

appear in the working codes under the two methods, though the difference in the master index itself is very great. The accompanying illustration, representing the first sheet of indexes under each method for the same industry, will best indicate this difference.* In referring to these methods, I shall hereafter speak of them as the "limited" or "unlimited" root method.

No claim is made for the particular root letters or designations used as illustrations, except with reference to the problem before me. These will necessarily be different to some extent in every industry. They may differ, even within the same territory, though this should not be.

The rules here given are compiled especially for a master index, made under the unlimited root method, but they are, with few exceptions, equally applicable to either or both methods. Before giving these rules, I wish to point out the exact relation of the two methods, and make it clear that the acceptance of the unlimited root method does not conflict with any principle involved in the limited root method, while it adds almost unlimited scope and flexibility.

The fundamental difference is in flexibility. The limited root index is like an arbitrary code, whereas the unlimited root index is like an alphabet or vocabulary, from which any number of codes may be written, all of them consistent, and no one conflicting with another.

In practice, separate working indexes (arbitrary codes) must be made for departments and individuals, whichever method is used. My preference is for the unlimited root method, for the master index, because, while it in itself is limitless in its application and utility, the working indexes made from it are as fixed as with the limited root method.

RULES

One or more letters symbolizing words are termed Symbols. MCFM Symbolizing the function of make ready in the cylinder printing division of the manufacturing department.

Each letter in a Symbol stands for a Designation: M—Manufacturing, C—Cylinder Printing, F—Function, and M—Make Ready.

One or more Designations, expressing only one element in a Symbol are termed Factors:

MC and FM are each a factor in the symbol MCFM. Factors when used by themselves are termed Symbols.

MC when used to indicate merely the Cylinder Printing division of the Manufacturing department.

The first Factor in a Symbol is termed a Root Factor: MC in the symbol MCFM.

The first letter or Designation in a Factor is termed a Root Letter or Root Designation: M in the factor MC.

The Root Factor in a Symbol indicates the subject of the Symbol:

MC in the symbol MCFM.

All the rest of the Factors in a Symbol qualify the subject of the Symbol:

FM qualifies MC in the symbol MCFM.

The Root Letter or Designation in a Factor indicates the subject of the Factor:

M in the factor MC.

All the rest of the Letters or Designations in a Factor qualify the subject of the Factor:

C qualifies M in the factor MC.

All Root Letters with their Designations and definitions of Designations should be written on 8 1/2 x 11 sheet.

The Designations represented by each succeeding letter in relation to its position in the Factor should be written on the next smaller sheet. This allows for the use of a tag index for each Factor, and for each letter position in each

*The absence of definitions in the Limited Root method illustration has no significance other than that the index from which this page was copied did not happen to contain them. They are given in the Unlimited Root method to illustrate certain features which will be dealt with presently.

Factor, without the possibility of confusion due to the number of tag indexes.

Each sheet should have all of the letters of the Factor up to the point of the qualifications of the last designation, with designation for each, written at the top, as

S—Standardized Stores.
K—Office supplies.
B—Book.
R—Register.

In the Limited Root method, there is no intentional dividing of symbols into Factors, and their root is determined by the group—Expense, Product, or Construction—to which the first letter of the symbol belongs. This limits the application of symbols to these three roots, subject to qualifications by the way and place in which they are used.

In the Unlimited Root method, every Factor in a symbol is indicated by a Root Letter, and the separate Factors, with one exception, are no more affected by the way in which they are used or by combination with other Factors than are words by use in different sentences.

The exception is when the letters B, G or M are used in factors, such as Cost, Equipment, Functions, etc., to designate the managerial or accounting divisions to which they refer, in which case they are not regarded as separate factors, even though the designation may be identical with that when used as root letters.

When two or more factors referring to the same managerial or accounting division are used in one symbol, these letters are used only once in the symbol, in the Factor Cost or Revenue, if any, or otherwise by themselves as a separate factor, and are omitted entirely from the other factors in the symbol.

Special care should always be taken to use the same word or designation for the same thing or meaning. For example, do not term money paid to employees in one place Pay Roll, and in another Wages or Labor. The opportunity for this type of inconsistency is limitless, and great care must be exercised to avoid it.

Without consistency, even to the use of capitals, the memory must act consciously. This makes the use of the index laborious. If the mental photographs of the index are consistent, it becomes as natural to combine factors as words, or to separate the factors in reading a symbol, as to separate letters in a word, or words in a sentence.

The same factor and all of its qualifications in every symbol should be represented by the same letter. This is possible because every factor is limited to the qualifications of the element it represents, and each symbol is merely a combination of factors. This consistency in the symbolic meaning of letters is of the utmost advantage in the matter of remembering and using the symbols.

While this same thing can be accomplished with the Limited Root method, it can only be done by first making a separate and complete index of each factor, and then building up the Limited Root symbols from these factors. In fact, it was through an effort to make the same factors in the different symbols under the Limited Root method consistent that the idea of constituting a master index out of these factor indexes was born.

It may at first seem that long symbols are inevitable under the Unlimited Root method, in that a factor is provided for every possible element in a symbol. This is not the case. A symbol may be long or short under either method. It may represent merely an item of stores, and it indicates whether it represents a charge for or against stores account, or the actual physical stores, though personally, I prefer that the symbol should be complete without regard to its use.

It was for a time thought that under the Unlimited Root

method it would be necessary to separate the factors by dashes. Experience has shown that this is not necessary. Each root letter seems to stand out with unerring certainty. Factors may be spaced, as in the case of words, and on the whole this is desirable, though in no sense necessary.

As a matter of fact, for ordinary purposes of designation, there is very little use for more than one factor in one symbol, so that in such symbols we need not concern ourselves with the separating of factors. It is only when we come to the use of symbols in writing instructions that the utility of symbols is such as to create a real necessity for the separation of factors, and in this use it is well that they be separated by spaces, as in the case of words.

Every factor and every symbol should describe rather than arbitrarily designate the thing symbolized, just as the words railroad, typewriter and aeroplane actually describe the objects signified.

The principle of symbolization is familiar in chemistry, and parallels its use in industry in three important points:

1. Symbols are used for brevity and convenience in writing, as the single letter H, instead of the eight letters required to write the word Hydrogen.

2. As far as possible, chemists make their symbols mnemonic. Having used P for Phosphorus, they use K for Potassium, taking the initial of the Arabic name of Potash, Kali. In this respect, there is a great advantage in industry, because, whereas in chemistry there is only one name for the element to be symbolized, in industry there are an indefinite number of synonyms and alternatives for almost anything you wish to designate.

3. By combining symbols, chemists express the composition of every compound, as H₂ S O₄, without the awkwardness of stopping to say two parts of hydrogen, one part of sulphur and four parts of oxygen to express the action of sulphuric acid in a reaction. Similarly in industry, we combine charges, functions and materials, or any other combination of factors in one symbol.

The natural antagonism to the adoption of a new language, so to speak, is the occasion of some difficulty in the introduction of the Mnemonic Index into general use in an establishment, but where the symbols are truly mnemonic, and are so constructed that they classify as well as designate, they are soon found to be a more simple and natural form of expression for managerial purposes than words.

The three fundamental principles sought after in working out these rules have been—abbreviation, standardization of terms, and sequence of relationship. The facility of symbols in these fundamentals, to which words and phrases are but clumsily adapted, soon recommends them, even though the principles are not consciously understood, and has the effect of making the symbols apt and easy to use.

Words in language and their relationship, or lack of it, are the product of a myriad chance influences, even to the occupation and temperament of its primitive people, the influence of foreign and ancient languages, etc. The sequence of designations in symbols, on the contrary, is built up in a direct causal relationship, the subordinate growing up out of the more basic terms, as the leaves of a tree grow out of the twigs, the twigs out of the branches, and the branches out of the parent limb.

Coming to the actual construction of the symbols, the method of accounting should first be determined upon, including the subdivision of accounts, not alone for the general ledger, but for statistics, and also the method in closing the books. The actual accounting symbols should be com-

pleted and thoroughly tested before much, if anything, further is done.

The tying in of the accounting methods with the index is an essential of a proper index for an industry. The selection of the root letters is materially affected by the method of accounting, and every accounting symbol, besides being a designation, should at the same time be a derivative of the accounting significance of the item represented by the symbol.

The subdivision of accounts is indicated in the Factors by the order in which the letters occur, and in the symbols by the order in which Factors are combined reading, always from the root to the end of the symbol. The closing of accounts is indicated in like manner, but by reading the factors and symbol backwards.

The master index should be fairly well developed as a whole and laid out in pencil and revised and made final only after the actual plan of management is determined upon and standing instructions have been written.

If the index is not fairly well developed as a whole, and without too much consideration for any one feature prior to its full development, it is almost inevitable that it will be unbalanced. On the other hand, it is impossible to perfect it beyond the accounting system, except in piecemeal, as investigation and classification go forward.

The following rules have been devised for the selection of letters and designations. They are no less important than the rules for physical and structural aspects already given. We should have constantly in mind the fact that the large number of persons who will be called upon to use an index have not trained minds, and have not the knowledge of the business, or the principles upon which the index is constructed to aid them in reading the symbols. No amount of pains should be spared in making the index absolutely mnemonic. Fine distinctions in the meaning of words should always be sacrificed to the selection of words which may be literally symbolized.

RULES FOR SELECTING LETTERS AND DESIGNATIONS

I and O should be omitted, as they are easily confused with the numerals.

Q and Z should be omitted, because they are difficult to write accurately.

Words beginning with I and O should be used as designations, as little as possible, and when used, may be placed opposite J and K respectively. This is because these letters are seldom used, and, therefore, confusion through double meaning will be infrequent.

Words beginnings with Q and Z are better omitted as designations, and, therefore, no provision need be made for them.

Numerals may be used to qualify any designation. They are often desirable, and sometimes necessary where there are more qualifications than there are letters. They should be introduced before the designation which they qualify.

Numerals may be used at the end of a symbol to indicate sequence in the thing symbolized, as order or lot number.

Every designation should, as far as possible, begin with the letter opposite which it is placed on the index sheet. To accomplish this, all of the designations to go on a single sheet should first be written opposite the letter with which the designation begins. This will frequently cause several designations to be placed opposite the same letter. This is as it should be to start with.

Dealing with the letters opposite which there are more than one designation, look over the designations, and select the one least used. Then consult a Thesaurus (you must never work on a mnemonic index without one) and see if you cannot substitute some word beginning with a letter which has no designation opposite it, which for symbolic purposes will be equally descriptive. You will be surprised to see how often you find a better word. Even if the word is not as good, it is more important that the designation should be mnemonic than literal, so long as it is symbolic of the definition of the designation. Do this