

and these points show personality." Then he must be optimistic. The next essential that I would consider would be that of:—

HEALTH, HAPPINESS AND HARMONY.

Health, as you know, is the greatest factor in keeping business going right. Happiness is a factor that keeps your organization in good running order like good oil used on machinery will keep it running right. The employee with a grouch can spread more dissatisfaction than the boy with the measles can spread the infection in a crowded room. Harmony is absolutely essential because no store, no home or factory can really prosper unless the employees work in harmony, and the proprietor should likewise work in harmony with the help. Who should the salesman work for, and who is the boss of the store? It is the customer that you and I are working for. It is the customer that you and I are here to please. It is the customer who pays your wages and mine. If it were not for the customer, you and I would be looking for a job and we might not get one as good as the one we have. Now, if you are sitting behind your counter doing nothing, and you see a customer (the boss) coming,—Jump.

The commercial pharmacist in his commercial field has a decided advantage. A well-known physician once expressed himself thus:—"A physician renders his service to the sick, the poor and the ignorant, while the pharmacist renders his service to the well, the wealthy and the wise." He infers that we are better off and can keep in better spirits when trading with that class of people. While I am not in accord with all his statement, yet I feel, to a degree, that pharmacy has its advantages. This being the case, let us be optimistic. Let us put on the smile of the optimist and discard the smile of the pessimist. Go forward to make every day count and if possible make some of them count for two, and let us not put anything in the way of the advancement of commercial pharmacy as we do not know how far-reaching it may be. Be kind to your fellow neighbor; do good whenever you can.

Remember the words of A. B. Hagemann which reads as follows:—"I shall pass through this world but once. Any good, therefore, that I can do or any kindness that I can show any human being, let me do it now. Let me not defer or neglect it, for I shall not pass this way again."

THE CULTIVATION OF MEDICINAL PLANTS IN THE UNITED STATES.*

F. A. MILLER.

The cultivation of medicinal plants in the United States is only in the very earliest experimental stage. Whatever may have been done toward investigating the peculiarities of growth of this class of plants, has so far had little influence upon their commercial production. With the beginning of the work of the United States Department of Agriculture on the cultivation of these plants and the interest shown by colleges, scientific societies and commercial institutions,

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our knowledge of the behavior of a number of the more important ones has gradually increased until we feel more confident of success. To the many inquiries upon the possibilities of success, however, we must still reply in a cautious and conservative manner. This attitude is advisable and indeed necessary for several reasons. To enumerate, a druggist, doctor, farmer or other individual wishes to engage in the commercial cultivation of medicinal plants. Their questions usually come in the following order:—what to grow, what species used, where to obtain authentic, viable seeds, how and when to plant, on what type of soil, when and how to harvest, what part or parts of plant used, how cured and packed, principal markets, prices paid, and annual consumption? Apply this series of questions to any one of the more valuable drug plants such as digitalis, belladonna, henbane or cannabis, and who among us cares to undertake the task of answering them? It is true that these are the very questions that are under investigation, but as yet only a beginning has been made toward their solution. Taking up these problems in their logical order, we find that they fall into certain classes.

The first of these classes includes all the problems of propagation. This involves the sources of seed and plant supplies and the accuracy of names, methods of seeding, as to whether or not open-field sowing can be practiced or the necessity of greenhouse accommodations in carrying the plants through the earlier stages of development. Vegetative methods so commonly employed by gardeners and florists are little used with medicinal plants. It is one form of this method that has proven so successful in the propagation and re-setting of peppermint and spearmint. The second class of problems to be solved is that pertaining to the manner of cultivation. This includes duration of growth requisite for a harvest, whether annual, biennial or perennial; nature of tillage, as to the use of hand or power labor; types of soils and fertilizers and their influence, both upon the production of crude material and the relative percentage of active principle. Following the natural order of procedure, class three covers the operations of harvesting. The nature of these operations varies widely according to the character of the part of the plant used. Roots, seeds, leaves and flowers involve as many operations and, what is of considerable importance, usually require special types of machinery or much expensive hand labor not common in regular agricultural practice. Concerning the time of harvesting these various parts, little is known of the seasonal variations of the active principles. The process of curing represents the fourth class of operations to be considered. It is self-evident that medicinal plant products cannot be cured in the same manner or by the same methods as agricultural crops. A crop of digitalis, or stramonium, cannot be harvested and cured with the same ease and rapidity as a crop of corn, oats or wheat. Handled in large quantities, these drug crops would all require a special equipment in the form of drying sheds, cutting machines, etc. At this point the time of harvesting is in question. When should the various classes of drugs be gathered in order to show the greatest medicinal value? We are all familiar with the wide variations exhibited by plant products as the plant progresses from the earliest stages of growth to maturity, and whether it is an alkaloid, a glucoside, a resin or what not, there is some stage in the life history of the plant when these products are present in greatest quantity. While this

has been determined to some extent for a few forms such as belladonna, stramonium and bloodroot, there is still much to be done before we can say just when a plant or plant part should be collected, in order to give the best product in proportion to the highest yield of crude material.

Thus it is evident that the whole problem of drug cultivation is still one of experimentation. That it will pass this stage successfully, especially with reference to the most essential vegetable drugs, we have little doubt. This success, however, will probably not fall to the lot of the farmer or layman. Little assistance can be expected from those people in solving the many-unsettled problems. As with the average drug collector, they see little necessity in the careful preparation of materials going to make up pharmaceutical preparations. On the other hand, it is their opinion, as well as that of many others, that medicinal plants will grow and thrive without any care or attention. In this respect, I know of nothing better to say to the beginner in drug-growing, than that medicinal plants do not grow and flourish, out of an impossibility to do otherwise, but that they have an excuse for living and growing, in that they respond to the same selective agencies as other economic forms and exhibit during their life history, a delicacy of balance, with reference to their active constituents, so essential that an error of a few days in harvesting and curing may turn success into failure. The mere fact that a form grows commonly about the fields, or appears as a troublesome weed in and about farm lots, or may be grown with comparative ease as a decorative or garden form, does not necessarily indicate that it will behave in a similar manner under field conditions. Indeed, this is rarely the case, and close observations will reveal the fact that most of our native wild forms are growing under an environment not at all comparable to field conditions as interpreted in terms of agricultural science. Too many recommendations based solely upon back-yard observations, have already been made for growing certain medicinal plants. Also, a too liberal spirit has been shown by some in the selection of forms best adapted for cultivation in this country. In my mind this number should be comparatively small and, even under the present market conditions, should not include more than twenty-five drugs, some of which are, aconite, belladonna, burdock, calendula, chamomile (German and Roman), cannabis, colchicum, conium, convallaria, digitalis, goat's-rue, hydrastis, henbane, larkspur, marshmallow, pulsatilla, rue, savin, stavesacre, stramonium, and wormwood. A clear understanding of these forms as to species used, methods of propagation, systems of seeding, cultivating, harvesting, curing and packing, should be had before attempting to make recommendations for their commercial production.

Taking up the question of drug-growing from another viewpoint, let us consider the possibilities of improvement from the stand-point of plant-breeding. We should not be satisfied with merely growing and domesticating these wild medicinal plants, but should so improve them through selection, hybridization and the testing of different species, varieties and strains, that better and more uniform crude products can be obtained. In attempting to thus improve medicinal plants, we are not attempting a new problem. We are only applying old and well-tried principles to new forms. Who of you, would at this day and age, turn to the woods and fields for plants of the strawberry, raspberry, blackberry, plum or a host of others, with which to re-stock your gardens and orchards? The idea of

wild, native ancestors for all economic plants in existence, rarely occurs to the layman and if so, it is quickly dispelled by the ever-ready nurseryman to supply him with new and improved varieties especially adapted to certain soil and climatic conditions. These varied forms have added much to our daily health and pleasure. Our eyes are delighted with the beauty of form and color of some favorite fruit, and our appetite appeased by a flavor so fitting to our individual tastes as not to be possessed by any other variety in existence. And so, in health, we enjoy the products of the plant-breeder, while, in sickness, we are subject to all the variations and imperfections of nature, in the use of products obtained from plants of unknown parentage and growing under conditions so adverse that their life history is one continued struggle for existence. Why not treat disease, in so far as botanical drugs are involved, with preparations derived from carefully selected, and improved strains, grown under controlled conditions and in such a manner that greater uniformity and high quality would be insured? We should have a strain of belladonna testing six- or seven-tenths of one *per cent.* of alkaloids instead of three-tenths, a strain of henbane which could be collected and cured in such a manner that barn-yard refuse could be eliminated, and assaying one-tenth of one *per cent.* instead of the now almost impossible seventy-five thousandths of one *per cent.* With stramonium a strain has been developed, which last year tested seventy-four hundredths, as compared with wild plants of the same locality which tested thirty-four hundredths. *Digitalis lanata* has shown in preliminary tests, an activity much greater than the official species. True, this activity may not be due to the same active constituent, or combination of constituents, as that of the species *purpurea*, but the fact that there does exist a more toxic species than the one in common use, indicates the necessity for investigation and the possibility for the plant-breeder to develop an improved strain. And so we might continue to take up the various phases of the problem, as to the possibilities of developing annual strains of such forms of biennials as digitalis, henbane, conium, etc., and the influence this would have upon the success of commercial production. In this respect the standards of the pharmacopœia must be reckoned with. These standards must be the guide of the prospective drug-grower, for, in many instances, they, in themselves, point out the many difficulties to be overcome if the proposition is to be a profitable one. For instance, the present pharmacopœial requirement for digitalis, includes only the leaves from flowering plants. This plant is almost strictly a biennial, meaning that land must be occupied two successive years by the plant before a harvest is realized. It is also a plant that cannot be seeded by open-field methods, but must be started in the green-house and transplanted. The question immediately arises as to the advisability of recommending this plant for cultivation. With belladonna and stramonium, only leaves are official, while it has been found that the stems of both of these plants contain at certain stages appreciable quantities of alkaloids. If the whole above-ground portion of these plants could be used, it would greatly facilitate the operations of harvesting and curing and at the same time materially increase the yield of crude material. Also, only the species *Datura stramonium* is now official, while it is known that the species *Datura tatula*, which is more common in this locality, contains as much and in some instances even more alkaloids. While some may claim that the alkaloids of these two plants are not identical, still

their close botanical relationship and the fact that we have evidence that European stramonium leaves are many times probably a mixture of these two forms, strengthens the assertion that there is little difference in their therapeutic value.

And so we might continue to take up the various problems of drug cultivation, together with their probable solutions, but space will not permit. In conclusion, therefore, it should be clearly understood that these problems are not simple ones and those undertaking their solution should bear in mind that the cultivation of medicinal plants involves more than merely allowing crops of weeds to grow in spite of themselves, in cutting them down when most convenient, pulling them out by the roots or otherwise, and quickly transferring them to the manufacturer who will be waiting with open hands to receive them at fancy prices. It has seemed advisable, therefore, to recommend to those interested in drug-growing, that they begin on a small scale with a few of the most promising forms, and that they be so situated and equipped that they can carry these through an experimental stage, developing their method of propagation, seeding, harvesting, curing, etc., before attempting any operations upon a commercial scale.

BOTANICAL DEPARTMENT, ELI LILLY & COMPANY, INDIANAPOLIS, IND.

CAN THE PHARMACOPŒIA AND THE NATIONAL FORMULARY BE MADE POPULAR WITH PHYSICIANS?

BERNARD FANTUS, M. D.

Professor of Pharmacology and Therapeutics, College of Medicine of the
University of Illinois.

Time and again has the idea been expressed that physicians as a class do not take enough interest in the Pharmacopœia and the National Formulary. As the truth of this proposition is quite generally admitted, it is probably unnecessary to adduce proofs in support of the assertion. All will agree that it is desirable to make these formularies popular with physicians. The question is: Can it be done?

In an article entitled: "Why physicians do not read the Pharmacopœia," Dr. Chambers (1) summarizes the reasons as follows: First, the physician fully trusts the application of its information to the pharmacist without question; and, secondly, the information the physician seeks for practical application by himself is not contained in the book. So little, indeed, of practical value to the physician is to be found in the book, that we might fairly raise the question: Why *should* physicians read the Pharmacopœia? An additional reason for the indifference of the physician toward the Pharmacopœia is the impression forced upon him that the Pharmacopœia is non-progressive; for nearly every mail brings to the doctor cleverly worded advertisements for proprietary medicines, all of which, no matter how varied their nature, agree in one respect, namely in claiming directly or indirectly, that they represent a decided advance or innovation in respect to the Pharmacopœia.

Now what can be done to make the Pharmacopœia more popular with those for whose guidance chiefly the work is published? Should we attempt this by intro-