

newspaper clippings, magazine articles, articles from technical periodicals, etc. Priority throughout is given to original sources of information, including any and all official reports, documents, etc., of value. Aside from the foregoing, there is a section on Graphics, which is becoming a matter entitled to separate consideration, on account of the growing demand for graphic publicity of social, medical and economic experience. As thus conceived, the organization of knowledge can be brought within the compass of six general divisions, which can easily be memorized and into which numerous special sub-divisions fit automatically on the principle of associated ideas.

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AMERICAN BIOLOGICAL STAINS COMPARED WITH THOSE OF GRÜBLER

IN a recent article¹ the writer called attention to the need of standardizing biological stains now that those of American manufacturers are on the market. In this article mention was made of the fact that the American stains had a rather bad reputation among biologists not necessarily because of their actual poor qualities, but merely because they are different from the Grüber stains which were standard before the war. It was stated at this time that the Society of American Bacteriologists was beginning an investigation of the American stains, and the cooperation of other scientific bodies was urged. Since the article in question was written much cooperation of this kind has been secured and the work has been put on a much broader basis. For this reason it seems well at the present time to insert in these pages a brief report on progress, particularly since many interesting results have already been obtained in comparing the various brands of stains.

Still more recently there appeared in this

journal² a statement as to a project of the National Research Council on the standardization of biological stains. This work of the National Council is the out-growth of the investigations already made by the bacteriological society. Several of the national scientific organizations, notably the Botanical Society of America and the American Society of Zoologists, are already taking active part in the work. As a result there are now some forty bacteriologists who have taken part in the bacteriological tests of the stains, about fifteen zoologists who are examining certain stains for cytological and other histological work, and it is expected shortly to have a similar group of botanists taking part in the work. The hearty cooperation of all of these investigators, located in many different institutions all over the country, is one of the most pleasant surprises the work has brought out. The tests involved are often quite time-consuming and the willingness of the collaborators to carry them out without question of remuneration or credit for the work is felt to show that biologists in general are keenly interested in the subject. Without their eager cooperation the work would have been impossible, and much credit is due to all of them.

The work has brought out quite plainly that three series of tests are necessary in standardizing any particular stain: first it must be tested for bacteriological staining; second for histological staining; and third its chemical composition must be determined so far as the present status of dye chemistry makes this possible. At present three stains or groups of stains have been tested from the bacteriological standpoint: fuchsin, methylene blue, and the gentian and methyl violets. Of these, methylene blue and gentian violet are now being tested in histological work. In addition to these, histological tests are being made of safranin, hæmatoxylin, orange G and eosine. Chemical work, through the cooperation of the Department of Agriculture in the Color Laboratory, under Dr. Ambler, has been done on methylene blue, and similar tests are shortly

¹ H. J. Conn, The Production of Biological Stains in America, *SCIENCE*, N. S., 53: 289-290.

² The Standardization of Biological Stains, *SCIENCE*, N. S., 53: 289-290, 1921.

to be made of gentian violet. Although the work has only just begun, enough information has already been obtained so that certain public statements can safely be made.

In the first place, it has been learned that there is no justification for implicit faith in the Grüber stains. They are apparently not nearly as pure as those that are now made in America. It has for a long time been well known that certain Grüber stains were cut with inert material such as dextrin or salt, and the recent chemical tests that we have made show very plainly the greater percentage of color in nearly all the American samples examined. Possibly in some cases the greater concentration of the American stains may have been the cause of the poor results obtained with them, since the directions for preparing staining solutions are all based upon the Grüber stains. In the second place, it has been found that the Grüber stains are not as constant or uniform as it used to be supposed. Some examples of Grüber's methylene blue for example are entirely satisfactory for staining dried milk smears, while other samples, the authenticity of which can not be questioned, have the property of dissolving casein and washing the milk smears off of the slides. Furthermore, certain Grüber samples of orange G prove entirely satisfactory in the Fleming triple stain while other samples are very unsatisfactory, ranking with the poorest American samples in this respect. It has been noticed with much interest that when an investigator has been using for histological purposes a sample of some Grüber stain from his own laboratory, and also various unknown samples sent to him, in which another Grüber sample was included, he has invariably reported his own sample of the Grüber stain as much superior to the unknown sample. From this it has been concluded that the Grüber stains vary as much as the American stains and that a histologist naturally reports best results with that particular sample with which he has had experience.

As to the qualities of American stains, it can be said without hesitation that they are in general very good. This is particularly true

of the bacteriological stains, to which for one reason or another the manufacturers have given most attention. Certain American methylene blues, in particular, are decidedly superior to any we were used to before the war. This statement is made on the basis of very severe bacteriological tests and of chemical analyses as well. There seems to be no question but that it will be possible to find American-made stains of practically all kinds desired by biologists as good or even better than those obtained from abroad.

The chief uncertainty in the situation at present is whether the producers of the stains will stay in the business. This matter may be settled one way or the other by action of Congress before this paper appears in print; but whatever is done in the matter, it is decidedly to be hoped that certain of the American stains which some of us biologists now invariably choose in preference to the Grüber products, will continue to be available to us.

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SCIENTIFIC EVENTS

THE STANDARDIZATION OF INDUSTRIES

BILLIONS of dollars can be saved by American industry if a comprehensive program of standardization is carried out, according to E. C. Peck of Cleveland, O., chairman of the standardization committee of the American Society of Mechanical Engineers. Mr. Peck writes:

The German work is of special interest to those responsible for the management of American industries, not only because of its importance, but also because of the similarity in the historical conditions surrounding the national standardization movements in Germany and in America.

Mr. Peck says that mass production is no longer primarily an American development, but that the lesson of the war has brought home to European countries realization of its significance, so that to-day in these countries far reaching programs of industrial standardiza-