Penfield’s homunculus

I was fascinated to read GD Schott’s devastating, but also enlightening, and at times amusing critique of the scientific value of Penfield’s homunculus. He points out some of the non-scientific associations of the word “homunculus”—for example, in modern psychology (In that remark the abused child is speaking).

I would add that a similar notion has become a part of contemporary folklore (Inside every fat man there is a thin man struggling to get out) and is reminiscent, not only of Cartesian philosophy (the ghost in the machine), but also of some basic assumptions of ear acupuncture and iridology (where the whole human body is represented by points on the lateral surface of the ear and circumscribed areas on the iris, respectively). It is one of the merits of Schott’s editorial that the reader is initially puzzled by the choice of the ill-defined term “homunculus,” with its multifarious associations. Schott is a seriously scientific investigator as Penfield, but comes to realise that the scientific evidence for this concept is equally puzzling.

Underlying, but not made explicit in Schott’s critique is a superficially whimsical, but highly relevant, and surprisingly intractable, philosophical puzzle, namely, how one thing can be about another thing, in this instance, how a drawing of a homunculus can be about a certain constellation of neurons—or, for that matter, how a drawing of a homunculus can be about anything at all. One answer might be that Penfield meant the homunculus to be about certain neurons (an explanation of the problem in terms of mental states), but this merely moves the scenery and leaves the problem itself centre stage. Another approach is to bring back from the very same teleology banished by Schott from the theatre of science: Penfield’s mind was “designed”, or had evolved, in such a way that the originalism seemed to him to be a satisfactory representation of the results of his work on stimulation of the human cerebral cortex.

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Schott replies:
I was interested to read Dr Crichton’s comments about some of the philosophical issues raised by the homunculus concept. The representation of the human body in respect of ear acupuncture has also been illustrated, even in modern times (fig).

Philosophical ideas about the homunculus, although discussed today, were of concern many centuries ago. The term probably arose in the 15th century, but has had different meanings in different eras. For instance, Paracelsus used the term to mean a fusion in man of animal and human spirits or qualities, a far cry from Penfield’s use of the homunculus. In philosophy, as in medicine, it is important to define and illustrate what one means.

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In the Middle Ages a favoured topic for debate among theologians concerned how many angels could rest on the point of a needle; latter-day neurologists debate with equal vigour (but no more success) the doctrine of the lacune. These perplexing holes were first well described by French pathologists as small cavities within the substance of the brain and thought by most to be ischaemic in origin. Other pathological conditions resembling but distinct from lacunes were recognised and the term came to be used to describe small circumscribed deep-seated infarcts. Early attempts to correlate individual lacunes with clinical symptoms and signs were hampered by the fact that there was no way of locating with certainty the site of lesion during life and when the patient eventually came to autopsy the lacunes were usually multiple. Pierre Marie however recognised the clinical correlate of longstanding etat lacunaire as a pseudobulbar palsy, spastic quadriparesis and dementia.

In the 1960s Fisher using a classical clinico-pathological approach defined a group of clinical syndromes (pure motor stroke, ataxic hemiparesis, dysarthria-clumsy hand syndrome) caused by small deep infarcts in specific locations. It soon became clear that the same syndrome could result from a lacune in a number of different sites, that a clinical lacunar syndrome did not always signify a small deep-seated lesion and that pathological lacunes could be found in the absence of any symptoms.

In recent years modern imaging has opened up the possibility of closer pathological correlation during life. However radiological changes may be deceptive—not all regions of signal change are infarcts, the lesions are often multiple and the size of the lesion on imaging (an important diagnostic criterion) may differ greatly from its pathological size.

We end up with three definitions of lacunes—pathologists mean a small deep infarct in certain sites, clinicians mean one of a number of neurological syndromes and radiologists mean a region of signal change of a specified size and location. The possibilities for argument and misunderstanding are infinite.

As if this were not enough, the disagreement about the nature of the lacune has developed into a further argument about its cause. Modern views on this have again been much influenced by Fisher who regarded a lacune as a small deep infarct exclusively in the territory of a penetrating artery. In most cases the penetrating artery is occluded by thrombosis, a consequence of chronic hypertension, but in a few occlusion results from atheroma or embolism. Furthermore the artery is not always completely blocked and it now appears that small deeply placed infarcts in distal field territories can be caused by haemodynamic events such as systemic hypotension in patients with occlusions of large extracranial arteries.

This well-produced book deals extensively with these controversies and leaves the reader (like FE Smith's judge) possibly none the wiser but certainly better informed. There are excellent reviews of cerebrovascular anatomy, microvascular territories, arterial pathology, radiology and clinical syndromes and much speculation on pathogenesis, notably a well-balanced and informative chapter from Dr Pullicino, one of the editors. The illustrations are also unusually good and the chapters are fully referenced. All in all this is a book to recommend to all those interested in cerebral vascular disease and one which will be much welcomed by clinicians and neuroradiologists alike.

R ROSS RUSSELL


This is a remarkable book. No one who deals with autism will ever be the same after reading this book which is a fresh edition of the original published by Gillberg and Coleman in 1985 and published by Praeger New York in 1985. In scope and detail it is as rich as an old-fashioned Christmas cake, not to mention the hidden charms which may cause injury if not noticed. Reading the book is almost like a love affair; not only not only do the authors review the clinical, epidemiological, genetic, biochemical, endocrine, immunological, electrophysiological, brain imaging, neuropathological and neuropsychological literature with extensive references. I have concerns that child psychiatrists... who read this book may do the recommended neurological examination and the recommended investigations without the intermediary of a paediatric neurologist, a difficulty being that the authors are not neurologists themselves. My substitution for the second part of table 25.1 (neuro-psychiatric assessment check list for autism) would be first to get a first quality paediatric neurologist to conduct the examination (for example one doesn't just look for Lasch nodules as confirmation of type I Neurofibromatosis—one arranges for a slit-lamp by the ophthalmologist). You may investigate using the philosophy of testing outlined in Handbook of Neurological Investigations in Children. This table ends with a novel invented definition of the milk-maid sign.

There are lucky charms in this book as for example in the section on epilepsy. There one finds for example a fine reference to “autism convulsii?” to emphasise that not only do epilepsy and autism go together but that autism might be a symptom of the epileptic process, the manifestation of one type of minor epileptic status. This is an autism treatable by anti-epileptic medication. There is uncontrolled evidence that vigabatrin when it abolishes infantile spasms may reduce subsequent autism liability.

J B P STEPHENSON

SHORT NOTICES


CORRECTION

Currier RD, Haerer AF, Meydrech, EF. Long-term outcome of allopurinol in patients with gout. J Rheumatol 1993;20:1217–18. The final sentence on p.1217 should read “an exacerbation was defined as a focal neurological worsening lasting at least two weeks followed by incomplete or complete recovery and so judged by an experienced neurologist.”