The progress of ophthalmology : a sketch / by D. Argyll Robertson, M.D.

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THE PROGRESS

OF

OPHTHALMOLOGY:

A SKETCH.

BY

D. ARGYLL ROBERTSON, M.D.,

LECTURER ON DISEASES OF THE EYE, EDINBURGH MEDICAL SCHOOL.

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THE PROGRESS OF OPHTHALMOLOGY:

A SKETCH.[1]

RAPID as has been the advance of all departments of medicine during the last thirty years, in none has this been more manifest than in that of diseases of the eye. As the introduction of the microscope led to a closer investigation of the structure of the body, and of auscultation to the exploration of disease in organs previously regarded as beyond our powers of observation, so the ophthalmoscope has opened up a new field for study and research in ophthalmology. But, after all, the invention of this invaluable instrument marks merely an epoch in the study of this science, for many important advances had been made before and some have been effected since it came into use. It is the object of this short paper to show in outline how our knowledge of this department has been developed and improved, how errors once dominant have yielded their place to truth, and how, from a vague and confused foundation, an enlightened science has gradually arisen.

The science of medicine was first divided into distinct departments by the ancient Egyptians, and to such an extent do they appear to have carried their process of division, that each important organ of the body was the subject of special study and practice, and thus they had their aurists, oculists, liverists, etc. Little advance appears to have been made by them in any department,—owing, most probably, to their ignorance of anatomy and pathology, and to the fact, that the knowledge they possessed was regarded as the private property of families, and transmitted from father to son.

The Greek, Roman, and Arabian surgeons considered the study of ophthalmic diseases an important part of medical education; and, consequently, we find that they possessed an extensive knowledge of diseases of the eye, as is proved by the accuracy of their descriptions. Celsus, for example, who wrote in the first century, describes most accurately almost all the diseases of the eyelids with which we are at present acquainted; and, among affections of the eyeball, pterygium, a disease in which a triangular portion of conjunctiva becomes thickened and vascular, is most minutely described; as is also the operation for its removal, which is almost identical, in all its details, with the method of operating to which we have

[1] The substance of this communication constituted a main part of an introductory lecture to a course on diseases of the eye.

recourse at the present day. Although ignorant of the precise seat of cataract, the nature of the disease otherwise appears to have been very well understood, and the performance of an operation for the removal of the opaque matter from the axis of vision seems to have been of frequent occurrence. Rules were laid down by which the cataracts favourable for operation might be distinguished from those in which a good result is less to be expected. A strict regimen was carefully enjoined for some time prior to the operation; for Celsus recommends that the patient should take a small amount of food, and drink only water for some days before the operation, and during the last twenty-four hours should abstain from all food,—an antiphlogistic system that would meet with but little favour in the present day. He also carefully considers the details of the operation, which, in every respect, correspond to those of depression as practised before the method by reclination was introduced. Should the cataract resume its former position, he recommends it to be cut to pieces, and states that thus it can be more readily displaced.

From this time the study of diseases of the eye appears to have been almost entirely neglected, until the seventeenth and commencement of the eighteenth century, when we find the department in the hands of itinerant quacks, who reaped a rich harvest from the possession of some supposed specifics. They were at first content to trumpet forth their own fame from the stages in front of the booths in which they practised; but, later, they circulated a knowledge of their powers and achievements by means of laudatory pamphlets, not unlike those issued by some irregular practitioners of our own day. Indeed, with very few exceptions, it was not the advancement of their department of medicine, but the spreading of their own fame, that they were most anxious to promote; and, as a natural consequence, pretensions the most extravagant, and a spirit of opposition to the profession at large the most unbecoming, characterized the productions of the oculists of that period. Their writings, indeed, evidence that they were continually engaged in professional squabbles alike mischievous and undignified. The following epigram from the preface to a treatise on Cataract and Glaucoma, by Woolhouse, published in 1717, is a specimen of the manner in which their works were made the vehicles of abuse and recrimination:—

> "Quid sunt falsa novis systemata fulta columnis?
> Mentis abortivum sunt titubanbantis opus.
> Brisseus, Antonius nobis dant talia, docto
> Ut sibi concilient nomen in orbe novum:
> Cæcutire tamen libet his; ast, orbis ocellus,
> Scit cæcis visum reddere Wolhusius."

This same preface—which, however, it is but right to say, was not written by Mr Woolhouse, but by a Dr Christopher le Cerf—contains, moreover, the following characteristic laudatory passage:—"Quis autem nescit Woolhusium ab adolescentia sua

tot mille cataractas et Glaucomata depressisse? Ac proinde ipsum ophthalmiatrorum Europae principem esse?"

Perhaps the most remarkable of the oculists who practised during the first half of the eighteenth century was "the Chevalier John Taylor," whose excursions appear to have extended over almost every part of Europe; he, moreover, published works wherever he went, in English, French, Russian, Danish, etc., in which all his titles are carefully enumerated, and his claims as an oculist set forth in a most exaggerated strain, accompanied by testimonials from many distinguished professors of the age, and by allusions to the fact that "several of the most illustrated personages in Europe had happily passed through his hands."

A point much disputed by the oculists of this period was whether cataract consisted in an alteration of the aqueous humour, by which an opaque membrane was formed occluding the pupil, or in an alteration in the structure of the lens. It is obvious that, under the term cataract, those authors included not only opacities of the substance of the lens, but also deposits upon its capsule, and thus the cases of cataract reported to have been cured without operative interference may readily be accounted for. The operation of couching for cataract seems to have been very extensively practised; and spring and autumn were considered the only proper seasons for its performance. Duddell, however, who published a small work on some diseases of the eye, at the commencement of the eighteenth century, states that the reason why they restricted the operation to those seasons was, because they were the most convenient for the itinerant practitioners of the art to travel in. It further appears, from the following extract from his work, that females practised and obtained a reputation for couching cataracts:—"About five years since, I saw a woman in Holborn, by King's Gate Street, that had a dissolution of vitreous humour in her right eye, a narrowness of the inward chamber, and immobility of the pupil, and half was dilated. The crystalline was opaque, and shrunk in its bigness, pressed against the lower part of the pupil, and was of a whitish gray, by reason of the fibrous parts of its crooked and contracted segments, so that she could not perceive any light with that eye. She asked me if I could do her any good? I told her there was no hopes; for she could not see the least glimmering, because her cataract was accompanied with a gutta serena, which was perfect. She told me that Mrs Jones, a famous woman for couching of cataracts, would have couched her some years before. I suppose in hopes of success, which quacks are wont to promise themselves, notwithstanding their want of knowledge to conduct them." A curious device for diminishing the amount of light admitted to the eye, had recourse to by Duddell in a case of cataract on which he had operated, consisted of a walnut shell, with a small hole drilled through the centre; this was kept applied over the eye by means of strings fastened to each end.

This exactly resembles in construction the metallic plate with small central aperture lately invented by Professor Donders, and at present employed in certain cases of opacities of the cornea, conical cornea, etc., with the view of preventing all but the most parallel rays from entering the eye. Much space is occupied with discussions as to the correct application of terms, and with speculations as to the nature of affections described under various designations by different authors. Some of these appear to have been applied in a very confused manner, and to affections with the nature of which the writers were quite unacquainted. This is illustrated by the following extracts from Duddell:—"The cataplexia of the eye which Hippocrates speaks of is, when the eye has lost all sort of movement and sensation of light, which happens in epilepsies and in great surprises and frights. Some call this the conick movement, which is the parrexis, or helcosis, and abruption, precision, or ulceration, and solution of the continuity of the optic nerve, caused from a stroke, wound, or sudden fall of humours or apostimation;" and again,—"The syntosis of Galen, or syntomasis, is a collaption, compression, flabbiness, or narrowness of the said nerve, which is affected by dryness or atrophy." It is amusing to observe how coolly they decide as to the exact pathological nature of these affections, although they had no opportunities for testing the truth of their hypotheses.

The troublesome affection termed granular lids was well understood at that time, and a plan of treatment pursued similar to that of the present day. A favourite remedy with some of the oculists of that period was a scarificator made of beards of barley, tied together in the shape of a little brush; and, among other applications in common use, we find viper's fat, the gall of fishes, particularly of the eel and pike, a mixture of ants and honey, the juice of goose's dung, and the insertion of a living louse, "which tickleth and pricketh, and rendereth the eye moist and rheumatic."

It was only about the middle of the eighteenth century that the attention of the profession at large was directed to this department, by the able works of Zinn, Haller, and Richter, in Germany, on the anatomy and surgery of the eye, and of Porterfield in this country, on the manner and phenomena of vision. The subject was now thoroughly taken up at the different medical schools in Germany, and to them we are chiefly indebted for the remarkable progress this branch of our profession has made from that time to the present day. The establishment of the Vienna school of ophthalmology by Barth, in 1773, was an important step towards placing this study in a correct relation to the other departments of medicine and surgery. He delivered lectures on ophthalmic surgery in connexion with the university of Vienna, and had certain wards set apart in the General Hospital, for the reception of cases, whereby his lectures were illustrated. He was thus the first to institute a course of systematic lectures, combined with practical clinical

instruction,—a combination by which alone a satisfactory acquaintance with any department of medicine can be obtained, and for which Germany has continued even to the present time to be deservedly famous. Although Barth did not add much to the literature on diseases of the eye, his name deserves to be carefully recorded for his strenuous and successful endeavours to wrest the subject from the hands of mercenary quacks, and raise it to its proper position among the branches of our profession. The medical schools of Germany, Italy, and England, now investigated the subject with great spirit, as the rapid advancement made at the commencement of this century amply testifies. Scarpa, in Italy, in 1801, published an excellent treatise on diseases of the eye, which, translated into English, continued for many years to be the best manual on the subject. Beer, in 1815, published an elaborate work, the result of his extensive ophthalmic experience, in which we meet with most accurate descriptions of the various affections of the eye, and which established his great reputation; but the absurd extent to which he subdivided these diseases, and his tendency to refer them all to some constitutional origin, were serious drawbacks to the practical utility of his work.

Mr Saunders deserves the credit of having founded the study of opthalmology in England. In 1804, he established in London an institution for the cure of diseases of the eye and ear. It was soon, however, found expedient to limit the charity to the former class of diseases; and at the present time, under the name of the Royal London Ophthalmic Hospital, it ranks as one of the largest, if not the largest, ophthalmic hospital in the world. Mr Saunders was the first to recommend operating for cataract in infants, pointing out clearly the great advantages resulting from its early performance —viz., that the operation is quite as successful, if not more so, than when it is delayed, and that the rolling motion which eyes affected with congenital cataract are so apt to contract, disappears if the operation is performed in infancy. He also published some excellent papers on Iritis, on the cure of inversion of the upper eyelid, and other subjects connected with this department.

At the commencement of this century a terrible epidemic of ophthalmia occurred throughout Europe. It commenced among the English and French troops stationed in Egypt, and thence it spread throughout Europe and continued for many years prevalent in the English, French, Italian, and Austrian armies. Some idea of the severity of the disease may be obtained from the consideration of the fact that in the year 1818 there were upwards of 5000 blind invalided soldiers in England. No doubt it existed previously, but it was not till this time that it attracted the attention of surgeons, and thus it has received the name "Egyptian ophthalmia," from the place in which it was first observed. The virulence of this affection, and the extent to which it spread, served to direct the attention of surgeons at home and abroad to ophthalmic

diseases; and, doubtless, the great advance that was made in this branch of the medical profession at the beginning of this century, was in part due to the occurrence of this dreadful scourge.

From this period ophthalmology rapidly progressed, institutions for the cure of diseases of the eye were established in all the larger towns, and a systematic course of lectures delivered in connexion with some of the medical schools. In 1817, a course of lectures on the anatomy and diseases of the eye was commenced in London by Mr Guthrie and Dr Forbes. The lectures delivered by Guthrie formed the substance of his work on the Operative Surgery of the Eye, published in 1823, undoubtedly the first work in the English language in which an accurate and complete description is given of those affections of the eye which require operative interference, and of the different methods of operating then in use. In the preface to his work he states, that "previously to the year 1817, no lectures were delivered in Great Britain on the diseases of the eye, unless the concise observations which were made in the schools of anatomy on some of the operations be considered as such." This observation, however, is not absolutely correct, as, about the year 1759, the Chevalier Taylor delivered a systematic course of lectures on diseases of the eye at Edinburgh. Guthrie, nevertheless, undoubtedly deserves the credit of being the first to institute in Great Britain an elaborate and complete annual course of lectures on the surgical diseases of the eye; and to him we are greatly indebted for the stimulus he thus gave to the study of ophthalmology. The able treatises of Lawrence, Tyrrell, Middlemore, and Mackenzie, which soon after appeared, served greatly to raise the British ophthalmic school. In Germany, contemporaneously, the journals of Graefe and Walther and of Professor Von Ammon, were the means of promoting the scientific advancement of this subject; while the works of Rosas, Juengken, and Arlt, all exhibit an amount of patient observation and research, for which the natives of that country are so pre-eminently distinguished. This short sketch serves to bring the history of this department to within the last twenty-five years: some of the more important improvements that have been made during the last quarter of a century, I propose to consider a little in detail.

In 1838, Dr Stromeyer (of Hanover), in his work on orthopoedic operations, suggested the division of the tendon of the contracted muscle as a means of curing squint. This suggestion was adopted by Professor Dieffenbach of Berlin; and the results obtained by the operation were so favourable that it soon became established as a favourite means of cure. But, as is always the case when a new remedy is introduced to the notice of the profession, this operation was applied to numerous cases to which it was utterly inapplicable; for squinting may as well be caused by paralysis of the one muscle as by too contracted a condition or over-action of its antagonist; and as these distinctions were quite overlooked

by many of the earlier advocates of this operation, it happened, in some instances, that although immediately after its performance the cure appeared perfect, the paralyzed muscle, regaining its wonted tone, induced squinting in the opposite direction; so that a patient who at first squinted inwards (the most common form of strabismus), shortly after the operation squinted outwards, and thus a greater deformity than the original condition was induced. But this operation must not be looked upon merely as a means of curing a deformity, but also as a means of preserving vision; for, in most cases of long-standing strabismus, the misdirected eye suffers, the retina becoming more and more insensible, until sometimes but little vision remains. Thus it was demonstrated that by a very simple operation not only can a deformity be removed, but also a danger to vision be averted.

In 1846, Mr Cumming, in a paper on the "Luminous appearance of the human eye," describes how a view of the interior of the living eye may be obtained. He observes—"The only circumstances necessary for observing the interior of the eye are, first, that the eye must be placed at some distance from the source of light, the distance being greater according to the intensity; second, that the rays of light diffused around the patient, and sometimes around the eye itself, be excluded; and, third, that the observer occupy a position as near as possible in a direct line between the source of light and the eye to be examined. Let the person to be examined sit or stand eight or ten feet from a gas-light, looking a little to the side; then approach him in a direct line, and at once will be seen the reflection of the bottom of the eye."—"On approaching within a few inches of the eye, the reflection is not visible; for before the eye of the observer can be brought within range of the reflected rays, the incidental rays of light are excluded." This, undoubtedly, was the first glimpse of that great discovery by which the obscurity and mystery enveloping the deep-seated diseases of the eye has been dispelled.

Professor Brücke of Vienna, and Helmholtz of Heidelberg, now devoted their attention to this point; and, eventually, Helmholtz, in 1851, was amply rewarded by the discovery of an instrument whereby the interior of the living eye could be distinctly viewed. His instrument at first consisted simply of a plate of glass, whereby the light from a lamp was reflected and directed through the patient's pupil, part of the returning rays passing through the glass-plate were received into the observer's eye, and there formed an image of the interior of the patient's. This instrument was termed the ophthalmoscope, and is now, in various forms, in general use among all the intelligent practitioners of this branch of medicine. The form most usually employed is that of a concave mirror with a small central aperture; by which contrivance more light can be thrown into the eye, and thus a clearer view be obtained. But this instrument was not introduced into practice without encoun-

tering great opposition, more especially at the hands of some oculists of this country, who opposed its use on the ground that, in cases of deep-seated disease, the exposure of the eye to such an examination would be followed with bad effects. This is, no doubt, a valid objection in some forms of acute inflammation of the retina, more especially when the observer is not practised in the use of the instrument, and thus requires to subject the patient to a prolonged examination; but, in the majority of cases requiring ophthalmoscopic investigation, the retina, so far from being more than ordinarily sensitive to the action of light, is, on the contrary, impaired in its sensibility; and in these cases no evil effects are known to follow even a lengthened examination. It is much to be doubted whether half an hour's percussion or auscultation is of much benefit to a patient labouring under inflammation of the lungs; but no one ever thinks of taking exception, in ordinary cases, to the brief but satisfactory examination required by the practised physician. No more can we object to the use of the ophthalmoscope in experienced hands, unless in certain cases of very rare occurrence. But some there still are who oppose it on the ground that no benefit is derivable from its use. The futility of that objection is proved by the services it has already rendered in enabling us to distinguish the various diseases which, under the term Amaurosis, were formerly enveloped in obscurity, to classify them according to the structure involved and the nature of the affection, and to form a correct prognosis as to the result. By it, moreover, we are enabled, in cases of malignant disease of the eyeball, to diagnose its presence ere other tissues of the orbit become involved, and by timely operative interference to remove the disease with some prospect of success. In cases of cataract in the incipient stage, it enables us to ascertain with certainty whether any complication is present, which, when the cataract came to be operated on, would compromise the result. The value, indeed, of this invention, in relation to ophthalmology, cannot be over-estimated, not only as affording an instrument by which our diagnosis can be rendered more accurate, but also as a means whereby the action of remedial agents on diseases of the inner tunics of the eye can be most readily investigated. The normal and abnormal appearances presented by the deep-seated structures of the eye, as observed by means of the ophthalmoscope, have been made the subject of works by Jaeger, Ruete, Pilz, etc., in Germany, not omitting Liebreich, the author of the introduction to the French edition of Mackenzie's work; Follin, Sichel, etc., in France; and Hulke, Bader, Hogg, etc., in this country.

The invention of the ophthalmoscope was rapidly followed by that of an instrument by which the curvatures of the cornea, and anterior and posterior surfaces of the lens, could be measured. To it the term ophthalmometer was applied by Helmholtz its inventor. It has been applied, with great success, to the determination of the changes whereby the eye is enabled to bring rays of different degrees of divergence to a focus on the retina. This,

Helmholtz has demonstrated, is accomplished by an alteration in the curvature of the lens, more especially of its anterior surface. Shortsightedness, which was, and even is frequently supposed to be usually caused by an increased curvature of the cornea, was by means of this instrument proved to be generally the result of an abnormal convexity of the lens. Other points of great interest have been investigated by its aid; but from its complexity of construction, and the amount of practice required ere results can be obtained, it has been very little used, except by one or two scientific observers, and may as yet be considered quite inapplicable to general use.

In 1856, Professor Graefe of Berlin directed the attention of the profession to the operation of iridectomy, as a curative measure in certain cases of recurrent inflammation of the iris, which, when unchecked, gradually implicated deeper textures, and ultimately led to loss of vision. From its great success in these cases, he was led to its employment in glaucoma, and was struck with the beneficial effects that followed its adoption; and, upon further investigation, he became convinced that in certain cases of that disease a cure could almost with certainty be thus effected. These views he communicated—along with an elaborate investigation into the nature and course of the disease—in a series of papers, which have been translated into English, and published by the New Sydenham Society. These views were at first strongly opposed by most of the oculists both of this country and the Continent; but this chiefly arose from the fact that the operation was applied to cases to which it was quite inapplicable, or performed in a manner different from that recommended by Professor Graefe. Now, however, with very few exceptions, all who have had opportunities of testing it, are satisfied that in it there has at last been found a remedy for a disease, the treatment of which, as recommended by an author little more than twenty years ago, was, on the patient's part, to bear,—on the surgeon's, to forbear. At the same time, it must be borne in mind that this operation is of greatest advantage in the earlier stages of the disease, and that to excise a portion of iris, in a person already stone-blind, can never restore the lost function; and here we have another noble illustration of the practical value of that instrument, by which we are in many instances able to trace its earliest development.

Prior to the discovery of the ophthalmometer, no definite knowledge existed as to the means by which the refractive media of the eye could be so altered as to enable rays of different degrees of divergence to be in turn brought to a focus on the retina. Little further, indeed, was known, than that in some persons the refractive power of the eye was abnormally great, and in others abnormally small; in the former case, concave glasses were found serviceable, in the latter, convex. It remained for Professor Donders of Utrecht thoroughly to investigate this subject, and to place it on a scientific basis. He classified eyes into the normal or emmetropic, the short-

sighted or myopic, the presbyopic, and the hypermetropic. The normal eye he defines as one which can see from an infinite distance up to within eight inches from the anterior surface of the lens; the myopic as one which, from too great a refractive power, is unable to see distant objects distinctly; the presbyopic as one which, from too small a refractive power, is unable to see objects distinctly except beyond eight inches from the eye; the hypermetropic as one which is able to see distant objects distinctly through a convex glass. He supplied data by which the degree of the affection of accommodation could be reckoned, and in accordance with which, suitable spectacles could be chosen. He also pointed out, that in very many cases the troublesome affection termed hebetudo visus, or asthenopia, was dependant upon the existence of hypermetropia; and that, upon the use of suitable convex glasses, the distressing symptoms disappeared. His views have been recently laid before the profession in this country, in an able work by Soelberg Wells.

It would extend this paper to too great a length were I to record all the advances that have been made within the last few years, and I must content myself with merely referring to the laborious researches of Von Ammon into the development of the eye, and its congenital malformations; to Dr Alfred Græfe's able monogram on the affections of the muscles of the eyeball; to Professor Von Graefe's valuable observations on almost every subject connected with ophthalmology; and to the investigations of Bowman, Hulke, Bader, etc., in this country.

I have thus shortly traced the development and progress of this interesting subject; and from its consideration a forcible example is adduced of the truth of the statement, that as our knowledge increases, the greater appears our former ignorance. Doubtless in future years the ophthalmology of our day will appear as crude and unsatisfactory to our successors as the views and practice of Duddell, Taylor, etc., are to us; but, at all events, those recent discoveries to which I have thus cursorily alluded have inaugurated a new era in the history of the department, and will bear me out in the statement that, within the last quarter of a century, no department of our wide profession has progressed so rapidly.

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