

about 0.5 part, due to the decomposition of the organic matter present in the flues, the floors and in the walls.

The air of the building in general, halls and drawing rooms, reading rooms, etc., which are open and in which people are constantly moving, is maintained at about 5.0 parts as an average of examinations during eight years. In the ninth year there has been an increase due to an increased number of lecture rooms on the second floor.

The air of most of the lecture rooms has contained from six to eight parts: of the larger crowded halls for 200 or more students, ten to twelve parts according to weather, whether it is clear and dry and with a strong wind, or whether the air is loaded with moisture and is still.

From this experience it would seem that students can work well in a clean room with about seven parts per 10,000 of carbon dioxide: much more than this causes dullness, and anything over thirteen parts causes in most cases an almost impassable barrier to the full acquisition of knowledge.

When churches, halls, and lecture rooms usually show from fourteen to eighteen parts per 10,000 in twenty minutes after the audience assembles, it is not strange that eloquence often fails to arouse enthusiasm.

AN INTERNATIONAL INDEX TO CHEMICAL LITERATURE.¹

BY H. CARRINGTON BOLTON.

DURING one of my bibliographical tours in Europe, an eminent librarian of a German University remarked: "You Americans are doing more and better work in bibliography than all the nations of Europe taken together." And this he said not in flattery but as the expression of an earnest conviction. Later I expressed surprise that Germans with such splendid collections of books and other advantages should leave it to Americans to cross the Atlantic and wrest from Europe materials for general and special bibliographies. To this he promptly replied: "Ach mein Freund, das Geld fehlt!"

I shall not attempt to demonstrate the accuracy of the gentleman's statements, as it would involve comparisons, and these

¹ Read before the World's Congress of Chemists, August 23, 1893.

are said to be odious. A basis for his enthusiasm is, however, found in such monumental works as Pool's Index, Fletcher's Index, Billing's Index-catalogue of the Medical Library of the Surgeon General's office, the Index-Medicus edited by Dr. Robert Fletcher, the catalogue of the Boston Athenæum, as well as the bibliographies of science published by the Smithsonian Institution, by the U. S. Department of Agriculture and in independent journals. Many other notable works will suggest themselves to the chemists present who will understand that this is only a passing reference.

The production of special and general bibliographies in the United States goes forward with the multiplication of public and endowed libraries, now increasing in number and value with gratifying rapidity throughout the land. Some of these are publishing bibliographies of specific subjects in addition to their Library Catalogues; in this direction Harvard University takes the lead. Unfortunately much good work done by institutions does not get beyond the MS. stage, as for example the Subject-Index in preparation at the Scientific Library of the U. S. Patent Office; and the chemical bibliographies compiled by the students of the University of Michigan as appendages to theses in science.

There are at least three organizations in the United States which promote the preparation of bibliographies; these are (1) the American Library Association, (2) the Committee on the Bibliography of Geology appointed at the International Congress of Geologists, and (3) the Committee on Indexing Chemical Literature of the American Association for the Advancement of Science. The work of the American Library Association is familiar to everyone; through the journal it reaches all librarians and bibliographers in sympathy with its enterprises. Its scope is, however, almost entirely literary and science finds little place in its admirable plans.

The secretary of the Committee on the Bibliography of Geology appointed at the International Congress of Geologists held September 1, 1891, at Washington, has issued a circular dated November 20, 1891 which sets forth its plans for work. These comprise the preparation of (1) a list of the geologic bibliogra-

phies already in existence, (2) new bibliographies of special topics, and (3) the periodic registration of the current bibliography of geology.

Their work has been so recently begun that as yet great results can hardly be expected.

The work of the Committee on Indexing Chemical Literature, of the American Association for the Advancement of Science, now in the eleventh year of its existence, is familiar to most persons present. This committee has endeavored to direct attention to the importance of compiling bibliographies, catalogues, and indexes to the voluminous literature of chemistry. While little systematic work has been undertaken, duplication of labor has been prevented and independent efforts have accomplished much. Thus a collection of special bibliographies has been gradually forming, which now number more than fifty; the list was printed in the tenth annual report of the committee published in the proceedings of the A. A. A. S. for 1892. While the committee feels that their labors have not been in vain, the proportion of the completed bibliographies to the number of authors publishing chemical papers is still unhappily small, and the average of five bibliographies per annum is rather lower than expected. The committee expresses the hope that the number will grow much faster in the future.

In England the British Association for the Advancement of Science has done something towards fostering the object under consideration, by appointing committees on Indexing Solutions and other topics, but their work progresses slowly.

The chemical societies of Berlin, Paris, and London, give to their members and subscribers, laboriously prepared abstracts of papers published in countries other than their own. For persons whose linguistic attainments are limited to their mother-tongue these abstracts are undoubtedly useful, perhaps invaluable; but it rarely happens that they can be entirely relied upon for the details needed by chemists practically interested, and the originals must eventually be consulted. It has seemed to me that if the same amount of energy expended by abstractors of the societies named could be exerted in indexing, greater practical results would be obtained, and at far greater economy of space.

Moreover these societies generally confine their abstracts to publications issued in other countries than their own, and consequently a large amount of good material published at home in Government reports, transactions of learned societies, and periodicals devoted to general science, escapes the eyes of all except a few industrious readers.

It has further occurred to me that the chemical societies of Germany, France, Italy, England, Russia, and the United States, instead of filling their official organs with abstracts of papers foreign to each, might well devote their energy to indexing the wealth of material produced each in its own nation. And this brings me to the statement of a plan which I have the honor to propose to this Congress, for a Co-operative International Index to Chemical Literature.

I suggest that this Congress, in which are representatives of the six leading chemical societies of the world, recommend to these societies the preparation of an annual index to current chemical literature, each society to care for the productions of the country in which it is situated. These annual indexes to chemical literature could be published in the journals (*Berichte*, *Bulletin*, *Journal*, etc.) of the respective societies, which fortunately for our purpose are all in octavo form, and when all the indexes are issued for a given year, they could be bound together for convenience. The bibliographies would of course be compiled, on the same or similar plans, this uniformity being secured by conference between the Index-Committees of the several societies. This plan would necessitate the consultation of six alphabets at least in each annual volume, but this inconvenience would be counterbalanced by the greater accuracy and fullness attained by the subdivision of labor here proposed.

What reception this plan may receive by the several societies is uncertain, but I believe that no more important work can be undertaken by the American Chemical Society. This newly re-organized association now numbers over 700 members and is a truly national society; the "Journal" could not present to its members and subscribers a more welcome contribution than a subject-index to the publication of American chemists. This might be done half yearly, or better quarterly, and should embrace the

widest range of pure and applied chemistry. Perhaps the American Chemical Society will lead in this enterprise, and then the older and more conservative societies of Europe might follow. One stimulus that would eventually influence them is national pride.

So far, this plan relates to current literature and some provision must be made for indexing the enormous accumulation of material already in print.

Probably there is no better way to attack this problem than to prepare a subject-index to the chemistry contained in the Catalogue of Scientific Papers published under the auspices of the Royal Society. This monumental work loses much of its value owing to the lack of a subject-index, and it is deeply to be regretted that there is no prospect of one being compiled, if at least one may judge from the correspondence on this subject printed in the pages of *Nature*.

And here allow me to place on record a fact bearing on the question: a few years ago a member of the Committee on Indexing Chemical Literature of the American Association for the Advancement of Science, already known to the scientific world by his labors in bibliography, decided to undertake the preparation of a subject-index to the chemistry and physics in the eight quarto volumes of the work named, but before doing so wrote a courteous letter to the secretary of the Royal Society announcing his scheme. In that letter the gentleman explained that he planned to compile the subject-index and to print it entirely without expense or liability on the part of the Royal Society.

After a long lapse of time the gentleman received a note from the secretary of the Royal Society stating that the matter had been laid before the council and they had refused permission to have such an index prepared! Thus rebuffed my friend abandoned his scheme and turned his attention to another task.

In spite of this attitude of the council of the Royal Society, I believe a regularly constituted committee of chemists could secure permission, if indeed necessary.

Details of methods to be pursued cannot here be considered; they could be formulated by a committee.

A general bibliography of chemistry has been recently at-

tempted by the writer of this communication; the results form a volume of over 1,200 pages just issued by the Smithsonian Institution as one of the series entitled Miscellaneous Collections. This "Select Bibliography of Chemistry, 1492—1892" embraces about 12,000 titles in twenty-four languages, yet makes no claim to completeness; it is moreover a bibliography, not an index.

In conclusion I have the honor to propose the appointment of an International Committee on Chemical Bibliography, to consist of one member from each country represented in this Congress. That this committee have unlimited power to add to its number, provided however no country have more than two representatives. That this committee, through the European and American Chemical Societies, report a scheme for an International Co-operative Index to Chemical Literature.

UNIVERSITY CLUB,
NEW YORK CITY,
August, 1893.

[EDITORIAL NOTE.—A committee consisting of Edward Hart, R. B. Warder, and Wm. L. Dudley was appointed by the Congress to consider the recommendations of Dr. Bolton set forth in the above paper. Their report with additional action by the Congress will be found on p. 309 of the June number of the *Journal* for this year.]

ACCURACY IN THE ANALYSIS OF DAIRY PRODUCTS.

BY H. DROOP RICHMOND, CHEMIST TO THE AYLESBURY DAIRY CO.

PART I. MILK ANALYSIS.

IN the July number of the *Analyst* for 1889 I published a paper on "Fat Extraction from Milk Solids;" the object of that paper was to show how the differences between the two rival processes of fat-estimation could be explained and rectified; I succeeded eventually in obtaining identical results by the processes due to Adams, Soxhlet, and Storch. Since that paper appeared it has been shown by Waller, Liebermann, and others that the processes of fat-estimation, especially the Adams method, should be modified by rendering the use of ether as a solvent inadmissible. The Werner-Schmid process has also come into extensive use.

In considering the accuracy of any process we have three

¹ Read before the World's Congress of Chemists, August 22, 1893.