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The following paper by Professor Briggs together with discussions by Drs. Burlage and Langenhan are very timely and of considerable interest to all teachers in colleges of pharmacy, and of particular interest to those who teach the subject of pharmacy. How many of the professors of pharmacy will agree with Dean Briggs' statement that "the work included in the Syllabus outlined under 'Theory of Pharmacy and Pharmaceutical Technique' is overemphasized and is receiving an unwarranted amount of time and credit?" Rarely do we find the professor of any subject stating that the time devoted to the subject is in excess. We will all admire Dean Briggs for his outspoken attitude, but will we agree with his conclusions?—C. B. JORDAN, *Editor.*

THEORY OF PHARMACY AND ACADEMIC STANDARDS.

W. PAUL BRIGGS.*

The beginning of the academic year 1932–1933 marked a mile-stone in pharmaceutical education. After half a century of very questionable requirements in quality and quantity, pharmaceutical degrees were brought to a parity with accepted academic standards. The Bachelor's degree carries with it certain implications of learning as well as rights, privileges and responsibilities. The B.S. degree stands for a rather definite level of attainment in the various fields of knowledge. In most instances the Baccalaureate degree in any major division of knowledge is accepted as the equivalent of the same degree in any other division. Thus, through resolution, the Profession of Pharmacy has placed the educational requirements of future pharmacists on the same plane as Engineering, Law and other respected professions. But resolutions, traditional degrees and *laissez faire* methods will not succeed in creating or preserving respect for the B.S. in Pharmacy degree. Such respect and acknowledgment can only be attained and preserved if the educational elements leading to this degree are sound and academically comparable to the elements forming the basis for other B.S. degrees.

Consider the traditional course usually titled "Theory of Pharmacy." It seems unnecessary to define this title or to describe its scope. Almost every college of pharmacy gives such a course, and the usual textbooks on Pharmacy devote from 168 to 256 pages discussing the theory of Pharmacy. The Pharmaceutical Syllabus requires 256 hours of Theory of Pharmacy, and Pharmaceutical Technique, which, the Syllabus recommends, should parallel each other. Without challenging the need for such instruction, for the moment, consider this fact; 192 didactic hours of Theory of Pharmacy and 64 laboratory hours of Pharmaceutical Technique, assuming that these courses measure up to established academic standards, would receive 13 $^1/_3$ credit (semester) hours, or over 10% of the usual 120 credit (semester) hours required for the B.S. degree. Bear in mind that this requires more time and more credit (semester) hours than Organic Chemistry and more than Botany and Physics together. Can this be justified academically? With due respect to the purposes of the Syllabus and to the objectives of pharmaceutical educators, I submit that it cannot be justified and further that when these

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two pharmacy courses and any other academic course are compared, the results will place pharmaceutical education on the defensive.

Over one-half (Sections B and C) of the outline in the Syllabus under Theory of Pharmacy deals with simple details which are necessarily considered in other courses. In discussing, for example, Sulphur or Alcohol under Theory of Pharmacy we are advised by the Syllabus to teach, ". . . .commercial phases . . incidents of historical importance . . nomenclature, official status, official uses, official preparations, classifications, pharmaceutical uses, methods of handling, preservation, etc." Sulphur and Alcohol, and every other item covered by Sections B and C of the Syllabus, under Theory of Pharmacy must be studied under some other course, such as Inorganic or Organic Pharmaceutical Chemistry. From an academic point of view these facts should be considered at the time these compounds are presented in the courses in Pharmaceutical Chemistry. It is probable that such information is now given in the courses in Pharmaceutical Chemistry, thus duplicating effort and needlessly consuming valuable time.

As to Sections A and D, I feel that the material suggested by the Syllabus is pertinent. However, it appears that tradition has been used as a yardstick rather than progress in developing Section A. The present-day student is educationally far advanced over those of fifty years ago, and Pharmaceutical practice has undergone far-reaching changes. Many students entering upon the study of Pharmacy to-day have had courses in High School Physics and Chemistry. Physics is recommended by the Syllabus, required by many colleges, and should be a part of the scientific training of all pharmacy students. With these conditions in mind, does it not seem that we are overemphasizing, under Theory of Pharmacy and Pharmaceutical Technique, the teaching of ". . . Heat, Evaporation, Solution, Crystallization," etc? This knowledge a student should certainly have but it is not necessary to devote two courses to teaching it. In his laboratory work in Botany, Chemistry, Physics and Pharmacy he actually carries out each of these processes, and does so with a definite objective. Such training is far more valuable than when done in an abstract manner. Preparing Fluidextract Belladonna leaves by percolation presents a vivid picture which is not soon forgotten, but packing a percolator with sawdust smacks of kindergarten methods.

I have discussed in detail the Syllabus outline for Theory of Pharmacy and Pharmaceutical Technique with the members of our Chemistry Department. It was found through this conference that every process and theory, outlined under Pharmaceutical Technique and Section A of Theory of Pharmacy, was actually employed in either the Chemistry or Pharmacy laboratory courses. The scope and methods of teaching General or Inorganic Chemistry have been fairly well fixed and in the majority of universities an 8-credit hour course of 2 lectures and 2, 3-hour laboratories per week for a year is given. No special course is given dealing with technique or process, but when a process is used for the first time, the instructor explains it, and the student proceeds immediately to employ the process to a definite objective. Now, if in teaching Chemistry, the student learns about filtration, precipitation, etc., and uses this knowledge as a means to an end, why in teaching Pharmacy, should the same processes and techniques be taught as Theory of Pharmacy? My answer is that we have been playing "Follow the Leader." Large books were written fifty years ago which attempted to cover

every phase of the practice of pharmacy. They were, in most cases, prepared for apprentices who never expected to attend College and who often possessed less than a grammar school education. To these young men the words filtration, precipitation, vaporization, etc., were terrifying and mysterious and they needed a simple description of the processes and techniques involved. But such is not the case to-day. Chemistry courses have shown us that freshmen students can work intelligently in the laboratory without spending 256 hours learning a few simple principles. A few pharmaceutical processes, such as drug extraction, may require more than superficial discussion and demonstration, but most of the work in Pharmaceutical Technique and Section A of Theory of Pharmacy, which is not covered in other courses, could be incorporated as a part of Operative Pharmacy. The old argument that repetition impresses facts upon students may be brought out in defense of the Syllabus. I would answer that argument with two questions. In what other academic courses is duplication resorted to? Are we willing to admit that pharmacy students, apart from all other university students, require repeated drilling in order to acquire knowledge? We should ask ourselves these two questions when we attempt to justify Sections B and C under Theory of Pharmacy. The propriety of Section D is granted but its position in the curriculum is questioned.

Personally, the best results have been obtained by combining the material covered by the Syllabus under Theory of Pharmacy, Pharmaceutical Technique and Operative Pharmacy, and deleting those parts here objected to. For these three courses the Syllabus requires a total of 448 hours. The set-up which has given satisfactory results is a 10-credit (semester) hour course of 96 hours of lecture and 192 hours of laboratory, a total of 288 hours, or $^1/_3$ less than recommended by the Syllabus for the three courses. In this course everything is carefully covered that the Syllabus includes under Operative Pharmacy. This work is preceded by lectures and demonstrations of the important features of Theory of Pharmacy and Pharmaceutical Technique, omitting those parts which are superfluous or which are adequately covered in other courses. Part D, under Theory of Pharmacy, which deals with the pharmacist as a member of the social order and in a professional status is omitted from this course, but is presented in Dispensing Pharmacy, where it seems to belong.

Results indicate that fundamental educational elements have not been slighted. The students complete the course with a wholesome respect for the work which they have done, they are not hurried and there is no evidence that any essential features of their training have been omitted. This is not offered with the idea that it is a perfect arrangement or that it should be universally adopted, but merely to support my personal views.

It may be that because of the professional background of pharmacy and because of the diversified knowledge which a pharmacist is expected to possess, we are justified in requiring an amount of educational training, in both hours and credits, in excess of the usual requirements for the B.S. degree. However, I cannot subscribe to this reasoning. When we offer a B.S. in Pharmacy degree we should compare it academically to a B.S. degree in Chemistry, Engineering, etc., and not to the purely professional degrees, such as D.D.S. or M.D. We have gone on record as approving an established degree for pharmaceutical education and

we should make our curricula conform to the established requirements for that degree. If we require an amount of work much in excess of 120-credit (semester) hours, examination of our curriculum, which is bound to come now that we are granting an academic degree, will raise a serious educational question. The answer will probably be either that our quality requirements are low or that the material of our curriculum does not warrant the credit or hours which we have assigned. By granting a purely professional degree we could avoid this inevitable analysis of our courses, but I most certainly would not recommend meeting the problem in that way.

In conclusion it seems to me that we need to carefully study our several courses, particularly Theory of Pharmacy and Pharmaceutical Technique, and adjust the time and credit evaluations on a sounder academic basis. Let me strongly emphasize here that I do not mean to minimize the necessity or value of these or any other Pharmaceutical courses outlined by the Syllabus. The issue which I raise is essentially a modernization of our traditional courses in the light of academic standards. In the hope of provoking discussion let me restate my stand; that the work included in the Syllabus outlines under Theory of Pharmacy and Pharmaceutical Technique is overemphasized and is receiving an unwarranted amount of time and credit (semester) hours; and, that the entire four-year course in Pharmacy can and should be brought in line with other baccalaureate degree courses in terms of clock hours and credit (semester) hours.

THEORY OF PHARMACY AND ACADEMIC STANDARDS.

A DISCUSSION OF A PAPER BY THIS TITLE PRESENTED BY W. PAUL BRIGGS.

BY HENRY M. BURLAGE.*

In discussing Dean Briggs' paper I wish, first of all, to congratulate him on his efforts and to say that, on the whole, I agree with the content and intent of such discussion. There is no doubt in anyone's mind that the adoption of the minimum four-year course by the colleges of the Association has cast upon the educators in the Profession of Pharmacy new responsibilities. Now that such a course has been obtained after years of struggle and planning, these educators should not sit back with an air of complacency but should direct new efforts to modernizing, stabilizing and unifying a curriculum which was established to meet an unfortunate two- and three-year requirement and as a result has been haphazard in its structure. I am glad to note that Dean Briggs sets forth in part the responsibilities accompanying the new "mile-stone in pharmaceutical education."

In his discussion, the author has singled out those sections of the Pharmaceutical Syllabus, which in my own mind are of greatest importance in our pharmaceutical curriculum in building a theoretical and professional background. It probably would have been much better if the various subdivisions of Theory of Pharmacy, Technique and Operative Pharmacy had been outlined as separate

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