MATTERS ARISING

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.[1] 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 choise of the ill-defined term "homunculus," with its multifarious associations, bu such a scrupulously 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 homunculus 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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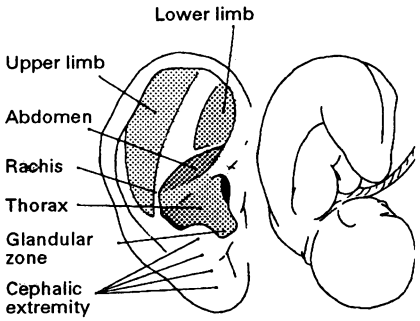
1 Schott GD. Penfield's homunculus: a note on cerebral cartography. *J Neurol Neurosurg Psychiatry* 1993;56:329–33.

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 originated in the 15th century,[2] but has had different meanings in different eras. For instance, Paracelsus used the term



The fetal homunculus located in the ear. Reproduced with permission.[1]

to mean a fusion in man of animal and human spirits or qualities,[3] 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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1 Nogier PFM. *Treatise of auriculotherapy.* Moulins-les-Metz: Maisonneuve 1972;58.
2 Kuhn SM (ed). *Middle English Dictionary,* vol 4. Ann Arbor: University of Michigan Press 1963;982.
3 Sudhoff K (ed). *Paracelsus: Sämtliche Werke,* vol 14, I. Munich: Oldenbourg, 1922;325.

NOTICES

The XIIth International Congress of Neuropathology will be held in Toronto, Ontario, Canada from 18–23 September 1994. This meeting will be conjoint with the American Association of Neuropathologists Annual Meeting and the Canadian Association of Neuropathologists Annual Meeting. For further information please contact Dr J J Gilbert, Victoria Hospital Research Institute, 375 South Street, London, Ontario N6A 4G5, Canada. Tel +1 519-667-6649, fax +1 519-432-7367.

The American Neuropsychiatric Association will hold its Sixth Annual Meeting on July 21–23, 1994 in Newport, Rhode Island, USA. The meeting will be a joint session with the British Neuropsychiatry Association and the programme will include invited lectures, platform and poster presentations, and videotaped case demonstrations. The meeting theme is "Subcortical disease in neuropsychiatry". Information regarding this meeting and requests for abstract submission forms can be obtained from: Stephen Salloway, MD, Chairman, Scientific Programme Planning Committee, Department of Neurology, Butler Hospital, 345 Blacktone Blvd. Providence, Rhode Island 02906, USA. Tel. +1 401 455-6403; fax. +1 401 455-6405.

BOOK REVIEWS

All titles reviewed here are available from the BMJ Bookshop, PO Box 295, London WC1H 9TE. Prices include postage in the United Kingdom and for members of the British Forces Overseas, but overseas customers should add £2 per item for postage and packing. Payment can be made by cheque in sterling drawn on a United Kingdom bank, or by credit card (Mastercard, Visa or American Express) stating card number, expiratory date, and your full name.

Surgery for Stroke. Edited by R M GREENHALGH and L H HOLLIER. (Pp 420 Illustrated; Price: £70.00). 1993. London, WB Saunders Co. Ltd. ISBN 0-7020-1759-0.

The title of this multi-author book is somewhat misleading as it is concerned only with carotid surgery; intracranial surgery for haematoma is not dealt with. This being said it is an excellent production. The opening historical chapter makes one appreciate how far we have come since 1954, when carotid stenosis was treated by resecting the affected segment of artery followed by end-to-end anastomosis, all carried out under hypothermia. This is followed by the usual chapters on cerebral ischaemia and on the pathophysiology or the carotid plaque. Good evidence is presented to show that the incidence of restenosis after surgery is higher in smokers but the authors simply state the facts without commenting on the currently topical, ethical issues which may arise.

Interesting chapters follow on methods of investigation, the view being expressed that conventional angiography is probably on its way out. Not that the authors believe that Duplex scanning, valuable though it is, is enough; it gives good pictures of the carotid lesion but tells nothing of the cerebral circulation as a whole. It is to magnetic resonance imaging and to computed tomographic angiography that the authors look for the future.

Most important is the section on the indications for carotid endarterectomy. Here it is made clear that you cannot simply say that endarterectomy is indicated in this or that condition; medical audit must be brought in. The surgical mortality in a particular institution must be known before a decision can be reached. This being said, endarterectomy for asymptomatic carotid lesions is recommended, provided the surgical mortality is less than 3 per cent. In TIAs, stenoses of 70 per cent or more should be removed. After a completed stroke much depends on the degree of residual disabilty; if this is not too great, endarterectomy is recommended, but only after a delay of four to six weeks. The remainder of the book is largely concerned with surgical technique, on which the present reviewer is not competent to pronounce, but, this aside, the book can be

There are also practical and concise chapters on operative positioning and perioperative management, and on cranial nerve function monitoring.

The scope of the book is therefore very wide, but—no criticism intended—those seeking information on vascular lesions or intra-axial tumours should look elsewhere. The text is invariably practical and authoritative, and the illustrations uniformly good. I could not fault the index.

This book is probably a must for departmental libraries, and will be welcomed by all neurosurgeons undertaking surgery in the posterior fossa, and perhaps particularly by those preparing to sit specialty Fellowship.

AJ STRONG

Cerebral Small Artery Disease. (Advances in Neurology, Vol 62). Edited by PM PULLICINO, LR CAPLAN and M HOMMEL (Pp 241, Illustrated; Price: $123.50). 1993 New York, Raven Press. ISBN 0-7817-0051-5 (Order Code 2591)

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 *état 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 clinico-pathological correlation during life. However radiolrgical 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 endless.

As if this were not enough, the disagreement about the nature of a 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 lipohyalinosis, 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 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 be recommended to all those interested in cerebral vascular disease and one which shines some welcome light into dark places and small holes.

R ROSS RUSSELL

The Biology of the Autistic Syndromes/2nd Edition. By C GILLBERG and M COLEMAN. (Pp 317, Illustrated; Price $37.50). 1992 Cambridge University Press. ISBN 0-521-43228-6.

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 title by Coleman and Gilberg 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. In so far as the book is aimed not only at psychiatrists and neurologists but also at psychologists special educators and even parents of children with autism, it is inevitable that which components are indigestible will vary from one readership group to another.

Originally there was Kanner's infantile autism but that has not been a helpful concept nor has the idea of "pervasive developmental disorder": autism is a specific neurological symptom complex not nearly as pervasive as in less politically correct times was called mental deficiency or mental retardation. Having teased that out 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 (neuropsychiatric 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 Lisch 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 inverted 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 "autisme convulsi?" 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

Electrical and Magnetic Stimulation of the Brain and Spinal Cord (Advances in Neurology, Vol. 63). Edited by O DEVINSKY, A BERIC AND MICHAEL DOGALI. (Pp 323; Price: $139.00) 1993. New York, Raven Press. ISBN 0-7817-0066-3.

Anatomic Localization for Needle Electromyography. By STEVE R REIRINGER. (Pp 154 Illustrated; Price: $28.95) 1994. Philadelphia, Hanley & Belfus Inc. ISBN 1-56053-068-5.

CORRECTION

Currier RD, Haerer AF, Meydrech, EF. Low dose oral methotrexate treatment of multiple sclerosis: a pilot study. *J Neurol Neurosurg Psychiatry* 1993;**56**: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."