MEDICAL PRACTICE

*Medical History***A Memorable Decade in the History of Neurology 1874-84—I***

J. D. SPILLANE

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One hundred years ago, in the space of a decade, the discoveries of three British physicians were of fundamental importance in the history of neurology. These men were David Ferrier, Richard Caton and J. L. W. Thudichum, pioneers in brain research—in cortical localization, electroencephalography, and brain chemistry, respectively. The fame of the latter two, but not so of Ferrier, was entirely posthumous. When Caton died *The Lancet*¹ mentioned only his educational, civic, religious, classical, and archaeological activities.

The *British Medical Journal*² ventured only to say that "he did some original work on localization of movements in the cerebrum in the seventies." When Thudichum died the *British Medical Journal*³ thought that "his life-long labours in physiological chemistry do not appear to have borne adequate fruit." *The Lancet*⁴ bequeathed a mere nine lines, saying only that "he did much work on pathological and physiological chemistry."

Sir David Ferrier 1843-1928

THE JOHN HUNTER OF NEUROLOGY

Ferrier had come to London in 1870, after graduating in Edinburgh in 1868, and for three years was a physiologist at King's College Hospital Medical School. He obtained clinical appointments to the Hospital for Epilepsy and Paralysis in Regent's Park in 1872 and to King's College Hospital in 1874. He joined the staff at Queen Square in 1880. His interest in the nervous system had already been demonstrated by his M.D. thesis on the corpora quadrigemina in various animals, including fishes, a work which was largely carried out in the garden of a country doctor in East Anglia, with whom Ferrier worked for a while in general practice in 1869. For this thesis he was awarded a gold medal.⁶⁻⁸

*Based on an address given at a joint meeting of the Association of British Neurologists and the American Neurological Association, Boston, 1974.

Newport, Pembrokeshire

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FIG. 1—Sir David Ferrier (1843-1928).

*The West Riding Lunatic Asylum*⁹

His first publication was in 1873 in the *West Riding Lunatic Asylum Medical Reports*.¹⁰ He had been invited by his friend, the superintendent Dr. (later Sir) James Crichton-Browne, to pursue in his laboratory at Wakefield the work of Fritsch and Hitzig on the effect of galvanism on the brain of the dog.¹¹ Many eminent men contributed to these now historic reports published annually from 1871 to 1876: they included William Turner, William B. Carpenter, Clifford Albutt, Lauder Brunton, and Hughlings Jackson.

FIG. 2—The birthplace of Sir David Ferrier on the north bank of the River Don, Aberdeen.

The enlightened superintendent had also inaugurated monthly medical conversaziones in the main hall, which was described as "magnificent and heated by no fewer than six huge open fires." There were lectures, demonstrations, and opportunities for conversation, when the asylum band (including polkas and gallops) provided appropriate music for the occasion and "suitable refreshments" were served. On 25 November, 1873, Ferrier lectured on "the localization of function in the brain," and Professor Carpenter of University College, London, on "the physiological import of Dr. Ferrier's experimental investigations into the function of the brain."¹² For many years Carpenter had taught that consciousness was concerned, not with cortical activity, but with the "sensory ganglia," notably the optic thalamus, the corpora quadrigemina and the auditory and gustatory ganglia in the medulla, a view which called forth a scholarly rebuttal in the *Journal of Mental Science* by a chaplain to the Abergavenny Asylum.¹³

Carpenter concluded that Ferrier's results "entirely harmonise with the view I have long advocated that the cerebrum does *not* act immediately on the motor nerves!" Carpenter was obsessed by the automaticity and reflex nature of man's activities and he cited parliamentary reporters who could continue to take down a speech in the House of Commons while they slept for short intervals. John Stuart Mills had also told him that his "system of logic was in great part mentally constructed during his walks between the India House and his residence at Kensington; and yet he never ran against persons or lamp-posts."

After the lectures, visitors to this instructive social event—and they would have included the official board of visitors—were able to study such exhibits as "tumours of the dura mater, atrophy of the left cerebral hemisphere, exostosis of frontal bone, clot in the cerebellum, tumour of the cerebellum, syphilitic disease of the brain, and the brains of monkey, ox, sheep, rabbit, rat, etc." There were photographs illustrating "the physiognomy of different varieties of mental derangements," "normal and abnormal arrangements of the cerebral convolutions," and there were "maps showing the geographical distribution of insanity and suicide throughout England and Wales." They were shown histological preparations of the cerebral convolutions in man and animals and "injected preparations illustrative of the vascular arrangement in the nervous and other tissues." One stall exhibited drugs and

medicinal preparations and another, scientific and surgical instruments. For the discerning, there were artistic photographs, including some of "Venice by Moonlight." The evening, of course, concluded with "God Save the Queen."

According to Crichton-Browne it was Ferrier who urged that the work which the reports had begun should, after the former's departure for London in 1875, be in some form continued. When *Brain* was launched in 1879, the editorial staff consisted of John C. Bucknill, Crichton-Browne, Ferrier, and Hughlings Jackson. Ferrier was also a founder member of the Neurological Society in 1886, which took over the management of the journal. Crichton-Browne, who held strong views *against* teetotalism, maintaining that no writer had done much without alcohol, died in 1938 at the age of 97. He was a fine after-dinner speaker and his Dundreary whiskers were probably the last of an era.

Though Ferrier was never on the staff of the West Riding Lunatic Asylum, Carpenter¹³ and J. Shaw Bolton¹⁴ both confirmed that the experiments were performed in that laboratory. Indeed, in his acknowledgements to Crichton-Browne, Ferrier¹⁰ mentions "a liberal supply of pigeons, fowls, guinea pigs, rabbits, cats, and dogs, for the purposes of my research," but he also refers to "more recent experiments" in which he was helped by Dr. Lauder Brunton, the pharmacologist at St. Bartholomew's Hospital in London. He does not make it clear if any of the work was carried out at King's College Hospital Medical School.

In this 1873 paper, which Ferrier called a "preliminary statement," his objects were twofold; firstly, to put to experimental proof the views of Hughlings Jackson on "destroying" and "discharging" lesions of the brain and, secondly, to follow up the researches of Fritsch and Hitzig, published in 1870. The latter did not mention the work of Hughlings Jackson.¹⁵ Ferrier was somewhat critical of the researches of the Berlin doctors. Of their attempts at localization of motor function, he wrote: "their researches in this direction were not carried very far, nor do they, I think, clearly define the nature and signification of the results at which they arrived." He concluded that convolutional localization was only "to some extent indicated by the researches of Fritsch and Hitzig" but Carpenter (1873) said¹² that Fritsch and Hitzig's experiments "anticipated those of Ferrier to a greater extent than I was aware of when I delivered my address."

At first Ferrier used injections of chromic acid into the brain, a technique recommended by Nothnagel,¹⁶ but it was not satisfactory and he proceeded to the use of faradic current and focal ablations. Fritsch and Hitzig began their experiments on unanaesthetized dogs, but Ferrier wrote that "it may be mentioned here, once and for all, that before and throughout all the following experiments, ether or chloroform was administered." He was wise to say so in the light of his subsequent abuse by antivivisectionists. In this first paper Ferrier concluded that the anterior portion of the cerebral hemispheres were the chief centres of voluntary motion and the active outward manifestation of intelligence, the individual convolutions were separate and distinct centres, the action of the hemisphere was in general crossed, and that epilepsies were discharging lesions of the different centres in the cerebral hemispheres.

In a paper to the Royal Society in 1874¹⁷ Ferrier extended his experiments on a variety of animals and concluded that "the whole brain is regarded as divided into sensory and motor regions . . . a scientific phrenology is regarded as possible." But in this eminent forum there was dissatisfaction that he had not fully acknowledged

FIG. 3—The West Riding Lunatic Asylum, Wakefield, Yorkshire.

the work of Fritsch and Hitzig.¹⁸ "The referees (Michael Foster and George Rolleston) felt that he had made insufficient reference to their work and T. H. Huxley was called in as a third referee "for the purpose of ascertaining whether Dr. Ferrier has or has not done sufficient justice to the labours of his predecessors in the same field of investigation." Huxley concluded that he had *not* and Ferrier added a more explicit acknowledgement of their priority in both method and findings. Neither Foster nor Huxley was satisfied, Hitzig complained bitterly, and the referees feared for the reputation of the Royal Society and of English science. Ferrier preferred to omit the experiments on dogs rather than to make the requested changes and consequently only his experiments on monkeys were published.¹⁸ In later years Ferrier was more generous in his acknowledgements to the German workers, writing, in 1883, "It is not going too far to affirm that (they) inaugurated a new era of cerebral physiology."

Two Classic Monographs: 1876 and 1878

In *The functions of the Brain* (1876), his first book, Ferrier included two drawings of the cerebral hemispheres of monkey and man in which he had transposed his experimental findings in the monkey on to Ecker's outline of the human brain. An English translation of Ecker's book *On the Convolutions of the Human Brain*, published in 1873, provided a more detailed account than Turner's work of 1866, though the latter had established the fissure of Rolando as the posterior limit of the frontal lobe.

A review of Ferrier's book in the *Boston Medical and Surgical Journal*¹⁹ is more reminiscent of Victorian England than of the New World: thus, "The turbid chaos of facts in which the laws of the functions of the encephalon have so long lain dissolved seems at last to be clearing itself up by depositing something like an orderly precipitate of doctrine."

It is surprising that Ferrier should have transposed his findings from monkey to man in the light of his statements in this book and in its successor *The Localisation of Cerebral Disease* (1878), which he dedicated to Charcot. Referring to this transposition, he wrote, in the first book, "There exists in different animals great differences in the degree of organisation. There are bound to be marked differences as the result of destruction of cerebral hemispheres . . . an exact correspondence can scarcely be supposed to exist, inasmuch as the movements of the arm and hand are more complex and differentiated than those of the monkey; while, on the other hand, there is nothing in man to correspond with the prehensile movements of the lower limbs and tail in the monkey" (p.488).

He realized the dangers inherent in deductions made from animal experimentation. In his second book he wrote, "Frog and pigeon physiology has too often been the bane of clinical medicine" (p.8). . . . "Our electrical stimulation is merely an artificial substitute for that which normally proceeds from the grey matter of the cortex" (p.18). "Anatomical homologies must not be pushed too far in support of identity of function." (p.20). Despite the existence of "motor" and "sensory" areas, he emphasized that the functions of the brain were essentially "sensorimotor." "Any system," he wrote, "which does not take both factors into account must be radically false." He was not really a party to the exaggerated claims of cerebral localization which came to characterize so much of the literature of brain function in the last quarter of the century. Concerning the organization of cerebral function he wrote (p.2) "Interference at any one point must necessarily tend to general functional disturbance" and again (p.3) "The doctrine of cerebral localization does not assume as Brown-Séquard would seem to imply, that the symptoms observed in connection with a cerebral lesion are necessarily the result of derangement of function in the part immediately affected. Everyone admits direct and indirect results in cerebral disease."

His general conclusion in 1878 was that "There are certain regions in the cortex to which definite functions can be assigned; and that the phenomena of cortical lesions will vary according to their seat, and also according to their character—viz., whether "irritative" or "destructive", two classes into which they may all be theoretically reduced." For a decade he increasingly argued that the ultimate object of his studies was the surgical treatment of brain lesions. "Is there any reason why a surgeon should shrink from opening the cranial cavity, who fearlessly exposes the abdominal viscera?" In 1883²⁰ he said "we are within measurable distance of the successful treatment by surgery of some of the most distressing and otherwise hopeless forms of intracranial disease." He was encouraged in this

outlook by having as a surgical colleague at King's none other than the great Lister.

Ferrier, with brain surgery always in mind, felt obliged to discard many of the older clinicopathological records of cerebral disease and, with Hughlings Jackson, thought that the study of small localized lesions, especially those which were traumatic, would be more fruitful than that of tumours. One of the first he examined in his book on the *Localisation of Cerebral Disease* was the "American crow bar case . . . at one time regarded incredulously as a mere Yankee invention," particulars of which had been given him by Professor Bowditch of Harvard. He reproduced the well-known illustrations of the skull penetrated by the crow bar, still, I believe, preserved in Boston.

Phineas Gage was not the only celebrated American patient quoted by Ferrier in this book. He knew of the case of Mary Rafferty reported in 1874 by Bartholow of Cincinnati.²¹ Bartholow quoted the experiments of Fritsch and Hitzig, and of Ferrier and the former's criticism of Ferrier's use of the faradic current, which they maintained stimulated the central ganglia and not the motor cortex. Bartholow was also aware of the criticisms of Dupuy and Carvill (1874),²¹ whose experiments had been conducted in Vulpien's laboratory. They also thought the faradic current diffused from the cortex through the white matter to the central ganglia, thereby setting up movements. In support of their contention they pointed out that anaesthesia abolished the electrical excitability of the motor cortex but not of the sciatic nerve.

Bartholow's patient suffered from an epithelioma of the scalp which had exposed the posterior parts of each cerebral hemisphere. He found that the dura mater and brain were insensitive to galvanic and faradic currents but managed to produce contralateral sensory and motor responses and, ultimately, convulsions and loss of consciousness. At necropsy the needle tracks were mainly in the parietal lobes and there was suppuration and sinus thrombosis. Bartholow thought "it most desirable to present the facts as I observed them without comment." Ferrier thought that his observations were too crude for any topographical deductions but that they confirmed that the human brain reacted similarly to the monkey. Kuntz (1953)²² says that "Bartholow was forced to leave Cincinnati." Walker (1957)²³ said that criticism was levelled at Bartholow for these experiments both in the U.S.A. and in Europe. The *British Medical Journal* (1874)²⁴ in an editorial entitled "Experiments on the Human Subject," said that Bartholow "had gone a step beyond Dr. Ferrier, and in a direction in which Dr. Ferrier is never likely to follow him." In reply Bartholow said that "the patient consented to have the experiments made" (but she was feeble minded), that the case of Phineas Gage seemed to indicate that puncturing the brain with needles would not be harmful, but, that, nevertheless, his experiments were not really justified.²⁵

Ferrier knew of Goltz's views, based on his cerebral ablation experiments on dogs, years before the confrontation in 1881. In *The Localisation of Cerebral Disease* he wrote (p.121) "According to Goltz it is not so much the position as the extent of the injury on which the phenomena of cortical lesions depend. . . . Instead of laying bare a distinct region in the brain, and accurately limiting his destructive lesion he merely trephines in the temporal region and destroys the cerebral substance by squirting it out with a strong stream of water. . . . While Goltz's description of the phenomena themselves resulting from this procedure may be accepted without question, his theory that the effects of cortical lesions depend more on their extent than on their position, must, I think, be unhesitatingly rejected."

The Seventh International Medical Congress: 1881

The background to the famous and oft-told confrontation between Ferrier and Goltz at the Seventh International Medical Congress in London in 1881,²⁶⁻²⁹ was that of a typical glittering Victorian spectacle. Included among the 120,000 individuals who received invitations were "all the crowned heads of Europe." Special steamship passages were arranged and British and French railways offered return tickets from anywhere in France and Italy at the cost of a single fare. A commemorative medal was struck depicting Queen Victoria and Hippocrates.

West Riding Asylum, Wakefield.

**MEDICAL
CONVERSAZIONE,**

25th NOVEMBER, 1873.

THE RIGHT HONORABLE THE LORD HOUGHTON
IN THE CHAIR.

AT EIGHT O'CLOCK,
W. B. CARPENTER, ESQ., M.D., LL.D., F.R.S.
Of the University of London,
Will deliver a LECTURE on
"RECENT ADVANCES IN THE PHYSIOLOGY OF THE BRAIN."

During the course of the Evening,
DAVID FERRIER, ESQ., M.D.,
Of King's College, London,
Will demonstrate
"THE LOCALISATION OF FUNCTION IN THE BRAIN;"
AND
RICHARD NORRIS, ESQ., M.D.,
Of Birmingham,
Will exhibit some New Experiments in Cohesion, Attraction,
&c., designed to explain the nature of certain leading phenomena
of Inflammation, Stasis of the Blood, and Transudation of its
Corpuscles through the walls of the vessels, without interference
with structural continuity, as observed by Addison, Wallis,
Williams, Cohnheim, and others.

FIG. 4—Programme of a Medical Conversazione at the West Riding Asylum in 1873.

There were 119 section meetings, 464 written communications, and 360 spoken communications—and some 2,400 pages of reports. Sir James Paget presided over the 3,000 doctors, who included Pasteur, Lister, Huxley, Virchow, Koch, Volkmann, Charcot, Jackson, and Gowers. The Prince of Wales read the welcoming address in the presence of his cousin, the Crown Prince of Germany, the Archbishop of York, the Cardinal Archbishop of Westminster, and the Bishop of London. The Congress was "marked by an unusually abundant series of banquets, receptions and excursions."

At a conversazione in the Kensington Museum "lit up by the electric light" there was "a multitude of languages audible to the visitor which gave a very foreign aspect to the scene." "Floral decorations were chaste" at the Guildhall reception, where the "male and female glee singers delighted the foreigners." At a dinner for foreign guests at the Star and Garter Hotel in Richmond, Charcot, responding for the guests, had some fun with the hypocrisy of the English—their fox-hunting and vivisection law. There were visits to the famous sewage farm at Croydon, and the Royal Seabathing Infirmary at Margate, Apsley House, and Hampton Court Palace, whence Dr. Langdon Down "conveyed his visitors by river to his residence at Hampton Wick for a garden party."

SOIREES AND GARDEN PARTIES

Mr. Alfred de Rothschild gave a soirée at his house in Seymour Place, but, alas, there was heavy rain at the garden party given by Baroness Burdett-Coutts in Highgate. There was a visit to John Hunter's house at Earls Court, "where several human bones recently dug up in the grounds of the great anatomist's former residence, were inspected with great interest by the visitors." And, to cap it all, 1,200 people dined at Crystal Palace and afterwards enjoyed a pyrotechnic display, the original

features of which consisted of the "fire-portraits" of Sir James Paget, Professor Charcot, and Professor Langenbeck (of Berlin). The *British Medical Journal* doubted if the next generation could hope to equal, much less surpass the advances of the previous 30 or 40 years.³⁰

In 1881 Ferrier was 38 and renowned. Goltz, who had been professor of physiology at Strassburg since 1872, was 47.³¹ In the chair, for Goltz's paper, was Michael Foster, Sherrington's lecturer at Cambridge.*

Goltz believed that localization of cerebral function could not be studied by electrical stimulation; only by ablation experiments could progress be made.

Fritsch and Hitzig, he explained, "had already perceived the flaws of the method of stimulus and had attempted a few experiments with extirpation—but only a few experiments." But Goltz had been "successful in a large number of experiments . . . which would demonstrate the truth of my claims." Goltz opened a suitcase which lay on the lectern and took from it an obviously damaged skull of a dog with a tiny preserved remnant of brain. This dog, he declared "whose skull and brain I have here, survived four major operations and was not killed until a full year had passed after the last operation." Though "idiotic" the dog was "neither deaf nor blind, had lost neither the sense of smell nor of taste, not a muscle of his body was paralysed, not a spot on his hide robbed of sensation . . . yet nothing was left in this brain of Ferrier's motor or sensory centres." He had brought with him a dog from whose brain he had removed the cortex from both parietal and occipital lobes, in five operations. But it was not paralysed and this would "prove beyond a shadow of a doubt that Ferrier's theory was . . . completely wrong . . ." Ferrier did not dispute these facts but totally rejected Goltz's conclusions. Ablation experiments on the frog, pigeon, rabbit, or dog could not solve the problem of cerebral localization in man: in such animals the effects of cortical ablation were transient; in monkey and man the paralysis was permanent. Goltz's dissections were too crude and Ferrier, with Yeo, had developed more refined techniques.

After the morning's discussions, the decorticated dog was inspected at King's College. It could "run, jump, see, hear, smell, feel. It does, however, display remarkable deviations from normal in its reactions to sense impressions. Its actions are so aimless and at times so contrary to intelligent behaviour that we must deny it all capacity for reflection and pronounce it a *canine imbecile* . . . providing proof that the theory of localisation was flatly wrong." An autopsy would show that "the cerebrum had been almost completely extirpated."

Ferrier demonstrated two monkeys.† The first was one whose left motor area had been extensively destroyed seven months previously. ("It is a patient!" remarked Charcot when this animal limped into the demonstration room). The second monkey was one from which, ten weeks previously, the superior temporal convolution had been destroyed in both hemispheres. It was deaf but otherwise normal. Professor Yeo in summary, at the end of this demonstration, stated "having seen these animals I feel sure Professor Goltz would modify his opinion as to the 'utter folly' of the view that special parts of the brain are peculiarly associated with certain functional departments." Subsequently the dog and the hemiplegic monkey were killed and their brains removed.

A committee, which included William Gowers, found that, whereas the lesions in the monkey's brain corresponded exactly to the areas that Ferrier and Yeo had thought they had destroyed, the destruction of the dog's brain was not as extensive as had been thought by Goltz. Clearly the remaining motor and sensory areas, and the lower scale of the differentiation of function in the dog permitted it to retain certain functions. The victory was Ferrier's, but Goltz continued to study the effects of cerebral hemispherectomy in dogs though in 1892 he wrote "I am not at all fundamentally opposed to the question of the localisation of cerebral functions."³²

* Sherrington, then aged 24, was so impressed by Goltz's decorticated dog, which was on display, in Professor Yeo's laboratory at King's College, that he decided to enter the field of neurophysiology and his first paper (with Langley) in 1884 was a study of the medulla and spinal cord of this dog. Sherrington subsequently spent a year in Goltz's laboratory and when he left Strasburg he gave him a gift of three monkeys. Goltz believed this was a hint for him to repeat various experiments on cortical localization, whose implications he still refused to accept.³²

† In 1883 Ferrier³⁰ again referred to two monkeys at this demonstration but in his presidential address to the section of neuropathology at the Seventeenth International Congress of Medicine in London, in 1913, he referred to three monkeys. The third monkey had been rendered blind a year previously "with progressive pallor of the optic discs" but without any other defect, by bilateral "occipitoangular" ablations. I have not found any contemporary record of this third monkey. Was Ferrier's memory faulty?

SUMMONS AT BOW STREET

But when the Congress was over Ferrier had to face another contest. He was summoned to appear at Bow Street Police Court under the Cruelty to Animals Act, 1876, for performing "frightful and shocking experiments" without authority from the Home Secretary. At the outset of the Congress Virchow had remarked on the then current wave of agitation. "Persons," he said, "who unscrupulously exploit the average man's love for animals are at work here in London to convince the populace that the British Vivisection Law of 1876 is inadequate. People who practice methods of hunting which far surpass in cruelty anything that is done in laboratories denounce the Bill which provides that no one in England may experiment on living animals unless he is recognised as a serious scientist and holds a Government licence."

The prosecution, or persecution as it was called in the medical press, excited world-wide interest. Hughlings Jackson, Lister, Michael Foster, Gerald Yeo, Burdon-Sanderson, Klein, and others attended the hearing. Three defence witnesses were called; the first was Dr. MacCormac, secretary of the physiological section of the congress, Professor Michael Foster, and the editor of *The Lancet*. It transpired that the account of the demonstration of Goltz's dog and Ferrier's two monkeys in *The Lancet* had been written by Professor Arthur Gamgee of Manchester, but he was not in court.

It was proved that the monkeys had been operated on under general anaesthesia by Professor Yeo, who held a licence under the said Act, and Ferrier was found not guilty "of an infringement of the Act in having countenanced the subsequent keeping alive of the previously injured animals." It was thought that the Anti-Vivisectionist Society had secured "a costly but graceless advertisement" and that the whole proceedings were "a dishonour to the English nation in the eyes of the world." *The Boston Medical and Surgical Journal*³⁴ thought that the opening address of counsel was "the prosiest and poorest twaddle that could have been tolerated in the support of the feeblest case." *The British Medical Journal*³⁵ spoke of the growing importance of Ferrier's work and of cases of posttraumatic hemiplegia, posttraumatic focal epilepsy, and cerebral abscess in which patients had been cured by decompressive operations based on Ferrier's researches. The combination of general anaesthesia, Lister's antiseptic surgery, and Ferrier's localization of brain function, heralded a surgery "of the largest promise." But curiously no reference at all was made to the possibility of surgical treatment of tumours of the brain. And yet only three years later the first removal of a brain tumour marked the highlight of Ferrier's career.

Brain Surgery: 1884

*An event absolutely unique in the annals of surgery*³⁶.

Anti-vivisectionists were as fanatical in their claims as were contemporary phrenologists and in 1884 their activities continued to attract headlines. Bishops, peers, and professors voiced their opinions in language and style which made Victorian public debates so spectacular and acrimonious. On 16 December, 1884, readers of *The Times*³⁷ were informed that a tumour of the brain had been removed for the first time by a London surgeon. This was the heyday of British Imperialism. Readers were also told that the Union Jack had just been raised in Zululand. An expedition to Bechuanaland was being prepared. An Irishman had murdered an English soldier in Ireland.

It was scandalous, said *The Times*, that a British surgeon had to go "for a few weeks to a foreign country" to conduct some animal experiments, which would clearly benefit his patients, because of the absurd English vivisection law. But the announcement of this surgical event "absolutely unique in the annals of surgery" took the form of a letter in the correspondence columns. It was entitled "Brain Surgery" and signed anonymously "F.R.S." The author was none other than Sir James Crichton-Browne. The letter began with these lines:

FIG. 5—Sir James Crichton-Browne; a cartoon by Spy.

"Sir,—While the Bishop of Oxford and Professor Ruskin were, on somewhat intangible grounds, denouncing vivisection at Oxford last Tuesday afternoon, there sat at one of the windows of the Hospital for Epilepsy and Paralysis, in Regent's Park, in an invalid chair, propped up with pillows, pale and careworn, but with a hopeful smile on his face, a man who could have spoken a really pertinent word upon the subject, and told the right rev. prelate and great art critic that he owed his life, and his wife and children their rescue from bereavement and penury, to some of these experiments on living animals which they so roundly condemned. The case of this man has been watched with intense interest by the medical profession, for it is of a unique description, and inaugurates a new era in cerebral surgery."³⁸

His letter which affirmed that this achievement was made possible only as a result of Ferrier's work was followed by a lengthy correspondence, with several fine editorials in *The Times*. At last, it seemed, the criticism was refuted that vivisection had never been of direct benefit to mankind. *The Lancet* article, by Hughes Bennett and Rickman J. Godlee,³⁸ on this case was published a few days later, on 20 December. For three years, the patient, a Scottish farmer aged 25, named Henderson,³⁹ had suffered from left-sided focal epilepsy. There was a progressive left hemiparesis and bilateral papilloedema. (No mention was made of the plantar reflex).

In their short paper they concluded there was a tumour of the brain; it involved the cortical substance; it was probably of limited size, and it was situated in the neighbourhood of the upper third of the fissure of Rolando. It proved to be an oligodendroglioma⁴⁰ "about the size of a walnut" and present at the operation were Hughlings, Jackson, Ferrier, Horsley, and, some say, Lister himself.⁴¹ Godlee and Hughes Bennett were both in their mid-30s at the time; Godlee was a nephew of Lister.

Hughes Bennett's father was a well-known professor of medicine at Edinburgh and, when he died after a lithotomy in 1875, a necropsy was performed and a benign parietal brain tumour with overlying hyperostosis was discovered.⁴² Edwin Bramwell⁴³ wrote "is it not reasonable to suppose that the operability of the tumour in his father's case must have left a vivid impression upon Hughes Bennett's mind, and that in consequence he probably visualised more clearly than most the possibilities of surgery?" Wilfred Trotter and Sir James Crichton-Browne agreed with Bramwell that in all probability Bennett, having diagnosed the case and localized the tumour, invited and persuaded Godlee to operate.

*This article is given in full in Feiling, A., *History of Maida Vale Hospital*.

FIG. 6—Sir David Ferrier at a picnic near his cottage at Porthgwarra, Cornwall.

Hughes Bennett⁴⁴ was on the staff of the Hospital for Epilepsy and Paralysis, Regent's Park, where the operation was performed. He was one of the earliest contributors to *Brain*. He suffered from "a most painful nervous disorder" which enforced early retirement and died at the age of 55 in 1901. I have failed to discover a photograph of this early neurologist.

Holmes,⁴⁵ who knew both Hughlings Jackson and Ferrier, said that when this operation was completed "Hughlings Jackson, in his characteristic slow drawl, said to Ferrier, who stood beside him, "awful, awful." "Awful," said Ferrier, "the operation was performed perfectly." "Yes," replied Jackson, "but he opened a Scotsman's head and failed to put a joke in it."

It was generally acknowledged in 1884 that the success of this event was largely due to the work of Ferrier. Like many a British neurologist, he lived a long time, dying in 1928 at the age of 86. He had been knighted in 1911. Everyone who knew him commented on his extraordinary energy, amiable manner, and enthusiasm.⁴⁶ Kinnier Wilson⁴⁷ wrote that "on the day of Hughlings Jackson's funeral in 1911 I walked away with him from the cemetery and after many minutes of silence, occupied with his own thoughts of his teacher and friend, he suddenly turned and said, "well, when I cease to take an interest in things it will be time for me to go." Sir Charles Ballance⁸ said "as Hughlings Jackson is the Socrates of Neurology, so Ferrier may be described as the John Hunter of Neurology." Sherrington in 1906, dedicated his classic *The Integrative Action of the Nervous System* to "David Ferrier, in token of recognition of his many services to the experimental physiology of the central nervous system."

The concluding part of this paper will appear in next week's issue.

Contemporary Themes

Exeter Project for Handicapped Children

F. S. W. BRIMBLECOMBE

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Summary

A project in Exeter has tried to increase the contribution of the paediatric department of a district general hospital to the long-term care, support, and treatment of handicapped children and their families. They include an infant care unit, day units for handicapped children, and holiday projects, and are based on close links with the educational and social services. The availability of such a family support unit may diminish the strain on the families of handicapped children and help them to maintain normal family and social relationships.

Introduction

Among the many considerations that determine whether a severely mentally or physically handicapped child remains at home or is committed to permanent hospital care the extent of the supporting services for home care is among the most impor-

tant. Support includes the essential contributions required from medical, social, educational, and voluntary services. This report describes a project in Exeter which has over the last seven years attempted to increase the contribution of the hospital paediatric service to the long-term care of handicapped children living at home with their families. It has been designed to fill previously unmet needs and has been closely co-ordinated with existing medical, social, educational, and voluntary services. While the paediatric contribution to investigation, diagnosis, and comprehensive assessment of chronic handicap has also been greatly increased over the last decade the Exeter project is concerned with continuing care, support, and treatment on a long-term basis. This project makes no arbitrary distinction between physically, mentally, or socially handicapped children, and in many children all three elements are present in varying proportions.

A paediatric service based on the catchment area of a district general hospital has through its neonatal service a prime opportunity to identify potentially mentally, physically, or socially handicapped children at a very early stage. In addition many infants born elsewhere are referred to the paediatric department in the early months of their lives for investigation of possible handicap. The potential paediatric contribution is both preventive and therapeutic because such children and their families need not only help during the period of diagnosis and comprehensive assessment but also long-term support.

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