HUGHLINGS JACKSON AND THE OPHTHALMOSCOPE.

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Dr. James Taylor has said in an article on the Ophthalmological Observations of Hughlings Jackson that it cannot be "easy for anyone who was not brought intimately into contact with him to understand the feelings of reverent affection which all the younger generation who had enjoyed that good fortune always entertained for the great personality of Hughlings Jackson."

This is in a sense true, and the writing of this article would have been easier had I had the privilege of knowing the great man. There are, however, three types of great men, in medicine. The first achieves his greatness during his life by his clinical work and by his kindness and skill in curing and alleviating the sufferings of large numbers of patients. The second, in addition to his clinical work, or perhaps to the relative exclusion of it, leaves behind him various scientific treatises, papers and books in which are recorded the facts and theories which he has elucidated during life—very valuable reading to the searcher after knowledge, but containing no illumination of the character of the man who wrote them. The third type of great man leaves, in his writings, the stamp of his own personality. He is not content merely to record scientific findings, but gives in addition some of his own philosophy of life—explains his difficulties and puts the reader into possession of far more than he would have gained from perusal of an assembly of merely academic facts and theories.

Jackson unquestionably belongs to this last type of medical genius, and it is for this reason that the writing of an article about his association with the ophthalmoscope is not so difficult as it might have been—to one who has not had the privilege of knowing him personally.

Although the ophthalmoscope was invented by Charles Babbage—an English scientific mechanician—in 1847, it was not until it was re-discovered by Helmholtz in 1851 that its applications and uses were appreciated. Hughlings Jackson must have been at this time about sixteen years old—and it was only eight years later that he came to London and began the scientific study of his profession at an Ophthalmic Hospital. In an oration delivered many years later before the Medical Society of London, he describes this beginning as being "the luckiest thing in his medical life," and one can well imagine the enthusiasm with which he would take up the study of ophthalmoscopy—still in its early years. Jackson, at Moorfields as Hutchinson's assistant, was working among a number of men who were at that time already attaining great skill in the use of the instrument. He was able to act therefore as a sort of liaison officer and apply the results of their technique to general medicine. In a paper published in the Royal London Ophthalmic Hospital Reports in 1863, he says, "My object in writing this article is simply that I may contribute from my own field of clinical work a few observations on a class of symptoms, the meaning of which it is most desirable to make out for the sake of advancing our knowledge of the central nervous system. This renders it necessary that I should address myself both to the ophthalmologists and to the general physician and thus I run a double risk of criticism. If in the

slightest degree I do something towards bridging over the special and perhaps somewhat isolated department of ophthalmic medicine with the more general one, I shall have done all I wish to do." Again, writing in the same journal some two years later, after apologizing for speaking too much of some symptoms which are outside the scope of a journal devoted to Ophthalmology, he goes on to say, "Much of the interest, however, depends upon the number of symptoms which can be put together in an intelligent order. Amaurosis may be studied at once with too much intensity and too little breadth. It is to the ophthalmologist a disease of so great importance, calling for particular action on his part that he may underrate its significance as a symptom in general conditions of the system. But it is when it occurs with other phenomena that we are most likely to discover what optic neuritis means." He then goes on to urge physicians and ophthalmic surgeons to do more work together. A useful reminder to the Ophthalmologist is Jackson's observation that such a man might, "dwell with exaggeration—hurtful to his own organisation of medical knowledge—on amaurosis as a defect of a highly specialized part of universal sensation." While on the other hand, the physician is reminded that "it is, I submit, imperative in all cases of severe cerebral disease, at all events in cases of an acute kind, to examine the eyes with an ophthalmoscope whether the patient complains of defect of sight or not."

Jackson's frequent use of the term "optic neuritis" in connection with the eye changes noted in cases of cerebral tumour serves to remind us that the pathology of this condition was not elucidated in his day. It seems rather curious that, although Jackson was in possession of much of the evidence in favour of the condition being an oedema of the nerve head and not an inflammation, he should still have talked of it as a "neuritis" and that it continued to be so regarded until Leslie Paton and Gordon Holmes published their classical paper in 1911.

A survey of the way in which Jackson tackled the problem will not, however, be out of place, since it shows the working of his mind and furnishes an admirable example of the way in which unsolved medical problems are to be approached. In the first place, Jackson was continually pointing out that "optic neuritis" could exist without loss of visual acuity, and he never tired of advising his colleagues to use the ophthalmoscope in cases of cerebral disease, even if the patient "affirms that he can see well and read small type readily." Jackson, though he was primarily responsible for bringing this observation to the knowledge of the medical profession as a whole, was careful to avoid claiming it as his own discovery, and we find in Vol. I. of the Transactions of the Ophthalmological Society, a footnote to the effect that Blessig was the first to mention the fact that sight may be good in cases of double "optic neuritis." This insistence on the retention of good sight in a certain proportion of cases of cerebral tumour shows that he appreciated the difference between true optic neuritis and what nowadays we should call papilloedema. The same can also be deduced from Jackson's pointing out that "optic neuritis was very frequently bilateral, and that in physicians' practice it was nearly always so," as also from his observations on temporary total failure of sight in cases of "optic neuritis."

In discussing the pathology of "optic neuritis" (Transactions Ophthalmological Society, Vol. I) Jackson has several theories from which to choose. The first was that of von Graefe who thought that pressure on the cavernous sinuses

within the skull induced venous congestion in the central vessels of the optic nerve. This was rejected on the grounds that "optic neuritis" may be produced by a tumour so small that it would not raise intracranial pressure to any but the most trifling degree. "A small tumour in the cortex has produced just the same kind, and I believe degree, of optic neuritis as a mass of tubercle weighing eleven ounces in one cerebral hemisphere." In face of such an observation as this it would seem impossible that increased intracranial pressure had any ætiological bearing on the production of "optic neuritis," unless the importance of free circulation of the cerebrospinal fluid were realized.

The second hypothesis, that of Schmidt, asserted that owing to increased intracranial pressure, the cerebrospinal fluid was forced along the sheath of the optic nerve, through the spaces of the lamina cribrosa and so into the nerve head, thus causing swelling and congestion. This he also rejected.

The third hypothesis, of Benedict and Schneller, was that which appealed most to Jackson, since it followed along the lines of his work in epilepsy. Briefly, it was that the tumour acted as a foreign body, causing changes of instability in the brain tissue around it which brought about the discharge of nervous impulses. These passed along the vaso-motor nerves to the vessels of the optic nerves or centres and by their repetition brought about eventual vaso-motor paralysis and so, "that trouble of nutrition which is optic neuritis." Even though such a theory must have been peculiarly attractive to him, Jackson does not mind admitting that it was only "the hypothesis which seems most plausible to him," and adds rather a delightful footnote—"an hypothesis is not a conclusion; it is only a provisional conclusion, something to be proved or disproved." Now, of the hypothesis under remark, I say only that it is "the most plausible," that is of the three considered. To the remark that it is "only an hypothesis," I would make the rejoinder that so is everybody's opinion at first as to the process of causation of optic neuritis. Such being the state of things, the question is not, "Is any one of the hypotheses true?" if, indeed, we may speak of a "true hypothesis," but, 'Is it a legitimate hypothesis?' Time has proved, that whether the hypothesis were legitimate or not, it was not a true one, and one cannot but admire the open-mindedness of its supporter. A lesser man would have dogmatically asserted the truth of the theory he was upholding, but Jackson was great enough to see its weakness and to admit that the occurrence of monocular "optic neuritis" was a difficulty in the way of the hypothesis. It was also difficult to understand why these vaso-motor phenomena should so constantly affect the optic discs—and this again Jackson admitted. By doing so, he was of course a source of inspiration to others, and it was this quality above all others which endeared him to those who were associated with him.

Hughlings Jackson did not confine his ophthalmoscopic work to discovering "optic neuritis," he was just as keen to discover its absence—and here his ophthalmological training stood him in good stead. He was well acquainted with the condition we now designate "pseudo-papilloedema," and in 1877 in his oration to the Medical Society of London, we find him saying, "It is an unfortunate thing that some investigators do not make allowance for differences in the appearance of the fundus in healthy people. It is a common thing for the inexperienced to see congestion and anæmia of the optic discs, when the experienced see nothing but a physiological redness or pallor associated with a fair or dark complexion. The determination to find something wrong in the eyes, when something wrong

is likely, leads to grave blunder. It is obvious that some observers are really largely inferring when they should be only looking. I believe that physicians are sometimes guilty of over-rating slight appearances, finding something extraordinary when there is nothing particular; and this naturally provokes the scorn of good ophthalmologists, and brings a valuable means of research in medical cases into contempt." This is a paragraph which might have been written yesterday, and the fact that it was spoken in 1877 is perhaps sufficient excuse for its quotation *in extenso*.

In the same oration, he emphasizes the importance of recognizing the effects which refractive errors may produce. Thus astigmatism may cause "confusion of vision" because of the difference in distinctness of the different meridians and hypermetropia may bring about symptoms simulating those of brain diseases, such as headache and squinting. In addition, the hypermetropic disc may bear a close resemblance to "the inflamed disc associated with cerebral tumour." This is a fact which to this day is insufficiently appreciated by many ophthalmologists and physicians, and it is surely a tribute to the ophthalmoscopic skill of Hughlings Jackson that he was able to warn the medical profession of this pit-fall in diagnosis nearly sixty years ago.

Jackson's ophthalmoscope was not limited in its use to the diagnosis of cases of cerebral disease. He was fully cognisant of the fundus changes in other diseases, e.g., syphilis and Bright's disease. He also realized that this instrument rendered accessible to observation, what was morphologically a portion of the brain and he drew his inferences accordingly. Thus we find him writing in connection with Bright's disease, "It is important to note that not only the so-called characteristic changes, but considerable hæmorrhages may exist when sight remains good; for it leads us to infer that small cerebral hæmorrhages may not reveal themselves by any obvious symptoms. Again, if a patient who has Bright's disease has had a most transient and slight hemiplegia—a little temporary thickness of speech or a slight attack of vertigo—we should reasonably assume that these symptoms were due to clots in the brain, if we saw clots in the retina. There is no need in such cases to suppose that the renal disease causes these slight symptoms, and especially the local ones, by preventing proper depuration of the blood or in some other roundabout way. . . . We see in the brain post-mortem just the sort of change we saw during life in a part of the nervous system easily looked at."

Towards the end of this paper, Jackson notes that the appearances in some cases of renal disease are similar to those occurring in cerebral tumour. The significance of this has been only recently elucidated, by showing that those cases of renal disease which present marked swelling of the disc show also a marked rise of cerebro-spinal fluid pressure.

Enough has now been said to demonstrate what a profound knowledge of Ophthalmoscopy was possessed by Hughlings Jackson. He did not himself make any startling discoveries in this branch of medicine, but he was a past master in the art of collating the work of others and of integrating them into an attractive and intelligible whole to be presented to his colleagues in one of the many addresses and papers which he wrote. If the words "Oh . . . that mine adversary had written a book" be regarded as a proverb, then in the case of Hughlings Jackson, surely the reverse is true—that by his writings, he must have made many friends, not only in his own time but both now and in the future.