Modified viruses
Anti-bacterial sera
Antibody solutions
Antitoxins
Toxin-antitoxin
Toxoids
Antivenin
Tuberculins
Mallein
Johnin
Pollen extracts
Protein extracts
Diagnostic reagents
Mechanism of immunity
Natural
Induced
Complement fixation
Widal reaction and other specific serum reactions
Regulations concerning the storage
Date of expiration
Keeping qualities

The unit covering *Sanitation,* includes the disposal of waste and sewage: the treatment of water supplies, milk and food inspection and other regional regulations.

Under *sterilization,* the special treatment for Galenicals and other medicinal substances, including *prescriptions* is emphasized. The various sterilization and pasteurization methods should be freely illustrated by each student.

Since the most important objective of this course is to acquaint the student of pharmacy with the official biologicals and commercial products of a related nature, he should be as familiar with the composition, use and dosage of these preparations as with any topic in Materia Medica.

Because of the frequency with which our graduates find positions in the technical, clinical or commercial laboratory it has become increasingly more important to include simple bacteriological technique in our curriculum.

A COURSE IN LABORATORY GLASS BLOWING IN A COLLEGE OF PHARMACY CURRICULUM.*

BY HORACE M. CARTER.[1]

Comparatively few schools and colleges in the United States, at the present time, offer courses in laboratory glass blowing. The foreign universities, on the other hand, have apparently long recognized the practical value of adequate training in glass manipulation, a most necessary adjunct to the person properly qualified to enter the field of chemical research.

There are, no doubt, a certain number of our American universities which provide a training in glass manipulation, but I am aware at the moment of only one of our leading technical institutes which *requires* a course in laboratory glass blowing of its undergraduates in chemistry. The majority of the universities prefer to maintain a department under the supervision of an expert glass blower for the repair and construction of glass apparatus. The chemist who ultimately enters the research field without any practice in the technique of glass manipulation finds himself entirely helpless to make repairs or to construct the simplest type of apparatus.

Many laboratories which specialize in the preparation of synthetic organic chemicals, and many industrial firms which maintain a research department, re-

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* Section on Education and Legislation, A. PH. A., New York meeting, 1937.

[1] Associate Professor of Pharmacy, Columbia University, College of Pharmacy.

quire their chemists to design and prepare all of the types of special glass apparatus required in research. The Eastman Kodak Company, in an interesting booklet entitled, *The Preparation of Synthetic Organic Chemicals at Rochester*, states:

"All special apparatus, from distillation flasks to the more complicated pieces, are prepared from Pyrex glass by the chemists who design and use them." The book abounds with illustrations of special apparatus, not commercially available, designed by Eastman chemists.

The commercial manufacturers of glass and glassware are apparently aware of the fact that those engaged in chemistry have had little or no practical experience in glass blowing. These manufacturers are moreover aware of the need of instruction in this field, and because of the lack of adequate instruction provided by the colleges and the universities, have taken it upon themselves to prepare booklets giving directions for the fabrication of glass apparatus. The Corning Glass Works, in a most valuable booklet, "Pyrex Bends, Bulbs and Seals," states:

"To aid laboratory workers in their efforts to become adept apparatus builders, Corning Glass Works offers, herewith, some suggestions as to the proper tools and equipment as well as the correct procedure in the construction of 'PYREX' apparatus."

This book also is replete with illustrations and should prove a most valuable aid to the amateur worker.

In view of the fact that the designing and fabrication of apparatus plays a most important rôle in the realm of chemistry, I have long felt the need of the inclusion of a course in laboratory glass blowing in the curriculum of those schools and colleges which prepare men to engage in chemical research.

Many of the colleges of pharmacy in the United States for the past number of years have been sending men into the research field of the pharmaceutical and allied professions. I am of the opinion that these men would be greatly benefited if, in the course of their studies, there was provided systematic instruction in laboratory glass manipulation.

It is understood that such a course in laboratory glass blowing has not as its aim the training of professional glass blowers; its object is to offer adequate instruction which will enable the worker to become proficient in carrying out the most common and most frequently used operations involved in the construction of laboratory apparatus.

It naturally follows that the first exercises be simple, at the same time stress fundamental points, such as the rotation of the glass, the proper working temperature, simple bends, drawing out a tube, constricting a tube, flanging a tube, which operations must be fully mastered and amplified later.

Then may follow the simple exercises of joining tubing of the same diameter, joining tubing of different diameters, construction of the "tee" tube, blowing a bulb on the end of a tube and blowing a bulb in a tube.

With these fundamentals as a foundation, the actual construction of apparatus may be attempted, *e. g.*, sealing a tube through another tube, required in making a gas-washing bottle, a suction pump or a Kjeldahl trap. Further practice in making ring seals and spirals, together with the fundamental operations already attained, will enable the worker to construct a variety of apparatus. In addition, one may purchase from the manufacturers of laboratory glassware, certain forms and sizes of flasks, stop-cocks, ground joints, etc., which may be utilized in the construction of special designs.

Our attention need hardly be directed to the fact that the Departments of Pharmacy, Chemistry and Materia Medica offer a wealth of material for the duplication, repair and construction of standard or special apparatus.

EXTRACTION OF NUX VOMICA IN THE MAKING OF TINCTURE.*

BY NELLIE PERRY WATTS.[1]

When the Tincture of Nux Vomica, manufactured according to the directions of the United States Pharmacopœia, Eleventh Revision, came upon the market, great indeed was the consternation. For decades this tincture had been an amber solution; the new product, however, is a red liquid. Not only is it red, it is of different shades of red; the products of the various manufacturers differ in shade, and even one lot of a manufacturer may vary from his next lot. You well know the doubt this change in color causes in the minds of the retail and dispensing pharmacists, particularly in the refilling of prescriptions calling for this galenical.

The formula for preparing the Tincture of Nux Vomica has changed many times. In reviewing its history in this country it will be found that *until the* Third Revision in 1851 the crude drug (nux vomica) only was official. In the revision of 1851 the tincture was directed to be made from the rasped seed, using eight ounces to two pints of finished tincture. The drug could be macerated, or macerated and later percolated, with the then official alcohol, specific gravity 0.835, which was about 90 per cent by volume. A menstruum of alcohol, too, yields an amber-colored tincture. For several decades no changes were made in this preparation, other than that the rasped drug was replaced by a fine powder. In the Sixth Revision, among other changes the menstruum was diluted—eight parts of alcohol to one part of water. It was in 1890, the Seventh Revision of the Pharmacopœia, that acid was first introduced; and extract of nux vomica was made from 1000 Gm. of drug, 50 cc. of acetic acid, 750 cc. of alcohol and 250 cc. of water. The tincture was made by dissolving sufficient of the extract in a mixture of alcohol and water (3:1) to have a concentration of 0.3 per cent of alkaloids. In the Ninth Revision (1910) the tincture was again made by percolating the drug without acid; in 1920 the process was continued with the addition of acetic acid. In the Eleventh Revision the 10 cc. of acetic acid per 100 Gm. of drug was replaced by 7.5 cc. of hydrochloric acid.

Nux Vomica seeds contain the alkaloids strychnine and brucine combined with igasuric acid, an acid similar to tannic acid. There is also present a glucoside —loganin (1).

In a study of this tincture five experimental lots were prepared; in each instance 100 Gm. of nux vomica, ground to a moderately coarse powder, was packed in a glass percolator and, after being moistened with the menstruum for twenty-four hours, drained at a rate of 3 to 5 drops per minute. Percolation was continued until the tincture measured 1000 cc. The menstrua used were:

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* Section on Practical Pharmacy and Dispensing, A. PH. A., New York meeting, 1937.

[1] Philadelphia College of Pharmacy and Science.