

SOME IDEAS ABOUT THE TEACHING OF PRACTICAL PHARMACY.*

BY ZADA M. COOPER.

No doubt all teachers whether of theoretical or practical subjects hear over and over again comments like these: "Why must we learn this?" "What good will this do us?" "We shall never make use of that when we get out of college." Students are, perhaps, too much inclined to think only of the practical, utilitarian value of their curriculum and they do not realize, either, that they are not often competent judges of what is valuable. Only those who have completed the work and who can look back upon it, as a whole, in the light of some years spent in application of the knowledge gained, are competent to distinguish between essentials and non-essentials. Naturally students do not know this nor will they take anybody's word for it. Youth seldom accepts at face value the statements of experience. They cannot believe until they see for themselves. The universality of this attitude demands infinite patience and tact.

One can only try to have them understand that what to them may seem impractical is often quite practical; one must attempt the more difficult task of showing them that they are learning fundamental principles which make the foundation upon which they are to build the superstructure of practical knowledge; that without one, they cannot comprehend the other.

The student himself does not know in the beginning, much less does the instructor, which of the various phases of pharmacy he will finally adopt as his own. If it could be known in advance, some adaptation might be made, though probably the two years of college is none too much to make the foundation sufficiently broad for later specialization.

The teacher must keep constantly in mind the necessity of making the practical application of what seems purely theoretical; close correlation must be the aim. On the other hand, being aware of the attitude of the student body, teachers must be ever on guard against minimizing fundamentals in order to reach, quickly, the more practical features. Only the perfect instructor could maintain this nice balance and doubtless we all fail at times in one or the other particular, since, "to err is human."

I fancy one is much more likely to meet this criticism of lack of practicality in laboratory courses than in theoretical ones because in the latter the student may accept as unavoidable a certain amount of pure theory and, therefore, be less critical. In the laboratory work of courses in practical pharmacy one frequently hears the statement: "We shall never do this when we are in actual business. The statement is true at times, but it should also be true that those very preparations should be chosen with the idea in mind that even though it may not be practical to make them in the ordinary drug store, there is something involved in the process that students should know about. It may be a chemical reaction that can be better understood by seeing it; it may be some method which is typical of a class of preparations or possibly just the technique. Dr. Hadley has said something about an ideal education which is much more sweeping in its scope but whose principle is applicable here. It is that an ideal education is "one where

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the student learns things that he is not going to use in after life but by methods that he is going to use."

It is true that pharmaceutical technique may be developed in a course by itself but a well planned course in manufacturing or galenical pharmacy will be sufficiently comprehensive to include all the processes and methods that would be taught in a separate course. The one should be interesting whereas it might be difficult to make the other anything but dull. It is only another instance of the advantage of the concrete over the abstract. For instance, familiarity with the various weights and their relations to each other will be acquired if formulas involving all systems are used in compounding. Each student, in his second year, if not from the very beginning, should have in his laboratory equipment not only metric and apothecary measures but his own prescription balance with both metric and apothecary weights and, for the bulky weighings which require it, larger balances and avoirdupois weights should be available. By a judicious system of checking, the senior student may be permitted to make all his own weighings and, little by little, almost unconsciously, he learns to think in terms of any system. Likewise, in his regular compounding he learns the applications of heat; for example, vaporization, distillation and sublimation. Ample opportunity arises to apply the principles of comminution, solution, filtration, precipitation, crystallization and percolation. A well chosen list of U. S. P. and N. F. preparations will insure skill in all ordinary manipulations and if such a list is supplemented by other formulas many difficult operations are learned.

Perhaps the ideal pharmaceutical laboratory is one which has a close connection with a hospital dispensary. However large the number of official preparations may be, many unofficial ones are called for, also, and the very great diversity opens up a real mine of practical information. Hospital affiliation also makes possible the compounding of large quantities sometimes. At first glance, that may seem insignificant, but with a little more thought it ought to be plain that if the student makes preparations only in quantities of a few ounces or a few mils he will be awkward and helpless if expected to prepare something in 5-gallon, 10-pound or 20-liter lots. If his preparations are always made in small quantities and he knows the work is experimental and that the finished product is to be thrown away he not only does not learn the technique of larger quantities but more than that he often does not feel the necessity of absolute accuracy. If it looks right and will pass the censorship to which it is subjected he is, perhaps, satisfied. If, however, he knows that it is to be administered to some patient in the hospital across the way he feels the responsibility of being absolutely right, he knows that life or health depends on its correctness. If he has a conscience he tries harder to make it right or, failing in some particular, even though the result would not show it, he admits his mistake at the risk of a lower rating, but because it might do harm.

Possibly that sounds like the millenium and it must be admitted that we haven't reached it even in Iowa and no doubt human nature remains about the same in Indiana or Pennsylvania. Frankly, we have always with us the conscienceless student who will be careless at any cost. Any system such as I have described means added responsibility for the teacher, much more careful scrutiny of everything, and, moreover, it means our presence, constantly, in the labora-

tory. But is it not worth while? If the student feels all through his college career the necessity of being right, will he not have acquired at the end of two years a developed conscience, an ingrained carefulness? Will he not have learned that he is serving the human race and that carelessness is criminal?

Closely associated with this idea of what is practical and what is not is the question of the advisability of preparing for student use a laboratory manual giving detailed information about each preparation. That such a system has some advantages cannot be denied, but they are so far outweighed by the disadvantages that bare mention of them should suffice. Briefly they are: fewer mistakes, assurance that each student has all of the explanatory notes that he needs and that if he reads the lesson at all he is not missing important points, a conviction that you have prevented copying from another's notebook, less labor involved in conducting laboratory classes. On the other hand, it is bad pedagogy, it subverts the whole conception of what constitutes study. Students do not learn to do things for themselves, like reducing or enlarging a formula or modifying it in some particular as we may often wish them to. They need this drill. Even if they make mistakes, and they are sure to make many, they will learn by those very mistakes. They learn, too, to be more careful. Above all there is an objection which in itself should be sufficient to preclude the adoption of such a system except for any but beginning classes. I mean the doing of a lot of work for a student. Every student needs to search out his facts himself, at least all that may be found in the common reference books. He will never do this if these facts are supplied him; his energy and time will be used in some other way if used at all and his initiative will atrophy.

No small part of a man's education consists in knowing how to find his facts, where to look for them, how to make good use of reference works. No one can pretend to remember all of the things that he will need to use. If, however, one knows just where to turn for the desired information, that is sufficient.

A laboratory manual fosters the habit of memorizing. The student learns the statements parrot-like. For a poor thinker it seems likely that such a system would give him a greater store of facts than otherwise, for it is only too true that it is impossible to make real students out of all. On the other hand, this would be at the expense of developing in many the studious, investigating, know-the-reason-why sort of attitude. And after all was not the educator partly right who said: "What we should seek to impart is not so much learning as the spirit of learning."

TAXATION.

Giving to the Cause impoverishes our business and hence impoverishes the nation. An impoverished nation can't win wars.

Earning for the Cause, by increasing production and reducing costs, strengthens our business and hence strengthens the Nation.

Nations whose business men first get this point of view, and put it into practice, will be the real winners in the present conflict.—*Babson's*.