

Occasional historical review

John Hughlings-Jackson: a sesquicentennial tribute

MICHAEL SWASH

From the Department of Neurology, The London Hospital, London, UK

SUMMARY One hundred and fifty years have elapsed since the birth of John Hughlings-Jackson, a pivotal figure in the development of clinical neuroscience. In this review the origin of Jackson's postulate of a hierarchical organisation of function in the nervous system is described in the context of his education and his contacts with contemporaries, both in his clinical practice at The London Hospital and at the National Hospital, Queen Square, and in relation to the evolutionary approach to the organisation and ideas on biology and society set out by the philosopher Herbert Spencer.

John Hughlings-Jackson (figs 1 and 2) was born 150 years ago on 4 April 1835 at Green Hammerton in Yorkshire. He died on 7 October, 1911 and was buried in Highgate Cemetery. Jackson's contributions to neurology¹ were extraordinarily wide-ranging and had far reaching influences on his contemporaries,²⁻⁵ and on those who followed him. Despite this formative role in the establishment of clinical neurology as a speciality in its own right, his contributions in a wider sense to studies of the central nervous system were far less widely recognised in his own lifetime. Indeed, he received none of the honours, for example a knighthood, that were bestowed on so many of his less distinguished contemporaries. The reasons for this are not hard to find in his peculiarly private personality and, perhaps, in the convoluted style of his prose. Further, he seems not to have been interested in developing an extensive and fashionable private practice and, as such, was less well known in London society than were many of his contemporaries.

Education

He was educated at schools in Green Hammerton^{2 6} and at Nailsworth in Gloucestershire until about the year 1850 when he was apprenticed to a Dr William Charles Anderson in a practice in Stonegate, York. Dr Anderson lectured in the York Medical School and Jackson spent about 5 years in York before com-

ing to London to spend a short time studying at St. Bartholomew's Hospital with Sir James Paget. In 1856 he qualified as a Licentiate of the Society of Apothecaries and a Member of the Royal College of Surgeons and then worked for three years, until 1859, as House Physician at the York Dispensary. There he was introduced to the study of mental diseases by Daniel Tuke (1827-1895) and Thomas Laycock (1812-1876). Tuke was physician to The Retreat, a hospital for mental diseases that had been founded by his great grandfather. Tuke had been educated at St Bartholomew's Hospital in London and at the University of Heidelberg, and Laycock, after attending University College, London, spent two years studying neuropsychiatric disorders in Paris and a year at Göttingen. Laycock, in particular, had been much influenced by Marshall Hall and the doctrine of reflex action and was clearly an important influence, in his turn, on Jackson. In 1859 Jackson was introduced by Samuel North, a surgeon in York, to another former student of the York Medical School, Jonathan Hutchinson, who had been appointed Assistant Surgeon to The London Hospital in that year.⁷ Hutchinson went on to pursue an influential and successful career at The London Hospital,⁸ becoming Surgeon to the Hospital in 1863, Fellow of the Royal Society in 1881, and President of the Royal College of Surgeons in 1889. For three years Jackson lived with Jonathan Hutchinson at the latter's house at 14 Finsbury Circus.

Life in London

On Jackson's arrival in London in 1859, Hutchinson arranged for him to be appointed a Lecturer in

Address for reprint requests: Dr M Swash, Department of Neurology, The London Hospital, London E1 1BB, UK.

Received 19 November 1985.

Accepted 5 December 1985.

28 Bedford Place W.C.
June - 14 1871

Dear Mr Nixon

I merely wish for a slight dash betwixt my two names, so as to show that I use both. The name of Jackson is so common that it is necessary to tack another to it to individualise one's self.

Faithfully yours

J. HUGHLINGS-JACKSON, M.D., F.R.C.P.

This is a specimen of the little dash betwixt the names [JH-J]

Fig 1 This letter, addressed to the House Governor of The London Hospital, and preserved in the Archives of The London Hospital, illustrates Jackson's own preference in the spelling of his name and, perhaps, gives an insight into his character. It reads as follows:

28 Bedford Place. W.C.

June 14 1871

Dear Mr Nixon

I merely wish for a slight dash betwixt my two names, so as to show that I use both. The name of Jackson is so common that it is necessary to tack another to it to individualise one's self.

Faithfully yours

J Hughlings-Jackson, MD, F.R.C.P.

This is a specimen of the little dash betwixt the names

JH-J

Pathology, Morbid Anatomy and Histology at The London Hospital Medical School. In the same year Hutchinson also helped Jackson obtain attachments as Assistant Physician to the Metropolitan Free Hospital, and to the Islington Dispensary. Jackson and Hutchinson together contributed medical reports to the *Medical Times and Gazette* during this period. In 1860 Jackson became clinical assistant to Mr Alfred Poland, at Moorfield's Eye Hospital and in the same year obtained the MD of St Andrew's University. In 1861 he became a Member of the Royal College of

Dr. Hughlings-Jackson.		Name Alfred Jackson.
HOUSE-PHYSICIAN C.S. Hawkins	Occupation Swimmer	Age 33
CEREBRAL CLERK Langdon Archer	Date of Admission May 28 1863	Date of Discharge June 29 1863
Diagnosis.		
Epilepsia Gravis Localis Epilepsy Double optic neuritis.		

Fig 2 An example of the front sheet of the case notes of a patient admitted to The London Hospital under Dr Hughlings-Jackson's care. Some of these notes have been preserved on microfilm. In accordance with the practice of the time a wide variety of cases came under his care, many of which did not suffer from neurological disease.

Physicians and moved to a house near Hutchinson's in Finsbury Circus.⁶

During this three year period from 1859 to 1861, while Jackson was feeling his way towards his future intellectual developments, he was much influenced by Hutchinson. Hutchinson has described how Jackson doubted whether he wished to continue in the practice of medicine in the general sense, perhaps considering devoting his intellect to philosophy.⁷ Dewhurst has recently pointed out that this probably meant neuropsychiatry or abnormal psychology rather than philosophy in the modern sense.⁶ The turning point in Jackson's career seems to have been his appointment to the staff of The National Hospital for Nervous Diseases, Queen Square, in 1862 as Assistant Physician. Brown-Sequard (1817-1894) was particularly influential in the appointment and he has been said to have remarked that it would be "foolish to waste your efforts in the wider observation of disease in general."⁴ The following year, 1863, Jackson was appointed Assistant Physician to The London Hospital and Lecturer in Physiology. His clinical publications in neurology begin from this period, particularly a publication in 1864 "Clinical remarks on hemiplegia with valvular disease of the heart." He married his cousin Elizabeth Jackson in 1865, but was bereaved only eleven years later in 1876.

He moved to 3 Manchester Square, to a house still extant, in 1867, the year of his appointment as Physician to the National Hospital, Queen Square, and was Goulstonian Lecturer of the Royal College of Physicians on "certain points of study and classification of diseases of the nervous system" in 1869. His work on epilepsy began to be published from 1870. He delivered the Hunterian Oration on "Physiological aspects of education" in 1872. He was appointed Physician to The London Hospital in 1874. His enthusiasm for the



Fig 3 Hughlings-Jackson's grave in Highgate Cemetery.

ophthalmoscope was communicated in his annual oration to the Medical Society of London in 1877 and he was elected Fellow of the Royal Society in 1878, the year of the foundation of *Brain*. He was one of the three founder editors of that journal. He continued to develop his ideas on epilepsy and became increasingly interested in applying evolutionary concepts, as put forward by Herbert Spencer, to the classification and understanding of neurological diseases from about 1880. His Croonian lectures, given in 1884, "On evolution and dissolution of the nervous system" are a particular landmark in this aspect of his ideas.

He retired from the staff of The London Hospital in 1894. The presentation on this occasion was made by Sir James Paget, who presented Jackson with the portrait by Lance Calkin that hangs in the London Hospital Medical College. A copy of this portrait hangs on the walls of The National Hospital, Queen Square. He retired from active clinical practice in 1906, the date of his retirement from The National Hospital, Queen Square.

The peculiarities of Jackson's personality in the years after the death of his wife are particularly clearly described by Sir James Taylor¹ and, in a Schorstein Lecture delivered at The London Hospital, by Sir E Farquhar Buzzard,⁴ "I remember him in

those days as the generous, kind-hearted but rather grave family friend or pseudo-uncle whose mind seemed to be in a state of constant conflict between his desire to give pleasure and his fear of being bored or bound. I do not think it can be easy for anyone who was not brought intimately in contact with him to understand the feelings of reverent affection which all of the younger generation who had enjoyed that good fortune always entertained for the great personality of Hughlings Jackson. He was so simple, yet so stimulating, and extraordinarily careful in his words so that he might convey his exact meaning. No doubt this is the reason why his papers are so often overloaded with footnotes. I once heard him say with a smile that he was distressed to think that in speaking of a man as being covered with a rash from head to foot he had been speaking unscientifically, for what he should have said was, 'From the tip of his nose to his perineum!'"

Buzzard concluded that "Jackson's pre-eminence was due to the fact that not only had he no superior in the work of making detailed and accurate observations, but no real rival in the art of generalisation or, in other words, of integrating those observations so as to produce an harmonious design of the nervous system as a whole."

Jackson had a peculiarly intense relationship with his junior colleagues, well exemplified in the Memoirs written by them after his death.^{3-5,9-11} Unlike those of his colleagues, his visits for ward rounds, both at The London Hospital, and at The National Hospital, "were quite unfixed in regard to time. They were frequent but irregular in their frequency, depending on his interest in some particular patient or problem at the moment. The ward round was neither formal nor prolonged and it was impossible to predict to which case he would devote most attention. If one was foolish enough to remark that 'This is just an ordinary case of hemiplegia' he might spend the next twenty minutes in demonstrating its unusual features or in explaining how such features illustrated one or other of his theories in regard to the evolution and dissolution of the nervous system. Quite suddenly his attention and interest would seem to fail; he would escape from the ward, but before we parted at the front door of the hospital he would say quietly, 'I will find you a reprint setting out my views on the subject we have been discussing, but you need not believe them.' He had a great belief in the value of sitting quietly at the end of the day, notebook in hand, to allow unconscious reasoning to form new associations in his mind and to mull over the intellectual implications of his clinical experiences."⁴

Jackson and Spencer

In order to understand the origin of Jackson's

concepts¹² the pivotal role of Herbert Spencer must be considered.¹³ Spencer, now little regarded, was the greatest popular philosopher of his day.¹⁴ The period of Jackson's early maturity, from about 1850 onwards, coincides with a period of enormous change in social, religious, and scientific attitudes. During this period the 18th century metaphysical ideas of Hume and John Stewart Mill gave way to new ideas, in the context of the collapse of the Enlightenment, and the confusion and disarray associated with the upheavals of the French Revolution and the Napoleonic wars that followed. This was the period in which the ideas of Kant and Hegel arose in Germany. In England the conflict of science and theology was a factor in philosophy long before Darwin's publication of *The Origin of Species* in 1859. Whewell attempted a universal approach to understanding science and theology in his *History and Philosophy of the Inductive Sciences* a book that Jackson would certainly have read. Here, J S Mills' concept of the Regularity of the Cosmos with its rules and inductions was discussed, but nature was still viewed as a machine subject to the rules of the Cosmos in which unity was present only in the supernatural being. Huxley and Bentham both also struggled with these concepts.

Herbert Spencer,¹⁴ born in 1820 in Derby, was educated by his father, a schoolteacher, and later by his uncle, the curate of Hinton near Bath. However, his studies did not prosper and he decided not to attempt entry to University. In 1837 he took employment as a Civil Engineer on the London and Birmingham Railway and remained working in this capacity, publishing a number of original papers in the *Civil Engineering Journal*, for eight years until a slump in the railway industry, caused by various railway disasters. He returned to Derby, to his family home, and then in 1848 became sub-editor of the *Economist*, a position he held until 1853. During this time he began to publish his own philosophical ideas. His first pamphlet *The Proper Sphere of Government* was published in 1842 and he began to formulate ideas in opposition to the current concepts of invariable laws of social behaviour. He speculated on man's relation to society and on theories of population, based on those of Bentham. During these years he met Mary Ann Evans, later well-known as George Eliot, who was then sub-editor of the *Westminster Review*, a journal to which he began to contribute extensively. His *Principles of Psychology* was published in 1855, the *Principles of Sociology* and the *Principles of Biology* thereafter. Most of his books were published at his own expense and it was not until 1874, 24 years after his first publication, that his books began to earn him income. During this time he established a national and international reputation as a philosopher having a particularly important influence in America, for example on

William James, and on the continent of Europe, but far less influence in Britain, possibly because of his lack of any university connection. He was himself much influenced by von Baer whose law of an ascending organisation in the Cosmos from a state of homogeneity to that of heterogeneity was adapted by Spencer to imply a hierarchical organisation within organisms, societies and structures from the most simple in which all parts are of equal type, to the most complex in which all parts are of different type but inter-relate to form the organism as a whole. In this sense his evolutionary ideas ante-dated those of Darwin but, clearly, the general concept of evolution was arising in many different ways at this time.

It is not known when Jackson met Spencer but they were certainly acquainted since Jackson introduced Weir Mitchell to Herbert Spencer in 1898. Jackson himself has written¹⁴ that he "found Mr Spencer's *Principles of Psychology* more useful than any other works of psychology in the study of those diseases of the nervous system which have a mental side. I believe that Mr Spencer's doctrines of evolution and dissolution are of very great value in the methodical analysis of cases of insanity, and further that, on the bases these doctrines supply, relations of different kinds of disease of the highest cerebral centres to one another can be traced, and also relations of disease of these centres to those of lower centres of the nervous system". Mercier,⁹ formerly one of Jackson's House Physicians at The London Hospital, was also much impressed by Spencer. "My idea of the value of Spencer's work is that he has done for co-ordinations in time what Newton did for co-ordinations in space. . . he has reduced chaos to order. He has at any rate discovered the fundamental principles of these sciences."

Spencer has himself summarised some of his underlying ideas in a short passage¹⁴ that illustrates how important it was to Victorian thinkers in the middle of the 19th century to develop a theory that transfigured both science and religion in one philosophy "Then it was that there suddenly arose in me the conception that the law which I had separately recognised in various groups of phenomena was a universal law applying to the whole Cosmos; the many small inductions were merged in the large inductions. Only then did I see that the universal cause for the universal transformations was the multiplication of effects, and that they might be deduced from the law of the multiplication of effects."

Jackson's hierarchical concepts of nervous function

Evolution of function within the nervous system was conceived by Jackson¹ as a passage from the most to the least organised, from the most simple to the most complex and from the most automatic to the most

John Hughlings-Jackson: a sesquicentennial tribute

voluntary. Dissolution was understood to be the reverse of the process of evolution. From the lowest to the highest centres there was increasing complexity (differentiation), increasing definiteness (specialisation), and increasing integration (or function). In general, the higher the centres the more numerous the inter-connections of their units (co-operation). Jackson's concept of a unit was complex. The concept was that of a unit of constitution, meaning a unit containing structures that implied functions in such a balance of relations that they served harmoniously in complete actions. Jackson believed that this unit of constitution of actions was the same at all levels of the nervous system thus implying that "the whole of the nervous system and its parts are developed on the same fundamental plan". Thus in a lesion of the nervous system recovery simply represented the continuation of the activity of parts spared within the lesion. Compensation did not thus mean that nervous tissues took on functions that they had never had before, but that lower levels continue to function in a similar way. A hierarchy of functional strategies was thus revealed.

In the last quarter of the 20th century these ideas appear antiquated and even archaic but they enabled Jackson to formulate a hierarchical concept of function, and of disorder of function within the nervous system that has been of fundamental importance in the development of ideas since that time. In 1880, James Jackson Putnam, of Boston, accompanied Hughlings-Jackson to his lectures at The London Hospital.⁶ "It was Dr Jackson's custom to draw a pyramid upon the blackboard which should stand for the hierarchy of the cerebral functions, the more fundamental of them being represented by the basal portions of the pyramid, the more complex and recently acquired by the apex portion. His idea then was that when the hierarchy of functions represented by this pyramid suffers derangement at any part . . . the attempt at re-establishment of some sort of equilibrium is always such that the new arrangement tends to safeguard itself by accentuating the more fundamental of

its powers, while sacrificing, so far as necessary, the more elaborate."

Jackson's formulation of the functions of the brain, and his distinction between psychological concepts and anatomical data, provided a foundation for clinical diagnosis that continues today. More recently his ideas have been taken up in physiological and anatomical investigations of the brain. These more recent approaches to Jackson's concepts of the brain and its functions were reviewed in a symposium entitled Hierarchies in the Brain held at The London Hospital on 30–31 October, 1985, to celebrate the sesquicentenary of his birth.

References

- ¹ Taylor J. *Selected Writings of John Hughlings Jackson*. London, Hodder and Stoughton, vols 1 and 2, 1931.
- ² Broadbent W. Hughlings Jackson as a pioneer in nervous pathology. *Brain* 1903;26:305–66.
- ³ Ferrier D. John Hughlings Jackson, 1835–1911. *Proc R Soc Med* 1912;84:xviii–xxv.
- ⁴ Buzzard EF. Hughlings Jackson and his influence on neurology. *Lancet* 1934;2:909–13.
- ⁵ Harris W. John Hughlings Jackson, 1835–1911. *Postgrad Med J* 1935;11:131–4.
- ⁶ Dewhurst K. *Hughlings Jackson and Neurology*. Oxford, Sandford Publications. 1982:169.
- ⁷ Hutchinson J. The late Dr Hughlings Jackson: a recollection of a life-long friendship. *Br Med J* 1911;2:1551–4.
- ⁸ Clark-Kennedy AE. *The London: Study of the Voluntary Hospital System*. London, Pitman Medical. Vols 1 and 2. 1962.
- ⁹ Mercier C. The late Dr Hughlings-Jackson. *Br Med J* 1912;i:85–6.
- ¹⁰ Editorial. Hughlings Jackson. *Br Med J* 1915;i:757.
- ¹¹ Head H. Hughlings Jackson on aphasia and kindred affections of speech. *Brain* 1915;38:1–27.
- ¹² Riese W. The sources of Jacksonian Neurology. *J Nerv Ment Dis* 1956;50:125–34.
- ¹³ Riese W. *Principles of Neurology in the Light of History and their Present Use*. New York, Nervous and Mental Disease Monographs. 1950:177.
- ¹⁴ MacPerson H. *Herbert Spencer, The man and his Work*. London, Chapman and Hall. 1901:227.