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THE PROPER PROVISION FOR TEACHING OPHTHALMOLOGY IN THE MEDICAL SCHOOLS *

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Ophthalmology, always a distinct department of medicine, embraced a great mass of clinical facts, as shown in the books of Mackenzie and Desmarres, before the work of Helmholtz, Graefe and Donders caused its rapid extension in the middle of the nineteenth century. Walton, Lawrence, Bowman, Sichel, Stellwag and other able men had found it an ample field for a life time of study.

The routine use of the ophthalmoscope and the test lenses enormously increased the extent and practical importance of this branch of medicine. It inspired able men of the younger generation with an interest that made it their life work. Jaeger, Arlt, Schweigger, Argyll Robertson are only specimen names from those of the host who, fifty years ago, saw in ophthalmic science the highest development of medical science, and in ophthalmic practice the highest, most exact application of medical art. Williams, Agnew, Noyes and Norris brought the inspiration of the new ophthalmology to America. Hughlings Jackson and Clifford Allbutt took the eye-mirror to throw light on obscure realms of internal medicine. Still active are Hirschberg, Fuchs, Haab, Landolt, Motais, Nettleship, Swanzy, John Green and hundreds of others who have devoted long and busy lives to a science and art that gave ample scope to all their powers. They and their students after them have continued to extend the boundaries of ophthalmic science and art in every direction.

By the labor of these leaders has been developed modern ophthalmology, the proper teaching of which we are to discuss. The catalogue of Hirschberg's collection of its literature occupies 336 octavo pages. The list of books, transactions, monographs and journal articles appearing in the year 1911 takes 151 pages and includes 3,506 titles. They constitute in the aggregate between

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20,000 and 30,000 pages. To engage successfully in ophthalmic practice one does not need to read all that has been written about ophthalmology. But the amount of this literature gives some indication, probably the best statistical indication, of the extent to which the problems of ophthalmology have claimed attention and study from those who have gone before us, and are claiming attention and study from those to-day engaged in ophthalmic practice.

Another estimate of what is to be taught in this branch of medicine might be reached by comparing such treatises as those of Weeks, de Schweinitz or Ball with text-books on medicine or surgery, like those of Osler or Tyson, Da Costa or Park, or by comparing the four-volume system of Norris and Oliver or the Graefe-Saemisch "Handbuch" with Allbutt's "Medicine" or Keen's "Surgery." The monographs of ophthalmology still more strikingly illustrate the greatness of this branch of knowledge. From Donders' book on "Accommodation and Refraction of the Eye" to Wood's two-volume "System of Ophthalmic Operations" or Parsons' four-volume "Pathology of the Eye" there is a long line of monographs, the more important of which must be read by any one who would be counted well informed on the literature of ophthalmology.

Consider it from another point of view. The anatomic relations of the ciliary body, lens, iris root and canal of Schlemm are as important to the ophthalmic surgeon as are those of cranial sutures and eminences, and of the cerebral convolutions to him who would do brain surgery. The exact understanding of the relations of the contents of the orbit and the optic nerve to the neighboring sinuses is as important as that of the relations of the fetal head to the pelvic diameters, which claim so much attention from the student of obstetrics. The functions of the visual apparatus are more complex and occupy more space in the text-books of physiology than those of any other special apparatus, except the brain. In diagnosis the ophthalmologist must master special instruments and methods, the trial set, the ophthalmoscope, the perimeter, the transilluminator, the tonometer, the varied muscle tests. These diagnostic attainments cannot be surpassed for refinement and importance in any other branch of medicine. What procedures in surgery require such delicate exactness, more intelligent

planning or more carefully elaborated technic than the extraction of cataract, iridectomy or the plastic operations on the lids?

The ophthalmologist, as a rule, knows more of the requirements and attainments of general medicine and surgery than any one outside of ophthalmic practice knows of the attainments and requirements of ophthalmology. In so far as any one class of men are capable of comparing different branches of medical and surgical practice, the members of this Section, by training and experience, are better fitted to compare the requirements for the proper teaching of ophthalmology with those for other departments of medicine and surgery than are any other group of men in the American medical profession. Do any of you believe that there is any line of work carried on in the medical profession which demands more training, or better training, for its proper performance than that encountered in ophthalmic practice? Occasionally there have been surgeons and physicians who have attained proficiency both in general surgery and general medical practice, and in some departments of ophthalmology—such men as Jonathan Hutchinson, Hughlings Jackson, Clifford Allbutt and Sir William Gowers. And these men without exception have given a relatively high place to the diagnostic and operative methods that belong to ophthalmology. That the knowledge and technic of ophthalmic medicine and surgery should be underrated by those who are ignorant of them is not surprising and has no bearing on a just estimate of their relative importance.

Aside from preparation for devotion to ophthalmology as a special line of practice, consider how much there is in it for study that may be of important service to other branches of medicine. The department of ocular hygiene should dominate the lighting of buildings, the conditions for study in schools and for work in factories and offices, and the prevention of blindness by industrial injuries, ophthalmia neonatorum or trachoma. Not less important are the diagnostic services ophthalmology can render in general medicine and surgery, the light it may throw on general diseases, on such processes as arteriosclerosis and lesions within the cranium. These are but scattering suggestions of the extent of the field of ophthalmology, the breadth of the science to be taught, the refinement of the art into which men and women are to be trained.

In our present educational scheme what is the provision made for teaching ophthalmology and its practical application? The best recognition we have been able to secure in the medical curriculum recommended is fifty hours in the scheme of the Council on Medical Education of the American Medical Association, or sixty hours in that of the Association of American Medical Colleges—less than one-third of the two hundred hours that Jaeger is said to have spent in producing a picture of one eye-ground. This period of sixty hours, or less, is intended to cover the only systematic instruction on ophthalmology given in the best American medical colleges.

The text-books of de Schweinitz or Weeks are practically as large as those of Osler or Da Costa. But ophthalmology is to have fifty or sixty hours, and medicine or surgery 600 or 800 hours. Are the text-books on medicine or surgery so wonderfully condensed, or those on ophthalmology so padded and stuffed with meaningless sentences, or irrelevant statements, that the subject of the latter can be mastered in one-tenth of the time given to the former? Even obstetrics, which has less literature than ophthalmology, gets three or four times as many hours in the medical curriculum.

It would be interesting to trace how such an anomalous distribution of time in the course ostensibly intended to prepare for every branch of medical practice had come about. But that is another story. The point here is that everybody recognizes that the course on ophthalmology in our best medical schools does not prepare any one for ophthalmic practice. This is recognized by the professor of ophthalmology who says, "I do not undertake to make ophthalmologists of the students." It is recognized by the honest "general" practitioner, who frankly tells his patients, "I do not undertake to treat diseases of the eye."

What is possible in the brief time allotted to ophthalmology? With bright students who have some preliminary training in physics and a good command of the fundamentals of medicine, it is possible to show what a trial case is and the general outlines of its use, so that the man who is interested and earnest will be able to work out presently the cases which the late Dr. Connor has referred to as "simple errors of refraction." It gives opportunity to show the student how he can see into the

eye with the ophthalmoscope and to recognize the more striking features of the normal eye-ground and a few of their common variations. He can be given a theoretic knowledge of the taking of the visual fields, can be made acquainted with the more constant symptoms of conjunctivitis and iritis. He can learn that ophthalmia neonatorum and trachoma are dangerous to sight, and for each a routine treatment. He can be told that glaucoma and detachment of the retina, as well as cataract and intra-ocular tumors, cause blindness. But with regard to the mass of diseases of the eye, as noted in the twenty-page classification, published two years ago by Duane, in the *Transactions of the American Ophthalmological Society,* he can know nothing. We may teach him to turn the lid and drop a collyrium into the eye, to remove a displaced lash or a superficial foreign body; but the best that we can hope to do with regard to the removal of cataract, the doing of an iridectomy, the operations for a squint or deformity of the lids is to impress him with their difficulties sufficiently to induce him to study farther before he undertakes them.

The fact is that the medical graduate may go out from the only responsible medical schools, the only schools recognized by our medical licensing boards, with but little more knowledge of optics than the best of the self-trained opticians and with little more skill in ophthalmic operations than the foreman of a machine shop who takes the foreign bodies out of the eyes of his workmen.

How then has ophthalmology been learned by those who wish to prepare themselves for ophthalmic practice? It is learned quite outside of our teaching institutions by those sufficiently interested and fond of study, through the systematic reading of text-books, monographs and ophthalmic journals; through the conscientious observation and consideration of such patients as come under their care; through service in private office or public clinic as assistant of some one more advanced in the line; through residence and service in one of our few ophthalmic hospitals, or through visiting and following, more or less closely, similar work in the medical centers of this country or abroad. In a very large degree the American ophthalmologist of to-day is self-educated. This has its advantages that are appreciable in the individual case; and its fatal disadvantages, as a general method of instruction for a profession on which

the community has to depend for important special service.

On the side of advantages we may count the enormous pedagogic gain achieved by letting the student pursue exclusively the line of work in which he is interested. If his time and interest are all absorbed in dealing with errors of refraction, he will reach an expertness in their diagnosis that the well-rounded practitioner might not attain. The same is true with reference to operative ophthalmic surgery or to the refinements of ophthalmoscopic diagnosis. By such a method are developed the extreme refinements of skill in particular branches that mark the work of the best ophthalmologists of our time. But for the purposes of serving the needs of the community this is largely specialism run to the extreme. As a means of securing a general standard of competence it is preposterous.

There is a dark side to the working of this system, or lack of system. With the absence of any authority to lay out and enforce a systematic course in ophthalmology, or to determine when such course has been successfully pursued, the community is at the mercy of the "get-rich-quick" scheme that leads the man, who is making a failure in some other line of practice, to go to a six weeks' proprietary post-graduate institution and then to return to the scene of his former failure, or more often, to make his appearance in some other part of the country as a full-fledged specialist in diseases of the eye, and probably also of the ear, nose and throat. The six weeks, if at all devoted to the effort, furnishes two or three times as many hours as the undergraduate medical school gives to ophthalmology, and will give the would-be-specialist a start which places him at an advantage over the general practitioner of the community in which he settles. Only a few shrewd judges of men will be able to pierce the thin cloak of special knowledge that veils the underlying ignorance. The six weeks' graduate will get patients suffering from diseases of the eye, and will come to be known as an authority in that branch by a good many people in the region. And, although he never opens a new book or learns the name of an ophthalmic journal, his place among ophthalmologists, as well as that of the more conscientious student, is thenceforth established; and the courage that enabled him to strike out into this new unguarded field is abundantly rewarded. Elsewhere I have pointed out some

shining examples of this kind of self-made specialist: the professor of ophthalmology in a western medical school, who had seen three cases of "glioma of the retina beginning after 50 years of age"; the ex-president of his state medical society who knew there could be no such thing as mixed astigmatism, because an eye could not be both hyperopic and myopic at the same time; the eminent oculist of a great eastern city who argued that astigmatism might depend on displacement of the retina. Such failures of the old plan for ophthalmic education are striking, but not unique.

Go up higher. Take those who exemplify the best results of this system of ophthalmic education. Is not their preparation for the whole of ophthalmic practice likely to be faulty in some direction? Who is there here that, looking over his qualifications for his work, is not (as I am) conscious that in some direction he might have been, and should have been, better trained? One, for instance, does not feel sure of the results he gets in measuring refraction; another feels himself at a serious disadvantage when he attempts to work out the significance of some paralysis of the ocular muscles; a third would rather avoid a plastic operation on the lids or orbit, and so through the list. We can each find a good excuse for our deficiencies—no one told us at the important time the need of special study of this or that particular point. Systematic instruction, in pathology or bacteriology, for instance, was not to be had at the time that we could have taken it to the best advantage. Later we have been hindered by this or that important matter from making good the deficiency, although fully conscious of it.

These defects in training, as well as the imposition of the six weeks' specialist on the innocent public and the guileless general practitioner, are all chargeable to the lack of a recognized systematic course of preparation for entrance on ophthalmic practice. One hundred years ago, comparatively few took any course of systematic study before entering the practice of medicine or of law, and schools of dentistry and engineering were quite unknown. Time has demonstrated that the well-conducted school, offering systematic courses and enforcing a rounded curriculum, is by far the best means of preparation for entering the practice of a profession. Only the indisposition to change, the stolid, unthinking position that what has been is right and must continue,

stands in the way of the recognition of this truth with reference to the training for ophthalmology. I am convinced from the evidence of the past year that even this attitude no longer offers an insurmountable or very serious obstacle to the proper teaching of ophthalmology.

The absence of any curriculum recognized as properly preparing for the practice of ophthalmology leaves both the medical profession and the public unable to decide what should be expected of a candidate for ophthalmic practice, or as to who has conformed to reasonable requirements of preparation for such work. This is not only a hardship to those who need the services of an ophthalmologist and an opportunity for the impostor; it also greatly limits the use that would be made of such services, lessens the value of our science and art to the community and prevents us from receiving the proper respect and consideration from the public. Our western fruit-growers discovered some years ago that carefully sorting and standardizing the products of their orchards not only paid for the labor expended and gave an increased profit, but also greatly extended the market for that product. If people knew what they could get and from whom they could get it, the number ready to act on such exact information would be greater.

There can be no doubt that much of the growth of the dental service of the community that has occurred in the last fifty years has been due to the perfectly definite professional status of dentists. The optometrists are so conscious of the value of a definite standard of attainment in professional skill that they are spending thousands of dollars in literature, legislative campaigns and newspaper advertising in order to set up the pretense of such a standard regarding one part of ophthalmology, their claim being supported chiefly by ambitious hopes and the fact that thirty-three students are taking the course on optics at Columbia University.

It may be asked, "Is the need of men trained for ophthalmic practice sufficiently great to justify teaching institutions providing the required training?" It will appear on examination that the demand for trained ophthalmologists is greater than has yet been recognized in any formal estimate of the situation. From month to month I receive letters from people in towns of considerable size inquiring where they can get the services of a reliable ophthalmic specialist. Some of these let-

ters are from patients, or members of their families; some are from well-known ophthalmologists with patients still in need of attention going to the places indicated. I probably have as good opportunity for knowing the ophthalmologists of a large part of this country as any one. Yet there are regions of hundreds of miles of fairly populated states in which no such services are to be obtained.

If trained ophthalmologists were sufficiently numerous and properly distributed to be available for all the services they could render to the community, I believe that one to every 10,000 inhabitants would find plenty of work and fair remuneration. Some of you have seen as many as 10,000 patients in private practice, but not all of you, not the majority; that would be a new patient—not the return of an old one—every day for thirty years. Practically all members of the community could be mutually benefited at some time by the services of an expert ophthalmologist, and many require a great deal of such service. Suppose that such 10,000 patients average 25 cents a year, $5.00 in twenty years, as their contribution to the ophthalmologist, the sum would be much above the average income of members of the medical profession. One ophthalmologist to 10,000 inhabitants would mean about 10,000 physicians trained in ophthalmology needed in the United States, and when we remember that of the men having such training we cannot expect an average of over twenty-five years of professional service, it means that there is a need of 400 men trained for ophthalmic practice each year. That the present opportunities for residence in ophthalmic hospitals and as assistants in eye-clinics are inadequate to furnish any such number of trained ophthalmologists is evident.

For the medical schools favorably situated with adequate facilities, there is no line of work that they can take up of more service to the community or of more advantage to themselves than this of systematizing and standardizing the training of ophthalmic practice.

What ground should this training cover? What facilities for study should it offer and utilize? How should the curriculum be arranged?

The course of training for a profession is not to be elaborated in a few hours of thought and compressed into a rounded paragraph, or thrown together in the course of a single discussion. But, above all things, it

is desirable that we should arrive at some definite practical suggestions; and, in order to give definiteness to this discussion, this scheme is outlined.

The work done before obtaining the degree of doctor of medicine should include the acquirement of a definite knowledge of the special anatomy and physiology of the eye, and of the general anatomy and physiology of all tissues entering into the composition of the eyeball or accessory parts. Only certain special problems in anatomy and physiology, like those regarding the filtration-space and the maintenance of intra-ocular tension, should be left for study in this special course. General pathology should be mastered in the undergraduate medical course; the processes of inflammation and degeneration, the characteristics and tendencies of tumors should all be familiar to every medical graduate. Moreover such an acquaintance with the ophthalmoscope, the trial lenses and other standard methods of ophthalmic diagnosis, as has been mentioned above, should be possessed by all graduates in medicine; and graduation in medicine after a standard four years' course should be made a preliminary to the work to be outlined. Furthermore, the special student of ophthalmology should have certain preliminary studies not required of all graduates of medicine. Both in justice to himself and to the community he should have some acquaintance with physical optics, algebra and plane trigonometry.

With such a foundation the special curriculum in ophthalmology may be undertaken with profit. The back-bone of the course should be one year of clinical work in an eye-clinic. This must be chiefly an out-patient service, but will be better to include a certain number of hospital patients. Perhaps an equivalent may be found in serving as an assistant to an ophthalmologist in full practice, the longer hours devoted to the work tending to make up for deficiencies in other directions. With the clinical work should go the careful study of every portion of one of the larger complete treatises on ophthalmology and the reading up of particular subjects in other text-books, monographs or journals in connection with cases encountered in clinical work. In addition, there should be work on pathologic specimens, both gross and microscopic, including the examination of smears and cultures, drill in the more common important operations on the eyes of the lower animals, special

instruction regarding the eye symptoms of diseases of the central nervous system and important general diseases. During the whole course the student should be assisted by demonstrations, and his work supervised by means of quizzes and clinical conferences. Finally there should be one or more thorough examinations, written, oral and practical, to test the knowledge the student has acquired and his ability to focus it on the question or case under consideration. To those successfully completing such a course a special degree should be given.

Such a scheme or schedule raises many important questions. First, the time to be devoted to it. A great deal could be said in favor of two or three years devoted to ophthalmology before recognizing the candidate as competent. But there is danger of making the requirements so rigid that not enough will meet them to supply the needs of the community and to establish such a course of study as the only proper entrance to ophthalmic practice. To establish a supervised course of one year is a radical departure from the practice of the past. When it has been thoroughly developed what this will do for the student, improvement in the curriculum may properly be considered. With reference to the preliminary requirements, it would be easy to argue for one year's work as intern in a general hospital. But the process of prolonging student life before entering on actual professional work has been carried about as far as can wisely be done, in view of the limitations imposed by human nature and the need of turning the youthful energy into channels into which it is to flow throughout active life, at the earliest date compatible with fair preparation of the average individual. The need is not now to lengthen the period of study, but to use it to better advantage, more economically, more efficiently; to bring into play more immediately and effectively the life motive, a realization that the individual has actually entered on the labor that is to determine his permanent place in society, and to bring this motive into play at the earliest possible moment.

The requirements regarding mathematics and physical optics might be a subject for discussion. But it would seem that, when so large a part of the work of the ophthalmologist consists of the measurement of the optical conditions of the eye and the correction of refractive errors, this kind of preparation ought to be insisted on, although many who graduate from standard medical

schools may not be ready to meet the requirement. To make up such a deficiency will usually not take many weeks, and it furnishes an excellent exercise for one who is entering on the practical study of physiologic optics.

Nothing has been said about the part of the course devoted to the refraction of the eye. In clinical work, in reading, in demonstrations and in quizzing, this should receive the full share of attention. It is so different from most of the undergraduate medical course that the preparation for ophthalmic practice may well include special emphasis on it, without conceding that it constitutes the whole, or almost the whole, of the practice of ophthalmology.

Briefly to recapitulate: Ophthalmology is a field broad enough to claim all the time and energy that can be given to it by any trained mind. Proper preparation for ophthalmic practice requires as long, systematic and thorough training as preparation for any other profession. Such professional training should be systematic and carried on by responsible institutions, working up to a recognized standard.

The supervising and standardizing of the course on ophthalmology will result in the more complete and rounded training of competent ophthalmologists and in the elimination of the incompetents who seek a short cut to professional standing and financial success. It will greatly improve and extend the ophthalmic service of the community.

The systematic supervised course that it is now practicable to establish should be based on completion of the ordinary medical curriculum and acquaintance with the necessary mathematics and physical optics, and should include one year of clinical work in ophthalmology, a careful systematic course of reading, with systematic instruction in special diagnostic methods, ocular pathology and therapeutics, and the measurement and correction of errors of ocular refraction.

Metropolitan Building.