

PHARMACODYNAMICS IN THE SCHOOLS AND COLLEGES OF
PHARMACY.*

BY A. RICHARD BLISS, JR., M.D.

INTRODUCTORY.

Among the factors that caused the writer to compile the data found in this article might be mentioned (1) the writer's personal interest in the subject; (2) the future plans of the institution with which he is connected (it has no school of pharmacy at the present time); (3) the comparative newness of the subject in the schools of pharmacy and the lack of statistical information concerning instruction in this branch in the same; (4) the woeful lack of elemental pharmacodynamical information displayed by many, if not most, of the retail pharmacists the writer has talked with; and (5) the hope that the information may prove of some value to the various schools and colleges of pharmacy, and particularly to those members of the pharmaceutical faculties who displayed whole-hearted interest in the objects of the questionnaire sent them and rendered valuable assistance by supplying the requested information. In order to secure first-hand data and an expression of opinion, the following questionnaire was mailed to the seventy-three schools and colleges of pharmacy of the United States listed in Handbook 11 of the University of the State of New York. Canada, Cuba and the territorial possessions of the U. S. were not included, in order to save time.

THE QUESTIONNAIRE.

July 16, 1919.

DEAR SIR:

Will you kindly fill in the questionnaire below and return at once in the enclosed stamped envelope? By so doing you will be rendering valuable assistance to a study that is being made of the instruction in pharmacodynamics offered by the Schools and Colleges of Pharmacy of the United States. Your kindness will be greatly appreciated. If desired, a compilation of the results of this questionnaire will be sent you at a later date.

Respectfully yours,

(Signed) A. RICHARD BLISS, JR.,
Professor of Pharmacology.

(A)

SUBJECT.	HOURS PER SESSION.							
	First Year.		Second Year.		Third Year.		Fourth Year.	
	Didact.	Lab.	Didact.	Lab.	Didact.	Lab.	Didact.	Lab.
Materia Medica.....								
Toxicology.....								
Pharmacodynamics.....								
Physiology.....								

*Read before Section on Education and Legislation, A. Ph. A., New York meeting, 1919-

(B) In studying the individual drugs under "Materia Medica" what order of topics is followed?

(C) Is the toxicology of the individual drugs taken up in connection with the material covered in "Materia Medica," or is it treated entirely disconnected from the material considered under "Materia Medica?"

(D) Is the instruction in "Pharmacodynamics" given by the members of the Dept. of Pharmacology of your medical school? Is the laboratory work in this subject given in the medical school laboratories? Is the laboratory work carried out by the student himself, or is the work given entirely by demonstrations?

(E) If no instruction in Pharmacodynamics is given in your school at the present time, do you believe that this subject should be added to the curriculum?

(F) Is the instruction in "Physiology" given by the Dept. of Physiology of your medical school? Is the laboratory work carried out by the student himself, or is it given largely by demonstration? Is the work given in the laboratories of the medical school?

(G) Are pharmaceutical students given instruction in any subject along with medical or dental students? If so, in what subject or subjects?

Additional Remarks:

..... (Dean, Prof. of Materia Medica).
 School (College) of Pharmacy.
 Street and Number.....
 City and State.....

The four subjects listed in the questionnaire were chosen because of their inseparable relationships. The writer regrets that he did not ask for greater detail because many of those who replied expressed a decided willingness to furnish more detailed information. However, at the time the communication was sent out, as curtailed a questionnaire as possible was decided upon as being most desirable. Hereafter is found "Summary of Replies." A reasonable time having elapsed after mailing out the questionnaires (along with a stamped, self-addressed envelope), postal cards, requesting catalogues, were sent to all the schools, including those that had already replied. It may be of some interest to note that a considerable percentage of the schools that had not (and have not to the present date) returned the questionnaire, promptly responded to the postal card request by mailing one or more catalogues and sending one or more cordial letters calling the writer's attention to the superior advantages of their schools and the wonderful opportunities for young men and women in the profession of pharmacy.

SUMMARY OF REPLIES.

No. of schools sent the questionnaire.....	73 or 100%
No. of schools replying "school discontinued".....	7 or 9 ⁴³ / ₃₃ %
No. of schools apparently in existence.....	66
No. of schools that answered questionnaire.....	30 or 45 ¹⁵ / ₃₃ %
No. of schools that did not answer.....	36 or 54 ¹⁸ / ₃₃ %
No. of schools that sent catalogues.....	52 or 78 ²⁶ / ₃₃ %
No. of schools that did not send catalogues.....	14 or 21 ⁷ / ₃₃ %
No. of schools that sent catalogues but did NOT answer questionnaire.....	27 or 75% of 36
No. of schools that sent neither catalogue nor questionnaire.....	10 or 15 ⁵ / ₃₃ %

Although but 45 and ¹⁵/₃₃ percent of the schools answered the questionnaire, the writer was able to secure the desired information from the catalogues of nineteen (19) additional schools. (Six (6) other catalogues gave no information as to

the number of hours devoted to the subjects, and one (1) catalogue has its material so stated that the writer was unable to classify it according to the classification used in this article.) Thus the data compiled represent information secured from 49 of the 66 schools and colleges (74 and $\frac{8}{33}$ percent).

Questions "(D)" and "(F)" were included in order to secure some data showing what coöperation was being given by the medical schools. Question "(E)" was asked in order to get an expression of opinion concerning instruction in pharmacodynamics in the pharmacy schools. Question "(G)" was included to secure data concerning a method of instruction that is usually frowned upon by educational authorities.

DATA SECURED.

Before going on with the data secured from the questionnaire and catalogues, the writer desires to call to the reader's attention the fact that very little uniformity exists among the schools of pharmacy and among textbooks in the use of the terms "*Pharmacology*," "*Materia Medica*," and "*Pharmacodynamics*." One has but to glance through the catalogues of the various schools and to compare the definitions given for these terms in such textbooks as *Potter*, 11th edition, *Butler*, 6th edition, *Tyrode*, 2nd edition, *Dixon*, 4th edition, *Wilcox*, 9th edition, *Bastedo*, 2nd edition, *Cushny*, 7th edition, *Shoemaker*, 7th edition, *Wood*, 1912, *Greene*, 1914, *Hare*, 17th edition, and *Sollmann*, 1917, to prove this to his own satisfaction. In using the term "*Pharmacology*," the writer prefers to look upon the subject as a very broad one, defining it as the *science of drugs*, and including as component parts such branches of science as botany, zoölogy, chemistry, pharmacognosy, pharmacy, *materia medica*, toxicology, *pharmacodynamics*, therapeutics, etc. "*Materia Medica*" he prefers to use to indicate that branch of science which embraces the study of the origin, preparation, physical and chemical properties, composition, pharmaceutical preparations and their doses of substances used in the treatment of disease. "*Pharmacodynamics*" (so frequently called "Pharmacology") he uses to designate the science which treats of the action of drugs on the living organisms. Whenever these terms are used in this paper, they will be used then in the sense just described.

Tables 1, 2, 3 and 4 give the data concerning the individual schools relating to (1) *Materia Medica*, (2) *Toxicology*, (3) *Pharmacodynamics*, and (4) *Physiology*. *Physiology* was included because of the fact that although one may in a way study *Materia Medica* and *Toxicology* without some knowledge of *Physiology* and get something of value out of his efforts, it is practically impossible for one to study *Pharmacodynamics* without some elemental knowledge of *Physiology* and *Anatomy*.

[EDITOR'S NOTE: In order to economize space it was found necessary to omit the four preliminary tables referred to in the foregoing paragraph. Since the Summary Table summarizes and condenses the data given in these tables, no serious curtailment has been suffered. The author will be pleased to furnish individuals with copies of these tables upon request.]

The Summary Table condenses the information obtained from the questionnaires and summarizes the material of the four tables.

SUMMARY TABLE 1

Subject.	No. giving separate rate in.		No. giving no separate rate in.		No. giving partial course in.		No. giving all of course in.		No. didactic hrs. first year.		No. laboratory hrs. first year.		No. didactic hrs. fourth year.		Aver. total 1st yr.	Subject.								
	in.	in.*	in.	in.	in.	in.	1 yr.	2 yr.	Small-est.	Larg-est.	Small-est.	Larg-est.	Small-est.	Larg-est.										
Materia Medica.....	49	0	0	4	17	34	45	6	1	1	11	1	1	1	15	56	102	15	29	180	85	M.M.		
Toxicology.....	22	27	0	2	12	15	17	2	0	2	24	5	0	32	41	50	0	0	25	50	66	T.		
Pharmacodynamics..	17	9	25	10	16	8	8	2	0	0	13	5	1	8	20	32	0	0	0	0	20	P.-D.		
Physiology.....	44	2	3	14	36	3	4	1	0	30	15	1	0	12	23	144	0	0	13	108	36 1/2	PHYS.		
	No. giving separate rate in.		No. giving no separate rate in.		No. giving partial course in.		No. giving all of course in.		No. didactic hrs. first year.		No. laboratory hrs. first year.		No. didactic hrs. fourth year.											
	No. No. not giving separate rate in.*		No. using medical school only.		No. giving didactic course only.		No. giving partly in.		No. laboratory hrs. second year.		No. didactic hrs. third year.		No. laboratory hrs. third year.		No. didactic hrs. fourth year.									
	Small-est. Aver.		Larg-est. Small-est. Aver.		Small-est. Aver.		Larg-est. 2nd yr. Aver.		Small-est. Aver.		Larg-est. 3rd yr. Aver.		Small-est. Aver.		Larg-est. 4th yr. Aver.									
	No. laboratory hrs. fourth year.		Aver. total 4th yr.		Total averages for the schools.†		Didact. Laborat. Both.		Subject.															
Materia Medica.....	36	34	64	147	136	61	197	M.M.	*Schools which include the subject in another course; as, for example, "Toxicology" included in the course in "Materia Medica."															
Toxicology.....	..	..	..	..	35	49	85	T.	†Averages calculated for the schools giving instruction in the subject.														
Pharmacodynamics..	16	16	16	16	40	19	59	P.-D.																
Physiology.....	..	..	..	96	39	15	54	PHYS.															

1 This table condenses and summarizes the material of the four tables referred to.

From the summary table we find

(A) IN PHARMACODYNAMICS*

No. of schools giving separate course.....	17 or 33 ¹⁷ / ₅₁ %
No. of schools giving some of the subject in the course in <i>Materia Medica</i>	9 or 17 ³³ / ₅₁ %
No. of schools giving NO course.....	25 or 49 ¹ / ₅₁ %

(B) IN PHYSIOLOGY.

No. of schools giving separate course.....	44 or 89 ³⁹ / ₄₄ %
No. of schools giving some instructions in the course in <i>Materia Medica</i>	2 or 4 ⁴ / ₄₉ %
No. of schools giving NO course.....	3 or 6 ⁶ / ₄₉ %

*51 schools are included here since two (2) of the schools that gave no details in their catalogues concerning hours showed, however, that no instruction in pharmacodynamics was being offered.

CONCLUSIONS.

(1) A total of one-half of the schools are at the present time giving instruction in Pharmacodynamics, and one-third are giving this work as a separate and distinct course. It is true that some of the schools are not giving a general course in the subject but rather limiting the work to such as is necessitated for the instruction in "Physiological Drug Assaying." Sixteen (16) of the total of 26 that are giving the instruction (or 61 and ⁷/₁₃ percent) are giving didactic work only. It is further doubtless true that some of the schools that are listed as giving some work in Pharmacodynamics are simply giving the *uses* of the drugs along with *Materia Medica*. A simple list of therapeutic terms such as diuretic, emollient, cathartic, vermifuge, antacid, carminative, hypnotic, antipyretic, emetic, etc., etc., reminds one rather of an old-fashioned patent medicine circular than of Pharmacodynamics. Still there are several schools at least calling this instruction in Pharmacodynamics.

(2) Ninety-three (93) percent of the schools are apparently giving instruction in Physiology and are, therefore, prepared to follow this with some instruction in Pharmacodynamics; although but 10 schools are giving any laboratory work in this subject.

(3) All of the schools giving a separate course in Pharmacodynamics include (if they do not limit the work to this alone) the physiological standardization of drugs as a part of the course. Thus over one-third of the schools have already equipped themselves with the necessary laboratory materials for performing "animal work."

(4) The average number of hours devoted to Pharmacodynamics by those schools that are giving the subject is, in the writer's opinion, sufficient for the pharmacy student; that is, a total of 60 hours of didactic and laboratory work. Doubtless a total of 50 hours would be sufficient for giving not only those things essential to "Physiological Drug Assaying," the part of the work that is looked upon by many as the most practical for the pharmacist, but also for giving many simple and inexpensive but valuable and important experiments and demonstrations with other drugs than those usually included under "Physiological Drug Assaying."

(5) The schools of pharmacy themselves have apparently realized the importance and the need for pharmacodynamical instruction, for 26 out of 51 schools are already giving some instruction and, as shown by the data below, 13 additional

schools (making a total of 39 out of 51) have indicated that they consider the subject a desirable addition.

No. of schools giving no instruction in Pharmacodynamics.....	25
No. of schools expressing no opinion concerning the advisability of adding the subject.....	10
No. of schools expressing an opinion.....	15
No. of schools not in favor of adding the subject.....	2
No. of schools in favor of adding it.....	7
No. of schools in favor of adding it to the advanced courses.....	6

(6) Several objections to giving the work in Pharmacodynamics in the school of pharmacy have been called to the writer's attention. We will respond very briefly to each of them.

(a) The objection that the addition of the course will entail considerable expense has been raised by several. Already over one-third of the schools have apparently equipped themselves and are giving the work. The newly added "Physiological Assays" of the United States Pharmacopoeia demand that instruction in this part of the subject at any rate be given by the school of pharmacy. The expense involved is not as great as one possibly concludes at first sight. With the possible exception of the kymographs, the necessary apparatus is not expensive and much of it is already found in the pharmacy school. Students may easily work in groups of two or four, thus reducing the number of sets of complete apparatus. A fair portion of the work can be given to advantage by demonstration, thus necessitating but one piece of any special apparatus needed for the demonstration. Furthermore, the apparatus is also suitable for the laboratory instruction in physiology and can be used for both subjects. In the case of the school that is a part of a university having a medical school, or in the case of an independent school located in a city with a medical school, suitable arrangements could doubtless be made for this instruction in the medical school, either by the Department of Pharmacology of the medical school giving the instruction or by providing necessary space and equipment in the medical school for the use of a pharmacy section under the direction of a pharmacy instructor. At any rate, if it is granted that the work is necessary, the matter of expense is a minor factor (or, at least, should be).

(b) Some have objected that the subject is illegitimate for the school of pharmacy and that the medical profession will object because of the possibility of the instruction in pharmacodynamics causing the pharmacist to feel that he is prepared to prescribe. The experiences of over one-third of the schools of pharmacy and the expressed opinions of nearly another third apparently show that the subject, after very careful consideration by men of experience, is looked upon as a necessary addition, if not to the two-year or Ph.G. course, at least to the advanced courses. No objections from the medical profession have reached the ears of the writer or those with whom he has discussed the subject. Surely, no intelligent physician is going to object to the pharmacist knowing something about *how drugs act on the living animal*. Surely the majority of physicians are possessed of at least ordinary intelligence. The course given in the pharmacy school is purely an elemental course (or should be), the object of which is *not to fit the pharmacist for the treatment of disease*, which, unfortunately, many are trying to do without any pharmacodynamical instruction. Granted that it is far better for the pharma-

cist to know nothing whatsoever of drug action than to have him believe himself possessed of the necessary knowledge for the treatment of disease, the writer is firmly convinced that an elemental course in Pharmacodynamics will not only serve the scientific objects in view but also forcibly impress upon the pharmacy student the complexities of drug action and the danger and folly of the prescribing pharmacist, who has not had the two years of instruction in anatomy, physiology, pharmacology, bacteriology and pathology required in medical schools and two or three additional years in the study of disease itself. (Some of our schools of pharmacy are teaching Therapeutics, according to the statements in their own catalogues! Therapeutics, without the necessary detailed instruction in the fundamental sciences anatomy, physiology, bacteriology, pathology and *pharmacodynamics*, is unheard of in the modern medical school.) Quoting from Sollmann's "Action of Drugs,"¹ A course of Elementary Lectures for Students of Pharmacy:

* * * * * To the sensible and tactful pharmacist, some knowledge of these matters (actions, uses and doses) is very useful, and indeed *necessary*. As a tradesman, the public expects him to be familiar with the uses to which his wares are commonly put, and with the manner of their use. As a *professional man*, he can coöperate with the prescribing physician much better if he has an intelligent understanding of the broad principles which guide treatment, of the objects which are to be accomplished and of the means that are utilized. The pharmacist himself will be protected against many blunders in the exercise of his higher professional function, the compounding of prescriptions. He will be able to protect the public against the errors of others, as well as his own. He may, by the exercise of some tact, put the physician under lasting obligations. In cases of poisoning, he has often the opportunity to institute correct preliminary treatment which may decide the patient's life.

The laboratory course in Pharmacodynamics can readily be used for instruction in Toxicology as well, for in many experiments the animal is sacrificed and it is a simple matter to carry the experiment to the toxic stage, thus giving opportunity to forcibly impress upon the student of pharmacy many practical and useful toxicological facts. No course of instruction that will assist in training the really scientific pharmacist, that will serve to render the pharmacist of greater assistance to the physician, that will enable the pharmacist to coöperate more efficiently in guarding public health and welfare, and that is essential, all must agree at any rate, to certain parts of pharmaceutical endeavor ("Physiological Drug Assaying"), will be objected to by the medical school or by the intelligent physician.

Doubtless a case described by Bastedo² would never have occurred if the pharmacist had received an elemental course in Pharmacodynamics. It is as follows: A case of hysteria had been treated for obstinate constipation by a pharmacist by the administration, in a period of 24 hours, of a Seidlitz Powder, three Compound Cathartic Pills, 2 drachms (8 Gm.) of Compound Jalap Powder, and three minims of Croton Oil! These resulted in no movement of the bowels until shortly after the last dose. Then there was a violent diarrhea, with blood in the stools, severe abdominal cramps, bloody urine, and later suppression of the urine. The patient went into collapse and died in 24 hours. Neither would Janeway be able to describe the case at St. Luke's Hospital of a girl of nineteen years admitted with a similar but less severe poisoning from Colocynth, given her by a pharmacist. She had vomited six hours after the dose, and repeatedly for

¹ Sollmann, "The Action of Drugs," page 18.

² Bastedo, 2nd edition, pages 135, 136.

24 hours, with almost constant diarrhea and a dull ache across the lower abdomen. The next day she was admitted to the hospital, the temperature being 99.8° F. and the pulse 116. She still had gastroenteritis and vomited twice after admission. This patient, fortunately, recovered in four days.

(c) A third objection, and this is possibly the most plausible of the three, is that there is no time for the subject in the Ph.G. or two-year course, which is already overcrowded. This might be used as a further argument, if any additional ones are needed, that the two-year course is insufficient for training the pharmacist. However, even in the two-year course the school of pharmacy could doubtless follow to advantage the example set by the medical school in cutting down the number of drugs studied. It is needless to point out that this could not be carried out to the same degree in the pharmacy school, but still a fair number could undoubtedly be eliminated without loss to anybody and this time devoted to Pharmacodynamics. "Useful Drugs" of the American Medical Association, which is used by practically all medical schools and State Examining Boards as the basis for instruction and examination, should prove an excellent guide in deciding upon those drugs that should be given major attention. The rest of the list of drugs could be carefully studied and those that were not eliminated entirely could be taken up in the course in Materia Medica, very, very briefly. This suggestion is made because the writer believes that the two-year or Ph.G. course is going of necessity to continue for quite a few more years, if not as a recognized course, then as a "special course." Although pharmacy is doubtless realizing that it also must make advances proportional to those made by its sister professions, Medicine and Dentistry, by advancing its entrance requirements, lengthening its courses, improving its instruction, and making the course in Pharmacy somewhat of a *liberal education* and not purely technical, still there is another factor that many, in their enthusiasm, are apparently losing sight of. Let us put the matter in the form of a question. If four years of high school work are required for admission to the school of pharmacy and four years of collegiate work required for graduation in Pharmacy, will the present or expected remuneration and life warrant, in the eyes of the high school graduate, the expenditure of the time and funds? Will young men and women be willing to make such sacrifices to follow the profession of Pharmacy? All of us know that the average pharmacist in the retail store does a little bit of everything, since there are comparatively few stores that are able or willing to employ a pharmacist to attend to the prescription work and manufacture only. Will men be willing to spend four years at high school and four years at college to fit themselves for positions as 90 percent store clerks and 10 percent pharmacists with pay less than that received by painters, plasterers, street car men, etc., etc., and hours twice as long? On the other hand, will the pharmacy employer be willing to pay the salary such improved preparation and education demands? Before Pharmacy can approach a state anywhere near ideal, some sort of adjustment will have to be made, some changes will have to be made in the method of conducting drug stores and employing pharmacists. Possibly the only workable solution of the problem would consist in a modification of the State Pharmacy Laws and the school requirements whereby a two-year course for the instruction of *drug store clerks*, not pharmacists, is maintained without the conferring of any degree but simply a certificate of proficiency. A course that would simply fit the in-

dividual for the usual functions of an ordinary clerk. This would leave the four-year-high-school-four-year-college-course for the preparation of the scientist of Pharmacy, the *pharmacist*, and would carry with it the Bachelor of Science in Pharmacy degree. Pharmacy must reach the standard four-year collegiate course, but it is the writer's opinion that we should make haste slowly allowing sufficient time for the necessary adjustments and changes that the jump to four years will cause. Furthermore, it will doubtless be wise for Pharmacy to drop the majority of the various degrees that are being conferred. The writer ventures to state that there is no other school conferring as many varieties of degrees in the limited time as the school of pharmacy: Ph.G., Phar.B., A.C., Ph.C., Pharm.M., B.S., M.S., Food and Drug Analyst, Phar.D. and Ph.D., are some of the degrees conferred by the pharmacy schools. It is rather interesting to note that several schools place the value of the Ph.G. degree above that of the Bachelor and the Master of Pharmacy. Some confer the Master's degree after the graduate has practiced Pharmacy several years and submits a thesis. Several confer the Ph.G. after 12 months of continuous work (not a war measure). One may take a four-year course in Pharmacy and secure four degrees! Pharmacy desires and deserves equal recognition as a profession with medicine and dentistry. However, before she can hope to attain such recognition certain glaring defects must be remedied or such recognition will continue to be denied. Medicine brought about its "reformation" itself; Dentistry soon followed. To-day these schools are officially inspected and classified by bodies with power and authority, and, in order to retain a classification, certain minimum standards must be maintained. Further, State Examining Boards are refusing examination to graduates of low-grade schools. Pharmacy must come to the same method. The sooner some body is authorized and provided with the means for carrying out such inspection, classification, etc., or some body assumes such authority, the better for Pharmacy as a profession. It may be interesting to state that there have been several schools of pharmacy calling themselves "Class A" schools, when, as far as the writer has been able to learn, no such classification of pharmaceutical schools has ever been carried out!

(7) But 10 of the 26 schools giving instruction in Pharmacodynamics are making use of the facilities of the medical schools, and but 14 of 46 schools giving instruction in Physiology are using the medical school equipment for this subject. In the cases of the schools of pharmacy of universities having medical schools more pronounced coöperation between the two schools can be readily brought about. In the cases of the separate schools the matter is possibly more difficult, and, of course, there are some schools of pharmacy located in cities in which there are no medical schools. However, where medical schools are coöperating, or where it is possible to secure such coöperation, the writer believes every effort should be made to foster it. Pharmacy is a specialty of medicine just as much as dentistry, pathology and obstetrics are. It is equally important and inseparable. If Pharmacy is not looked upon as such by all physicians, it is purely the fault of Pharmacy. Unfortunately Pharmacy itself is divided. On one side we have a faction that emphatically denies that Pharmacy is a profession, claiming that it is solely a business, a trade. On the other side we have a faction that correctly maintains that Pharmacy is a profession. Until Pharmacy can bring about close union within itself, its strength and influence must necessarily suffer. The member of the

pharmaceutical faculty is often surprised to find out that members of the medical faculty are interested in the work of the pharmacy school and willing to render assistance. Advantage should be taken of this interest and means employed to foster it. Through conferences between medical and pharmacy school committees much can be accomplished that will absolutely work out for the benefit and profit of both schools. One thing that can certainly be accomplished in the majority of schools (if not all) connected with universities having medical schools is provision for instruction in Pharmacodynamics, or where instruction is already provided provision for supplementing and improving such instruction. The matter might be first taken up with the professor of Pharmacology, for he certainly is deeply interested in drugs and drug problems and will lend a willing ear to the plan of the pharmacy school and pledge his support in an important movement of this sort which has such meritorious objects in view. The same also holds for the other laboratory branches of the medical and pharmacy schools. Intimate scientific and professional relations between medicine, dentistry and pharmacy are surely invaluable to the professions themselves and also to the public. Medicine and Dentistry are each year coming closer and closer together. Pharmacy is making some progress but is not advancing along these lines as rapidly as it possibly can.

(8) Five of the schools are "doubling up" on instruction by having other students take the same work in the same sections with pharmacy students. Even though one ignores the fact that frequently a subject must be approached from a different viewpoint with the pharmacy student than with the medical, the dental, the veterinary and the premedical student, one can hardly disregard the fact that the best results are not obtainable where students of decidedly different degrees of preliminary training and ages are thrown together in the same classes. The speed of a moving group of independent individuals is the speed of its slowest member. This statement is also applicable to the intellectual advancement, preparation and training of a group of individuals. The writer was pleased to note that only a comparatively few schools are using this "economical method."

The writer trusts his readers will pardon the several digressions in this paper. His only excuse is his whole-hearted interest in the advancement of pharmacy and the pharmacy school.

LABORATORIES OF PHARMACOLOGY,
SCHOOL OF MEDICINE, EMORY UNIVERSITY,
ATLANTA.

A WORKABLE DRUG STORE THAT WILL WIN SUCCESS.*

BY HENRY P. HYNSON.

If I were permitted to do so, I would advise the young person who had concluded to enter the retail drug business, under ordinary conditions, about as follows:

As a fundamental requirement, you should be overwhelmed with a desire to helpfully serve the community in which you are to be located and especially those

* Read before Section on Commercial Interests, A. Ph. A., New York meeting, 1919.