ADDRESSES AND CONTRIBUTED ARTICLES

INDEXING REFERENCES

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The problem of indexing references to current literature was found, till lately, particularly troublesome in the Customs and Inland Revenue Laboratory, where the scope of work done is unusually wide. The Customs Chemist may be called upon to analyze any material imported into the country; he must also be ready to say how the material is made, what are its uses, what other material it most nearly resembles, and to answer almost any other question which can reasonably or unreasonably be put to a chemist. On one occasion a package of rennet tablets was received with an official request for information as to whether this was genuine rennet, and if so whether it was made from the stomach of a cow, of a calf, or of a pig.

Since omniscience is expected of him, it behooves the Customs Chemist to have at his command either an exhaustive knowledge of the literature or a very lively imagination, while a combination of the two is preferable. The former requisite involves not only extensive reading and note-taking, but also a sound and simple system of filing notes.

The system now in use has proved so effective and elastic that it seems worth describing. Its adoption brought order out of a chaos of cards. It should be noted that this system was suggested by, and is only an elaboration of, that described by Arthur Marshall.¹

In the first place it is necessary to select from the library certain specific works as "index volumes." All these index volumes together must cover the field on which notes will be made. They must be carefully chosen to avoid overlapping as far as possible, while leaving as little as possible untouched. At the same time their number should be reasonably small. Profundity, and even accuracy, are less essential than comprehensiveness.

For each index volume a blue "Index Card" is used, having a "flag" along three-quarters of its upper edge. This flag bears the name of the index volume to which it corresponds. For each chapter or section of the index volume a "Sub-Index Card" of contrasting color (buff) is provided, its "flag," of half length only, being inscribed with a contraction for the name of the index volume and with the chapter number, section, or set of pages to which it is the key. The notes to be filed are made on ordinary ruled white cards of suitable size. In this laboratory 5 x 3 in. has been found most generally suitable.

An example will best illustrate the manner in which the filing system works. It has been found here that the organic field can be pretty adequately covered by the following index volumes: Allen's "Commercial Organic Analysis," 8 vols.; Martin's "Industrial and Manufacturing Chemistry (Organic)," 1 vol.; and Beilstein's "Handbuch," 4 vols. Supplementary volumes are not included as part of this index. The use of 13 blue cards is thus involved, each with its complement of buff cards to differentiate chapters. A certain paper is to be noted for future reference: a white card is therefore made out thus:

Some Notes on Sandalwood, Its Assay, Yield of Oil, and Changes in the Oil during Distillation. By C. H. BRIGGS, *J. Ind. Eng. Chem.*, 8 (1916), 428; Abstr. in *J. Soc. Chem. Ind.*, 35 (1916), 706. Method of assay is given, with some results and the constants of certain samples of oil are noted. See original paper.

This may constitute the reference. For filing, such a card should be made out in triplicate.

¹ *J. Soc. Chem. Ind.*, 37 (1918), 360r.

Sandalwood oil is dealt with, so far as the index volumes are concerned, in Allen's "Organic Analysis," Vol. IV, p. 391 (*i. e.*, in the section paged from 303 to 461), in Beilstein, Vol. III, p. 549 (*i. e.*, in Section XII B), and very briefly in Martin's "Industrial Chemistry (Organic)," p. 137 (*i. e.*, in Section XIII).

The three reference cards will therefore be placed

(I) Under the blue Index Card "Allen, Vol. IV," and its buff Sub-Index Card "A IV 303-461."

(II) Under the blue Index Card "Beilstein III," and its buff Sub-Index Card "B III, XII B."

(III) Under the blue Index Card "Martin Organic," and its buff Sub-Index Card "M O XIII."

A less comprehensive paper would not require to be indexed under so many leadings. For instance, had this paper been concerned only with an analytical method, a single card would have sufficed. It would have been placed under "Allen IV" and nothing would have been entered under "Martin" or "Beilstein."

As an example of how information thus filed may be found when required, it may be supposed that information is sought on the manufacture and assay of a disinfectant of the Lysol type. Such information as can be found in Lunge's "Coal Tar and Ammonia" or other standard works available having been assimilated, the "Index Volumes" are consulted. It is an easy matter to know which of these few books will contain anything pertinent; they are Allen's "Commercial Analysis," Vol. III, in the section paged from 287 to 390, and Martin's "Industrial Chemistry (Organic)," Section XII (where, however, the subject is hardly more than touched). We may therefore be sure that any references to the current literature on this subject which have been filed are to be found under the blue Index Card "Allen, Vol. III" and its buff Sub-Index Card "A III 287-390," or else under the blue Index Card "Martin O" and its buff Sub-Index Card "M O XII." References bearing on analysis may be more particularly expected in the first-mentioned place, while in the second will be those bearing on manufacturing methods. The search thus narrows itself to glancing over the headings of perhaps one or two dozen reference cards.

Every index-maker must select his own set of index volumes to meet his own requirements. Those mentioned above were found to serve fully the purpose of the Customs and Inland Revenue Laboratory in the field which they are used to cover.

CRITICISMS AND THEIR ANSWERS

The foregoing has been subject to certain criticism while in manuscript. The maximum of clearness will probably be attained by giving the criticism, following each of its points with the answer.

I—How would you handle such difficulties as might arise from the fact that sometimes in a reference book a given subject is treated in more than one chapter or part of the book? This would seem to be a confusing circumstance.

No more confusing than the reading of the book. A card is made for every section of every index volume which contains anything pertinent. The cards may be considered as footnotes, to be inserted wherever needed.

II—The importance of comprehensiveness in the selection of the so-called index volumes for a given field is emphasized. There would be a limit, of course, in one's ability to secure this desirable feature and some might wonder how a subject (possibly a new one since the publication of the index volumes) would be handled. The system would appear to have a limitation unless there were some supplementary method of taking care of new subjects.

Even the "newest" of subjects is related to something which has gone before. Had it been the writer's task to index by this

system polonium and radium when they were new, he would have placed them (temporarily, of course) under uranium. The system does not profess to abolish the necessity for some consideration before placing cards in order.

III—The system is of course dependent on the indexes of the index volumes, which would very likely vary both in quality and in method. Usually the indexes of books do not contain cross-references. To a small extent, at least, the lack of a place in the system for cross references might be a handicap at times.

This seems to be founded on a misunderstanding. In practice the Table of Contents of the volumes is generally more important than the Index, since the Sub-Index Cards refer to sections of the volumes, not to individual pages. The writer sees no difficulty about cross-references: all that are desired can be introduced on the cards. It should be clearly understood that the cards must be made out and filed by a *chemist*—one of the men who will use them—not by an ill-educated clerk.

IV—The system seems to be really more a filing system than an indexing system, so that possibly it would be more appropriate for the title of the article to contain the word "filing" in place of the word "indexing."

According to the writer's vocabulary and English dictionary, it is both. The cards, having been filed, constitute an index.

V—I believe that the article would be of real interest to the individual or laboratory which desires to keep its own record of the literature and that the system might be very useful, particularly in laboratories of a certain type. There are a good many chemists who prefer to keep individual records of the literature. It has always seemed to me that it would be much simpler and just as satisfactory to depend upon the abstract journals, particularly since the very considerable amount of work involved in keeping an individual record up to date would be avoided.

Indexes to abstract journals, like Christmas, come but once a year, while it is often necessary to look for a reference only a few months old. Even the best of indexes is constructed on the basis of "Subject" and "Author" only, though "Subject" is usually translated "Title." There may be a very important subject dealt with in a paper yet not mentioned in the title and consequently not found in the journal indexes. Turning to one at random, the writer finds "Aluminum and Ferric Oxide" followed by a page reference. Truly illuminating.

WOOD ALCOHOL NO LONGER: HEREAFTER METHANOL¹ By Charles Baskerville

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Wood (methyl) alcohol poisoning is an unique problem in that it involves not alone physiological changes and technical matters having to do with production and distribution of the toxic agent, but sociological factors as well.

The "adiophorous" spirit obtained by distilling wood (Boyle, 1661) was thought by Taylor (1812) to be a new kind of *ether*; in fact, he called it "pyroligneous aether." Dumas and Peligot (1835) established its resemblance to ethyl (*ether*) alcohol and named it methyl alcohol from the Greek μέθυ mead and ἄλγῃ wood. In fact it may be recalled that the word *alcohol*, derived from the Arabic, *Al Kohl*, at one time meant a fine powder and only later meant spirits.

Commercially the destructive distillation of hard woods (refuse) is the main practical method followed for the production of methyl alcohol in America, although in Europe it has been obtained from peat and as a by-product from vinasse, and in the manufacture of wood pulp by a soluble sulfite process. The numerous synthetic methods known at present are too costly to be practiced on a commercial scale. The condensed tarry and

acid products distilled from wood are subjected to partial purification by distillation. This crude material, about 80 per cent pure, is then usually shipped to centrally located refineries in tank cars, drums, or barrels for further purification and rectification.

This crude wood alcohol, "wood spirit," "wood naphtha," a vile-smelling, greenish yellow to dark brown, nauseous liquid, is a complex mixture containing a variety of impurities. They are removed in the main in the first refining, yielding a product containing about 95 per cent methyl hydroxide. In 1896 processes for greater refinement were put into operation, so that about 1906 a deodorized product (97 to nearly 100 per cent) was placed upon the market in the United States under such names as "Columbian Spirits," "Eagle Spirits," "Hastings Spirits," "Colonial Spirits," "Manhattan Spirits," "Union Spirits," and "Lion d'or," in Canada as "greenwood spirits," and "standard wood spirits," and in Germany in 1912 as "pro spirit." Technically it was called methyl hydrate, carbinol, methylic alcohol, methyl hydroxide, and methanol. The pure substance is a colorless, mobile liquid, having a pure vinous odor, similar to that of pure ethyl alcohol, and possesses a burning taste.

These facts of names and their meanings are not known by all technical men. They are even less known to the "man-of-the-street," but the layman does know that "alcohol" is the stuff which makes drunk come; that it is the stuff that cheers when downhearted; that uncontrolled it has been a curse in the world; that it is the "real thing" in the disguise of beer or light wine, which formerly rested him when the arduous day's work was done. So when he sees the can or vessel with the label "alcohol" on it, and as he knows "alcohol" is the thing that gives the "kick," rest, or cheer, without considering the qualifying words "wood," "methyl," or what not, he is going to take it. He is little deterred by the "poison" label, for he has a more or less similar idea from the pictures of intemperance, and still he drank. Therefore, the term *alcohol* should cease its present significant use, at least in chemical literature. Technically, all alcohols should become known as "-ol" bodies or hydroxides, as "methanol," "ethanol," "propanol," "butanol," etc.; methyl hydroxide, ethyl hydroxide, propyl hydroxides, etc.

In 1906, after a vigorous campaign, the United States followed England, France, Germany, and other European countries by enacting laws permitting the general use of a tax-free domestic alcohol for industrial purposes, and for light, heat, and power.¹ This law has made us a self-contained nation in regard to certain medicinals; ether, ethyl chloride, chloral hydrate, nitrous ether, and numerous synthetics may be mentioned in illustration. To emasculate alcohol, as it were, the law requires that tax-free alcohol for use in the arts and industries shall have first mixed with it (under close supervision) substances which "destroy its character as a beverage or render it unfit for liquid medicinal purposes." On account of its poisonous properties, difficulty of removal from the resulting industrial alcohol, non-interference with many of the industrial purposes for which the denatured product was intended, and a desire to avoid the destruction of the methyl alcohol business, for methyl alcohol was cheap at that time, the first act designated it as a denaturant, and the Commissioner of Internal Revenue selected it as the principal one.

Up to date some forty-one formulas for "specially denatured alcohol," to be used for designated purposes only, have been authorized under the several acts. Five formulas for "completely denatured alcohol," which may be used for light, heat, and power, have been authorized. One of each of these has been revoked.

The control of the former class (special) is so complete, in-

¹ Presented at the 59th Meeting of the American Chemical Society, St. Louis, Mo., April 12 to 16, 1920.

¹ Act of Congress, June 7, 1906; amended March 2, 1907; Act, October 3, 1913.