

agnostics and atheists is small. In a final analysis most people have some concept of God and some concept of a life after death. This is such a widespread concept that at no time and in no civilisation throughout the history of man has any important race, nation, or culture existed without a real relief that death is not the end but the gateway to a new pattern of living. This is not based on the fear of death. I have already mentioned that most people are not frightened of being dead, they are frightened of the process of dying. It is not based on a wish for immortality, because most people would be quite happy to enter a long, uninterrupted sleep from which there is no awakening. For this reason it is important that we strengthen so far as we can the spiritual resources of dying people. In the Western world the spiritual basis on which they rely is Christianity. It follows that normally the spiritual support given in hospices is based on the teaching of the Christian church. It would, however, be quite wrong for people working in a hospice in any way to undermine

the faith or absence of faith of those who hold alternative views. We consider it important that a dying person should receive all the spiritual succour that can be given by the heritage and tradition of his own group; whether this be Christian, Jewish, Moslem, Hindu, or any of the other "isms."

### Research

Finally, a word about research. It is common practice when asked to define roles to add to the list—research. This is quite proper, but not always appropriate. Not all research programmes are worth while and most require considerable effort. This might best be expended in some other endeavour. But despite this caveat, hospices will undoubtedly become increasingly involved in scientific research and will add, thereby, to our knowledge of the great mystery of life we call death.

## Functional diseases

MICHAEL R TRIMBLE

The word "function" has probably been in use in the English language for over 400 years, though its meaning as "a special kind of activity" is more recent. Originally, it had two uses: one physiological—that is, as the activity of an organ—and one psychological—that is, as the activity of the intellectual or emotional faculties. The word does not appear in either of these senses in the writings of, for example, Hobbs, Locke, Berkeley, or Hume, despite the fact that all wrote extensively on psychology and Locke had a medical training.<sup>1</sup> Its physiological sense was used by a sixteenth century physician called Edward Jorden in a book on hysteria, called *The Suffocation of the Mother*. Jorden argued against the theological demonic propositions of the times and suggested that hysteria was a natural disease within the scope of medical study. He wrote:

"It is an affect of the mother or wombe wherein the principal parts of the bodie by consent do suffer . . . [These] . . . are the seates of the three faculties which do govern the whole bodie. The braine of the animal, the hart of the vitall, the liver of the naturall . . . these parts are affected in this disease and do suffer in their functions as they are diminished, depraved or abolished, according to the nature and plenty of the humor and the temperament and situation of the mother."

Furthermore, Hartley in his *Observations on Man* used the word function 20 times, mainly in the physiological sense, when describing the structure and function of several bodily organs.

Andrew Combe<sup>2</sup> was the first to use the term functional in relation to nervous diseases. In about 1831 function had both the psychological and the physiological meaning. The first was particularly used by the phrenologists such as Gall and Spurzheim, who wrote extensively about the functions of the brain. Combe's use was physiological:

"The exciting causes may be divided into two great classes of local and functional . . . the functional causes . . . are not only the

atural. These parts are affected in this disease, and do suffer in their functions as they are diminished, depraved, or abolished, according to the nature & plenty of the humor, and the temperament and situation of the Mother: and that diversly: For sometimes the instruments of respiration alone doe suffer, sometimes the heart alone, sometimes two or

From *The Suffocation of the Mother*, Edward Jorden (1569-1632). Reproduced by permission of the British Museum.

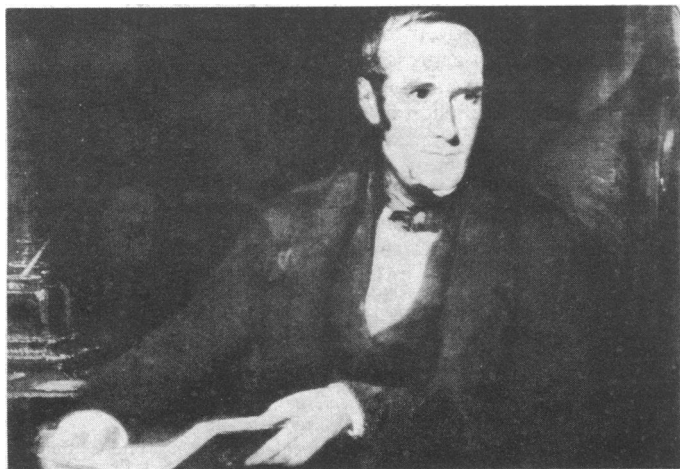
most frequent and most important, but in the strictest sense functional . . . the term functional has a reference to disorder in the action of the organs of the mind."

After this several neurologists classified diseases as organic and functional, the latter in its physiological sense. For example, Reynolds,<sup>3</sup> writing on the symptoms of disease, noted that they "resolve themselves into modifications of structure such as hypertrophy, variolus pustules, etc, and of function as for example paralysis, convulsions, flux and the like." Gowers<sup>4</sup> also classified neurological disorders as organic and functional. The last included "those diseases that consist only in a disturbance of function and many diseases which have this in common with true functional disease, . . . they are transient and not permanent and they are not known to depend on organic changes." He did, however, consider their pathology when he said, "Molecular changes in nutrition, considered as such, must be colossal to be detected. Such alterations, not sufficient to be seen but still considerable, probably constitute the morbid process in many diseases that are commonly classed as functional." His "functional" disorders included chorea, paralysis agitans, tetanus, epilepsy, migraine, and hysteria.

Hughlings Jackson<sup>5</sup> also referred to the term functional: "It is sometimes used as a name for minute changes, or for those the existence of which we are obliged to discover at post mortem. For instance it is said that epilepsy and chorea are functional diseases, it being meant that the changes on which the symptoms

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Andrew Combe (1797-1847). Reproduced by permission of the Royal College of Physicians, Edinburgh.

depend are so slight that they do not involve alteration of structure, but only of function. . . . I have . . . used the term functional to describe the morbid alterations of the normal function of nerve tissue." For him functional abnormalities were physiological states. There were two fundamental kinds of alteration of function in disease—namely, loss of function and overfunction; in the latter more "nerve-force" was stored up than in health and more was therefore expended, nerve tissue becoming unstable.

At the turn of this century, however, the term radically altered its meaning. Charcot, who was particularly interested in the mechanisms of the neuroses, investigated hysteria by the same methods he had used for studying organic neurological disease. He confirmed Briquet's suggestion that hysteria was "governed in the same way as other morbid conditions, by rules and laws which attentive and sufficiently numerous observations always permit us to establish." He used the term functional in its physiological sense in a discussion of a hysterical upper limb paralysis:

"There is without doubt a lesion of the nervous centres but where is it situated and what is its nature? It is, I opine, in the grey matter of the cerebral hemisphere on the side opposite the paralysis, and more precisely in the motor zone of the arm . . . but certainly it is not of the nature of a circumscribed organic lesion of a destructive nature. . . . We have here unquestionably one of those lesions which escape our present means of anatomical investigation, and which for want of a better term, we designate dynamic or functional lesions."<sup>6</sup>

In addition to his important work in neuroses, however, Charcot brought together two key figures in the history of neurology and psychiatry—namely, Freud and Janet. Though Janet paid great attention to unconscious factors in the formation of hysterical symptoms, he held on to the notion that in patients with hysteria the brain was in some way abnormal and weak. Initially Freud incorporated some of Janet's ideas into his own conceptions of the neuroses. Through his friendship with Breuer, however, he evolved independent ideas after firstly working with cathartic hypnosis and then developing the so-called "talking treatment." In his early days he used the physiological meaning of the term functional:

"I will take the word 'functional' or 'dynamic' lesion in its proper sense: 'alteration in function of mechanism.' Such an alteration, for example, would be a diminution in excitability or in a physiological quality which in the normal state remains constant or varies within fixed limits. . . ."<sup>7</sup>

Later, however, he developed his structuralised model of the

mind which gradually, but totally, came to be discussed without further consideration of neurological mechanisms.

Since Freud the term functional has reverted to its psychological meaning. As with the term psychogenic, of which Lewis said it was "at the mercy of inconsistent theoretical positions touching on the fundamental problems of causality, dualism, and normality. It would do well . . . to give it a decent burial, along with some of the fruitless controversies whose fire it has stoked,"<sup>8</sup> its use has ended in disrepute.

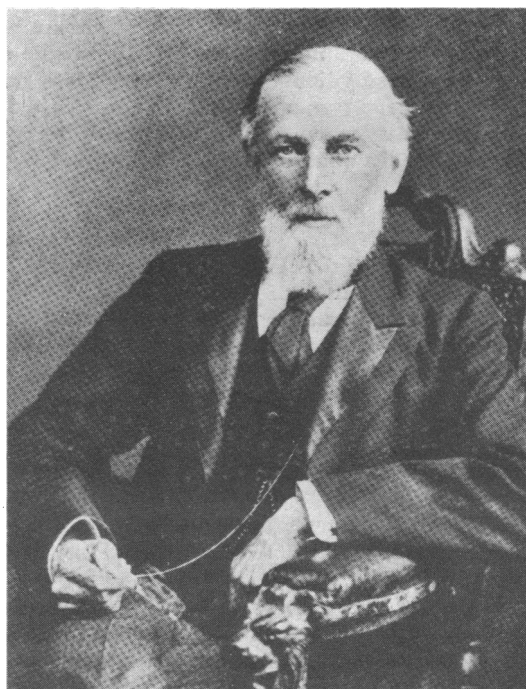
Thus more contemporary use of the word has floundered completely. Not only may it refer to psychiatric illness generally, but it is used indiscriminately in patients' notes as if it were an end to the diagnostic process itself. Its use assumes that everybody—except the patient—understands what the cause of the symptoms are. The point is well made by this anecdote from Kessel:

"A professor of medicine was consulted by a middle-aged lady with stomach ache. On her second visit he looked one by one at her x-rays and then turned to her, beaming, and said, 'I'm glad to be able to tell you that they don't show anything wrong.' Seeing her crestfallen face, he asked her if that was not what she wanted to hear. 'Well, my doctor told me,' she exclaimed indignantly, 'that I've got a large functional element.'"<sup>9</sup>

If then the term functional is still widely used, but it is imprecise and relatively meaningless, perhaps we should reappraise its value, particularly in relation to the newer ideas of neurochemistry and neurophysiology that were not available to earlier writers. An inkling of these ideas came from Jorden, Gowers, and Jackson. A turning point in our knowledge is the description by Von Economo<sup>10</sup> of the clinical and pathological consequences of encephalitis lethargica:

"Hardly ever has the discovery of a disease not only taught us so many separate new facts, but altered our outlook so radically; . . . future scientific generations will hardly be able to appreciate our pre-encephalitic neurological and psychiatric conceptions, particularly with regard to so-called functional disturbance. . . . Now we can describe encephalitis lethargica as a functional affection, but on an organic basis. . . . Our disease proves the essential role which quite a number of anatomical structures play with regard to our psychological processes and their arrangements."

The pathological changes noted in this condition were seen primarily in the midbrain and brain stem, and the clinical



William Gowers (1845-1915). With thanks to the photographic department, National Hospital, Queen Square, London.

sequelae included a wide range of behavioural abnormalities from hyperkinesia to Parkinsonism to personality changes and frank psychiatric illness. Not until the development of the electron microscope in the 1950s was the old debate on whether or not neurones represented a reticular mass of connective tissue or were separate entities finally settled with the clear delineation of the structure of neurones and the synaptic cleft. Shortly afterwards neurotransmitters—identified earlier in peripheral nerves—were detected within the central nervous system, and techniques for delineating various neurotransmitter pathways developed. In the past 20 years particularly, certain well-defined neurotransmitter systems—for example, the monoamine and peptide pathways and their role in moderation and alteration of behaviour—have become more clearly defined and understood. The group of illnesses often referred to as functional disorders—that is, those not clearly associated with structural disease and usually presenting as alterations of behaviour—seems to be related to alteration of activity in such pathways. Treatments such as psychotropic drugs emphasise the role of neurochemical mechanisms in the control and moderation of behaviour.

If the term functional is to have any useful meaning in the neurosciences, we must once again emphasise the physiological use of the term and abandon its psychological interpretations. Functional disorders are those which arise out of disturbed functioning of the nervous system. The goal is to find out which parts are affected most and how they become disordered. In

this sense “functional” has heuristic value and ceases to be a meaningless term for undiagnosable symptomatology or a polite eponym for psychiatric disorder. It would thus have practical value and not be an expression of some metaphysical state that apparently stands in antithesis to so-called organic disease and has caused such confusion in the clinical neurosciences.

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# Acute biochemical responses to moderate beer drinking

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## Abstract

**The consequences of drinking six pints of beer (3.3 l) over three hours were investigated in six healthy men. The expected rise in plasma osmolality, fall in plasma vasopressin concentration, and increase in free water clearance occurred; these variables had returned to normal by nine hours. There was a small but significant fall in plasma concentrations of urea and creatinine accompanied by a rise in plasma potassium concentration. Serum activities of alkaline phosphatase, gamma-glutamyl transferase, creatinine kinase, and lactate dehydrogenase did not change, and there was no alcohol-induced hypoglycaemia. All subjects had a slight hang-over, but none was fluid depleted.**

**It is concluded that, apart from inducing changes in water balance, alcohol in this form causes remarkably little metabolic disturbance.**

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## Introduction

Long-term effects of excess alcohol ingestion are well known, but acute metabolic effects are less certain. Early work using alcoholic spirits defined the diuretic effect of alcohol<sup>1</sup> and implicated an inhibitory effect on secretion of vasopressin, which was subsequently confirmed by direct measurement.<sup>2</sup> In the early 1970s hyponatraemia was described in beer drinkers,<sup>3 4</sup> but whether this was related to an acute dilutional effect,<sup>5</sup> or to chronic sodium depletion was uncertain.<sup>4 6</sup> Beer drinking is such a common social pastime that we investigated its acute effects on sodium and water metabolism and other biochemical variables.

## Subjects and methods

We studied six healthy men (mean age 25 years, range 21-32) of normal body weight (mean body mass index 22.4, range 20.9-24.8) who regularly drank moderate amounts of beer (six to 10 pints a week). The study had the approval of the local ethical committee. The investigation was carried out between 1800 and 0800 the next day, indwelling intravenous cannulae having been inserted beforehand. The subjects were not allowed to drink beer or spirits or smoke for 18 hours before the study, and during the study they did not drink tea or coffee or smoke. Blood samples (20 ml) were taken hourly from 1800 to 2400 and then at two-hourly intervals until 0800. Urine was voided at the same times; its volume was noted and an aliquot kept. Before blood sampling the subjects remained seated for 10 minutes. Blood pressure was also measured at these times. The following blood variables were measured: plasma urea, creatinine, electrolyte, arginine vasopressin, and glucose and serum ethanol concentrations; osmolality; and activities of alkaline phosphatase,  $\gamma$ -glutamyl transferase, creatine kinase, and lactate dehydrogenase. Urine was analysed for sodium and potassium and osmolality. Plasma arginine vasopressin