STATE BOARD EXAMINATIONS.*

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It has often been the subject of comment and inquiry that so many candidates fail in the examinations conducted by our Board. There are various reasons for these failures. The Board arranges its examinations with the greatest possible care, and spends more time in conducting them and marking the results than probably any other board in the country. It endeavors, so far as possible, to avoid questions which necessitate memorizing abstract facts of no particular value, and avoids difficult prescriptions and incompatible preparations. But it is very difficult for a board to frame questions and assign practical work that will fit the mental capacity and mechanical ability of the majority of the candidates who appear before it, unless such board considers its work merely a perfunctory duty, to be disposed of in the easiest manner and in the least possible time.

The prevailing thought among the candidates of to-day seems to be to get through every task with the least possible exertion; and, therefore, it is impossible for these to show even fair knowledge or skill in pharmacy in the length of time they devote to the study of it and the manner in which they use their time.

The idea seems to be general that a thorough knowledge of pharmacy may be obtained by the average student after four years' experience in a modern drug store, or two years in such and two years in a school of pharmacy. Such a feat is not impossible, but the students who would burn the amount of midnight oil necessary to its accomplishment are comparatively few.

The young people of to-day, as a class, are not studious; they are pleasure-loving. At school, college, and university they waste a great deal of valuable time in outside activities and social enjoyments, and "cram" for examinations.

I am a firm believer in a proper amount of recreation and social enjoyment, but these should never be allowed to interfere to any serious extent with the course of study. There are, of course, in every school some who can devote a great deal of time to matters outside of the prescribed course and still keep their work up to a high level, but the majority cannot do this. When those who have wasted valuable time in one way or another appear as candidates before a quasi judicial body, such as a Board of Pharmacy, and are given examinations to determine how much of their education has been retained and how much has filtered through, then we hear complaints of the unfairness of some of the questions, the difficulty of the examinations as a whole, or the objectionable personalities of the examiners as excuses for ignorance, carelessness, or both combined.

In case you may think these strictures too severe, let me give you a few answers, taken at random, from recent examination papers:

"Rhizomes are Mediterranean stems which grow underground."

"Pilocarpus is broom tops."

"Phenol is obtained from the destructive distillation of wood."

"The source of phenol is the mines of Germany."

"Pepsin is taken from the inside of a hog; the pancreas is taken out and dried and kept in air-tight bottles."

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* Read before the Scientific Section of the Minnesota State Pharmaceutical Association, Minneapolis, February 9, 1916.

" Pancreatin is taken from the calf. It is prepared in nearly the same manner as pepsin."

These last two answers are by the same candidate.

" A fixed oil is an oil that is made by distillation or other process, and an essential oil is an oil made artificially by dissolving in an alcoholic solution, such as perfumes, etc."

" State source of paraffin." Answer: " From the whale."

" Pepsin is found in the lining of the abdomen of the hog."

The last two answers are from graduates in pharmacy.

" Pepsin is found in the bile of a sheep. Pancreatin is from the fat of a hog. Pancreatin is obtained from hops or barley. Linseed oil is obtained from the cotton seed."

All of these are answers from the written portion of the examinations.

Now let me give you a few examples of how the practical work was done. Every candidate is compelled to bring with him a copy of the U.S.P. and N.F., and they have these books before them in all practical work.

" Prepare one dozen compound cathartic pills," was one of the instructions given at the last examination. The completed pills varied in weight from 22½ to 80 grains. Another example was: " Prepare six Seidlitz powders." Many of the candidates did not weigh the powders, but divided them by eye, with the result that the blue papers varied in weight in the same half dozen from 16 to 53 grains. Several of those who weighed the powders had differences of from 15 to 30 grains, and in one case 9 grains difference in the white papers. This set of Seidlitz powders, which I now present for your inspection, was made by a candidate who has had three years' experience in a drug store, but has never attended a school of pharmacy. He thought he had a good chance to become a registered assistant by examination. He had never seen the inside of a Seidlitz powder. He had never sold one except in the original wrapped packages bought from the manufacturer. The blue papers contain about 1½ grains each and the white ½ grain.

A prescription for an ointment was presented containing one drachm of mercury and two drachms of wool fat. One candidate turned in 4 drachms and 18 grains of finished product, another 3 drachms and 38 grains, and in both cases a considerable quantity was left in the mortars.

Another candidate asked for and obtained nitric acid to extinguish the mercury before adding the wool fat. Another used 1 drachm of mercuric iodide (which had been supplied for making Donovan's solution) instead of mercury.

At an examination some time ago a candidate was asked to make 12 pills of alion, strychnine, and belladonna. He took the quantity for 100 pills and divided it into 12. Scores of examples similar to the above could be taken from the results of every examination, but I think I have given enough to account for the percentage of failures being as great as it is.

Such answers show ignorance, carelessness, and lack of reasoning power, yet all of the candidates who wrote these and did the practical work just mentioned believed themselves qualified to act as pharmacists or assistant pharmacists.

What is most needed to raise the percentage of success in our examinations is to rid ourselves of the idea that a knowledge of pharmacy sufficient to entitle a person to practise it with safety to the public can be obtained in a " catch-as-catch-can " manner. It cannot be obtained by simply putting in the prescribed time in the average drug store without systematic study, or by merely attending classes in a school or college of pharmacy. Pharmacy to-day is more complex than ever. The old order of things has changed. New drugs are being used and more com-

plex preparations are in vogue than ever before. The standards of quality for all drugs are being raised, and the tests for purity increased. The pharmacist of to-day is expected, and rightly so, to be able to determine the quality and purity of the substances he uses; thus the demands made upon the student of pharmacy are constantly increasing and more time and study are required than ever before to meet modern conditions—probably more, you may say, than the remuneration of the calling warrants; but that is the fault of business conditions, not of the practice of pharmacy.

THE SAME CHEMICAL ELEMENT MAY HAVE DIFFERENT ATOMIC WEIGHTS.

Until recently it has been assumed that a given chemical element must always possess the same atomic weight, no matter from what mineral it is obtained. The inclusion of the radio-active elements in the periodic system, effected by Fajans and also by Soddy about a year ago, shows that we must assume the existence of elements which vary as much as 8 units in atomic weight, with corresponding variations in their radio-active properties (rays emitted, rate of decay, etc.), without any change in their chemical behavior. In reviewing the subject, *Umschau* observes that this conception was based on indirectly proved, or inferred, properties of the short-lived radio-active elements. Hence it was important to prove by direct experiment that two elements that appear chemically identical may have different atomic weights. The way to such an experimental demonstration was pointed out by Fajans, who concluded that the atomic weight of the lead formed in uranium ores, in the course of millions of years, as the final product of the disintegration of uranium, probably differs from the atomic weight of lead extracted from common lead ores.

This conclusion has now been confirmed experimentally by very careful determinations of the atomic weights of specimens of lead of diverse origins. The research was suggested by Fajans, and was carried out by his former assistant, Lembert, in the laboratory of Prof. Th. Richards in Harvard University, which is celebrated for its accurate methods of determining atomic weights. The atomic weight of lead obtained from uranium ores was found to be 206.6, while ordinary lead gave the distinctly different value 207.1.

The uncertainty attaching to these results is less than 0.02, and is consequently very much smaller than the observed difference. It is notable that these two varieties of lead appear to be identical, spectroscopically as well as chemically.

Analogous considerations make it appear probable that the lead of thorium ores also differs in atomic weight from common lead, but is atomically heavier than the latter. Possibly common lead is a mixture of uranium and thorium lead.

The question naturally arises whether the observed atomic weights of most elements are not merely mean values of the atomic weights of several elements which are chemically identical, and consequently not separable by chemical methods. The study of atomic weights, therefore, is confronted with a wholly new task—the investigation of the atomic weights of elements as affected by their origin—*Scientific American*.
