

when there is a daily rise of temperature to 102 degrees.

5. That given by the rectum the results are equally as good as when given hypodermically.

6. That rectal injections never cause any unpleasant symptoms, as are occasionally produced hypodermically.

These conclusions, as I say, are based on actual experiments in private practice, and necessarily must be of value to any one using the serum. Most of us, when giving a new treatment a trial, are apt to use it on an old case as a last resort, everything else having been tried. This helps neither the patient nor the treatment; perhaps it may benefit the former a little, but most assuredly injures the latter. It is also of great importance for us to make an early diagnosis in all cases, and if possible to begin treatment in the pretubercular stage. Each and every year many precious lives are sacrificed on the altar of physicians' carelessness in examinations. No matter how slight the trouble may be, he ought to be able to locate it. Our examinations should be both physical and microscopic. It not infrequently happens that on physical examination we detect a lesion, and at the same time a microscopic examination of the sputum fails to show up the tubercle bacilli. One examination in such a case should not suffice; we should make them at stated intervals until some positive diagnosis can be made.

In tuberculosis all of us recognize a wasting disease; such being the case, we must not only endeavor to arrest or destroy the germs by antitubercle serum, but also endeavor to surround the patients with such conditions as are most conducive to convalescence. I shall not dwell on this point, I only wish to call your attention to the fact that this antitubercle serum deals only with the tubercle bacilli, and that it is also necessary in addition to put the patient on flesh-producing food, tonics, and in a good climate. It has been my experience that tubercular patients improve more rapidly in a low altitude than in a high, because as a rule they all have weak hearts, and the higher the altitude the more strain on the heart. I shall not weary you with a detailed report of all my cases, but there are four to which I would like to call special attention:

Case 1.—Young man, aged 28. First hemorrhage in October, 1897, followed by fever and night sweats. Cough troublesome. No appetite. Came to Summerville in March, 1898. Put him on the serum treatment—rectal injections. Improvement began almost immediately. He was allowed to return to his home in Georgia to carry on the treatment. Last reports of his condition are good. Says he has never felt better in his life and weighs more than his average weight.

Case 2.—Male, aged 28 years. Family history good. Contracted phthisis pulmonalis in February, 1895, after having been weakened by two successive attacks of grip. Physical examination showed one spot on apex of right lung, and another in lower part of upper lobe of left lung, posteriorly. It was a typical case, with fever, cough, night sweats, hemorrhages, etc. The patient was ordered in May, 1895, to the mountains of North Carolina, where he passed the summer with little or no benefit. He then came to Summerville in the autumn and remained for two months, when tuberculosis of the hip and testes developing, he was advised to go to Charleston for the purpose of having an operation performed. There his testes were operated upon, but he refused to have his hip joint opened. The pain in the hip had become so intense that the slightest movement in bed would cause extreme agony. At my earnest request the physician in charge kindly consented to treat him with Dr. Paquin's serum, and it was not very long before his hip became much improved. So great was this improvement that in a few months the patient was enabled to walk without the help of crutches and with absolutely no pain.

In every respect he continued to improve and finally in March, 1896, he returned to Summerville. There I continued the serum treatment until the hot weather set in, at which time, for numerous reasons, I stopped it. Not three weeks after its discontinuance the patient developed tuberculosis of the brain, which in the space of two weeks caused his death.

This case is interesting in many points. First the development of tubercles in the lungs, followed by tubercles in the testes, hip and brain; also because of the marked and immediate relief furnished him by Dr. Paquin's serum. And lastly, because it was the only case in which I have observed alarming symptoms caused by a hypodermic injection of the serum.

Case 3.—Woman, aged 35 years. Family history negative. Patient had suffered from repeated attacks of the grip. In the last four years it was her custom to come south for the winter season. An examination revealed a lesion in the upper part of the right lung, I could not say whether it was tubercular or not. A careful examination of the sputa did not show tubercle bacilli. There had been no improvement in health during the last three winters, so in 1897, I placed her under the serum treatment. Immediately after using this serum improvement became quite noticeable, and after three months' treatment I allowed her to return home; not, however, without cautioning her to be extremely careful with herself, and for the next year to use twice a week rectal injections of Dr. Paquin's serum, forty minims at a dose. In March, 1898, this patient reported continued improvement.

Case 4.—Male, aged 25 years. Family history poor. Father and sister had died of phthisis pulmonalis. Patient has had a cough all his life. In June, 1896, he had several hemorrhages; also fever, night sweats, cough, etc. On examination I found consolidation in upper part of lower lobe of left lung. I immediately put him under the serum treatment, with no other medicines. Very soon his hemorrhages ceased, his night sweats were arrested, and his fever left him. His appetite was restored and his strength renewed. Improvement continued until the summer, when the injections of serum were discontinued because of the great difficulty in keeping the serum fresh. In the fall I commenced to inject him again, and since that time he has steadily improved. His gain in weight is eleven pounds, and he coughs only when the atmosphere is damp and moist. I advised him that he could return to his work, but that for the next year he must use the serum by rectal injections twice a week. This case is worthy of observation, because of such a brilliant and successful result in one who so strongly inherited a predisposition to tuberculosis.

April, 1898.—During the past winter he has coughed a great deal, owing to a discontinuance of the serum contrary to my advice, but is now better and at work again, having resumed the serum treatment.

Finally, I want to say again that another year's experience with antitubercle serum (Paquin) has convinced me more than ever of its merits, and I feel sure that after giving it a fair trial you will likewise be convinced.

THE STUDY OF MATERIA MEDICA AND THERAPEUTICS.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics, at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo.,

June 7-10, 1898.

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MINNEAPOLIS.

My views upon the subject were given under this title in the *New York Medical Journal*, May 2, 1896. Some points set forth will be emphasized in this paper. The object of study is twofold: first, to train the mind; second, to give the student knowledge that he can make practical use of. In this age of utilitarianism, the first object is often lost sight of. Teachers of medicine and surgery may even speak of the study of materia medica as useless. Their opinion is based upon the fact that the older one is in the

practice of his profession the smaller will be his list of therapeutic agents. They argue that a student will pick up the necessary knowledge relating to important drugs, in connection with his clinical studies. This is certainly a mistake. The best therapists are men who are thinkers, not machines. The practitioner who uses a therapeutic agent because he was trained to do so by his clinical teacher in his student days, will soon become a back number. The agent may have been the best of its kind in his student days, but the rapid progress that is now possible in therapeutic knowledge may soon displace supposed valuable products by others which prove themselves of greater value. Therapeutic knowledge is becoming more exact each year, and this is due largely to the work of the pathologist and the physiologist.

There are three methods of teaching materia medica: by lectures; in the pharmaceutical laboratory; in the physiological laboratory. It is quite common for a school to adopt one or the other of these three methods, to the exclusion of the other two. This is a mistake. No student should commence the study of materia medica unless he has had at least a year's work in chemistry and physiology. This would prepare him to understand the terms that are in constant use in the study of drugs. The lecture room is the place to begin the study of materia medica. The process here is one of general instruction, of bringing together the important chemic, physiologic and pharmacologic facts. Drugs that have little value can be described briefly by the lecturer, and then receive but little further consideration by the students—possibly never be thought of again, or possibly be brought out and used to good purpose at some future opportune moment. The important drugs should be given due prominence by the lecturer. It would be hard for the student to grasp the necessary points connected with the study of drugs were he to depend upon his own judgment, but a few words from the lecturer should make the way clear to him. Without such help the student would have to wade through a mass of material, and would be unable to separate the wheat from the chaff. For example: consider the study of opium. Without a guide a student would be thoroughly confused by the number of active principles and pharmacologic preparations. Let the lecturer go over this subject with his class, drawing attention to the fact that a knowledge of a few of these preparations is quite sufficient; that, in fact, it would be no great loss if one knew nothing of the opium preparations, provided his knowledge of morphin was accurate. The use of any opium preparation is to secure the action of morphin, so that direct dosage with morphin should be more satisfactory in every way than the use of opium in any form. So also with the preparation of iron. The uncertainty as to the true therapeutic explanation of the action of iron, together with other bases for theories, has been an excuse for introducing a remarkable list of preparations, official and non-official. The student is quite embarrassed by this display of titles. A few words from the lecturer, however, may reduce this confusion of the iron preparations to a few simple principles—stability, local action, remote action, etc.—and thus make the actual knowledge required an easy matter. All these points are as easily given, by lecture, to a room full of students as to small sections of a class. There is also a great saving of labor by this method. The lecturer thus paves the way for the laboratory

instruction. In laboratory instruction, pharmacologic work should be taken up first. This should be taught by a medical man with a pharmacologic training, rather than by a pharmacist with a medical training, otherwise the pharmacologic knowledge imparted to medical students is apt to be overdone. The teaching should be most practical. The course must necessarily be short, for there are many other important things to take the student's time. The medical student does not need to be a pharmacist, but he must have sufficient pharmacologic knowledge to enable him to write prescriptions intelligently.

After the pharmacologic training, the student is ready for the physiologic laboratory, where he may study drug action. This should be the most interesting part of his work in materia medica. It is the most difficult part for the instructor. The work must be done by the class in small sections. The experiments, even in the hands of trained men, are often failures, for one reason or another. This work often takes a great deal of time and yields very poor return from the student's standpoint. The study of the physiologic action of drugs is by no means a simple task, and it is an open question whether it might not be better for the general medical student to accept the conclusions of some eminent physiologist, as to the physiologic action of drugs, rather than try to demonstrate such action for himself. It is a question whether the study of drugs in the physiologic laboratory should not be limited to demonstrations, by the instructor, of a few important truths. It certainly is a question whether the student's individual work along this line should not be classed with the advanced work of the senior year, if taken up at all. He may then be able to apply his combined student's knowledge to the task before him. It is even a question whether the special physiologic laboratory study of drugs should not be made an elective course, so that only those who have a special liking for such work would take it up.

Thus we have the work of the lecturer and of the laboratory instructor combined. The lecturer is an educator in the broadest sense; the laboratory instructor is a practical demonstrator, more important, in a way, than the lecturer, but more restricted in his work.

The student is now prepared to take up his work in therapeutics. This naturally comes in the third year of a four years' course. Therapeutic agents are best studied first in groups, according to action, as anodynes, antipyretics, analgesics, etc. The demand for a therapeutic agent naturally suggests one of these groups. In each group there will probably be but three or four important therapeutic agents. The student learns naturally, through this arrangement, to eliminate those that are unimportant. At the same time, a little reasoning will enable him to appreciate the advantages one agent may have over another of the same group, in any given case. It will also prepare him for the necessity, which sometimes arises, of changing from one agent to another of the same group, under certain conditions, in order to secure the best drug effect, and at the same time, to avoid establishing either a drug tolerance or a drug habit. When the student learns his therapeutics in this way, he will have little inclination to become a prescription copyist, and his tendency will be toward the writing of simple prescriptions, rather than toward polypharmacy. In this system of teaching therapeutics, it becomes unnecessary for the instructor to

devote time to the therapeutics of each and every drug separately. He gives, in common, the points to the whole group, and then points out the advantages and disadvantages, the importance or the uselessness, of each agent in the group. Naturally, he would devote a considerable time to the therapeutic properties of the important agents. In connection with this course, the student must become familiar with prescribing. Three methods of using drugs are now in vogue: the hypodermatic method; the bedside dispensing of drugs; the use of prescriptions. The student would readily become familiar with the first and second methods. The third method is a little more difficult to follow. Instructions should, therefore, be given in prescription writing, drawing attention, not only to the action of drugs prescribed, but to the form of prescription, compatibility of parts, both chemically and physiologically, and last, but not least, if the prescription is for internal use, its palatability. This work should place the student in good form for his duties at the bedside.

The work that I have so far outlined, as belonging to therapeutics, should occupy time extending through the third year of a four years' medical course. In the senior, or fourth year, the work in therapeutics should be continued, but along very different lines from those pursued during the previous year's study. There should now be an application of the knowledge which the student has already acquired. The therapeutic teaching should be connected with clinical work. It is not enough to study a case simply to arrive at a diagnosis. That may satisfy the physician's curiosity, but it will not satisfy the patient. Something must be done to cure the patient, if possible. If this is not possible, it is at least necessary to do all in one's power to guard against complications, to pilot the patient through to a safe termination of his troubles, or to at least produce euthanasia when dealing with those cases where death is the only ending for suffering. There are nihilists in therapeutics, but these are men who are not willing to consider the comforts of their patients. We should take great pains not to have any therapeutic nihilists among our students. The instructor in therapeutics for this final work should be a clinical teacher, one who appreciates the points I have just referred to as bearing upon the comfort of his patients.

I have thus outlined the teaching of materia medica and therapeutics to extend over a period of three years. This has not been with the purpose of loading a great deal of work upon the medical student, but rather of giving him a little at a time, in order that he may understand the subject thoroughly. The work could be done in one year, as far as time is concerned, but it would then be simply a process of cramming, and the results could not possibly be satisfactory.

SOME PREPARATIONS OF THE NATIONAL FORMULARY.

Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-ninth Annual Meeting of the American Medical Association held at Denver, Colo., June 7-10, 1898.

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At the meeting of this ASSOCIATION in 1893 I had the honor to read a paper¹ before this Section, in

¹"The National Formulary." Read by invitation in the Section on Materia Medica and Pharmacy at the Forty-fourth Annual Meeting of the American Medical Association.

which I outlined some of the conditions that have had marked influence upon the practice of pharmacy in its relation to that of medicine. I pointed out that the modern practice of prescribing medicaments of special manufacture had become a burden upon the pharmacist which, if not relieved, would surely end disastrously to those who, adhering to the ancient landmarks, strove to supply their patrons with medicaments of their own manufacture or of generally recognized and officially accepted composition. Indeed, the thought has impressed itself more and more upon my mind, that if physicians had entered into a conspiracy to drive the educated and qualified pharmacist out of business, they could not have pursued a more certain method than that which has become a common practice during the last decade. In my personal experience, drugs, chemicals and pharmaceutical preparations which were considered indispensable under the older practice now remain unused on the shelves or become ruined before they can be disposed of; and this in face of the fact that these same drugs, chemicals or preparations are the component parts of, or are represented by, the preparations of special manufacture now popularly prescribed.

So simple a drug as gentian root is made into a palatable and slightly preparation by the aid of some aromatics, wine and glycerin, and, with the assurance of the manufacturer that it has taken years of study to perfect the formula, it is at once successfully launched into popular favor among prescribers, and takes the place of old and well-known preparations over which the new one possesses no tangible advantage. But a more serious manifestation obtrudes itself as a consequence of the modern practice. Formerly the physician, confining his prescription to drugs, chemicals and preparations of officially recognized quality and composition, knew exactly what he was prescribing and the patient accepted his prescription without inquiry. Now, the patient is familiar with the name or title of the medicament that is being prescribed for him, and is more than likely to ask for it without prescription, while neither he nor the physician has a true knowledge of its composition; for such knowledge is in most instances based upon more or less obscure or misleading statements borne upon the label or upon the circular accompanying the preparation.

Under these conditions it is not to be wondered that the purely commercial element has overwhelmingly gained ascendancy in the practice of pharmacy and that the professionally inclined are largely in the minority, I was about to say hopelessly so, but I am unwilling to concede that. I have occasionally met with the statement that, as applied to politics, the minority is always in the right. However this may be of politics, I am not sure that it applies with like force to the revolution that has invaded the practice of pharmacy; but I do believe that, with persistent effort, and with the aid of thinking men in the medical profession, the minority will eventually lead the majority into channels in which the commercial shall be subservient to the scientific and professional qualifications. Among these efforts perhaps the most important is the successful introduction of authoritative formulas for the preparations that are now popularly prescribed, and the acceptance by physicians of the preparations made in accordance with such formulas by reputable pharmacists everywhere. This has been the aim of the American Pharmaceutical Association.