surrounding maps that represent other, often adjacent, body surfaces. Consequently, following an amputation, sensory experiences in an absent limb can be elicited by stimulation of body surfaces whose cortical maps have invaded the territory of the amputated region. The face and arms have adjoining cortical maps and so, not surprisingly, face stimulation can elicit sensation in a phantom arm.

The critical importance of reorganization is also attested by the fact that the intensity of phantom limb experiences is directly propor-

Mind field: can neuroscience yet adequately explain the strangest psychological disorders?

tional to the degree of cortical remodelling. The account provided in *Phantoms in the Brain* of phantom limb phenomena strikes an exemplary balance between narrative, amusing anecdote and clear scientific exposition.

Although the discussion of phantom limbs forms a substantial part of the book, there is also extensive treatment of a more elusive phantom, a zombie within, capable of making perceptual discriminations of which a person is not consciously aware. It is now well known that patients with profound perceptual impairments can nevertheless perform directed and appropriate actions towards 'unseen' environmental targets. The classic examples include blindsight, neglect and the agnosias. So, for example, in blindsight a patient who is blind in a portion of their usual field can nevertheless indicate the detection of a moving target there. The severe dissociations in these patients provide the ammunition for Ramachandran to argue that the experience of self may be just an illusion that provides a convenient mechanism for organizing the army of zombies inside one's head.

No serious account of self, or consciousness, can ignore emotion and feelings. Their relevance to a sense of self is illustrated by what is surely one of the oddest mental afflictions, Capgras' syndrome. Here a person acquires the belief that someone they know, usually a close relative or spouse, has been replaced by an identical double. In all other respects, a person with this condition has the appearance of being completely rational. Notably, they have no difficulties with visual recognition or high-level visual discrimination tasks. What is also well documented is that this type of false belief, or delusion, often develops following a brain injury.

A proposed explanation is that the neural machinery for perceptual discrimination is intact but that a parallel system for emotional evaluation of visual objects, such as people, is

dysfunctional. Consequently, the emotional resonance linked to recognition of a particular individual is blunted or absent. Ramachandran, and others, argue that a strategy for dealing with the ensuing experiential anomaly is to assert that the real person has been replaced by an identical double. Of course, this highly plausible account implies that when push comes to shove emotional evaluations hold greater sway in the theatre of the mind than rational appraisals.

This book will have wide appeal and will further whet the appetite of a public with an increasing hunger for information about the brain. But mass-market appeal is notoriously associated with compromise, and many would question whether the buzz words of the era — synthesis, coherence, consilience — convey an excessively comforting view of the nature of science. The optimistic tone that is good for book sales fails to reflect the toil, tedium and frustration that makes up much of what Thomas Kuhn referred to as normal science. This begs the question of what, other than fortune and fame, should motivate anyone to write a science book. Perhaps it should be considered a modern day virtue that is its own sufficient reward. □

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Knowing your roots

Dental Anthropology: Fundamentals, Limits and Prospects

edited by Kurt W. Alt, Friedrich W. Rösing and Maria Teschler-Nicola
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Simon Hillson

Dental anthropology is the study of people from the evidence provided by their teeth. As with other areas of anthropology, 'people' is used in a broad sense to include our extinct relatives taken in the context of primates as a whole. It has been one of the less well known sub-disciplines of anthropology, but the past two years have seen no fewer than five books published on the subject, on top of several earlier texts. Dental papers are regularly published in the main anthropological journals, and there is a thriving Dental Anthropology Association with more than 200 active members and its own journal.

Why teeth, and why the growth in interest? Teeth and bones are the main research material for anthropologists who study the fossil remains of hominids and other primates, human remains from archaeological sites, and forensic cases. There are particular advantages in studying teeth, however. They survive better in the ground because they are tougher and more heavily mineralized than bone, and they are among the most common fossils found. Teeth provide a protected