

holds a position of responsibility in a large department store requiring frequent computations. She also failed. The third person was also a college graduate, but she had majored in mathematics. She made a mess of it.

In all three instances, I cared less about a correct answer than about the method of approach. So simple is the problem that, with a realization of the meaning of the word percentage, neither addition nor subtraction, division nor multiplication, the stumbling blocks even of expert mathematicians, need be involved. Yet all three tried to follow a rule, but failed to apply it successfully. Had they forgotten their rules and applied a modicum of reasoning they could not have gone wrong.

It is this failure to apply reasoning that is responsible for so much of our failure in education. If the teacher and examiner are satisfied with memorizing, what else can we expect of student and candidate?

What applies to Arithmetic, applies equally to Chemistry. In the simple statement of the U. S. P. on the volumetric estimation of  $\text{NH}_3$  in ammonia water, with the actual factor given, most candidates could not give a rational explanation of its derivation. The answer given, they could not utilize the simple chemical equation, quantitatively interpreted, to show how it was derived.

We hear much these days about comprehensive examinations, a final cramming course, as a college president recently termed the latest fad in pedagogy. Yet with a whole page of U. S. P. text, and a dozen suggestions in the form of questions, few candidates will write more than fifteen to twenty lines for an essay of the subject under consideration. True, some will come with the smart Alec trick and use the words of the U. S. P. text slightly rearranged. But even when subdivisions of the topic were suggested, this aid to the candidate proved of little avail. Again something is radically wrong with our method of teaching if our graduates do not know how to express themselves. Also, State Board questions for fifty years have contributed nothing to this capacity on the part of candidates.

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### STATISTICS OF INTEREST TO PHARMACY.\*

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At the 1935 N. A. B. P. convention in Portland, Oregon, the far-seeing Dr. Robert L. Swain presented a resolution, which was adopted, outlining a statistical survey and citing the necessity for a full understanding of the conditions under which Pharmacy is practiced in the various states as the soundest basis for legislation and pharmaceutical betterment.

The resolution was very explicit as to the types of information to be gathered and the central office of the ASSOCIATION undertook the job without realizing just what we had bargained for. We willingly admit, however, that the background of information gained as a result of this study has been of inestimable value to us in our work.

We have all heard of the three types of liars—of which the worst is the statistical liar. Statistical methods are simply a set of tools which are used to obtain,

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analyze and present a large mass of data. The measurements can be made as accurately as the mathematical formulas permit. The error comes in when statistics are used to prove something, a use never intended. The conclusions reached on the basis of the figures are only as good as the logic and common sense of the person formulating them. Hence interpretations often do not agree. In our N. A. B. P. survey published in 1936, we drew no conclusions—simply commented upon conditions in each state and the person reading the report is given the privilege of formulating his own conclusions.

One of our great surprises was the wealth of information available, particularly from the Census reports over a period of years, which Pharmacy seems to have more or less disregarded, particularly of a commercial or economic type.

To give an example: In the Census of Business—Retail Distribution, you will find the independent drug stores of the country classified as to volume of sales; also the chain and mail order outlets. Did you know, for example, that the largest of the independent groups is the class doing from \$10,000 to \$20,000 worth of business per year and it constitutes 32.6% of the total stores? Some one asked us recently "How many drug stores in the country do over \$20,000 business annually?" We searched the census reports and found the answer: In 1935, 29.6% of the stores in the country were in this class. Only 3.8% of the independent stores were in the \$50,000 or over classification but 64.7% of the chain and mail order outlets were in that class.

As boards of pharmacy, however, these commercial and economic questions are of interest to us only in the sense that a pharmacist must make money to remain in business and be able to render professional services when needed. So we carefully studied the per capita expenditure in various states, the number of stores on a population basis, the number of pharmacists and students in proportion to stores and population, etc. These commercial statistics, however, are of little value in judging the number of pharmacists needed. Legally anyone may sell proprietary remedies, cosmetics, cigars, fountain drinks, etc., which constitute a large portion of the total sales volume. Only 12.2% of this volume is prescription work, 34% is drugs, including patent and proprietary sales, and the balance of the items are not exclusively restricted to the drug store.

In the end, we found that no two states were exactly alike and that each needed a careful study of underlying conditions. Some states seem to have too many pharmacists and too many drug stores—others seem to have room for greater development. However, there seems to be a fundamental and constant adjustment of supply and demand which probably can be trusted as a better regulator than any device we may be able to set up. So long as our system of reciprocity functions smoothly, a redistribution of pharmacists can be worked out with little delay as changing economic conditions in the various states warrant.

The argument has been advanced that if there is an expansion in retail drug store sales back to say the 1929 level, there will be an acute shortage of registered pharmacists. This viewpoint cannot be logically accepted, in view of the fact that a considerable proportion of this increase is in items not restricted to the drug store. Prescription work is probably the most stable item. The number of physicians in proportion to population does not vary greatly, the annual cost of illness has been computed so that group clinics and even hospitals are able to quote annual rates at

so much per capita, and if we were to make a detailed study of the number of prescriptions compounded annually and other like professional services, we would probably find them equally stable. In fact, such a study should be undertaken by the various state associations.

Several estimates from reliable sources place the annual volume at 200,000,000 prescriptions, which is less than ten per drug store daily and less than six per pharmacist, although, of course, not evenly distributed. However, inasmuch as the pharmacists of the nation are constantly urging that the physicians write more prescriptions and various campaigns have been undertaken to bring this about, the number could probably be doubled without much difficulty other than perhaps a shifting of personnel in certain locations. The boards of pharmacy have no right to go beyond their legal prerogative and that is limited strictly to the professional duties for which a license is issued.

Last year, Dr. E. F. Kelly read a paper at this Section in which he estimated the needed replacements in personnel at from 3 to 3 $\frac{1}{2}$ % of the total number of registered pharmacists, or approximately 3000 to 3500 new registrants annually. The N. A. B. P. studies show that close to this number have been registered each year for the past three years when the count was taken. Just to check up further, particularly after the discussions at last year's convention, we ran through the trend of registration as established for the eleven-year period 1925-1935, inclusive, and found that our final total was approximately 3300. It was necessary to make reasonable estimates for some of the states where no detailed data had been submitted.

The vital need of pharmacy, in our opinion, at the present time is to get a sufficient number of *adequately trained* pharmacists. Of these, there seems to be a shortage. We find this reflected in the contradictory reports from time to time. For example, we hear that the entire graduating class have positions months before the college term is over, and then on the other hand, we have reports from that same state of registered pharmacists unable to secure employment. Questioning often reveals that the latter class have had little or no college training, are too old, etc.

Also, there are many avenues of endeavor now open to the young man or woman receiving the four-year degree in pharmacy and it is not surprising to find some of them choosing lines of endeavor other than retail pharmacy. Again questioning reveals that the principal detriment so far as retail pharmacy is concerned is the long hours. Recently a young man who had deserted Pharmacy for football coaching asked why he should be expected to work for 40¢ per hour, when an unskilled laborer can earn that. Retail Pharmacy needs to keep a goodly number of these four-year graduates, particularly in view of the rapid progress being made in the field of new medicines. Such men have the basic scientific training to approach the physician in detailing for the pharmacist, and there is no reason why the individual pharmacist should not detail the physician as the manufacturer does. He is in a better position to do so, and it is the only way in which he can build up his prescription department. With efficient management and coöperation, hours can be cut without too great a loss in sales. Here, then, is a problem retail Pharmacy must consider and solve.

Now for a few figures to live up to the title of the paper: In June 1936, there were 8184 students enrolled in colleges of pharmacy; in June 1937, 8424 students

were in school; in the latest count June 1938, the number was 8190. In other words, the 3% increase of last year has again been wiped out. A contributing factor, however, has been the enforcement of the four-year course as the minimum in New York. While the enrollment totals for 1936 and 1938 are practically the same, there is an actual increase of approximately 150 students in other states because of a decrease to that extent in the New York figure.

A study of the student count by states and groups of states reveals a variety of trends. For example, we find that in *six* states Maryland, Massachusetts, New Jersey, New York, Oklahoma and Rhode Island enrollment has steadily decreased over the three-year period. However, all but one of these states had more students per store in college than the national average for 1936, so this may be a natural adjustment.

We find another group of *nine* states in which the enrollment has steadily increased during this period. These states are: Alabama, Connecticut, District of Columbia, Kansas, Kentucky, North Dakota, Ohio, Texas and Wisconsin. In Texas, the 1938 enrollment is 75% over that of 1936—but this is readily understandable to anyone in touch with conditions in that state.

There is another group of *eight* states, in which the June 1938 enrollment is above that of June 1936 but does not quite equal the higher figure established for 1937: Colorado, Minnesota, Missouri, Tennessee, Virginia, Washington, Georgia and Michigan.

In the final group of *nine* states, the 1938 enrollment is lower than that of either 1936 or 1937 but the decline has not been progressive: Illinois, Nebraska, Indiana, Iowa, Louisiana, Mississippi, Montana, Oregon and South Dakota.

Here is a point we want to emphasize: We brag that Pharmacy is almost universally on the four-year college basis and yet only about one-half of the 3000 pharmacists we register annually are graduates, if we compare the senior student count with the number of board registrants for the same year. This spread seems to be too wide—not all of the balance can be flunkers from previous years, or those just completing experience requirements. A considerable portion must still be quiz school products or assistant pharmacists and others coming in under special exemptions. Here, then, is the real problem—to fight and cut down on these exemption leaks so that an increase in college enrollment will be warranted.

The opportunities in Pharmacy, as in everything else, are limited. When we let poorly trained men in by the back door, we deny ourselves the better trained material that would be willing to come in by the front door—by meeting the degree requirement.

While the N. A. B. P. has opposed the use of publicity seeking to attract High School students into Pharmacy on the plea of a shortage of pharmacists, the ASSOCIATION realizes the necessity of eventually building up a larger student body so as to have say 3000 graduates available annually. To foster this, the central office sponsors a free vocational guidance service and sends out hundreds of envelopes of printed material to High School students, vocational guidance counselors, authors of vocational texts, etc. These valuable contacts should assist in attracting the right type of students from a long range point of view. The vocational guidance counselor wants facts not propaganda and for that reason statistics seem to be the most sought after form of information.