maintenance will be contributed for three years by the foundation, and then the local houses will be put under the management of the local government.

THE degree of master of science in engineering has been established at Cornell University and will be granted upon recommendation of the Engineering Division of the Graduate School to those graduate students who have successfully completed a course of study or research majoring in some specialized branch of engineering for which they have the necessary prerequisite training. No student may be admitted to candidacy for this new degree whose training does not include work in one foreign language, equivalent to two units of entrance.

UNDER the auspices of the Academy of Natural Sciences of Philadelphia the two-masted schooner *Morrissey,* commanded by Captain Rob Bartlett, has sailed from New York for a three months' exploring and collecting trip along the west coast of Greenland as far north as Ellesmere Land. The members of this expedition, which is sponsored by R. R. M. Carpenter, of Wilmington, Delaware, a trustee of the academy, are: William K. duPont Carpenter, son of Mr. Carpenter; Harry J. Lance, Jr., of the museum staff, and Robert F. Dove, who will join the ship at St. John's, Newfoundland, and a representative of the Canadian Government. An expert photographer will accompany the expedition to make motion pictures. The ship is stocked with provisions and fuel for a two years' stay in case unusual conditions should be encountered. The chief objectives will be to secure specimens of birds and animals and collect fishes and other sea animals. It also is hoped that some definite information may be obtained as to the nesting and breeding habits of the greater snow goose and the common brant, two birds which summer in Arctic lands and in the autumn migrate southward to North Carolina, and even as far as Cuba. After skirting the coast of Labrador, the *Morrissey* will proceed through Davis Strait into Baffin Bay and head for Cape York to inspect the Peary memorial monument erected there last summer. Captain Bartlett was commander of the *Roosevelt* when Peary made his successful trip to the Pole in 1909.

THE birth rate in the United States during 1933 was 16.4 per 1,000 population, according to a report of the Census Bureau in the *New York Times.* The infant mortality rate was 58.2 per 1,000 live births. These figures represent a reduction in the birth rate but a slight increase in the infant mortality rate from 1932. However, in 1932 there were no figures for Texas. In 1932 the rates were as follows: Births, 17.4; infant mortality, 57.6, and still births, 3.8. The still birth rate for 1933 was 3.7 per hundred. The birth rate for 1933 is the lowest reported since 1915, when registrations began. New York, Pennsylvania, Texas and Illinois lead the states with the greatest number of births, respectively, as follows: 187,139, 157,046, 107,924 and 105,861. The states with the highest birth rates per 1,000 population are New Mexico, 26.7; North Carolina and Utah, each with 22.9; South Carolina, 22.7; Mississippi, 21.6; Alabama, 21.1, and Virginia, 21.0. The lowest birth rates are for Oregon, 12.2, and California, 12.4. Infant mortality rates, which are based on the number of deaths of infants under one year of age per 1,000 live births, are excessively high in New Mexico (134.2) and Arizona (111.4)—both states with large nomadic Indian and Mexican populations. The next highest rate is 78.4 for South Carolina. The lowest rates reported are those for Washington and Oregon, 38.9 and 39.3, respectively. The birth rate decreased from 1932 to 1933 in every state except Nevada, Oklahoma and Vermont. The infant mortality rate, while showing a slight increase for the entire country, actually decreased in twenty-three states.

DISCUSSION

REFORMS IN CHEMICAL PUBLICATION (DOCUMENTATION)

IN recent years it has become increasingly evident that a reorganization of the production and distribution of chemical publications is needed. The number of journals and other documents is now so heterogeneous that, even though one has access to excellent libraries, it is practically impossible to obtain and consult all original published articles on a given subject. An amelioration of this situation is necessary if chemistry is to continue to advance at a rapid rate.

With this object in view, the Office International de Chimie (O. I. C.) was organized several years ago for the purpose of enlisting the cooperation of representatives of various countries, qualified by experience and authority, in finding a solution of this problem. Several meetings have been held and attention has been directed in the first place towards establishing the form and methods of international cooperation. As a basis for suggestions along these lines the existing situation in regard to chemical documentation has been studied. The local, specialized and national efforts have been reviewed. The relation of chemical documentation to that of other sciences and human interests has been considered. From this broader point of view the O. I. C. has endeavored to enlist the aid of the International Institute of Intellectual Cooperation of the League of Nations. The suggestion has been made that a comprehensive International Guide to Documentation be prepared.

Among the individual suggestions which have been made for the reorganization of scientific publication and bibliography perhaps the most comprehensive is that communicated privately for criticism to interested persons during the past year by Mr. Watson Davis, of Science Service, and recently presented by him as an address before the Chemical Society of Washington.

Mr. Davis's plan embraces not only chemical but all other scientific publication. He suggests that a central scientific information institute (S. I. I.) might eventually be established and thus perform the double function of publication of current original communications and the furnishing of bibliographies and photographic copies of current and previously published scientific documents.

He proposes that a photographic process of reproduction of documents be substituted for publication by means of the printing press, in all cases except papers of general interest and abstract journals.

According to his plan printed journals of original research would disappear and all original communications would be submitted to the Scientific Information Institute. Abstracts of these would be published in the appropriate abstract journals. The individual would gain his knowledge of new discoveries in science by means of the abstract journals. He would then order from the Scientific Information Institute photographic copies of all original papers desired. He would thus pay for and receive only those publications he needed for the particular research in which he was engaged.

The proposal made by Mr. Davis contemplates a complete reorganization of the present methods of scientific publication. Although this may be advantageous, it certainly can only be achieved very gradually. It is therefore necessary to prescribe the successive steps towards this end which may be taken without too greatly disturbing the existing order of things—such steps as will at first supplement present efforts rather than supplant them and render those services which changing conditions are making increasingly difficult.

It is believed that the inauguration of a service of photographic reproduction of chemical publications would be an initial step which would satisfy the conditions mentioned. This might conveniently be referred to as the American Bureau of Chemical Documentation (A. B. C. D.). Its initial function would be to make and distribute photographic copies of documents describing chemical research.

As will be realized, the success of such a venture depends upon the perfection of a satisfactory and economical process of photographic reproduction of printed documents. Some progress has already been made in this direction, and it may be assumed that suitable devices to meet the particular needs of the case will be developed.

It is probable that the most satisfactory system will be one in which 16 mm film is used, and from such strips of negatives of printed pages positives will be prepared and these mounted in windows on filing cards. Such cards need not be much larger than 10×15 centimeters and have sufficient space for typewriting the author's name, title of paper and its classification number in addition to the window in which will be fastened the film strip containing the photographs of some 20 printed pages. For longer papers two or more cards would be required. For reading these cards a small table projecting machine would be necessary, and this should permit of variable enlargement according to the desires of the reader.

When such standardized equipment becomes available there should be established in each country a Bureau of Chemical Documentation in which photographic copies of current and former publications may be made for those who request them. Naturally, the bureau must have access to excellent libraries and be provided with filing cases for conserving the negatives prepared of all original papers demanded.

In the beginning the service rendered by the bureaus would undoubtedly be most appreciated by chemists working in localities not well provided with chemical libraries. This service would enable such persons to undertake research not otherwise possible. It would in fact put them on an equal footing with chemists having access to the best stocked libraries. The convenience of having so much of the literature of a given subject in one's hands in a convenient form can hardly be overestimated. The fact that the cards do not have to be returned promptly to the library, as is the case with borrowed books, should be particularly appreciated. They are available for consultation indefinitely and if lost or destroyed can be easily replaced.

There is, however, an even greater advantage and economy which such a system of furnishing copies of original papers would provide. This is in reference to the printed publication of original papers.

At present the number of papers offered to chemical journals for publication is far in excess of the number which can be printed with the available resources. Many of these papers are refused and practically all are accepted only if they are condensed to a considerable degree. This results in the printing of many papers which are in large part unintelligible to those for whose benefit they were written. In such cases it would be far better if only a brief résumé of the paper was printed and the original complete communication placed on file in the editorial office or

elsewhere. Photographic copies of it would then be distributed by the B. C. D. exactly as would be done for all other papers. To those requiring full details of the investigation this plan would be of inestimable benefit and to editors of journals it would probably provide a welcome relief from frequent embarrassment.

It may be expected that this curtailment of printed publication would be taken advantage of on an ever-increasing scale and the amount of such unprinted chemical literature eventually would become very great. The cost of distribution in this way would be so much less than by the printed journal that certain of the more theoretical publications could probably be discontinued and many others greatly reduced in size and circulation.

If this plan were put into operation by the American Chemical Society and by similar organizations in other countries the photographic copies of these original unprinted papers would be exchanged by the various Bureaus of Chemical Documentation and thus chemists of all countries would be able to receive copies of them promptly.

Since the pressure of publication in printed journals would be relieved, funds not devoted to that purpose could be diverted to the expansion and improvement of abstract journals. This is especially desirable since it would be principally from these that chemists would gain their knowledge of new work and make out their orders for copies of original papers. The chemical literature needs of a chemist would then be almost completely supplied by his abstract journal and the photographic copies of papers furnished by the B. C. D. Borrowing from and returning journals to libraries would be reduced to such an extent that a considerable saving in service rendered by libraries would result. This is one of perhaps many indirect economies that would result from the wide-spread adoption of a system of photographic reproduction of chemical documents.

If this project should be undertaken by the American Chemical Society it is probable that this service would eventually prove to be the greatest which it renders to our own chemists and those of other nations.

From an international standpoint the Bureaus of Chemical Documentation, established in the various countries, would soon become the centers for the promotion of cooperation in all matters pertaining to chemical publication. Not only would negatives of deposited original unprinted papers be exchanged, but reproductions of occasional and rare documents as well as complete numbers of the current journals. Thus each B. C. D. would rapidly acquire an enormous mass of chemical publications in a compact form and suitable for unlimited reproduction. It would become the most important center of chemical documents in each country.

Such an exchange of material would undoubtedly lead to many other kinds of cooperation. Such details as reference numbering, classification, cataloging, etc., of papers would eventually be reduced to a uniform practise throughout the world. It is even likely that attention would be given to nomenclature, abbreviations, symbols and many other subjects of international concern to chemists.

With the perfection and international adoption of this system of chemical documentation it is reasonable to expect that other branches of science will quickly follow suit. Bureaus of documentation similar to those for chemistry would be organized for other sciences and the same equipment used for the photographic reproduction and the projection of these for reading. Thus the goal described by Mr. Davis would be gradually approached.

It is probable that, owing to the large scale of its production, the cost of the necessary photographic equipment would not be excessive. The perfection of such mechanism is a subject worthy of the intensive study of the foremost apparatus makers of the world. The success of the undertaking depends upon the solution of this initial but largely mechanical problem. There is little doubt that sufficient ingenuity to perfect every detail of the necessary equipment will be forthcoming.

The question of the cost of the operation of such a system of distributing chemical documents should not be a serious one. It is probable that a relatively small proportion of the funds now expended for printing would be sufficient. The resulting economies and advantages to each worker may be expected to be so great that any reasonable expenditure will be largely repaid in the increased productivity of chemists of all nations.

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THE CONTROVERSY CONCERNING THE PHYSIOLOGICAL EFFECT OF TRI-HYDROL IN LIQUID WATER

PORTIONS of an article by T. C. Barnes in SCIENCE[1] for May 18, 1934, under the above title might prove somewhat misleading to any one who did not refer to the original literature there cited. It may, therefore, be not inappropriate to set down a few quotations from this article and to add comments.

"Some years ago Baker[2] suggested that association takes place more slowly for liquids than for gases, *i.e.*, water heated at 80° C. for 48 hours (in presence of a catalyst) may exhibit an altered vapor pressure

1 T. C. Barnes, SCIENCE, 79: 455, 1934.
2 Baker, *Jour. Chem. Soc.*, 130: 949, 1927.