de la Tourette syndrome, except Dr Fahn and his colleague, Dr Burke.

Our paper addressed the important and generally acknowledged problem of potential heterogeneity in tic and Gilles de la Tourette disorders, and proposed that these patients might represent an atypical form of Gilles de la Tourette syndrome. How one views these cases will in large part be determined by whether one is a "lumper" and groups these patients with Gilles de la Tourette syndrome (or some other entity) or a "splitter" and separates them out from more typical cases. When one is confronted with a group of 1,600 patients that we have studied over the past 21 years, the majority categorised as typical Gilles de la Tourette syndrome, and when, from among that group, a small subgroup demonstrates an unusual, relatively consistent symptom pattern, one is led to hypothesise that these patients may represent a distinct entity. It is true that tics may occur in paroxysmal bursts and may have dystonic or tonic features. However, typical tics in Gilles de la Tourette syndrome are brief, irregular, nonrepetitive, nonrhythmic, usually unilateral, and, if they occur in paroxysms, they are usually of brief duration. Our patients' movements were regular, repetitive, rhythmic, and bilateral, often with coordinated vocalisations, and occurred upon occasion in prolonged bursts lasting as long as thirty minutes. In addition, these movements interfered with ongoing activity, a feature highly uncharacteristic of Gilles de la Tourette syndrome. There is no reason why these symptoms could not be included within the realm of motor tics, but we were struck with the fact that a particular subgroup demonstrated this cluster of unusual symptoms.

We also noted that all four cases (and two others not reported in detail), had hyperactivity, attentional and learning disabilities (ADD). It is also true that patients with Gilles de la Tourette syndrome may have hyperactivity and attentional and learning disorders. However, it is likely that the diagnosis of ADD in Gilles de la Tourette patients had been overestimated in the past because of ascertainment bias (greater likelihood of either diagnosis in patients with two illnesses). In fact, only 17% of 340 Gilles de la Tourette patients studied by us from 1981 to 1984 have had a concomitant diagnosis of ADD, a percentage which is closs to the estimated population prevalence.

Whether the report of response to fluphenazine and clonidine in Case No 1 represents spontaneous improvement or drug response is difficult to ascertain, especially by telephone. Cases 2, 3, 4, and two others in our series, also demonstrated significant refractoriness to pharmacotherapy. Although poor response to medication is an inadequate diagnostic criterion, it may clinically point to the possibility that we are dealing with a particular subtype of Gilles de la Tourette syndrome, or, an as yet uncharacterised novel form of movement disorder.

In the final analysis, it is not critical whether we view this symptom complex as a new entity, a subentity, or typical Gilles de la Tourette syndrome. Our analysis is proposed as a heuristic hypothesis warranting further clinical observation and study. We hope our paper and Dr Fahn's comments, and the future availability of the videotape, will stimulate further study of atypical tic disorders. This hopefully will lead to greater diagnostic acumen, and definition of subtypes which might predict treatment response. If our paper stimulates work in this direction, we feel it will have served its purpose.

Book reviews

Metal Ions in Neurology and Psychiatry *(Neurology and Neurobiology Vol 15)*. Edited by Sabit Gabay, Joseph Harris, Beng T Ho. (Pp 424; £72.00.) New York: Alan R Liss Inc, 1985.

Metal ions appear to exert fundamental actions on all parts of the nervous system. A deficiency or an excess of many elements may distort normal neuronal function. The present volume examines in detail the effects of metal ions relevant to both neurology and psychiatry.

A series of 22 chapters divided into five sections outlines in detail the advantages and disadvantages of metal ions on the nervous system. Some topics are predictable such as the actions of lithium, the possible involvement of aluminium in Alzheimer's disease, the role of copper in Wilson disease and lead toxicity. However, each of these is covered efficiently and in a manner summarising the current state of the art. In some chapters stimulating global hypotheses for the actions of metals are put forward. In particular, I would recommend the chapter by J Crammer which attempts to integrate the facets of the actions of lithium. Similarly, the chapter by JCL Lai and colleagues clearly portrays the essential role of a variety of metal ions in the normal functioning of neurotransmitter systems and the aberrations that alterations in concentration may cause.

Earlier chapters cover the importance of metal ions on the development of the nervous system and on the aging process. In particular, the involvement of metals in the rapid aging of patients with Down's syndrome is discussed in detail. Other interesting contributions include the role of vanadium as a cause of affective disorders and the potential of rubidium for treating psychiatric disorders. The complexity of the action of metal ions is illustrated in an excellent chapter on manganese by J Donaldson and the late Andre Barbeau. Clearly, this ion can induce a complex neurological syndrome when present in excess but at the same time is essential for the regulation of enzymes protecting the nervous system against attack by free radical mechanisms. Finally, there is a collection of chapters of essential reading dealing with the critical issue of measurement of metal content of nervous tissue. The problems and pitfalls of obtaining accurate determinations are clearly stated. Also, there is a detailed description of the sophisticated new techniques allowing localisation of metal ions within neuronal structures.

I found this volume well balanced and stimulating. It is a book of interest to many in the field of neurology, neuropathology, neurotoxicity, psychiatry and the basic sciences and provides a modern treatise on the role of metal ions that will be widely read and cited.

P JENNER

Headache (*Clinical Medicine and the Nervous System Vol 1*). By Richard Peatfield. (Pp 178; £36·00.) Berlin: Springer-Verlag, 1986.

This is one of the best of the current glut of small books devoted to migraine and headache. The author is a senior registrar in Leeds who has had extensive experience in

the Princess Margaret clinic in London and has published many papers on his research. In 14 chapters he reviews the existing knowledge of migrainologists and the many dilemmas they share with their patients.

The chapters cover a proposed classification, a clinical appraisal and investigation, a summary of organic and functional causes of headache and epidemiology. Most of the book is concerned with migraine. Peatfield describes in turn: clinical features, precipitants, pathophysiology and treatment. There is an adequate section on cluster headache but only very brief accounts of post-traumatic and tension headaches.

As an up to date account of migraine this is an excellent, well referenced work, highly suitable for postgraduates, neurology trainees and indeed any physician who is called upon to handle this very common symptom. We are provided with valuable summaries of recent drug trials, though perhaps the author's temptation to classify and impute mechanisms on the results of such empirical trials is to be resisted. As a text on the much wider subject of headache (as implied by the title), it has shortcomings. Despite the controversy about the separation of tension or muscle-contraction headache from common migraine, the former remains the most frequent source of headache and therefore merits a much more detailed and explicit description than is accorded here. Similarly, the important topic of cranial arteritis is only afforded a page and a half; and a much longer and more thorough appraisal might have been apportioned to the section on trauma and its common medico-legal complications.

The text is well written, and the author has plainly spent much time and assiduous effort in compiling a lucid, well referenced text. It is nicely produced with clear line diagrams, tables and illustrations. I would warmly commend it as a short monograph on migraine, and look forward to future editions which I would hope will be either confined to this topic or considerably expanded to do justice to the many other sources of pain in the head.

JMS PEARCE

Aspects of Epilepsy and Psychiatry. Edited by Michael R Trimble and Tom G Bolwig. (Pp 256; £24·50.) Chichester: John Wiley & Sons Ltd, 1986.

This is a further book dealing with the inter-relationships between epilepsy and psychiatry. Once again it represents the proceedings of a symposium, this one held in Denmark. It consists of a number of chapters each of which is followed by a brief discussion on the subject matter. At the very least it proves that those interested in this area meet regularly to discuss the issues involved. Those who have read *The Psychopharmacology of Epilepsy* edited by Dr Trimble and published by the same house in 1985 will be struck that some of the chapters and authors cover similar subjects, though in slightly different ways. The advantage of this particular publication is that the coverage is rather broader and the review articles rather more comprehensive, useful and well written. There is a good chapter discussing the controversy over the existence of the "epileptic personality" and a number of chapters that deal with the associations between hyposexuality, hypergraphia and other personality traits and temporal lobe disorders. The relevance of antiepileptic drugs to psychiatric disorder, and the association between psychosis and epilepsy are again exhaustively explored.

The introductory chapter leaves itself open to some criticism by using a classification for seizures which has subsequently been updated by the 1981 International Classification. This chapter also gets into difficulty when discussing the psychiatric disturbances associated with non-convulsive status. It appears to use the term petit mal status to cover all absence status.

This is overall a helpful book in that it is reasonably coherent and comprehensive in its coverage. On the whole neurologists will find it more useful than the previous *Psychopharmacology of Epilepsy* and those uncertain as to which book to purchase would be well advised to consider this rather than the former.

DAVID CHADWICK

Memory, Imprinting, and the Brain: An inquiry into mechanisms. *(Oxford Psychology Series No 10)*. By Gabriel Horn. (Pp 315; £25·00.) Oxford: Oxford University Press, 1985.

In the long history of the physiological psychology of learning and memory, the mechanisms underlying the processes of storage and retrieval of information have been the most difficult to investigate and thereby remain poorly understood. This reflects at least in part the legacy of Lashley's well-known failure to find the "engram", and a number of often poorly-controlled studies in the 1950s and 1960s which purportedly, but not convincingly, demonstrated changes in protein synthesis as correlates of memory. However, recent advances in the brain sciences with the consequent rapid growth in technologies available to explore brain function, together with the detailed descriptions of memory impairments observed in individuals (such as H.M.) with specific brain lesions, has encouraged a vigorous growth in research aimed at elucidating this vital interface between the brain and cognition.

In this volume, the latest in the excellent *Oxford Psychology Series,* Gabriel Horn reviews some twenty years of personal research directed towards this goal. The reader is led from a brief account of early studies of habituation to a novel stimulus, a simple non-associative memory, to a detailed, but still ongoing, analysis of the mechanisms of imprinting in the domestic chick, a process whereby the young chick will form an attachment to its mother or an artificial substitute. This comparatively complex behaviour proves to be particularly interestingly heuristic in the study of memory mechanisms as it contains a number of behaviourally dissociable components: the imprinting object will act as an unconditioned stimulus for approach in the naive chick; it will act as a reinforcer in other learning tasks; and it will lead to processes that form a recognition memory of the object.

The rationale behind the experimental approach taken by Horn and his colleagues is compelling. Carefully considering the necessary control procedures, they initially describe changes in uptake of radio-labelled amino acid and RNA metabolism in the forebrain roof as a consequence of imprinting. Subsequent autoradiography localises the protein synthesis and turnover as well as increased energy metabolism following imprinting in one part of the forebrain roof, the intermediate and medial part of the hyperstriatum ventrale (IMHV). In a later chapter, ultrastructural changes in the IMHV as a consequence of imprinting are discussed. There follows a detailed discussion of a large number of studies where focal lesions are made in this and other regions of the chick brain and their effects on the acquisition and retention of both imprinting and non-imprinting tasks are assessed. Parallels are deftly drawn between the behavioural dissociations observed following such lesions in the chick and the memory deficits and amnesias seen following cortical and subcortical lesions in primates and humans. Further, the excellent detailed description of the anatomical connections of the IMHV is considered in relation to anatomical connections and structures implicated in mammalian memory.