

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

THE LURE OF RESEARCH.

BY ZADA M. COOPER.*

Under the title, "The Lure of Research," Professor Nutting, head of the Department of Zoölogy of the State University of Iowa, has written a splendid little article. The language is beautiful and it makes an alluring picture of the fascination there is in searching for the unknown. It would do every real pharmacist good to read the article in its entirety but, brief as it is, it is too long to reprint in these columns. Professor Nutting's own life is a splendid illustration of what may be accomplished if one is imbued with the spirit of discovery. Speaking of him, one of his colleagues has said "By many years' work in this little inland town more than a thousand miles from the nearest seacoast he has become a distinguished authority on a minute species of marine life which few people know exists."

Professor Nutting believes that popular opinion about research is full of misconceptions. "Research," he says, "is not a sort of highbrow pose which gives an air of superior learning, a reputation of exceptional scholarship: an effort to belong to a superior caste in the estimation of the world, to occupy the spotlight on the stage. This sort of incentive marks not the real but the pseudo research men or women, and lacks the ring of pure coin.

"To my mind the research spirit is not found either in those who seek professional profit or those whose objective is intellectual reputation. It is a far better and deeper thing; an impulse that has done more, perhaps, than any other to advance civilization and the ascent of humanity.

"The true research worker is of the calibre of the pioneer, and he feels that same lure, the same fascination, that impels him to advance the frontier of knowledge in any direction which may be open to him on earth, in the heavens, or in the depths of the sea. He is seeking primarily neither fame nor fortune, but his aim is always to penetrate a little further into the unknown than have his forbears or companions; to advance the frontiers of knowledge, if ever so little, and leave the reaping of the harvest to those who come after him and succeed in using his discoveries to the betterment of mankind in what we know as 'Applied Science.'

"The best research men that I have known have always had this spirit of the intellectual pioneer and never have they seemed to be impelled primarily by the desire for advancement or financial gain. The lure is forward and beyond the borderland of knowledge and this spirit actually carries them forward into the unknown and it is my belief that it always leads to the discovery of new things beyond the border.

"It is this urge, constant and insistent, to penetrate into the unknown and push its borders back at any point, that impelled such men as Daniel Boone and Davy Crockett, Lieutenant Pike and Roald Amundsen to set aside the comforts of life, turn their backs on friends and home, and plunge into the perils of the unknown. It is the lure of the Arctic and Antarctic; of Africa, South America

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and the Isles of the Sea. It is the compelling impulse to penetrate the unknown that has cost many a heroic life and will cost many more so long as man is man. It is the pioneer spirit, the divine discontent that ever compels the onward move beyond the frontier, the spirit that enabled our fathers to conquer this continent and make it the land of peace and plenty that we know and love."

The earth still has some unexplored spots to beckon adventurous spirits to hunt out their secrets but the undiscovered in the world of science is infinitely larger. Even in the pharmaceutical world, there are many almost untouched fields. There is not one of us who cannot think of a score of things that need investigation right now. Nor is there anyone who is altogether shut out from the possibility of doing some small bit to add to the sum of pharmaceutical knowledge. The opportunities are all around us if we will only look and think and act on our present knowledge with the tools we have at hand.

I don't know how much the colleges are doing to correct the wrong impressions that exist but it is obviously the duty of those of us who teach to utilize every opportunity to instil into the minds of our students the idea that they should cultivate, not suppress, the desire to investigate and the belief that the will to achieve has more to do with achievement than the possession of a brilliant intellect, a profound knowledge, or expensive apparatus with which to work. Professor Nutting expresses this idea splendidly. "I think there is a feeling among students that the research worker must be a man of exceptional intellectual endowment, a towering mentality, a genius of some sort. This is a mistake, and my experience goes to show that an average intellect plus this eager pioneer spirit, this urge to pass the frontier, is all that is required to make a successful research man or woman. No genius, without that spirit, is apt to attain success, and a fairly mediocre mind, impelled by the incentive and with the powers of concentration and persistence, can often outstrip men of vastly superior mental endowment."

Genius is after all a capacity for taking great pains, it involves great patience, much persistence in the face of discouragement. Prof. Nutting relates an early experience of his own which illustrates, excellently, what I have been trying to say about the possibility of anyone who has the inclination making discoveries of his own. "Expensive laboratory equipment, although often highly desirable and sometimes essential in solving certain problems, is not always necessary for good research. I well remember a most profitable summer vacation when I secured my first microscope in payment for renovating a small collection of birds and was eager to put it to practical use. While spending a part of the summer on the farm, I secured the services of a good-natured hen who obligingly furnished numerous eggs for my investigations. These were used to work out the first three days in the embryology of the chick.

"By the use of normal salt solution the germinal part of the egg could be kept alive for a sufficient time to see a number of the most important events in the drama of development actually occurring in the living creature under the lens of the microscope. No motion picture was ever so fascinating as this. Here was the story of evolution actually unfolding itself under my very eyes. It was infinitely more interesting than any series of prepared slides of preserved material could possibly be. Here was seen the gradual deepening of a slight groove which changed to a tube in which the spinal cord and finally the brain took form and developed

in complexity and in orderly fashion. Another tube-like structure bent on itself, grew into two chambers, and these two became divided into four and lo! a heart was formed, pulsating and starting the blood current which would know no rest while the creature lived. Again little knob-like buds appeared, four of them in pairs, gradually unfolding until they took the form of wings and legs. I had read these things but the fascination of seeing them actually taking place was one of the memorable experiences of a lifetime. The satisfaction of independently making these discoveries was real, and far beyond any that could result from reading about them or hearing lecturers telling of them, and the profit to me was as great as if they had been entirely original discoveries. It had all the joy of research and of penetrating beyond the borderland of my previous mental experience. Although this borderland had been crossed by others, I had entered by a trail that was of my own devising and felt the joy of the pioneer."

As pharmacists we should remember, for our own sake, and remember to tell our students of the many pharmacists who have made important discoveries; for instance, that Scheele was an apothecary throughout his entire life: that all his discoveries were made in that little shop, under heavy odds. It is said that he used wooden tubes lined with goose quills and collected gases in bladders, but the discoveries are his and for them he was made a member of the Swedish Academy of Science. Chemists do not forget to record his discoveries. Do we do as well?

French apothecaries have brought much honor to pharmacy. Courtois discovered iodine in the ashes of seaweed and Balard discovered bromine; Parmentier did much research work on belladonna, cinchona and ipecac; Pelletier discovered strychnine and brucine and with Caventou isolated quinine. Serturner, another pharmacist, discovered morphine and Unverdorben was the first to obtain aniline. All of these men and many others were apothecaries engaged in the regular pharmaceutical work of those days and most of them worked under very great handicaps. In the light of what they accomplished there is no excuse for present-day pharmacists. We who teach are derelict in our duty, too, if we do not put research in its proper place. No student should go out from our class rooms feeling that research takes unusual brains, a peculiar temperament or great wealth. Whatever present opinion about research may be we can do something to mould that of the next generation of pharmacists, if we try.

Prof. Nutting's article deals chiefly with pure science as distinguished from applied science, though he recognizes the place applied science takes in our modern world. "The pursuit of pure science," he says, "seldom yields financial gain such as often rewards those who devote themselves to the field of applied science. To be sure the pure scientist may rightly hope for some advancement in his profession if he is a teacher; but this is, and should be, merely incidental and hardly sufficient to tempt ambitious men and women. But this paper has been written in vain if it has not envisioned a reward far above that of money. It cannot be quoted in the stock market, but it is real, substantial, soul-satisfying—the joy of discovery."

Prof. Nutting will retire from teaching at the end of the present college year in order to devote his entire time to research. We, who know him, know that he is sure to feel the thrills of satisfaction of which he speaks in concluding his article, as we know he must have felt them in the past. "Somehow we think of intellectual pleasure as cold and lacking the glow and tang of emotional satisfaction. But it

is emotion, stirring the soul to its very depths. It is on a higher plane than our ordinary emotions, but all the purer for that; a spiritual exaltation like that on the mountain top with the world at one's feet, where small things are forgotten and big things stand out; a world seen in true perspective. Here is a stupendous enlargement of vision and we see, reaching into the blue serenity of heaven, other peaks to scale, heights seen only from the heights, and we are spurred on by a new ardor, and new inspirations come that point to further and grander achievement, still fuller joy. For no Alexander of the intellectual world will ever weep for new worlds to conquer. They ever stretch beyond the limits of his horizon and the more he achieves the more extensive his vision.

"Here on the heights is a foretaste of immortality, for the peak of his attainment will forever bear his name, a monument more lasting than inscriptions on granite or bronze, lasting as the peak on which he stands.

"The monuments of Rome are crumbling, but the seven hills remain."

Perhaps it is anticlimax to call attention to the two sentences in this article that, to me, stand out above all others: I am not artist enough to know. They are: "For no Alexander of the intellectual world will ever weep for new worlds to conquer" and "The monuments of Rome are crumbling, but the seven hills remain."

THE PROGRESS OF PHARMACY.*

BY C. B. JORDAN.

After introductory remarks relating to his connection with pharmacy, and his devotion to it and faith in the mission of pharmacy, Dean Jordan said:

Pharmacy and Medicine had their beginning in antiquity. As myth tells us, ever since Epimetheus, attracted by the beauty of Pandora, accepted her box as a gift and lifted the lid, hunger and want, sickness and disease have afflicted the world. Fortunately Hope, though injured, escaped along with man's torments and has ever remained to console and comfort him. She was soon represented by the god Aesculapius who taught man the art of healing and thus Pharmacy and Medicine were born.

The early practitioners were both pharmacists and physicians, diagnosing, preparing their drugs and decoctions and administering them. As the art of healing advanced, some went forth to call upon the sick while others remained to prepare the remedies. Thus there began a division of this labor and to the pharmacists fell the duty of collecting, preserving, preparing and dispensing known remedies and developing new ones. These duties they are performing to-day and it is the purpose of pharmaceutical education to prepare young men and women for this important work.

It soon became apparent that one pharmacist could dispense for many physicians and the forerunner of the modern dispensary came into being. Gradually there was added to the pharmacists' duties, the sale of sick-room supplies, household remedies and such personal necessities as toilet articles, soaps, perfumes, cosmetics, etc., and there was developed the modern drug store, a necessity in every community because it renders a service that is both professional and semi-com-

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mercial, a service that cannot be rendered successfully except by those who are educated and trained for the task.

The past fifty years have chronicled notable achievements in educational professions. We still have with us some of the old family physicians who received only two or three years of collegiate training. Many of them are very successful, but no young man can enter medicine to-day unless he has received a much more comprehensive training. Dentistry has advanced, in a comparatively short length of time, from one year to four years of collegiate training.

Pharmacy has been slower in its educational advancement, due, I believe, to the fact that the pharmacist's attention was divided between scientific and commercial pharmacy. The pharmacist must serve his community in a commercial way as well as professionally. These services, although in a measure dissimilar, are closely correlated and no one can say which is of the greater importance to the people who receive them. A trained mind is necessary for the proper execution of this semi-commercial service, but the training need not be so thorough as that required for safe and successful dispensing of medicinal compounds.

We of the professions of Medicine, Pharmacy, Dentistry and Nursing fully appreciate the responsibilities assumed by those who are charged with the relief and cure of disease. The uninitiated, however, do not appreciate and rarely give a thought to this responsibility. A careless pharmacist may negative the efforts of the most competent and painstaking physician. Even more, they may jeopardize the life of the patient. The same is true of careless physicians, dentists or nurses. Every time you take a prescription to a drug store you are placing your life or the life of others in the care of the pharmacist. The misreading of a prescription or a label, a hand placed upon the wrong container, a mistake in weighing or measuring, may mean suffering and death instead of relief and health. Surely a person who bears such responsibilities, one who holds life or death in the hollow of his hand, must be well trained in order to perform these successfully so that the safety of the patients is assured and public health is safe-guarded. Such a person cannot be too well prepared for these important duties.

All of this is accepted by the public as a matter of course and little or no thought is given to the gravity of the work in charge of the pharmacist. Only when an error occurs is the importance of correct knowledge and painstaking care in compounding appreciated. The recent unfortunate incident in one of our large universities, although not proven to have been due to the pharmacist, brought out this lack of appreciation of the importance of the responsibility assumed by every practitioner of pharmacy. Our President sent for me at once and wished to know what precautions I was taking to prevent error in the compounding of our 5000 or more prescriptions a year. We have been compounding student prescriptions for years and yet the importance of the work had not heretofore been brought forcibly to his attention. Several members of our Faculty said to me, "Do you not worry about the responsibilities you voluntarily assumed?" I said, "I have always appreciated them." The answer invariably was, "Your students must be carefully and thoroughly trained for their work."

No profession has advanced as rapidly as has pharmacy during the past few years and, therefore, I am proud to speak for it to-night. It has not reached our ideal but the outlook is very hopeful because of its recent long forward strides.

Until a comparatively few years ago, many of our States had no control over the practice of pharmacy. Any who wished could open a drug store, sell poisons, and compound prescriptions. There were a number of good colleges of pharmacy but the product of these colleges was only a "drop in the bucket" and, therefore, we had a great number of drug stores; a very high percentage of the total were manned by men who had no college training and who were out of sympathy with it. Naturally, it was very difficult to convince this majority of the need of collegiate training. The problem was further complicated by the fact that a considerable percentage of the trade of the average drug store in many aspects is commercial. In order to advance it was necessary to push forward the dead weight represented by these commercial drug stores, the operators of which were more or less convinced of the futility of college training for successful service and business advancement.

It was a Herculean task because it had to be preceded by an extensive campaign of education. Fortunately there were a number of men of vision, such as your own Dean Rudd, in charge of our colleges of pharmacy. These men acting through a constituted agency, The American Association of Colleges of Pharmacy, were the yeast that eventually leavened the whole mass of indifference and brought forth the bread of professional advancement.

The National Association of Boards of Pharmacy also has been an important agency in aiding this professional advancement of pharmacy. Among a number of men of this Association who stand out as beacon lights to aid in guiding the ship of Pharmacy, none are more forward-looking than A. L. I. Winne of Virginia.

Ten years ago not more than three States required a college training for entrance to pharmacy. Five years ago there were but a few colleges of pharmacy and only one or two States that required full high-school training for entrance and for admittance to licensing examinations. To-day a great number of the States require college training for permission to take the licensing examination and this number is increasing every year. All the reputable colleges of pharmacy demand high-school graduation or its equivalent for entrance and since September of last year these colleges have eliminated their two-year courses and are requiring a three-year course as a minimum. As I have indicated, this advancement has all taken place within the space of a few recent years. This gives us reason to believe that the professional machine of Pharmacy so well started will not stop until a baccalaureate degree will be the lowest degree recognized by Pharmacy. It was a long, hard fight to secure the entering wedge for professional advancement, but the beneficial effects of higher standards became apparent at once and the rest of the battle was comparatively easy.

Pharmacy is indeed fortunate in that it is the only profession that has been surveyed from a functional standpoint. This survey, conducted for the Commonwealth Fund by Dr. Charters and assisted by a number of teachers of Pharmacy, has been completed. The report of it is not yet in print but we know enough about what that report will be to be assured that the American Association of Colleges of Pharmacy acted wisely when it eliminated the two-year course and adopted the three-year course as a minimum. We anticipate that this report will show us the need of a longer training for good professional work. At any rate, it will tell us

very definitely whether or not we are teaching the things that must be known by the every-day pharmacist in the conduct of his professional business.

It gives me pleasure to say that the Pharmacy Colleges of the South, especially those of the Medical College of Virginia, the University of North Carolina, the Medical College of the State of South Carolina and the University of Mississippi, have taken a very active part in this movement and to these colleges of pharmacy belongs a great deal of credit for the achievements I have related. It is true there are still some backward States and weak colleges but the tendency is decidedly upward and we have every reason to believe that the time is not far distant when these States and colleges will be in accord with us.

In the laboratories of our colleges of pharmacy and of our pharmaceutical manufacturers an enormous amount of research has been done and a great deal has been added to the sum total of human knowledge. Yet the surface of this important work has only been scratched and an almost unlimited amount of research is yet to be done. We cannot expect much of it to be done by the busy retail pharmacist, as his mind is directed to other things. We do hope that our colleges of pharmacy will do their part of this most important work. This cannot be accomplished unless our institutions offer the opportunities and encourage the research worker. We have not yet discovered a "Rockefeller" of Pharmacy but we hope that modest contributions to this work will be given by a number of persons and thus be better able to assist our physicians in their fight against disease.

Graduate work in Pharmacy is necessary to improve old preparations and remedies and to develop new ones. A great deal of research work must be done before satisfactory tests and analyses of some of our U. S. Pharmacopœial products are developed. This work could very well be part of our graduate courses. Many of our colleges are doing graduate work but the amount done in research is small in comparison with the needs.

Several colleges select assistants who have baccalaureate degrees and ask them to give half of their time to the college and half to preparation for a graduate degree. We, at Purdue, are pursuing that policy with a great deal of satisfaction to both the applicants and the college. These graduate students are assigned some research problems involving scientific Pharmacy. Our State-supported institutions should encourage research in Pharmacy by offering opportunity to any who show aptitude for it, be it a member of the faculty or a student, and by appropriation to the budget of the college sufficient to supply the needs of research workers. This latter is but a small part of the problem; the greater part of it is in securing individuals who are mentally fitted for research and the stimulation and encouragement of this aptitude.

To the professions of Medicine, Dentistry, Nursing and Pharmacy is given the great responsibility of keeping the people well, curing those who are ill and giving relief to those who suffer. This obligation can best be discharged by these four professions working in complete unity and harmony.

The Medical College of Virginia is unique in that it trains for these four and only these four professions. This then is the ideal institution to foster this close coöperation and interdependence. From what I know of the College, I can say that this is being done to the satisfaction of all four professions, and for the benefit of public health.