The subject of *materia medica* and therapeutics must be viewed in its general and special aspects. The general course at present required of a student of medicine ought to be omitted altogether. The treatment of disease so far as it can be effected by drugs should be discussed by the teachers of medicine and surgery. That an ophthalmic student should be compelled to sit through a course of instruction which is simply an extension of the *British Pharmacopœia* is simply to force him to waste valuable time which should be given to other subjects. Probably he ought to know something of the principles of the science of pharmacology; but that can readily be taught in a special short course dealing with the drugs which are essential in his practice, such as the mydriatics and myotics, mercury, opium, iodides, etc.

The days of active so-called therapeutic practice are as thoroughly at an end in ophthalmology as they are in the best forms of medical practice. Can anyone imbued with the spirit of modern ophthalmic practice revert to the old *régime* of blisters, setons, and the terrible prescriptions which were so much in vogue only a few years ago?

Pathology also should form an important element in the ophthalmic surgeon's training. This should include a general course and also a special one. The general course should be much the same as that which is given to ordinary medical students; it should be quite as extensive, and should contain the same amount of practical work.

It is essential that the ophthalmic student should have training in bacteriology. Micro-organisms play a very important part in the production of many forms of eye diseases, and the student ought to be familiar with the methods of bacteriological investigation. Moreover, a bacteriological examination of the conjunctival secretion undertaken before operation will often prevent disaster.

A course of special pathology is also desirable. How necessary it is in an ophthalmic training is abundantly shown by the fact that in a recently published and lengthy article on glaucoma, the author made not the slightest reference to obstruction of the corneo-iridic angle. That an author should be ignorant of or ignore the magnificent pathological work done in this department during the last few years by Priestley Smith, Treacher Collins, and others is simply astounding.

To what extent students should be required to attend formal lectures on diseases of the eye is a difficult matter to determine. Little good is to be obtained from teachers who simply draw up lists of symptoms characteristic of the various maladies and the different remedies suitable for their treatment. All such information can be obtained from one of the smaller textbooks, and there the student ought to get it. Exceptionally a teacher may be found whose lectures are worth attending, but such teachers are rare, and the information to be had from lectures is generally more fully contained in good textbooks.

While, therefore, attendance on formal lectures on diseases of the eye should be made optional, clinical work ought to be compulsory. It should extend over a period of at least three years, and should be taken up entirely with the examination of patients, under competent teachers. Clinical courses should include the study of (a) external diseases, (b) fundus diseases, (c) operative work, (d) refraction errors, (e) muscular defects, (f) perimetric examinations.

The student would thus be brought into direct contact with all forms of ophthalmic ailments, and would learn to recognise them as found in actual practice. This is the only method of studying disease in a useful manner. No doubt it is not everything. Much remains to be learnt in the laboratories as to the physiology and pathology of eye affections, but without clinical work, and that of the most extensive kind, book knowledge and information obtained from lectures lose much of their value.

Nor does it suffice that the student should see patients examined. He must be made day after day to examine them for himself and to report on their condition to his teachers. That is the only form of clinical instruction that is of any value. The modern practice of substituting pictorial demonstrations for the examination of patients cannot be too strongly condemned. Such exhibitions will not teach students to recognise diseases when they see them and generally are of little value.

Again, were a special register for ophthalmic surgeons instituted, there would be other advantages besides securing the better education of those practising ophthalmic surgery. It would immensely improve the status of the practitioner relatively to the public. Recently many ophthalmic surgeons have endeavoured to get the General Medical Council to prevent ordinary spectacle vendors from doing ophthalmic work. The Council has replied that at present they cannot at all interfere with this practice: all they can do is to see that medical practitioners have no improper professional connection with spectacle vendors. It cannot be denied that ophthalmic practice should be carefully regulated, and those who specially undertake such work should be specially qualified. But so long as medical practitioners have no special qualification, it is somewhat illogical that they should object to spectacle vendors prescribing, on the ground that they are not qualified.

ON THE ADVISABILITY OF THE INCLUSION OF THE STUDY OF ANÆSTHETICS AS A COMPULSORY SUBJECT IN THE MEDICAL CURRICULUM.*

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THE proposition that it is desirable to include in the curriculum prescribed by the General Medical Council the study of anæsthetics may appear too obvious for formal consideration.

It is probable that all the laity and many members of the medical profession assume that the methods of employing anæsthetics are taught in medical schools, and the subject is therefore practically included in the student's course of studies. Yet such is not the case. When, however, the matter is inquired into further and the methods of teaching are brought into prominence, there arises in some minds a certain amount of opposition. Besides the natural disinclination to embark upon new regulations and to impose fresh burdens upon students, there is a feeling that the schedule of subjects is at present quite long enough, and that the time and energies of the medical student are already more than adequately taxed. The further objection is advanced that when many subjects have to be mastered it is only right that the least important ones should be ranged behind those of greater moment. The study of anæsthetics is by many looked upon as of less importance than many other branches of medicine and surgery. It is urged that a brief experience will render the man of average intelligence a competent exponent of it, and to make him more so is unnecessary unless it can be accomplished without encroaching upon more pressing studies. It is to attempt to meet these objections, which I admit are all of more or less weight, that I propose to advance the following arguments.

In the first place, there is at present no uniform teaching of anæsthetics in Great Britain. Personal zeal and the demands of the management of general hospitals have in many cases established some sort of teaching for students in this branch of knowledge. There are lectures and demonstrations, and in some cases students are instructed to give the anæsthetic in the presence of and by the guidance of the anæsthetist to the hospitals. These lectures, however, are settled by the particular anæsthetist, or the authorities of the medical school, and too often are regarded as an encroachment upon the time available for teaching other subjects. As to the practical teaching of the subject, that again varies in the different schools. It is not by any means universal. In some cases the person who gives the anæsthetic teaches by pointing out the steps in his method, and the students, until they come into hospital as residents, have never given an anæsthetic, and their knowledge is wholly theoretical. In other instances, however, a better plan is pursued, by which the student administers the chloroform or ether under

* Read before the Society of Anæsthetists, April 19th.

supervision. A further discrepancy is seen when we inquire how many of the students at any hospital are actually taught to give an anæsthetic themselves. In some cases none are so taught, in others a certain number of the men—those, for example, who are to compete for or take up hospital appointments. At present, however, there is no obligation imposed by the controlling centre for medical education for any student to acquire a familiarity with the subject of anæsthetics. He knows that he may be asked a question in the "paper," or be mildly heckled in the "*viva*," but the chances are so remote that he accepts the risks, and avoids the non-scheduled subjects. On the other hand, the average student of intelligence gives much attention to the subject, and, in my experience, regards it as of great interest and of primary importance. So we may say that at present there is no systematic or uniform plan for teaching this subject, and no definite pronouncement from the General Medical Council requiring all students to receive instruction in anæsthetics, and to have shown competence to conduct an ordinary case of anæsthesia.

Now as to the time required to be spent upon the subject, and whether a further and undesirable burden will devolve upon the student if he be compelled to pass a test in this subject before he is allowed to qualify, I do not find the average student requires to give much time before he masters the primary rules, provided, that is, that the responsibility of the task is thrown upon his shoulders. If he is merely looking on his attention wanders to the surgeon's manipulations, but if his interest in the anæsthetisation is once awakened he rarely loses his sense of individual responsibility.

It is quite possible by having two or three students and allowing them to succeed one another in charge of the cases, to maintain their interest by pointing out the phenomena of narcosis as they appear during a surgical operation. The students acquire in this way that attitude of aloofness from the surgical aspect of the operation which is of such paramount importance.

It may be wise to explain that I mean by aloofness to the surgical aspect of the operation not a mere ignoring of the requirements of the surgeons, since the anæsthetist's duty must always be to render all possible aid to the operator, considering his convenience as being second only to the safety of the patient. What I mean, however, is that the student has to acquire the power of concentrating all his mental powers upon establishing and maintaining an adequate degree of narcosis without allowing any swerving of his attention from that object. In short, to recognise that the anæsthesia is his concern, and that all other matters are secondary, and should only be permitted to enter upon his mind's horizon when they begin to affect, or to become affected by the narcosis.

The attendance on six or even twelve lectures during the last year before their final examination, and the administration of an anæsthetic on twelve occasions as a minimum, together with watching anæsthetisations during such a period as would give fifty attendances including the twelve administrations, would not occupy much time. It would mean about three or four afternoon attendances for a month according to the length of time during which the operations are carried on. What is perhaps the best test whether the student finds the study of anæsthetics a burden is his attendance or abstention from the opportunities afforded him at present when he is free to come or keep away according as he chooses. My experience is that, so far from urging the students to attend, one has to plan and contrive so as to find time to teach those who are anxious to learn.

Then as to the relative importance of the study of anæsthetics and the subjects scheduled. There are two sources of evidence upon this point, but the one which is most convincing to my mind is that derived from medical men who have commenced practice without having had any instruction during their studenthood. I find, and I presume my experience is shared by other teachers, that one is constantly in correspondence upon matters anæsthetic with qualified medical men, many of them having practised for years. They write asking to become attached to the hospital wholly and solely to study anæsthetics, for "practical instruction" as they put it. They are willing to leave their practices and stay in London simply for the one purpose of mastering the subject of anæsthetics. Surely such

men are not likely to throw away time and money on a subject of minor importance? As a matter of fact, they have found out by their own experience how essential it is for peace of mind as well as for the safety of patients that a medical man should possess a competent knowledge concerning anæsthetics. It is quite possible that just as a general practitioner sends for a consultant for an obscure medical or surgical case he may, and probably will, send for an expert for any specially perilous case of anæsthetics, but in the everyday work of his practice he wants to be able to give gas, or ether, or chloroform with a sense of knowledge and experience which enables him to safeguard his patient and himself.

The student of to-day is the practitioner of to-morrow, and is shrewd enough to recognise that he will be involved in greater responsibility—one of life and death—in his practice when using anæsthetics, than will fall to his lot in other ways. He may give chloroform for the most trivial operation, and his skill or defect will make all the difference between success and disaster. Again, a glance at the schedule of subjects will further inform us that many matters involving no great skill or experience, such as vaccination, are already included, and certainly none which involve life and death more directly than does the practice of anæsthesia. So that its exclusion is not due to its minor importance. It probably arises from the fact that the study of anæsthetics is so closely involved in that of surgery that the surgical teaching is held to include anæsthetics, just as manuals of surgery commonly contain a chapter on anæsthetics. But the time has come, I believe, when one has to recognise that surgical teachers no longer attempt to give such teaching, if they ever did make the attempt. Nor is it desirable. The study of anæsthetics at the present day is a wide one, and involves not only the practical application to surgery, but a knowledge of the physiology of the various agents employed, as well as sufficient clinical acumen to be able to recognise the disabilities of patients, and then make a judicious choice of the anæsthetics to be used in their cases.

A very large and increasing literature upon the subject demands leisure and diligence if a worker is to keep abreast of his subject, and probably few, if any, could afford the time except those whose whole energies are centred in anæsthetics. Certainly students cannot read for themselves such an inchoate mass as the separate papers on anæsthetics have grown to be. Nor is it desirable. If, however, they are compelled to learn the subject, teachers will be equally under compulsion to teach, and will then be in a position to prepare the literature into a digestible form, and possibly "learn by teaching" methods and hints in practice which might have otherwise escaped their notice. I feel very strongly that the inclusion of the subject of anæsthetics in the curriculum will prove equally beneficial to the public, the surgeons, the students, and the expert anæsthetists. It will safeguard the public by ensuring some, if only a minimum, of knowledge of anæsthetics in every qualified man, and, even if it only arouses his sense of responsibility and of the potency of the agents he is employing, it will do much good. It will enable the surgeon to pursue his own sufficiently anxious duties without the added worry about the anæsthetic. It will compel every student to acquire such a knowledge of anæsthetics as will not only enable him to manage routine cases, but will assist him to discriminate such cases as should receive a greater amount of skill and the result of a wider experience than that to which he can lay claim. And, lastly, it will enable the anæsthetists attached to teaching schools to systematise their teaching and experimental work so as to present their results in the best form for the requirements of the students, to whom they would be bound to give the most satisfactory instruction.

Passing now to practical points in connection with this matter, I venture to suggest a plan by which a satisfactory result could be obtained if it received the sanction of the General Medical Council.

1. That a resolution be passed compelling all medical students, before applying for final examination, to afford evidence

(a) Of having studied the practice of some recognised anæsthetist. Such instruction should comprise a course of lectures dealing with the theory of anæsthesia, its physiology,

pharmacology, and practice. This should comprise familiarity with the common agents and mixtures and apparatus.

(b) Of having actually administered nitrous oxide gas, ether, and chloroform. As a minimum, 50 cases might be accepted at which the student has been present, and of these at least 12 should have been conducted by him from start to finish.

(c) Of having obtained a certificate of proficiency from a recognised teacher.

2. That the final examination of students should include one by which their knowledge of anæsthetics can be tested. This should when possible include a practical and *viva voce* examination, and an addition to the surgery paper of two questions, one only of which need be answered. Or what would be better, to give a separate paper with three questions, one being optional. Such a paper need not take more than an hour to answer, as no subject presents greater facilities for examination. In a few sentences any student can make or mar himself when writing of anæsthesia.

Possibly the practical part of the examination may appear less simple. This need not necessarily be so. The experienced teacher will soon detect whether the examinee has a practical knowledge of his subject, and has ever seen or handled the apparatus.

If, in conclusion, I were asked to give one strong reason why anæsthetics should be forced into such prominence, I should say this: Practically every medical man in some stage of his career will be compelled to give an anæsthetic, and by far the majority will have to do so very frequently. Admitting this, and admitting the grave danger which attends want of knowledge and lack of experience in giving anæsthetics, it follows that all students should during their training for their profession acquire a competent knowledge of this subject, and should further be compelled to prove their efficiency before being granted a diploma to practise their profession.

NOTE.

¹ It is obviously most important that some care should be used in selection of such teachers, all of whom should possess hospital appointments.

ON CERTAIN PRACTICAL APPLICATIONS OF EXTRACT OF SUPRARENAL MEDULLA.

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[From the Physiological Laboratory, University of Edinburgh.]

As the result of numerous experiments which have been conducted in this laboratory by Drs. J. D. Slight, J. Malcolm, and W. E. Frost, which are not yet published nor entirely finished, I feel justified in suggesting that a trial should be made of the extract of suprarenal medulla in all cases in which it is desired to strengthen or to induce uterine contraction. The observations which we have hitherto made show that this extract has a far greater power in causing contraction of the muscular tissue of the uterus, whether pregnant or non-pregnant, than any other drug having the same reputed action, and this whether the extract be applied directly to the muscular tissue or be introduced into the circulation. Since the active principle is unaffected by the gastric juice, it can be given by the mouth, but in *post-partum* cases it would doubtless be more advantageous to inject it directly into the uterine cavity, where it would not only tend to produce immediate contraction of the uterine musculature, but also of the uterine arterioles, and thus more effectually control accompanying hæmorrhage. The solution which I would recommend to be used is an infusion of dry medullary substance, 30 grs. to the pint of water. This should be sterilised by boiling and injected whilst still fairly hot. Such a solution is a powerful styptic, and its value in this respect may be still further increased by the addition of 60 grs. of calcium chloride.

Another class of cases in which the extract in question may prove of the greatest clinical value are those of sudden cardiac failure, whether as the result of shock or hæmorrhage, or of an overdose of anæsthetics. In these cases the sterilised decoction, which may be of the strength of 5 grs. to a fluid

ounce and must be filtered, should be injected with a hypodermic syringe very slowly into a superficial vein, or even, in extreme and apparently hopeless cases, into the heart itself through the thoracic wall. I have seen such remarkable results from the application of this method to animals in which the circulation had apparently entirely ceased, and in which the heart has been completely resuscitated by the action of the drug, that I have no hesitation in recommending that it should be tried in this class of cases in the human subject.

The material which we have used has been prepared at my request by Messrs. Willows, Francis, Butler and Thompson, of Aldersgate Street. It consists of the separated healthy medulla of the suprarenal capsules of the ox or sheep, rapidly dried in thin layers at a temperature of not more than 50° C., then powdered and kept in well-stoppered bottles. In this form it retains its activity for a considerable time, and an infusion can be prepared from it in two or three minutes. The exact strength of the solution for the purpose of intrauterine injection is immaterial; any that might be absorbed into the general circulation would be beneficial rather than otherwise. For intravenous injection in cases of cardiac failure a much weaker decoction than that above indicated can be used, but it should then be made with 0.9 per cent. salt solution, and injected warm; a dose of 5 grs. of the dry medullary substance may be introduced into a vein in this way slowly without fear of deleterious results, and may be repeated if found necessary.

SUPRARENAL GLAND EXTRACT IN THE EPISTAXIS OF HÆMOPHILIA.

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SCHÄFER's discovery that the local application of suprarenal gland extract is followed by contraction of the unstripped muscle fibres in the walls of blood vessels first led to the use of this substance in hæmorrhage from mucous surfaces. Since its introduction it has grown rapidly in favour, especially with rhinologists, as a speedy and efficacious hæmostatic in cases of epistaxis, and in bleeding during operations upon the nasal cavities.

It is said that the condition known as hæmophilia is associated with "congenital hypoplasia" (Immerman) of the vessel walls, including, of course, the muscular elements. If this statement be correct, one would expect, says Grünbaum,¹ that in hæmophilia the application of suprarenal gland extract to a bleeding surface would be of little or no use. That writer finds that his clinical experience bears out this reasoning, and as far as I can discover no case has hitherto been recorded which would induce us to reconsider our views. Weil,² indeed, says that in cases of "habitual nose-bleeding" the use of the organic extracts is worth a trial, but he pins his faith to local applications of a 5 per cent. solution of gelatine for the epistaxis of hæmophilia. The following case, therefore, is of value as bearing on this point.

G. B., male, aged 13, was brought to me on February and suffering from "bleeding at the nose," which had lasted off and on for ten days. Ordinary homely remedies had entirely failed, and the boy had become blanched and weak. Insertion of the speculum into the affected nostril—the left—was sufficient to start the flow. No bleeding point was found. Tannin was given for insufflation, and 5 grs. of calcium chloride in water every four hours by the mouth. Next day I was sent for to find his condition unchanged. The nostril was then plugged and the bleeding controlled by a strip of lint introduced from the front. The following day, however, on removing the lint bleeding began again, requiring fresh plugging, and so on daily for seven days. The calcium chloride was dropped after three or four days.

During this time the boy lost little blood, but the appearance of purulent discharge from the constant presence of the foreign body in the nostril, and the discomfort induced by the plug itself, led to a trial of suprarenal gland. Three tabloids (5-grain, Burroughs, Wellcome, and Co.) were bruised to powder, mixed with 5j of water, and allowed to settle. A tampon of cotton-wool soaked in the clear fluid was loosely inserted into the nostril, with immediate success. Violent sneezing accompanied the application of the remedy. A slight recurrence of bleeding some hours after was checked at once in the same way, and there has been no further trouble.

The diagnosis of hæmophilia rests upon the following facts:

Family History.—His father, in youth, bled constantly and freely at the nose; and now bleeds freely with any slight cut or tooth extraction.