

The samples were stored in 4-oz. bottles and were shaken daily, in order to prevent a dilution of the top of the liquid, which would serve as a good medium for the growth of any kind of bacterial or mold contamination.

The first observation worth noting is that the syrup, made by either hot or cold method, seemed to be free of glucose when stored in a cold, dark place.

In spite of the fact that the bottles were shaken daily, all of them developed a fungus growth after a few weeks, and this continued to develop regardless of the high concentration of the syrup. The first bottle gave off a slight alcoholic odor, and the cork "popped" when drawn, suggesting CO₂. The second showed CO₂, but the alcohol was not noticeable. Neither of these were noted in the others, all of which contained a lesser amount of glucose than the first two.

When cultures were made of the different syrups both on agar and gelatin, the latter showed practically no growth, but the agar showed much gas formation and a strong alcoholic odor, signifying the presence of yeast, which was later verified by the microscope. The gas formed under the agar in both aerobic and anaerobic cultures, and was sufficient in each case to raise the agar up in large lumps. The anaerobic culture showed some short, thick rods when stained with methyl violet. These seem to have been a contamination of some kind, as there were very few and there was no fetid odor characteristic of most bacterial growth.

In addition to the yeast cells there was a mold, which proved to be *Penicillium glaucum*. It seems that the mold was almost, if not entirely, responsible for the inversion, as the mold was most abundant in the samples which showed the largest amount of glucose, and these bottles were also the ones which were stored under conditions most favorable to the growth of the fungus, both as to light and temperature.

Therefore it would appear that the best conditions for the storage of syrup are as follows:

The syrup should be stored in full bottles in a cold, dark place, and shaken daily or perhaps twice in a day, in order to preserve the highest degree of concentration and thus keep a thoroughly sterile preparation. There is probably no advantage as far as inversion prevention is concerned in either the hot or cold method of preparing the syrup.

WANTED—THE OLD-FASHIONED PHARMACIST.*

BY J. W. ENGLAND.

Under the caption of "Wanted—The Old-Fashioned Doctor," the following editorial has recently appeared in the Philadelphia *Public Ledger*:

"As the shortage of doctors continues to make itself manifest in civilian life, it is being made clear to the most thoughtless that what the medical schools should turn out in greater numbers and what the country needs is the good, old-fashioned, all-round general practitioner. In many ways the tendency of medical education of recent years toward concentration in the matter of schools and extreme specialization and standardization has not only reduced the number of doctors as a whole, but seriously cut down those who cared for or were trained for general

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practice. It is now seen that this practice was not altogether the wisest of courses. The highest of standards for admission to medical schools, it may be said, should be maintained in these days of advanced sanitation and advanced methods of preventive medicine; but with these high standards, which have had the effect of cutting down the supply of students, and therefore of doctors, it would seem as if something should have been done before the war to increase the attractiveness of the medical profession, and, what is more, instead of forcing the issue as to specialists, give the general practitioner a dignity and opportunity which for a number of years have been denied him.

"As a consequence, the depletion of the specialists, not only the surgical specialists, by the war, has left the medical profession available in civil life scant in numbers and with altogether too few who are indisputably general practitioners and truly understand the 'art of healing.' For healing is an art, and it depends more largely than many think on individual equation plus the science of medicine as it is obtained in the schools, the hospitals and the daily practice. * * * As it is, if the war continues, the great need of utilizing the general practitioner for all sorts of service from which he is now cut off by the detailed specialization which rules will be pressed home on every one.

"The medical educators, however, naturally are not blind to the situation and to some of them what is happening will be viewed as a case of 'I told you so.' At all events, as all schools and colleges are looking to their methods with a view of determining their practical relation to the output, it would seem as if the medical schools are in need of some genius who will plan for them a system which will turn out more old-fashioned doctors and leave the necessary specialization to be carried on by relatively small groups of laboratory workers, while the doctors serve the community as a whole and along broad and general lines, applying the hospital and laboratory facts by the bedside, in the home and in the office as occasion calls for."

The shortage of the "good, old-fashioned, all-round general practitioner" is not only quantitative, by reason of fewer medical schools and fewer students, but qualitative, also, by reason of the extreme standardization of the medical sciences and art taught in the schools and the overspecialization of medical practice.

The practice of medicine to-day is in a state of evolution. The older practitioner has a firm faith in the use of drugs for the treatment of disease. The newer practitioner has little faith in drugs and much concerning preventive medicine.

The scientific exactness of the sciences applied in preventive medicine—bacteriology, immunology, hygiene, sanitation, etc., and the brilliant results they have yielded in conserving human life, have appealed powerfully to the imagination of the medical profession, especially when contrasted with the apparent lack of scientific precision in the use of drugs, which lack, by the way, is more apparent than real.

Many of the medical schools unduly emphasize the importance of preventive medicine and minimize the importance of materia medica and therapeutics, so that therapeutic nihilism has grown apace and drugs are being used, less and less, by the younger men, at least, in the treatment of disease, although, it is but fair to add that some of the most prominent schools and teachers of the day recognize the value of drugs and are staunch advocates of their use.

The indirect result of this trend, however, has been that there is less and less demand by physicians of pharmacists for professional services; and yet many

physicians condemn pharmacists for the too largely non-professional character of pharmacy. If the practice of pharmacy in the retail drug store of to-day is not as professional as it should be, the fault is chiefly with the medical profession, by reason of its neglect of *materia medica* and therapeutics, although the pharmaceutical profession itself is by no means blameless.

As usual, in medical history, the pendulum has swung from one extreme to the other. Formerly, drug therapeutics was everything in medical practice and preventive medicine a dream; now preventive medicine is everything and drug therapeutics is nothing, relatively. The truth is, of course, between the two extremes. There is a brilliant future for preventive medicine, but there can be, also, an equally brilliant future for drug therapeutics. It is most desirable, of course, that every step be taken to prevent disease; but when disease is present, the patient does not care then to know how he got it, or how he can avoid getting it again; what he wants to know is what relief he can get *now*. He is not particularly keen about being "an interesting case" *only* to his physician! He wants something done, being of the opinion of Jacobi, that, "Those who die, die 100 per cent."

Some one has said that the medical profession has "run after false gods" and "fallen down on its job," that it does not get as successful clinical results as it did when drugs were more generally used (the death rate of pneumonia, for example, twenty-five years ago was 25 percent; to-day it is from 30 to 50 percent), and that in consequence, the confidence of the public in physicians has become so weakened that osteopathy, Christian science, and patent medicines particularly, have obtained their present widespread vogue.

But, whether this is true or not, the fact remains that thousands of years of clinical experience have shown that drugs, rightly used, have real possibilities of usefulness in clinical conditions. It may be that the results gotten cannot always be explained with modern scientific exactitude—the individual drug reaction in the treatment of disease may be too variable to do so—but this does not justify the neglect of *materia medica* and drug therapeutics shown by many of the medical profession in recent years.

Drugs have positive clinical values, and these should be as accurately determined as possible to the end that the wheat may be separated from the chaff and utilized for the benefit of sick humanity. If empirical therapeutics is anathema from a scientific viewpoint why not develop rational therapeutics, as advocated years ago by Dr. Horatio C. Wood, the ablest therapist American medicine has ever produced?

The old-fashioned doctor with his intimate knowledge of the possibilities and limitations of drugs in the treatment of disease is being superseded by the new-fashioned doctor who thinks chiefly in terms of preventive medicine; and unless the medical profession awakens to the very serious dangers that menace it through its neglect of *materia medica* and drug therapeutics, with the consequent insufficiency of clinical results and the weakened confidence of the public, the influence and prestige of the medical profession will be seriously imperiled.

The medical profession needs nothing to-day so much as to be born again in a new faith in the rational use of drugs for the treatment of disease, both to

ensure and promote the growth and development of the science and art of medicine and for the better preservation of the health and lives of the people.

And when this is done, then the old-fashioned pharmacy and the old-fashioned pharmacist will again come into their own. God speed the day!

MANUFACTURE OF AMPOULES.*

BY CHARLES L. BARTHEN.

The methods as well as the advantages of administering medicinal remedies, hypodermically, by means of Hypodermic Tablets, Biological Serums, Antitoxins, etc., are well known. But "ampoules" which are hermetically sealed, glass bulbs, containing standardized and sterile, aqueous or oil solutions of drugs or medicinal chemicals, are considered as comparatively new products on the North American market, although they have been in very common use in Europe and South America for a great many years.

With but very few exceptions the content of ampoules are specifically intended for subcutaneous, intramuscular or intravenous injections; therefore possess all the advantages that hypodermic administration affords.

There are, however, three paramount advantages to be gained by the use of ampoules; namely, convenience, accuracy of dose and the ready to use sterile product.

In view of the facts I have just stated, it is reasonable to expect, that the greatest care, accuracy and aseptic conditions should be observed in the manufacture of ampoules, so that even the most exacting physicians will not hesitate to use them.

I shall endeavor to outline in detail the manner in which ampoules are manufactured in the Laboratory where I am employed.

Manufacturing and Filling of Solutions.—Ampoule solutions with very few exceptions do not contain any material other than the actual medicament and the solvent. The solutions must be neutral in reaction or as near neutral as possible, so that when injected they will not cause any irritation, pain or shock. Therefore they are standardized by chemical tests and assays. As a demonstration I will cite a few examples. Sodium Cacodylate solutions must be very faintly alkaline, and free from Cacodyl, the ester of Cacodylic Acid, which is objectionable. Alkaloidal solutions, such as Quinine, Morphine, Atropine, Strychnine, Emetine, etc., must be faintly acid. Solutions of iron salts must be neutral. Solutions of Adrenalin, Pituitrin, Ergot, Strophanthus, and similar products, are submitted to a physiological assay. Mercurial compounds contain some local anesthetic, because there is no other means of preventing them from causing pain, without changing their very nature.

Filtering.—The solutions are filtered first through paper, then through a Berkefeld or Pasteur filter, the latter preferably because it is more dense. The solutions are forced through the filters with compressed air, and the filtrate received in sterilized bottles. Bacteriologists claim that the solution as it leaves the Pasteur filter is sterile.

* Read before Detroit Branch A. Ph. A., April meeting, 1918.