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COMMUNICATIONS

THE EDUCATION OF AN OPHTHALMIC SURGEON*

BY

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If we were to enquire into the reasons which influence a young man in the choice of his profession, we would seldom, if his answers are given truthfully, discover a very deep personal inclination or conviction. In the majority of cases he is influenced by a variety of factors—parental pressure, for example, or material considerations, social ambitions or (more typical of the pre-war young man) because that particular job chosen appeared to be the least unattractive.

To me it seems that two main factors should govern the choice of a profession—the general demand, and secondly, more important still, the individual's own qualifications. It is perhaps true that the figure stated as the yearly quota for ophthalmologists by the practising eye specialists would vary considerably from that stated say by a Government department! That is only natural. But we are not interested here in deciding who is to pass judgment on the *general demand*. We deal here with the question of the *qualifications* of the individual only.

I have seen many young men starting ophthalmology, and

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have always been amazed at the surprising fact that our profession (which by general consent requires at least moderate skill and dexterity) appears at least in Czechoslovakia to attract like a magnet sometimes the most adexterous people. One cannot explain this dark riddle of nature, but it is sufficiently common to force itself upon one's attention. I knew some excellent ophthalmic scientists leaving the *clinical* side of their work to those of the assistants whom they saw to have more inclination and greater gifts in that direction. Can it be wrong, therefore, to exclude from our science any person on the grounds that he is "handless"? As I have been privileged to see many of our great continental ophthalmologists at work I can assure you it is most surprising to see with what difficulty some of these splendid men handle even a simple cataract. How then can we even contemplate excluding such successful and in every other respect highly gifted people from ophthalmology at the very beginning of their careers? And yet, if we are to be honest with ourselves and with the public, which is our trust, we must! All these great clinicians and investigators would do excellent work in any department of science; but to be an *ophthalmic* surgeon one must be *able* to operate upon the *eye*. There is little place for failure. We have to examine the beginner, to admit the gifted and to refuse the less able.

On the other hand, one must not over-estimate the necessity of so-called "perfect" operations. On many occasions I have performed an operation upon one eye, and have permitted a junior to operate upon the second. As a beginner his work was aesthetically not so pleasing, and yet it has given no poorer, and sometimes even a better result. We have to admit, too, that manual adexterity is not unchangeable. The ability of the fingers for such delicate work as we are dealing with, like everything else, improves with practice. All *finger* work can be an aid to eye work. Exercises with your fingers like a pianist or a violinist in the morning during your general exercises; drawing, cutting, and so on, are most useful. The best method of getting correct finger movements is, as we have been advised by our teacher Elschnig, drawing with a mirror kept at an angle of 45°. If you look only into the mirror while drawing you will be astonished to find how difficult it is to finish a quadrangle without looking at the paper. Cutting and carving soft material, as marrow of elder, with a Graefe knife, or minute pieces of cotton wool with de Wecker's instrument, are very useful exercises.

I believe ambidexterity is a great advantage, and easily attainable if exercises are practised *alternately with each hand*. It is the custom with all pupils of my teacher Elschnig to operate upon the left eye with the right hand and upon the right eye with the left hand. In this way the operator can watch the patient's eye

whilst sitting in front of the field of operation. This we assume to be a great advantage. I think that ambidexterity should be cultivated, and I am convinced that anybody with normal ability **can learn** it in a short time.

There must be no doubt, however, that there is a wide variation of dexterity in young men, and the better ones should be chosen. Examination of likely candidates should not, of course, depend *entirely* upon skill of fingers! The *quick response of the mind* to a change of conditions—occurring so often during operation—is most important. The true, the born, operator is recognised by this reaction. If an operation becomes *atypical* the true operator is not terrified, but feels a kind of satisfaction. His powers of observation, attention to detail, and his gauge of the general appearance are some of the factors which differentiate the great from the mediocre operator. I believe that a complete psychotechnical test should accompany every application for medicine. How much more necessary is it in the surgery of the eye! Such a psychotechnical test may extend to quick reaction, general intelligence, to motor co-ordination and to temperament. Tranquillity of mind is a great gift to any surgeon. Undue excitability and hot temper spoil many delicate situations.

I was often asked about the preparation of a young man who wishes to go in for ophthalmology after getting his degree in medicine. In order to tackle this matter in the ideal way the financial side unfortunately cannot be neglected. I should recommend a young man to go first into pathology for three months to learn especially histological and bacteriological methods; then for three months at least into physiology to get a glance into experimental methods, animal experiments as well as self observation; and, last but not least, to get into contact with theoretical experts, a contact which should never be interrupted during his clinical work. The next six months should be dedicated to general surgery to learn the principles of asepsis; how to stop bleeding without being shocked and without losing his head; how to use different instruments, especially in bone operations, and how to make good sutures. To observe a neurosurgeon at work forms a very useful part of the young man's education. So he will be better prepared for his future *teamwork*, urgently needed for successful clinical efficiency. We admire its great results, *e.g.*, with the Mayo-Foundation marching in front of most of our specialities by the elaborate co-operation of all its excellent clinics. In addition, its post-graduate system seems to be brilliant.

Unfortunately, however, the ideal kind of preparation for the future ophthalmologist is reserved meanwhile for young men with a certain material independence. I believe that here is the place where private charity could do great work with larger scholarships.

It would be better if these scholarships could be granted by the Government, their interest being in breeding good teachers for the future.

Now we pass on to the question of *clinical* education. There can be no doubt that this is made much easier if the young man is attached to the clinic as a *full time assistant*. There can be no adequate substitute for that. I myself was 14 years full time assistant with the anatomist R. Fick, with Elschnig and Axenfeld. I do not regret one day of this long learning period. I worked from morning till night learning how these masters of their art discussed, diagnosed, treated, operated, and *why* they operated, and why sometimes they did *not* operate. Indications for operative procedure can be learned only by observing the experienced "maestro" at work. Of that there can be no doubt. The evenings were spent at the laboratory discussing histological and experimental results, and they were always delightful.

Teacher and assistants, the old and the new ones, belong together for ever to one *school*. Such schools exist everywhere on the continent. The "pupil" remains the "pupil" even when 80 years old. For example, the famous Ernst Fuchs in Vienna, or Sattler in Leipzig, talked proudly of being assistants of Arlt, or old Hirschberg of his assistantship with Albrecht von Graefe. We pupils of Axenfeld felt and were treated by the famous Uthoff, Axenfeld's former chief, like grandchildren. The pupils of each school work together for the good of the whole. The master is as proud of the scientific results of his pupil as if he had performed them himself, and during big meetings he stands behind his pupil to defend him if attacked. Often, in fact, the pupil is working out the ideas of his teacher; and if they differ, truth prevails. In every case the pupil is encouraged and inspired by his master. There is no doubt that sometimes the great personality of a teacher may suppress the individuality of a young man. Great men are not always agreeable characters. Such cases are not at all unknown, but generally they are rare.

In this country of strong individualities, however, a different state of affairs exists. A young man has to work alone and unsupported. His greatest hindrance lies in the fact that he has very little chance of getting a full time assistantship. He has to start alone, work alone; in short, discover practically by himself the most of ophthalmology, while his more fortunate continental brother forges steadily ahead at the shoulder of an experienced teacher. Most of the young enthusiasts in this country, having to do general private practice, appear at the clinic tired, troubled, overworked and unable to catch more than a few snatches of knowledge from their seniors, who, in their turn, overburdened with huge clinics, have no time to explain the interesting cases,

or discuss them if they are willing to do so. I have admired very often the idealism and energy of the young men in this country following their path in spite of all those hindrances. I cannot understand how the outstanding men, the excellent pioneers of our science, made their way in this country. I confess for my own part that I would have never overcome so many and great obstacles. It may be that all these difficulties which tend to keep out the mediocrities are apt to let through only the best and keenest. But it is the *mediocrity* we need urgently; they form the backbone of our eye surgeons. They have to treat and to operate upon the nation. They have to get an excellent training.

I believe the best way to alter this situation is to create full time assistantships with pay and with no private practice allowed. The ideal state of affairs would be to have the chiefs on the same footing, dedicating their lives to clinical, teaching and research work only. Such a thing is in existence in the U.S.A., and even here in this country there are a few idealists in the medical profession who renounce the great temptation of an overwhelming private practice.

The young British doctor before qualifying studies only a very minor course of ophthalmology—one 10 weeks' term, 3 hours a week—about 26 hours in his lifetime. There is no general compulsory examination. Compare this with the continental student who has a course amounting in most universities to about 320 hours! He has a daily clinical, theoretical and practical lecture for a whole year, an intensive state examination, compulsory ophthalmoscopy three times a week and separate voluntary short classes in operative procedure, refraction, etc. No doubt one would assume the young continental doctor thinks he is a complete oculist! On the contrary. He has learned just enough to realise how difficult ophthalmology is, and as a result sends his suspicious cases very quickly to the specialist in order to get rid of them. The courses here, I suggest, are so short that young practitioners are not fully aware of the dangers surrounding the subject and themselves, and more often than not courageously treat eye diseases themselves.

Here I emphasise that undergraduate teaching of ophthalmology is very difficult. It demands a great amount of table material, drawings, an epidiascope and, besides a considerable number of out-patients, a staff of trained assistants. I remember that at Axenfeld's famous clinic all clinical work was interrupted when the main lecture began. All the clinical assistants were needed for demonstration purposes. It seems nearly impossible for *one* teacher to instruct efficiently more than 10-15 undergraduates.

In my country, Czecho-Slovakia, if a general practitioner were to treat unsuccessfully a gonorrheal conjunctivitis, a septic corneal

ulcer, or a glaucoma he would run the risk of losing his degree. That is his legal responsibility.

At any rate, I repeat that a good ophthalmological education in my opinion can only be gained by a young man, without wasting time and energy, staying as a full time assistant with an experienced ophthalmic surgeon.

The school to which I was attached as first assistant for many years, with Elschnig as the leading operator, was a famous one, and many more or less outstanding ophthalmic surgeons from all over the world came to learn there for a few days at least, especially such things as intracapsular extraction, corneal grafting, dacryocystorhinostomy, and so on. On such occasions I had to prepare for operation, in addition to such everyday things as cataracts and glaucomas, something special for our visitors; a ptosis, or a Krönlein or a plastic operation. We called that "concert" operating. At the School of Elschnig we held such "concerts" two or three times in a month. Usually Elschnig put away two-thirds of the cake himself, and left the last slice for me—the piece mostly without the sultanas!

I mention these facts to emphasise that it is of the greatest importance for anyone who is, or would be, a good ophthalmic surgeon to visit the different schools, and see them at work. Everywhere that I have gone, and it has been my privilege to have visited many of the eye clinics of Europe, I have learned something new. My notebooks are full of remarks, not only on what to do but sometimes also on what *not* to do. I gained knowledge with each of these tours and remember with gratitude Elschnig's advice. So I strongly recommend that young assistants towards the end of their education should go round the world, as our great men—take Bowman, Graefe and Donders, for example—did during the 19th century, to complete their education and to compare their own knowledge with that of other schools. How highly that knowledge may be valued is demonstrated by my own personal experience. Towards the end of 1915 I was a young Surgeon-Lieutenant in the Austrian Army on the Italian front. I had already been an assistant to Elschnig for a few years. At once I was asked to go to Graz in Styria to take over for a fortnight a big military eye hospital. I was delighted to be sent to this nice hinterland town. Apparently I had been sent to relieve Professor P. while he was on leave. As soon as he had heard that an assistant of Elschnig was at the Italian front he had asked for me, but he himself did not go away on leave at all. For fourteen days the Lieutenant-Colonel worked from morning till night as assistant to the Lieutenant in order to learn as much as he could of Elschnig's methods.

During his work as a full time assistant the young doctor has

to learn many things. One of the most important, and one I have always stressed myself to younger men, is to examine *slowly* and with *care*—even when there are 50 patients waiting outside most impatiently! It is always better to ask the patient for a second examination as a mistake made in haste may never be mended. I realise of course how difficult it is to act in that way in big understaffed clinics.

In my experience the best thing to do to avoid such errors is to keep to a *set scheme of examination*. Something like this: External inspection, movements of the eye, pressing on the tear sacs, pupillary reactions, indirect and direct ophthalmoscopy, diaphanoscopy, retinoscopy and eye pressure. This scheme is, of course, enlarged according to the demands of the case. If such a procedure is repeated regularly and systematically, it will be rarely that anything of importance is overlooked.

Refraction work is developed very well in Britain and in U.S.A., I think better than on the continent in most places. I realised that defect and learned on two occasions during my assistantship at the Zeiss works laboratory in Jena to fill up the gap. Your retinoscopy is reliable, although I sometimes am of the opinion that it should not be *substituted* for ophthalmometry. Best of all, of course, is to use both. Whether it is worth while to prescribe $\frac{1}{8}$ of a dioptré, as is the case in America, I cannot say. I myself can scarcely distinguish less than $\frac{1}{4}$ of a dioptré cylinder, but that may be my fault, of course.

An important feature of ophthalmology is *histology*. An ophthalmic surgeon knowing nothing of the histological changes in his own cases is like a physician or surgeon who ignores pathology, and does not bother to learn the results of his post-mortems. Histology then must loom large on the young assistant's horizon. Histological methods, and bacteriological technique (smears, cultures and so on) are all important auxiliary subjects and enough for clinical use can be learned with little difficulty.

Another point, difficult for a man who is working in a busy practice, is the reading of current publications. The assistant should read not only the modern textbooks to check up the cases seen daily—everybody does it of course—but also two or three journals on his special subject should be followed carefully, as well as one general medical journal so as not to lose contact with general medicine. If he learns to do this while he is a student he will never give it up, and will remain a well informed specialist all his life.

The assistant ophthalmologist would be well advised to discuss his cases not only with his chief and colleagues, but also with his neighbouring specialists; neurologists, ear, nose and throat experts, pathologists, general surgeons. I have learned a great deal in that way, especially from neurologists.

Very soon the assistant will want to operate. At first of course he is observing his chief, and the likelihood is that he will get the erroneous impression that operating upon eyes is the easiest thing in the world. Everything runs smoothly and quickly. Rarely does a complication arise, and when it does, it is easily overcome. Let him try, however, to extract the lens from a dead pig's eye without losing it in the depth of the vitreous and he will realise that it is perhaps not so easy. He will watch his chief at work again, and so as his experience ripens, he will appreciate that there are some difficult cases, too. Then his chief must help him. He *has* to assist his pupil, encouraging him the while. That is most important. The young man will see other less skilful operators too. I do not underestimate the value of these sometimes exciting experiences.

While a young man is working as an assistant the importance of *asepsis* must be impressed upon him. He must learn it by heart as he will be inclined to forget a part of it during his life, and I am convinced that asepsis cannot be overdone in a *teaching* clinic.

Most of the older ophthalmic surgeons operate as they have learned during their assistantships. Therefore the responsibility of the teacher is great. Some schools say the ophthalmic surgeon should limit his activities to the bulb and the lids. Others, like the Elschinig school, do not stop short there, but include the depth of the orbit, the antra, the frontal portion of the brain, and plastic surgery.

As the young man learns the methods of his school, and in his travels those of other schools, the notes in his notebook will accumulate. He will find, too, many *conflicting* points. For example, in some clinics with leading oculists cataract cases are kept in bed for a week or longer, while in others, afraid of hypostatic pneumonia, they are up in an easy chair four hours after operation. Some surgeons close both eyes for a week, others fear mental disturbances and open the unoperated eye twelve hours after the operation. Some protect the operated eye with Fuchs' wire-netting; others use a shield or a simple bandage. The young assistant may use whatever method he likes, or bring such methods to his chief. Perhaps his chief will be nice enough to admit that another method, not his own, is not quite unsuitable. Eventually the young eye specialist will learn to make his choice, until at last he is old enough and wise enough to go his own way. Only such a man, with such an education, is, in my opinion, fit to take a leading part in his profession and to take the responsibility of educating the next generation.

What a pity it is that the great majority of highly gifted practising eye specialists in this country cannot enjoy these advantages

and must fight a lone battle, unencouraged, learning imperfectly from journals. Here the post-graduate courses could help immensely.

The best methods have been developed in U.S.A. and the continent, where there are regular post-graduate schools of instruction, as started by Axenfeld. These courses are performed in the least time excellently in the Wilmer Institute in Baltimore. They last usually a week at a time, from morning till night, where the most recent advances of science are related to an audience of practising ophthalmologists. Lectures are also given by outstanding men of the border sciences, such as physiology, neurology, pathology, oto-rhinology, surgery, and so on, and the audience learns of the latest developments in these sciences. All these meetings are overcrowded and seldom have I seen such enthusiastic audiences; a perfect blend of youth and age. Professional etiquette did not prevent old white-haired men from sitting at the feet of young assistants, and always most interesting discussions arose. Many of the experienced ophthalmic surgeons remembered cases confirming the new ideas which came to light. In America these post-graduate courses have been highly developed in the last few years at several clinics. The late Alfred Bielschowsky lectured all over the United States upon muscular anomalies, and I trust that one day soon such continuation classes may be developed in this great country too. Professor A. J. Ballantyne has already initiated such evening lectures very successfully with the aid of other ophthalmic surgeons in Glasgow, in spite of the difficulties of war time.

I have tried to explain briefly my ideas, which are based on experience, on how to educate the eye surgeon of the future—demands not bound to any country. It may be overestimation of my own profession if I take that question so seriously and dedicate so much of your and my time to it; but preserving eyesight, restoring the light that failed seems a wonderful thing to me—life and light being equal in my estimation. We have to teach the younger men *love* of our profession, enthusiasm. To do our work "*non sordidi lucri causa*," but to find in it the greatest satisfaction, the reward being the work itself. We must give them too a great admiration for scientific creation,

But what touches me more than the task of leading young medical men to the crests of our beloved profession is the *general* aspect. We, the older generation, have first and last one sacred obligation, to transmit to youth all our experience, all that life has taught us. That is our only right to exist. We, the men over 40, are, according to Sir William Osler, useless if not teaching. There is no space for jealousy, competition or envy. It is a

tremendous waste of energy if the young man has to learn undirected, has to discover known facts, has to do research work unencouraged. All that we professional people all over the world have learned is not our own private possession, but a great privilege which has been entrusted to us, and it is our duty to pass on this loan, our knowledge, enlarged by the result of our own research work, to the rising generation. If we betray this trust we provoke hatred where love and gratitude ought to be, and lose our only right to exist. Disappointed youth will fight against old age, and youth will prove the stronger.

There is still time for reforms all over the world. They are urgent everywhere, as much of our schooling has been inherited from a prescientific age (T. A. Lauwery, 1941). But fate knocks at the door. Let us older ones listen to the fateful sign; otherwise we will sink back to the moral standard of prehistoric wild tribes where youth killed the aged as a useless, bothersome burden. We are servants of the future smoothing the path of youth.

GLASS IN THE ANTERIOR CHAMBER

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THE subject of glass in the anterior chamber of the eye assumes added importance at the present time from the frequency of eye injuries due to glass among air raid casualties; and the treatment of such casualties is therefore a matter of common interest. Present practice seems to be based on the belief that glass retained in the anterior chamber spells the doom of the eye; one may quote, for example, a recent annotation in the *Brit. Jl. of Ophthalm.*, "... eyes containing glass fragments shrink relatively quickly, save in a few exceptional cases when a glass fragment has remained in the vitreous for years without complaint."¹ Nevertheless, cases (2, 3, 4) are to be found in the literature (Bickerton's, as far back as 1888), in which such fragments have remained in the anterior chamber for long periods and a useful eye has been retained after their removal.

The purpose of this paper is to report a case in which a spicule of glass was necessarily retained for some months in the anterior chamber, subsequently giving rise to severe irritation and almost total loss of vision, with recovery of full visual acuity after its removal.