PRESIDENTIAL ADDRESS

ON

OPHTHALMOLOGY & GENERAL MEDICINE.

Delivered before the Ophthalmological Society of the United Kingdom.

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No professional honour could be more pleasant to me than is the Presidency of the Ophthalmological Society. I thank you for it with all the greater heartiness because I am already very much in your debt for your selection of me to deliver the Bowman Lecture of 1885,¹ and to open a discussion on that most important neurologico-ophthalmological subject optic neuritis.² There is no department of medicine which has greater attractions for me than ophthalmology has. It was the first subject I specially worked at after my student life, and I still think what I said when giving the annual address, 1877,³ before the Medical Society, that it was "the luckiest thing in my medical life that I began the scientific study of my profession at an ophthalmic hospital." Many years ago I had the good fortune to be Mr. Hutchinson's clinical assistant at Moorfields. I suppose it is to his example and teaching that I owe the beginning of the little scientific development I may have. At an ophthalmic hospital one has the opportunity of being well disciplined in exact observation. When a physician sees how carefully and precisely ophthalmic surgeons investigate the simplest case of ocular paralysis, he is getting a lesson in exactness, and will be less likely in his own department of practice to deal in such generalities as that a patient's seizure "had all the characters of an ordinary epileptic fit," and more likely to take pains to describe the convulsion, the place of onset, the march and the range of the spasm. I suppose I must have felt myself under the kind of discipline mentioned when I wrote about twenty-three years ago:⁴ "Until physicians work at the muscular disorders of various convulsive seizures as carefully as ophthalmic surgeons do at paralysis of the ocular muscles, our knowledge of convulsions will not advance in an orderly way." One meaning of science is exactness, or, as Dr. Buzzard put it in suggesting a name for a celebrated painting, "science is measurement." The ophthalmic surgeon measures the swelling of the discs in optic neuritis, the degree of error of refraction in hypermetropia, astigmatism, etc., and makes exact charts of the field of vision.

Although I do not congratulate you on your present choice, I think it a good thing that the President of this Society should sometimes be a physician. It will encourage physicians, especially young physicians, to work earnestly at the ophthalmological aspect of cases of patients under their care. By doing so they may repay part of the great debt to ophthalmology which general medicine, and especially neurology, is under. Part of this debt has been paid by Charcot, Westphal, Weir Mitchell, Gowers, Clifford Allbutt, Ferrier, Seguin, Stephen Mackenzie, Bristowe, Wilks, Sharkey, Edmunds, Herbert Habershon, Samuel West, James Anderson, and many other physicians. I would particularly mention Gowers's magnificent work *Medical Ophthalmoscopy*, a work esteemed by neurologists throughout the world. The recent researches of Beevor and Horsley on localisation of ocular movements in a particular region of the cerebral cortex of monkeys is an important contribution to ophthalmology as well as to general medicine and surgery.

Since six cranial nerves and the sympathetic nerve supply the eyeball and its apparatus, it is evident that, without a good knowledge of eye diseases, the thorough investigation of very many morbid affections of the nervous system is not to be methodically carried out. It is easy to show that this statement is by no means a mere truism. Unless the physician uses the ophthalmoscope by routine, he will often enough overlook the best evidence—and I am convinced in some cases the only decisive evidence—of gross organic disease of the brain there is to be had; and if, as is most often the case in a physician's practice, sight be good, he will not surmise that there is anything wrong with his patient's optic nerves, and will very likely

be incredulous when someone who has looked at them tells him that there is swelling of the discs. It is not very many years since the ophthalmoscope was rarely used except by ophthalmic surgeons. Dr. John W. Ogle was the first physician in this country who used this instrument in the investigation of medical cases. I think it very unlikely that there is to-day a single patient in the National Hospital for the Epileptic and Paralysed whose eyes have not been examined by this instrument.

I was very much struck by the frequency with which Dr. Macewen, of Glasgow, mentioned optic neuritis in his paper, "The Diagnosis, with especial reference to Localisation of Intracranial Lesions, the Result of Aural Disease," read at the Leeds meeting of the British Medical Association last August. This paper is a most valuable contribution to ophthalmology, otology, and surgery. I urge young physicians to study eye diseases at an ophthalmic hospital or at an ophthalmic department of a general hospital; this nowadays needs no urging on physicians especially interested in neurology. A superficial knowledge will not suffice. Without special knowledge of ophthalmology a medical man may overlook paralysis of a superior oblique muscle altogether—may not know that there is any eye trouble at all; if so he will misinterpret the vertigo for which his patient consults him. The physician's ophthalmological knowledge should be wide. A neurologist who thought only of those ocular symptoms which pertain to the nerves of the eye and their centres would be thinking too narrowly for practical purposes. Unless more widely trained in ophthalmology, he would overlook hypermetropia as a cause of headache and other nervous symptoms, and might thus treat by drugs a condition only needing spectacles for its cure. Again, the physician may, if he does use the ophthalmoscope, misinterpret what he sees if he does not know the morbid results of strain of hypermetropic eyes on the optic discs; he may erroneously consider swelling of the discs due to hypermetropia as a neuritis signifying serious brain disease, and treat the patient on that hypothesis. I infer that there is some excuse for this mistake when made by a physician, and I confess that I have made it, as I have known more than one highly accomplished ophthalmic surgeon to be, for a time at least, in doubt in such a case.

I hope I shall be pardoned for making one more quotation from the address delivered before the Medical Society; I repeat emphatically that "without a good knowledge of ophthalmology a methodical investigation of diseases of the nervous system is not merely difficult, but impossible."⁵ Indeed, no physician will, I submit, doubt this who reads Mr. Swanzy's Bowman Lecture, printed in our forthcoming volume of *Transactions*, a most able and very valuable contribution to both neurology and ophthalmology.

I speak again of optic neuritis with gross organic brain disease. I suggest that cases of unioocular neuritis with tumour of one cerebral hemisphere (I have only seen three cases with necropsies) are the cases which, after microscopical examination of the parts concerned, will throw most light on the process by which optic neuritis results from disease of various parts of the encephalon. These cases are most likely to come under the care of physicians. The discovery of this process will be a great gain, not only to ophthalmology but to neurology also. For, presumably, the process by which the pathological condition for some other symptoms, occurring in cases of gross organic brain disease, is produced is similar. At present there are only hypotheses as to this process. I find that I am sometimes quoted as having concluded that optic neuritis results by vasomotor action, whereas I have only said, what I still think, that that hypothesis seems to me to be the most plausible of the three hypotheses I spoke of.⁶ I would remark that an adequate hypothesis has to explain not the neuritis only, but some other pathological conditions, also produced by intracranial tumours. We may put for answer the more general question, How does a tumour, say of the cerebral hemisphere, produce symptoms not explainable by its destructive action? It is well known that some patients, subjects of optic neuritis, and who for most of their time see well, have frequent temporary losses of sight. It is very remarkable to observe a patient stagger into one's room quite blind and then to find him next minute seeing quite well, although with double optic neuritis. Dr. Samuel West has recorded in our *Transactions*, vol. iii, p. 136, a valuable case of the kind. So striking and so very defi-

¹ *Trans. Ophth. Soc.*, vol. vi.² *Op. cit.*, vol. i.³ Ophthalmology in its Relation to General Medicine. *JOURNAL*, May 12th, 1877, et seq.⁴ *Roy. Lond. Ophth. Hosp. Rep.*, vol. v, Part 4, p. 68.⁵ *JOURNAL*, May 12th, 1877, p. 575.⁶ *Trans. Ophth. Soc.*, vol. i, p. 90.

nite a symptom demands explanation as much as do epileptiform seizures, which often result from the same tumour of the mid-cortex which produces double optic neuritis. Neither of these paroxysmal symptoms can be put down to the destructive action of the tumour. I submit that they depend on diametrically opposite changes; that there is exalted instability of cortical grey matter—a condition induced by the tumour, probably by a local encephalitis, a condition permitting occasional sudden excessive nervous discharges. An acceptable hypothesis has to account for these two symptoms as well as for optic neuritis. It has still more to account for.

There are other symptoms sometimes occurring along with optic neuritis from intracranial tumour which require explanation; and this I hope physicians will endeavour to give. Dr. Buzzard⁷ made the following remarks: "Was it possible.....that the vomiting and the slowing of the pulse might represent an affection of the pneumogastric brought about by the same cause as that which produced optic neuritis, and that the sudden or rapid death which Dr. Hughlings Jackson had mentioned as one of the possible contingencies of optic neuritis from intracranial disease, might also be explained by a more severe influence exerted upon the same nerve?" It is very remarkable that many patients with optic neuritis die suddenly or rapidly, and when seemingly in fair general health, sometimes at work, certainly most unexpectedly. I have often urged this on the attention of physicians. In some cases of cerebral tumour the patient may be acutely ill; he may have an illness very like tubercular meningitis in many of its symptoms; there may be slow and unrhythmical pulse and irregular respiration; there are retracted belly, constipation, and vomiting. I suppose that when a patient who has post-neuritic atrophy tells us that his sight failed after "bilious" or "gastric" fever, he has had such an acute illness. Dealing with certain cases of optic neuritis in children, Hutchinson wrote: "Nearly always there is a history of a severe illness, which was supposed to be fever, and was marked by delirium and other head symptoms."

The organic, or, as one may call them, the "vital" symptoms I have mentioned, are of great importance to the physician. Speaking figuratively, a cerebral tumour in producing optic neuritis is trying to make the patient blind; in producing the other pathological conditions, those of the "vital" symptoms, it is trying to kill him. Following up Dr. Buzzard's very luminous suggestion, I advise that when a patient with optic neuritis dies suddenly or rapidly or dies in an illness with the "vital" symptoms mentioned the medulla oblongata as well as the optic nerves and tracts should be searched microscopically. There is, however, something to be said against the location of the changes under remark in the medulla. It is perfectly certain that the organic parts, although represented directly in the medulla oblongata, are indirectly represented (represented over again or re-represented) in the mid-cortex of the brain; hence it may be thought the "vital" symptoms spoken of are owing, not to morbid changes induced in the medulla, but to such changes provoked by the tumour in the cortex in its neighbourhood, especially as it is unquestionable that the tumour does produce the changes round about itself on which epileptiform seizures depend. This I think unlikely, especially when the tumour is in one half of the brain. I now wish particularly to mention that, as Fagge⁸ pointed out, some patients die of cerebral tumour by rapid respiratory failure. In one case under my care artificial respiration was tried, so respiratory, so to speak, was the condition. I cannot but think that in death by failure of respiration in cases of intracranial tumour there have been morbid changes akin to optic neuritis induced in the respiratory centres of the medulla oblongata. It must be borne well in mind that, strictly speaking, optic neuritis is not a symptom, although it is the custom to call it one, but a pathological condition; often enough it exists without any symptom (defect of sight) attending it. Hence it compares, not with convulsion and the "vital" symptoms, but with the pathological conditions of the cortex or medulla on which they depend.

I would submit to ophthalmic surgeons the importance of minutely investigating not only well-marked epileptic and epileptiform seizures, but also any slight transitory symptoms, with or without loss of consciousness, which patients with optic neuritis may have, especially when there are with them "subjective" sensations of smell or taste. These transitory and quasi-trifling sym-

ptoms may be slight epileptic paroxysms of a very important variety; their study when optic neuritis exists is important with regard to localisation of changes productive of epileptic paroxysms of different kinds. In the vast majority of cases of epilepsy proper we discover no morbid changes *post mortem*: when there is optic neuritis with epileptic seizures, we mostly find a very obvious change, often tumour of the brain; we can then infer the situation of the secondary changes in grey matter productive of epileptic fits of different varieties. It is quite certain that our present definite clinical knowledge of epileptiform seizures in man comes from the study of those of these cases, which are complicated by optic neuritis; and I have no doubt whatever that it will be so in cases of epilepsy proper. By such work as I have indicated, we shall break up epilepsy proper into its varieties as we have done epileptiform seizures. No case of epilepsy, certainly no case of epileptiform seizure, is properly investigated unless the ophthalmoscope be used.

Dr. James Anderson has recorded¹⁰ a case of tumour of the left temporo-sphenoidal lobe. In this case there was atrophy of both discs, but some weeks before death neuritis of one of them. There were also slight epileptic seizures, with "subjective" sensations of taste along with what is commonly called an "intellectual aura," but which I prefer to name "dreamy state." Such cases are of very great medical interest, and are of vastly more scientific value than scores of cases of epilepsy in which no organic disease of the brain is discovered *post mortem*. I have published a case of optic neuritis in which there were slight seizures with "subjective" sensations of smell along with the "dreamy state."¹¹ The patient died rapidly, as is so common in cases of optic neuritis, but no necropsy was obtained. In that number of *Brain* I have dealt with this variety of epilepsy, (the one with the "dreamy state,") and refer briefly to a case under the care of Dr. Beevor and myself in which there were optic neuritis and hemiplegia, and also paroxysms with "subjective" smells and the "dreamy state." In this case also there was a tumour in the temporo-sphenoidal lobe. This case and Dr. James Anderson's patient's case are important as bearing on and confirming Dr. Ferrier's cortical localisation of smell and taste. These are the only cases I know of, and one was uncompleted by necropsy, in which the variety of epilepsy I have spoken of has been found with optic neuritis. Such paroxysms being very slight, and not always attended by unconsciousness, might be easily ignored in cases of severe brain disease. I very much hope that ophthalmic surgeons will observe minutely, and with their customary precision, slight temporary "sensations," "queer feelings," etc., which patients with optic neuritis may complain of.

There is no end to speaking of the integration of ophthalmological and neurological knowledge. The ophthalmic surgeon studying nystagmus is helping towards the elucidation of the nature of tremor, in which the neurologist is greatly interested. Great attention should be paid, both by ophthalmic surgeons and physicians, to the tremor (Marie) in cases of Graves's disease—one of the four varieties of "vibratile tremor" of Charcot.¹² Work done on miners' nystagmus is valuable to the general body of scientific medical workers, as helping to complete the homologous series of professional spasms, of which writers' cramp is the commonest example. The work the ophthalmic surgeon has done on the symptomatology of cases of paralysis of ocular muscles gives the clue, as Wundt long ago suggested, to the interpretation of incoordinations experimentally produced by destructive lesions of nervous centres in animals. I think it gives the clue also to the interpretation of all disorders of co-ordination in man, including writers' cramp and other occupation spasms, from negative lesions. It explains the squinting resulting from hypermetropia: I think, too, that it explains the seeming alterations in the size of objects after instillation of atropine and eserine, a thing of importance, since these alterations occur at the onset of some epileptic fits.

In the field of the eye we are most likely to be able to trace the ascending complexity, speciality, etc., in the evolution of movements from the ocular muscles to their representation in most complex movements in the highest motor centres, that is, in the physical bases of visual ideas. Whilst a man is looking at anything, there is at that time engagement of all orders of centres from highest to lowest, and thence on to ocular muscles.

Much valuable material has been accumulated for the study of the evolution of ocular movements by Graefe, Hutchinson,

⁷ *Trans. Ophth. Soc.*, vol. i, 1881, p. 98.

⁸ *Roy. Lond. Ophth. Hosp. Rep.*, vol. v, 1886, p. 307.

⁹ *Prin. and Prac. of Medicine*, vol. i, p. 10; 2nd ed.

¹⁰ *Brain*, October, 1886.

¹¹ *Brain*, July, 1888, p. 179.

¹² *Diseases of the Nervous System*, vol. iii, S. & S., p. 186.

Priestley Smith, Vulpian, Prevost, Ferrier, Horsley, Beevor, and others. We have clinical observations on ocular paralyses from disease of (1) nerve trunks, of paralyses from disease of (2) lowest motor ocular centres (ophthalmoplegia externa), of ocular paralyses (as in lateral deviations of the eyes) from lesions of (3) still higher centres ("motor region" of the cerebral cortex, or, as I call them, middle motor centres), and I hope we shall have such observations of ocular paralyses from lesions of (4) motor centres still higher—the highest motor centres, the physical basis of visual and of other mental states. I have considered this subject in the Bowman Lecture (1885).

There is no task I would rather accomplish than this, for by doing it we should do very much towards showing that the organ of mind is sensori-motor, as is the rest of the nervous system. We should thus place the study of epilepsy proper and insanity on a realistic basis. I have long urged a study of the evolution of movements, and first of all in ophthalmic journals. "If such an expression be permitted, there is a gradual increase in intelligence in movements from the lowest nerve trunks to the highest nervous centres." This, written in 1866¹³ expresses crudely what I think can be scientifically stated as a basis for investigation.

Alienist physicians, being more than any other physicians directly interested in the anatomy and physiology of the nervous system as they correspond to psychology, are of necessity interested in ophthalmology, and are in great debt to it. I hope they will be interested in the scheme of work suggested on evolution of ocular movements; but I now speak of something more definite. I do not see how any question can be more important or more fundamental in nervous physiology, as it expressly corresponds to psychology, than whether mental states do or do not occur with the "out-going" current as well as with the "in-going" current.

Now the battlefield of this question is the case of paralyses of ocular muscles when the full symptomatology of those cases, particularly "erroneous projection," is considered. There are reasons more on the surface why alienist physicians should co-operate with ophthalmologists. Much has been done in the study of ocular symptoms of cases of insanity (Westphal, Allbutt, Wigglesworth), but much remains to be done in this direction. Great good would come from investigation of such an insanity as general paralysis by skilled ophthalmic surgeons conjointly with experienced alienist physicians and other neurologists. I very much wish this joint investigation could be made.

Physicians should try to help ophthalmology by bringing forward cases little likely to come under the notice of ophthalmic surgeons. Cases of spasmus nutans with nystagmus (a variety, I think, of spinal, or rather, spinal-system chorea, a symptomatic condition akin to canine chorea) would, as "living specimens," interest all our members. I wish surgeons who see cases of so-called traumatic tetanus would settle whether the muscles of the eyeballs do or do not suffer spasm in the exacerbations of this disease. If the ocular muscles are not involved their escape is a matter of great importance and significance, especially to neurologists. Physicians and ophthalmic surgeons ought to note the motor condition of the eyes in the tetanus-like seizures sometimes occurring in cases of tumour of the middle lobe of the cerebellum. Very much more could be done by physicians in the observation of the development and the order of development of ocular movements in cases of epileptiform seizures from mid-cortical disease. I hope that Horsley's promised demonstration before the Society of the representation of ocular movements in certain parts of the monkey's cortex cerebri will be a stimulus to our medical members to note very carefully the behaviour of the eyes in the "cortical fits" of man.

I think aural surgeons could bring before us cases of great ophthalmological interest. I have published the case of a man who had ocular movements during a paroxysm of auditory vertigo,¹⁴ and that of a woman¹⁵ in whom lateral movements of the eyes were producible by pressure on a diseased ear. Mr. Laidlaw Purves gave me most important help in the investigation of the woman's case, as did also Mr. Couper. If such cases are met with by Mr. Purves, I hope he will let us see them, especially as he, having great ophthalmological knowledge, would investigate the ocular as well as the aural side of the cases thoroughly. Dr. Kipp, of Newark, New Jersey,¹⁶ has recorded several very important

cases of abnormal ocular movements in cases of ear disease. He refers to cases recorded by Bürkner, Urbantschitsch, Jacobson, Gruber, and Moos, as well as to the two I have reported. I think all ophthalmic surgeons will be interested in Dr. Kipp's researches.

Speaking of otology, I admit that a knowledge of this department of medicine as well as of ophthalmology is of vast importance to the neurologist. I regret very much that I did not years ago pay as close an attention to otology as I did to ophthalmology, especially as the cases just referred to show that the two are related. Let young neurologists take warning so that they may not afterwards have like regrets.

I have illustrated the relation of ophthalmology to general medicine by its bearing on neurology; it has, of course, much wider relations. I can best conclude this address by adopting the words with which Dr. James Anderson ends a paper:¹⁷ "It seems to me the best and most hopeful feature of ophthalmology that it has relations closer or more remote with every branch of medicine and surgery—indeed, with almost every branch of science."

EXTRACTS FROM THE HARVEIAN ORATION ON THE PROGRESS OF MEDICINE AND SANITATION.

Delivered before the Royal College of Physicians.

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[DR. POLLOCK having quoted Harvey's two directions—"Remember your benefactors—search out Nature by experiment," observed that by benefactors were to be understood not only those who had made donations to the College, but those who had contributed to the knowledge and so added to the greatness of the profession, and then proceeded shortly to consider the state of Europe at the period when Harvey, who was teaching in London in 1619, and published his discovery in 1628, was at work. He next proceeded to review the state of knowledge as to the circulation when Harvey commenced his career.]

The structural arrangement of the heart and vessels was known both by Harvey and his predecessors. Two sets of chambers and their alternate contraction had been observed with care, the valves which separate them, and the vicinity of the lungs, each provided with a much larger vessel than was required for their nutrition. The arrival of a current of blood at one side of the heart and the means of its exit at the other were recognised, yet how the circuit was completed remained a problem. The alternate contraction of the auricles and ventricles was witnessed by Harvey, but Galen, Aretæus, and the whole Alexandrian school saw it in their vivisections, as did Silvanus in the early part of the sixteenth century, and many others to the time of Servetus, who immediately preceded Harvey; and many of these teachers had opened the living bodies of animals and seen the cardiac movements.

A remarkable investigator of Nature—the monk Sarpi, who was imprisoned for his liberal views of religion, and is well known as the historian of the Council of Trent—must here be mentioned. It has been claimed for him that he discovered the circulation before Harvey. He was, like him, a student at Padua under Fabricius; but I cannot, after a study of the most ancient record in Italian, satisfy myself that he knew the motor power of the heart, although he was aware of the valves in the veins and believed in a circular movement of the blood.

Further, we are now aware, and Harvey came to know, that the great veins did not start from the liver, although returning the used blood from that organ.

The mode by which the different arteries terminate and the whole venous system of return currents begins was not known to Harvey with distinctness, for I cannot find it in any of his statements. The vessels which we now call capillaries, and which intervene between the terminal arteries and the originating veins, were not demonstrated till some thirty years later, when Malpighi, aided by microscopic power, revealed their existence. That

¹³ *Roy. Lond. Ophth. Hosp. Rep.*, vol. v, part 4, p. 290.

¹⁴ *Brain*, April, 1879.

¹⁵ *Trans. Ophthal. Soc.*, vol. iii, 1883, p. 261.

¹⁶ *Trans. American Oological Society*.

¹⁷ "Some Ocular and Nervous Affections in Diabetes and Allied Conditions," *Ophth. Review*, February to April, 1889.