

A Lecture ON INTRACRANIAL TUMOURS.

*Delivered at the National Hospital for the Paralyzed and
Epileptic, Queen Square, W.C.*

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I WISH this afternoon to show some cases of intracranial tumour, and then to say a few words with reference to the prominent symptoms of them and their treatment, and the degree of recoverability which one may expect from the medicinal measures resorted to, or from operation if it is decided that that should be carried out.

The first patient is one who was in the hospital fifteen years ago, and the history of the case is extremely interesting, as is also the sequel to the treatment during his stay in the hospital. He came first of all on account of severe headache and vomiting. He also had, I may say, intense optic neuritis and right-sided weakness, affecting both the arm and the leg. In addition there was very great difficulty with speech. It was not a true aphasia but rather a slowness of articulation, and apparently a difficulty in expressing what he wished to say as well as to understand what was said to him. He was put upon small doses of iodide of iron; but he only continued that for a week or two, because the administration of anything by the mouth became so difficult that he was left practically without any medicinal treatment. He became rapidly worse, the impairment of power in the limbs became much greater, and the weakness spread so as to affect the opposite side. In course of time he became completely paralysed in all four limbs. At this time he was also unconscious, taking no notice of anything which was said to him, and only swallowing, and that automatically, when anything was put on the back of his tongue. A surgeon was then asked to see him in reference to operation. But the surgeon was of opinion that it was not the kind of case in which operation could be reasonably expected to do good. The patient remained unconscious for about two months, completely blind and deaf. Then he gradually began to recover, and in some months he attained the condition in which you see him now. The only defect with which he was left—a most unfortunate one—was a very grave defect in his vision on account of the intensity of the optic neuritis, which had proceeded to atrophy. During those years he has remained quite well except for that one defect, and he is now working at piano tuning. He is a man of considerable intellectual ability, and with very marked intellectual tastes, and those attributes have not suffered in any degree by his illness.

The case illustrates the fact that, however hopeless the condition of a patient may appear to be, it is possible for him to recover from a very severe degree of paralysis without impairment of mental functions. And it also illustrates that the great danger of these cases which recover is that permanent and grave impairment of vision is apt to remain. The question of the nature of such a tumour is one of very great interest, and in this case I think there was some reason for supposing that the tumour was probably tuberculous in character. You will notice that on the right eyelid he has a scar which looks like a strumous scar, and he has told me to-day of something which has occurred since I saw him last, namely, that his father has recently died of phthisis. So I think we may look upon it as probably a tuberculous tumour, in which the tumour has become calcified or encysted, and in consequence of that it has ceased to exert any pressure or other influence on the surrounding structures.

This is by no means a unique case. I have seen several cases of similar character, although perhaps not of the same intensity, in which recovery has resulted without operation. It is always interesting to speculate what would have happened if this patient had been trephined. There is no doubt that when the surgeon was asked to see him there was very intense intracranial pressure and a very considerable tumour present. There was probably a great deal of oedema around the tumour, and of course there were vessels no doubt getting larger, which were supplying that tumour. Whether the actual intracranial pressure was an element in the recovery

by leading to a certain degree of strangulation of the vessels it is very difficult to say. If it is so, then of course operation in his case, although it might have been undertaken with the view to saving his sight, might conceivably have led to the reduction of intracranial pressure, and so perhaps have favoured a state of matters likely to lead to an increase of the tumour.

The next case I wish to show you is that of a girl in an even more advanced stage of recovery, and I am very sanguine that in the course of time she may illustrate a similar condition of recovery from very severe symptoms of cerebral tumour. She came to the out-patients' department of the hospital in October last, sent by Dr. Battams, with a history that for about a month she had been sick every morning, had suffered from severe headache, and had developed weakness of the left arm. Just before she came she developed a weakness of the left leg also. It was also found on examination that she had fairly well-marked optic neuritis. After she was admitted, the only other sign of illness which developed or was visible was a defect in the field of vision. It was a quadrantic defect, the lower left quadrant of each field being absent. There was also a slight degree of sensory impairment on the left side. Here, then, was a patient with left hemiplegia, with slight sensory impairment, and with some hemiplegic defect and general symptoms of intracranial tumour. It was comparatively easy to localize such a tumour in the posterior part of the internal capsule, because we know that there the motor and sensory fibres for ordinary sensation, and also for the special senses, are collected together, and a tumour pressing in that region would give rise to all the symptoms which this patient had. The history since then has been exceedingly interesting. She was put to bed, and remained there for some weeks, and from the very beginning she began to improve. She was put on small doses of iodide of iron. I would not attach too much importance to the influence of medicine upon recovery. Yet she began to rapidly lose her symptoms. She had practically no headache after she was put to bed, little or no sickness, and the motor power began to return in the left limbs. First of all, the sensory impairment disappeared from the left side, and the defect in the vision disappeared, and the optic neuritis also subsided. Then she began to develop an affection on the right side. She had also tremor of the left hand and arm, and weakness of the right arm and leg. This was combined with a recurrence of the weakness on the left side, with tremor, especially in the left arm and hand. There was no recurrence of the headache or of the vomiting, and the optic discs remained free from neuritis.

It is very difficult to understand what the condition was which was present under those circumstances. It is possible there was a small tumour on the posterior part of the internal capsule on the right side, and round that tumour a very considerable degree of oedema, which had interfered with the use of the left arm and leg. It is conceivable that this tumour spread across the middle line so as to affect the other side, and that in doing so the pressure was taken off the parts which subserved the left limbs. Still, that, of course, must be more or less a matter of conjecture. The point that remains quite distinct is that there was a very marked increase of her symptoms, which could naturally be referred to the increase in the tumour which was without doubt present. After she had become exceedingly ill and weak and very much disabled, recovery began to take place, and in the last few weeks the degree of recovery which has taken place is extremely gratifying. The tremor, which is still present, you will observe, is very well marked in this right hand but not so distinct in the left, although at one time the left was very much worse. The limbs are still somewhat weak and spastic, but she has a very much greater degree of control over them than she had two or three weeks ago, and, as I have said, the tremor is very much less troublesome than before. As a matter of fact, a few weeks ago she was compelled to lie in bed on her arm in order to keep it from shaking.

This is not so striking as regards recovery as the other patient; but if you had seen her two or three weeks ago you would have been very much struck by the improvement which has occurred since that time. And the gratifying point is that the recovery is still in progress, and she is even better to-day than she was this day last week. So one hopes—and, in fact, one is justified in feeling sanguine, I think—that even more improvement may occur than has actually taken place. The question of the nature of the tumour in this case is also very interesting; whether it is tuberculous

or whether it is some tumour of a curiously soft character which changes the incidence of its pressure, as it grows in different directions, it is not easy to say. One hopes, however, that it is tuberculous, for it may become encysted, and in that case there may be considerably more improvement than has yet occurred. You will remember I said that the optic neuritis in her case has already disappeared, and there is no fear, therefore, of the patient losing her vision.

The next patient is a little girl, who was apparently fairly well until August, 1904. She had had a discharge from the ear more or less ever since her birth. At all events there is no doubt when she came under observation, which is some months ago, she had a very marked offensive discharge from both ears, and there was perforation of both tympani. Apparently she last August developed severe headache, and there was also occasional vomiting, but the intensity of the condition was not sufficient to attract attention or to raise any suspicion of any very grave form of illness in her mother's mind. Nothing of that character occurred until some three or four months ago, at which date she was brought to the Moorfields Eye Hospital to see Mr. Lawford. And she was brought there because of her falling vision, which interfered with her work at school. On examination she was found to have intense optic neuritis in both eyes, more marked in the right. There was also some headache and a history of headache and vomiting. Mr. Lawford accordingly asked me to see her, and we had her in here, because in any case in which you have chronic ear discharge it is conceivable that any symptoms of intracranial tumour arising may be the result of the formation of abscess. We know that abscess formation is frequently associated with middle-ear disease, and when you have a combination of the symptoms of intracranial tumour with ear discharge, it is well to think of the possibility of abscess. We have examined her here, and the only additional symptom we found was a slight degree of pain on the right side of the head. I asked the surgeon to see her, and he agreed it was a case for trephining, and he acquiesced in my view that it would be well to trephine on the right side first of all, chiefly because of this localized pain on the right side. There was no sign of cerebellar impairment, no staggering or inco-ordination, and the deafness which was present was such as you find as a result of middle-ear disease. Sir Victor Horsley trephined on that side, and explored both temporosphenoidal lobes on that side, also the cerebellum, but without being able to find anything definite. There was evident bulging of the brain at the seat of the operation, a bulging which you see still persists. A few weeks later she was trephined on the other side, in the corresponding region, and another careful and exhaustive exploration of those regions was made, but without any result. Her head has healed up completely, and the only thing which remains is this bulging on the right side. On the left side there is no bulging at all, and it seems to me that the bulging on that side and the evident increased pressure on that side justifies us in having trephined first of all on that side, and it seems that it also justifies further exploration on that side on the chance of finding something which may possibly be removable. She has no headache and no vomiting now, but her sight is rapidly going; as a matter of fact, her right eye is almost blind. So if anything is to be done in saving her vision by relieving intracranial pressure, and possibly removing what is causing it, it must be done soon. I have therefore asked Sir Victor Horsley to see her again, and consider whether under the circumstances of the bulging still persisting on the right side, and the evident increased pressure there, it will not be justifiable to make a further exploration.

It may be asked, Can an abscess be possibly present in such a case? Of course, an abscess is often acute, giving rise in a very short time to very severe symptoms. But we must also remember that there are in the cerebellum and cerebrum chronic abscesses. I think I have read of a case in which there was reason to suppose that an abscess found *post mortem* had been present as long as ten years. And one has seen cases of abscess of the brain and cerebellum *post mortem* in which there has been a very thick wall to the purulent cyst, a wall which would take a considerable time in its formation. So in this child I think it is conceivable we may have to deal with a collection of pus which is encysted in a strong resistant wall.

This next patient is a woman who also came to Moorfields, and there saw Mr. Treacher Collins. She attended that hospital two or three years ago on account of failure of vision. There has been nothing else to point to any interference with cerebral functions, or those of the

nervous system, except this interference with vision. And this interference with vision is evidently due to the severe optic neuritis which was present at that time and which still persists. So this case illustrates the fact that a patient may have for a considerable number of years very well-marked and indeed very intense optic neuritis, without its leading to any very considerable impairment of vision, because I may say that it is only in the last few months that the vision in her case has become very much impaired. She has had severe headache for some years—intermittent, of course, and associated with vomiting. She has had also optic neuritis, but no other symptom or sign giving us the slightest indication as to where the intracranial growth is which probably accounts for her symptoms. And I want you to see her to-day especially in association with the other cases which you have seen, because the signs are very similar to those in the last patient. In each there has been intense optic neuritis, in each there is a history of headache and vomiting, and the neuritis has persisted for a considerable time. In the girl we have an indication of a possible source of trouble in the double ear disease which has persisted, as I have said, for so many years, but in the present patient we have no such indication, and one is at a loss in such a case as this to say where the supposed growth is. No doubt some cases of cerebellar tumour are like this without giving rise to any very severe symptoms. But if it is cerebellar we would have expected the neuritis to be more progressive, and the failure of vision to have occurred to a greater degree, and at an earlier stage in the illness. So there is no sign here which will help us to say in what part the new growth is. There is no evidence of it being pontine because there is no paralysis of cranial nerves, so one must suppose it to be in some more or less unimportant part, so to speak, of the cerebral hemisphere, that is to say, some part of the hemispheres in which the function of any particular part of the body, is not definitely and alone represented. Of course there are various parts of the cerebrum in which that is the case, more especially in the frontal and occipital regions. In her case there is no evidence of interference with the mental processes, or of any interference with vision beyond that which can be accounted for by the optic neuritis. So we are in a difficulty in this patient as to where the supposed new growth is situated, and also we are in a difficulty as to what to do for her. The question in this case also is whether we could by any possibility relieve her condition by trephining. One hesitates to undertake such a measure, especially where there is chronic optic neuritis such as this is, in which, presumably, a good deal of damage has been done to the nerve which might not be recovered from, even if the pressure is relieved. Her headache and vomiting are very slight, and her symptoms have almost disappeared, so one hesitates to recommend such a severe operation on the off-chance of relieving her vision.

The next case is one about which I may speak freely, as she is deaf. She is rather a young woman, sent to me by Dr. Cooper of Rochester, and the history of her illness shows it to have been rapid. In January of this year she began to be troubled with giddiness, and also had diplopia and severe headache, especially in the right frontal region. And in March she had some interference with her eyelid. She had some degree of ptosis and some internal strabismus of the right eye. In April she began to have some weakness of the right side of the face, and also some deafness of the right ear. A month later she developed deafness of the left ear, and now she is practically totally deaf. When she walked here, you saw that she staggered a little and did not walk at all easily. She has headaches over the right frontal region, double optic neuritis, slight ptosis on the right side, nystagmus on deviation in every direction. Her nystagmus is very marked indeed, especially to the right side, and she also has intense optic neuritis. So in this case we have signs of interference, especially with the structures about the base of the brain, and more especially related to the pons and cerebellum. The striking thing about her is the intensity of the headache, and also the fact that the headache is most marked on the right side. Another point is that she has very marked impairment of sensation, both ordinary sensation and painful sensation, over the upper two divisions of the fifth nerve on the right side. So the signs here all point to the presence of intracranial growth. There is, however, nothing to indicate the probable nature of such a growth. Her family and personal histories are above suspicion. But the position of the tumour is much more clearly

indicated than in the last case. The affection of the fifth nerve and of both eighth nerves, and the nystagmus and the inco-ordination, with the staggering gait, all point to the likelihood of it being in the region of the cerebellum and pons—that is to say, they show it to be a subtentorial tumour, and the rapid progress indicates the same thing.

The question one has to discuss and consider in such a case is, if the tumour is in the cerebellar region, is it in the cerebellum, or is it extra-cerebellar? In this case I am inclined to the opinion, on account of the involvement of the nerves which has taken place, that the tumour is very likely to be extra cerebellar, and in that way it is conceivable that operation might be a justifiable procedure. Fortunately, or unfortunately, as the case may be, the symptoms have become very much mitigated since her admission, so that with a patient apparently improving one hesitates a little to have resort to surgery. But, of course, if the patient were to cease to improve, and especially if her headache and vomiting became worse, and the optic neuritis remained very intense, one would certainly feel not only justified, but would feel bound to give her such a chance as surgery offers.

GENERAL OBSERVATIONS ON SYMPTOMS.

In conclusion, I wish to say a few words with reference to the symptoms of intracranial tumour and the recoverability of such cases, and also a few words with regard to treatment.

Headache and Optic Neuritis.

First of all, with regard to the symptoms. Of course, headache is one of the most severe symptoms, which nearly always suggests the possibility of intracranial tumour. Vomiting I have also referred to, and the headache and the vomiting nearly always go together in the same patient. Optic neuritis is of the utmost importance. There are only a few other conditions except intracranial tumour with which optic neuritis is associated. One of these is albuminuria, and in many cases it is exceedingly difficult to say whether the case is one of intracranial tumour or one of kidney disease. In the case of the woman we have had in, in whom there is no sign of localizing growth, I thought for some time we should probably find signs of kidney disease present, but no such signs have been found, either in the urine or in the heart or blood vessels.

Another condition in which you find optic neuritis sometimes present is simple anaemia. There are, no doubt, cases of simple anaemia in which optic neuritis is present in which the neuritis disappears when the anaemia is treated by such drugs as arsenic and iron. One of the signs associated with optic neuritis is that the patient complains occasionally of amblyopia. Just as patients with uraemia get transitory amblyopia, so in cases in which there is intense optic neuritis patients sometimes say that a mist frequently comes over their eyes and makes them for the time almost totally blind. Such a symptom usually indicates that the neuritis is of severe degree, and may lead to severe and even complete blindness. It may be asked—Does the intensity of the optic neuritis give us any indication of the locality in which the tumour may be supposed to be? I think there is very little doubt that subtentorial tumours as a class cause much more intense optic neuritis than do tumours in the hemispheres. I say "as a class," because exceptionally one finds that tumours of the hemisphere do give rise to just as intense optic neuritis as you ever find. But, as a class, tumours under the tentorium do give rise to more intense optic neuritis, and of a more rapidly progressive character, and to optic neuritis which is much more apt to lead to blindness, than is the optic neuritis associated with tumours of the hemisphere.

Another point which is of considerable interest is, Does the degree of neuritis present on one or other side give any indication as to the site of the tumour? I made a good many examinations a few years ago of cases of tumour of the hemispheres and also of the cerebellum in reference to the question of whether the optic neuritis was more intense on the side of the tumour or on the opposite side. I found that in half the cases the optic neuritis was more intense on the side of the tumour and in the other half on the side opposite to the tumour. That is to say, in one series of cases the optic neuritis was more intense on the same side, and in another series the optic neuritis was more intense on the opposite side to the tumour. And on looking at those cases and regarding them from the point of view of symptomatology and in regard to the possible position of the tumour, I think there seemed to be very little doubt that when the tumour is pretty well

forward in the frontal region, especially if it be in the Rolandic area, the optic neuritis is more likely to be more intense on the same side as the tumour, but when the tumour is in the occipital or cerebellar region, the optic neuritis is likely to be more intense on the side opposite to that on which the tumour is situated. I think the cases which I examined were suggestive of some such view as that. I do not know that it is a view to which one would attach a great deal of importance with reference to localization, but it is a view which might conceivably influence the surgeon in reference to the side on which he would attack the disease in any case of doubtful localization.

Fits.

Another of the series of symptoms which arise in tumour is fits. Fits are fairly common in cases of tumour of the hemisphere, and Jacksonian fits are one of the most common varieties or signs which we come across in reference to the localization of tumours, and we know it is this sign which led Dr. Hughlings Jackson to make the discovery which is associated with his name. In cases which we recognize as cases of tumour they occur in association with the classical signs and symptoms of tumour. There is a class of cases in which fits do occur before there are any signs of tumour present. I have seen several cases in which a similar history to the following has been given: A patient comes to the out-patient department on account of what are called epileptic fits. The history is that he has been in perfect health up to two or three weeks before, and then he has a fit, which is not peculiar in regard to local commencement or local effects, nor is headache or optic neuritis associated with it. He is put under treatment for ordinary epilepsy, and goes on with the treatment for some time. Perhaps one day he comes and complains of headaches, and on examining his eyes you find there is present intense optic neuritis. I have a case in my mind which came in that way, and attended with very successful results as far as the fits were concerned, for two years. One day he complained of intense headache, and I found he had a marked degree of optic neuritis. He came into the hospital, and was operated upon, and it was found that he had a large tumour on the right side. I have no doubt that in that case the tumour had been present from the very first onset of the fits, which had been present two years before there was anything to excite suspicion of a new growth; it was probably up to that time of very small size, and only exerted an influence which amounted to slight irritation, and so giving rise to those fits, which were justifiably regarded as epileptic. So the condition of fits arising in a patient who had been perfectly healthy up to a certain time should be regarded with a certain amount of suspicion lest these fits may be really one of the early signs of new growth.

Tremor.

Another condition which is present in many cases, especially in mesencephalic tumours, is tremor—tremor very similar to that of disseminated sclerosis, intensified by volitional movement, and giving rise also to a condition which suggests occasionally the possibility of paralysis agitans. Where you find a tremor of that character present, especially on one side, and associated with headache, and especially if also associated with fits, it is always well to suspect the possibility of the presence of a tumour, and you should examine the eyes to see if there is any optic neuritis present.

PROGNOSIS.

Now a few words with regard to the recoverability of patients who have intracranial tumours. The cases I have had here to-day for your inspection show that in some instances there is a natural tendency for the patient to recover. There is no doubt many syphilitic tumours do disappear, so far as their symptoms are concerned, under the influence of iodide of potassium and mercury. It is also true that many syphilitic tumours do not disappear under those drugs. A certain amount of necrotic tissue remains, and that tissue produces all the effects of a foreign body inside the skull. And of course those syphilitic tumours very often have their symptoms persisting, and are associated with a degree of mental impairment which is very marked. Another point in reference to the effect of antisyphilitic remedies is this: that one must not be misled in any particular case of intracranial growth by the remarkable effect which sometimes follows the administration of iodide of potassium and mercury. I have seen cases in which all the symptoms have, if not disappeared, at all events been very materially mitigated, so much so as to make one positive that the tumour which was present must be syphilitic. I have seen such cases and afterwards examined

them *post mortem*, and found that after all it was not a case of gumma. But I suppose that in every rapidly-growing tumour there is around it a considerable quantity of freshly-formed new tissue which is amenable to the influence of such drugs as iodide of potassium and mercury. So we must not be misled into giving a favourable prognosis when we happen to see the symptoms very much reduced by the administration of iodide of potassium and mercury.

Then with regard to the recovery after operation. It is curious how the results in this respect have varied in this hospital from time to time. In some periods one has been far from sanguine as to the favourable results of operation in tumour cases. At other times the brilliant results of surgical interference have been most encouraging. And there is no doubt, I think, that if the tumour can be removed, and if it is one of those tumours which has been exerting its influence by pressure, rather than by infiltration, the outlook is extremely good, even when the pressure which has been exerted has been excessively great. And the fact that such a result follows operation in certain cases, and the fact that you never can be quite sure whether a tumour is infiltrating or whether it is one which is growing into the nervous tissues from the outside, seems to necessitate a resort to operation in many cases. No doubt in some of the cases which we have had here the results have been extremely gratifying, and have been far better than one would have dreamed of. It is true that in other cases the results have been most discouraging, but it seems to me that as the condition is one of intracranial growth in which the outlook without operation must be exceedingly poor, that one would be justified in stretching a point in order to give the patient the possible benefit which surgery might have to give. Of course, with regard to the influence of iodide of potassium and mercury, there cannot be two opinions in reference to their efficacy in most syphilitic growths and also in some non-syphilitic ones. A considerable fallacy exists with reference to the influence of those drugs in the case of intracranial tumour, because the effects which those drugs may have in the cases which are not syphilitic may lead to the idea that they are syphilitic. So the treatment of intracranial tumours resolves itself into two points. First of all, the administration of iodide and mercury in every case, whether there is a syphilitic history or not, and the administration of some drug like iodide of iron, which is supposed to influence tuberculous growths. The second point is the treatment by surgery, and wherever the treatment by drugs seems inefficacious, unless there is some strong indication to the contrary, which I can scarcely conceive, I think we should give the patient the benefit of an exploratory operation. Of course in many cases it is found after exploration that the tumour is of such a character that it cannot be removed, but in such a case the condition of the patient is not worse than it was before, and the chances are that he is relieved of his headache and vomiting, and possibly also his optic neuritis may subside as a result of the operative measure.

An Address

ON THE

CRYSTALLINE LENS IN HEALTH AND IN CATARACT.

*Delivered before the Post-Graduate Class in Ophthalmology in the
University of Oxford, July 10th, 1905.*

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GENTLEMEN,—If and when the complete history of ophthalmology is well and truly writ, I trust that due mention will be made of, and due credit will be ascribed to, the life and labours of Alhazen, the Saracen. He flourished in the eleventh century of our era, and died at Cairo in 1038. He was, alike in theory and practice, a man in advance of his time, and perhaps was more successful with his theories than with his practice. It is true he failed in his undertaking to dam the Nile, a work the completion of which it has been reserved for this generation to witness. He, however, seems to have been the first to explain that vision was due, not to some emissive property or tentacular agency on the part of the

eyes, but to the refractive influence of their translucent media and to sensory impressions made upon the retinae. He also demonstrated atmospheric reflection and refraction, thus accounting for the phenomena of twilight and of the apparent reduction of size of heavenly bodies as they pass from the horizon towards the zenith. Before Alhazen's time the rôle of the crystalline lens was incomprehensible and mysterious. It had been sanctified by the ancients as the seat, or one of the seats, of the soul or *πνεῦμα*, while other old authorities had deemed it to be the organ of vision; just as the vulgar to-day will sometimes bring the extruded lens from a case of perforative ulceration of the cornea and tell you the child's "sight" has come out.

It is not surprising that a structure so beautiful and so unique in the animal economy as the lens should, even in these prosaic times, excite our thoughtful scrutiny, and we do but find our interest stimulated and fascinated as we proceed to investigate the development, the structure, the function, and even the defects and diseases of this dioptric jewel of the globe.

I need not tell you that no amount of condensation will enable me to crowd into the limits of a single lecture even a *résumé* of the work that has been accomplished in this department of ophthalmology; the lecturer and the subject of the lecture being alike the selection of your excellent Reader, Mr. Doyné, I am absolved of responsibility, while the amplitude of the title will enable me to dwell on such topics as I have paid special attention to while passing lightly over such matters as you will find adequately dealt with in the ordinary textbooks.

The crystalline lens, in almost every aspect in which we approach it as an object of study, presents features which, if not unique, are almost without parallel in other structures of the body. Take, for example, its persistent growth from infancy to age; its complete isolation from blood supply, coupled with its most perfect nutrition by endosmotic and exosmotic currents; its elasticity so perfectly controlled by muscular action as to subserve faithfully the purposes of the most delicate of our senses; while its pellucidity, which is shared by the other dioptric media, is, in its case, accompanied and sustained by a construction so complex, and a mode of growth so involved, that there are some points in relation to both which have not yet been thoroughly elucidated.

The rôle of the lens in disease has afforded no less occasion for wonder, mystery, and disputation. By a curious inversion of order, successful treatment of cataract appears to have preceded any accurate knowledge of its cause. It would almost seem either that a traditional treatment had survived the knowledge on which it was originally based, or that a pre-established harmony had guided the hand of the empiric.

Thus, Albucasis the Moor, a skilful surgeon of Cordova in the eleventh and twelfth centuries, has a chapter on the cure of cataract by depression, and, in a fine reproduction of his works in Arabic and Latin, edited by Channing at Oxford in 1778, you will find a neat representation of the instrument he employed. Yet he speaks "*de cura aquae quae descendit in oculo vel cataracta.*" Pliny and Galen seem to have been acquainted with "couching." The term cataract appears to have been employed by the School of Salerno, derived from the Greek *καταρράγνυμι*, but whether used metaphorically, as in the quotation I gave from Albucasis, or in the sense of "breaking down" or "confusing" is not clear. The older Greek writers had called it *εποχυσίς ὄφθου*, the Latins "suffusio," and the Arabo-barbarians, "gutta in oculo," all terms borrowed from humoral pathology. How, indeed, was any rational pathology then possible?

However, since Helmholtz presented us with the ophthalmoscope, about the middle of last century, much mystery has been cleared away. Amaurosis, that invention of the schoolmen which connoted a condition of the eye in which neither the patient nor the oculist could see anything, has been resolved, and the parts played by the lenticular and the deeper structures of the globe respectively in its production have been correctly apportioned, while the old confusion between glaucoma and cataract has been for ever set at rest.

M. Brisseau, of Tournai, appears to have been the first to explain correctly the true nature of cataract. A soldier with cataract having died in the Tournai Hospital in 1705, he examined the eyes *post mortem*; he thereupon made the startling discovery that a cataract was nothing but an opaque lens, and not a membrane engendered in the aqueous. Much elated, he reported his secret to Duverney, who would not