SYMBOLS

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PREFACE

Up to the present time the use of symbols, even in the manufacturing industries, has been very limited. Their field of usefulness, however, is not confined to industrial establishments, since all branches of business, as well as scientific, research, commercial, banking and professional pursuits, can apply symbols to equal advantage. The possible uses for symbols are unlimited.

During years of experience with all forms of symbols, I have developed the system herein described. It has been in continuous use, wholly or in part, in various plants for many years. Its use in practicable form under the stress of all the demands of large and growing companies, working in many cases at high pressure, has proved beyond a doubt that all the requirements of the ideal symbol system have been successfully met. Only a sufficient number of examples are given in the following pages to convey clearly to the reader how different variations may be worked out to suit any particular case. The system is sufficiently flexible to meet all requirements in any kind of business or profession.

The use of symbols expedites the routine of the day's work by a great saving of time and a much greater saving of space in keeping complete records. Symbols give a brevity, simplicity, stimulus to accuracy, and a scheme of statistical comparison that cannot be obtained by any other means. It is to be regretted that the value of symbols is not better understood. It is my hope that this book may be the means of greatly stimulating the use of symbols and that the keys given herein will form the basis

of a universal and standard system, since standardization is one of the important elements of the science of management. The reader can readily adopt the symbols herein listed with little or no modification, and so have the benefit from the start of a system that can be amplified to an unlimited extent to meet any ultimate demands.

Symbols really constitute a language in themselves. A few characters, suggestive to a marked degree, replace from six to many times six the number of letters that would ordinarily be required to describe the same thing, or combination of things, in the usual words. One memorizes these characters as one would memorize the alphabet and through association begins to think in the character language. After the mind becomes trained to the habit of thinking in the symbol language, and this is an exceedingly easy and quick thing to master, it becomes instinctive to *talk* in the symbol language. The next step is naturally that of recording in the same language the ideas and expressions resulting from the use of this method.

It is really easier, and obviously very much quicker to think and speak the symbol language when one becomes familiar with it, than it is to follow the long and tedious route necessary when using the usual terms of a national tongue.

THE AUTHOR.

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CHAPTER I

THREE SYSTEMS OF SYMBOLS

The prime object of any system of symbolizing is to provide a character which will assist in the prompt identification of any unit. The second object is to use a scheme flexible enough to include all branches of a business within its scope. The present opportunities for the use of a practical, comprehensive scheme of symbols are unlimited. This is true of all business, educational, scientific, research and professional spheres.

The author maintains, adverse criticism to the contrary, that a symbol is an identification mark first and foremost. The character must positively differentiate one article, unit or act from some other. If a simple and not too cumbersome symbol could be devised which would instantly tell by its form or character *what* is represented, it might be ideal, but so far all efforts along such lines have proved impractical. If we know the number of a house on a given street, for example 360 West Fifty-ninth Street, it is not necessary to know whether the house is an old Mansard design, an early Colonial type, or a modern tenement structure in order to identify it. The address enables us to direct one to the house or find it ourselves with a minimum of effort. The symbol should enable one to identify an article or unit with just as little effort. So,

bearing in mind the essential factor of identification, it is obvious that the greatest practical use will be obtained from that scheme of symbols which is founded upon the simplest rules, with as few characters and the least variations possible.

The different schemes of symbols which have been developed from time to time may be classed under the following general headings:

1. Dewey Decimal System
2. Mnemonic System
3. Parkhurst System

The Dewey Decimal System is undoubtedly the most complete and highly perfected in theory of any, and, as the name indicates, is a combination of figures and periods giving a symbol of an almost unlimited number of characters. This use of figures and decimal points offers an infinite number of possible combinations. The system carefully worked out will provide a number symbol applicable to every conceivable thing past, present or future. It is, however, in no way suggestive nor practical for general use, and a voluminous key is necessary even to interpret the symbol.

The Mnemonic System, as its name indicates, was devised with the purpose of supplying a symbol which should be suggestive and which would indicate the object that it was intended to identify. In theory, it is an excellent system and could, perhaps, be applied in a limited way to a comparatively small number of units so as to be comprehensive and valuable. For general use, however, the system utterly fails to meet the end for which it was designed. It is impossible to devise a simple symbol on the mnemonic plan which is generally applicable to units of widely varying kinds of business. The mnemonic symbol consists of combinations of letters and figures with

the occasional use perhaps of a period or a dash. If the attempt is made to apply this system very generally, it soon becomes apparent that the result is a symbol of a great number of characters, often running to twelve or fifteen, and one which in itself is in no way suggestive. Again a voluminous index or "key" becomes necessary.

There are a great many combinations of letters representing general classifications which have been developed in connection with the mnemonic symbol system. The result is that five, six or seven letters, or combinations of letters and figures, may be necessary before one gets to the number identifying the one particular piece in a class from its next-door neighbor. A further disadvantage of a mnemonic scheme is that a combination of letters and figures is much harder to write or read, or to remember even for a few minutes, than a comparatively arbitrary one, providing this combination of letters and figures consists of more than several characters. SHVXRI is much harder to read and to retain in the mind than 24321X or 234211. If two pieces just alike are symbolized, one with the first of the above symbols and the other with one of the two latter, the one bearing the plain number can be more easily and quickly identified.

Another argument often brought up by advocates of the mnemonic system is that when one sees a piece bearing a symbol or sees the symbol in print, it is desirable to know what the piece is so that it can be located. In practice, however, this is not so for several reasons. One is, that should a stray and strange piece with a symbol attached be found, it would be necessary in any case to refer to the symbol index. This would be true whether the Dewey, Mnemonic or Arbitrary System was in use. Obviously, then, the simplest and easiest system to remember is the best. In the majority of cases, the use of the symbol is either in connection with papers or documents, or one

is looking for a piece of which the simple name is known.

Further to illustrate this point, suppose that the order or material list referred to a "Right Support for an 18-inch by 10-foot motor-driven engine lathe"; the simple name of the piece would be a support, which one would identify by its symbol. The symbol in such case answers the same purpose as the number of a house on a certain street. In practice, as above stated, it is very seldom that there is any great material advantage, especially in connection with piece symbols, in having the symbol represent the character of the piece involved. After all is said and done, it is an absolute impossibility without reference to an index.

Many of the most satisfactory and easiest forms of identification in use are some of the old systems of "piece numbers," which are nothing more or less than arbitrary numbers which have been given to pieces as they were designed or became merchandise. Another very old scheme is that of grouping pieces by classes, as E112, to represent a part number 112 for an "E" type machine. Modern practice, however, especially in connection with the higher developed forms of management, has made it desirable to utilize a scheme of symbols for many and various purposes. The writer believes that the simple form of symbol is by far the best. In modern management the use of symbols is becoming an absolute necessity. Without symbols the speedy and condensed recording of instructions, data and recapitulation of statistics is almost impossible, to say nothing of the saving of space and time.

The author has had years of experience in the practical application and use of all systems of symbolization, and to meet the requirement of actual practice, has evolved the following system, which has been in actual use for many years. It fully meets the requirements in practice and is in no way cumbersome nor difficult to install. Mem-

bers of the organizations with whom he has established his methods have never yet had any difficulty in easily and quickly becoming thoroughly familiar with, or in adopting this system.

In the following pages the author treats of each different group or class of symbols into which his system is divided. The combinations described have been prepared in such a way as to give the best general description of the system. An effort has also been made to give enough actual detail so that any specific application of the Parkhurst symbol system can be readily made by the reader after a little study.

The reader is advised whenever possible to adopt the actual symbols with their corresponding description herein shown as a step toward standardization. There will, of course, be many cases where changes will be necessary. Modifications of the following can be readily made to suit any condition, thus giving the necessary flexibility which is the actual measure of value of the system.

The characteristic formation of each symbol group must, of course, be maintained, but the application and name of the things each symbol represents may be varied to suit each problem where necessary. As first stated, however, standardization is important. Particular attention is called to the fact that with few exceptions, the element of suggestiveness is maintained throughout this entire symbol system. The single reading of these chapters will result in a large majority of the symbols being memorized. Such is particularly true of the general group formations. A few moments' study will be all that is necessary to remember details after the fundamental principle on which this system is founded has been clearly understood.

The author has succeeded in evolving a symbol system free from all the cumbersomeness of both the Dewey and Mnemonic systems, while keeping the unlimited flexibility

required of any adequate system. It combines the absolutely necessary essentials of actual and practical value in operation, which after all is the true test. The key to the system for any given plant consists of a few pages, so that in a short time members of an organization have little need to refer, except occasionally, to the key.

CHAPTER II

PLANT SYMBOLS

The first step in connection with the development of a scheme of symbols for any business is to provide for a plant letter or symbol. It may be that there is but one plant. On the other hand, provision must be made for the identification of that plant as at some future time the growth of any business is more than likely to result in additional plants. Business conditions often prompt the purchase of another plant to enable immediate increase in capacity, so the entire scheme of symbols contemplates unlimited expansion.

Plant symbols consist of a single letter. The letter used is almost invariably the first letter of the city or town in or near which the plant is situated. The following is a typical list of plant letters.

A—Atlanta Plant
B—Baltimore Plant
C—Cleveland Plant
D—Detroit Plant
E—Erie Plant
F—Fitchburg Plant
G—Galveston Plant
N—Newton Plant
R—Research Plant

It sometimes happens, however, that a company with a number of plants may have two or more plants in one place. If so, the initial letter of the street on which each

plant is situated may be used. There is enough flexibility in this plan to enable suggestive letters being obtained without chance of trouble due to duplication.

The plant letters should appear on interplant stationery such as interplant letter paper, purchase orders, requisitions, charges, etc. This applies only, however, to those plant forms which are not abolute duplicates of forms used in some other plant and which for good reasons must be identified instantly with the plant in which they originated. In this connection it is also advisable to use a different color for each plant. The following is a typical list of "plant colors."

Plant *A*—Gray
" *B*—Blue
" *C*—Yellow
" *D*—Cafe
" *E*—Buff
" *F*—Mandarin
" *G*—Galveston, Pink
" *N*—Newton, Golden Rod
" *R*—Research, Pale Green

The plant letters may be used singly or in combination with other symbols. When used in combination they come first. The plant symbol is the only symbol consisting of one character, a letter, so there is never any duplication or confusion in use or in interpretation. It should be noted that all of the various symbol groups used in the system may be used in combination without confusion and without danger of duplication, as shown in the last chapter.

Combinations of plant symbols with other symbols enable one readily to record data which can be instantly identified, and comparisons made between various groups and plants. Space is conserved and the recording and reading of records are both greatly expedited. For example:

A1A means "Atlanta Plant Accounting Room" (see Chapter III). These three suggestive characters tell us what ordinarily would take at least *four* words totaling *twenty-six* letters to describe. The saving in space and time is obvious.

CHAPTER III

DEPARTMENT SYMBOLS

3-A. General Scheme of Departmentalizing

After providing for the plant symbol as described in Chapter II, the next step is to determine the departmentalization of that plant and provide a symbol for each department. The determination of the limits of each department is not necessarily fixed by four walls, but rather by the trades represented, the class of work, or the kind of equipment.

The department limits of a plant are not ordinarily as clearly defined as they should be. Neither is the average plant divided into enough departments. A building may have several floors all doing the same general class of work. Each floor should be a separate department. If there are several trades doing different kinds of work on any or each floor, or in any building, the departments should be divided so as to separate each class of work or trade.

Too much emphasis cannot be laid on the importance of exercising extreme care in determining department limits. The feature has a vital bearing on modern management methods. The most important of these are the routing and handling of work and material, proper analytical

cost records, accurate indirect expense subdivision, etc. To permit the best use of the differential process rate of distributing burden or overhead, it is important that the department limits be clearly defined and separated as suggested above. It makes possible a complete and accurate subdivision of indirect expense. There will be no need of overburdening one class of product and unduly favoring another. See Chapter IV, section 4–E.

3–B. Typical Office and Shop Departments

Department symbols consist of a numeral from 1 to 20, followed by a letter. There is no other symbol of this formation used with a numeral less than 30, so duplication and confusion are avoided. The symbol, as well as others, may be used in combination, as explained in Chapter XII. Bearing in mind the caution given above regarding the determination of department limits, it becomes a simple matter to allot symbols to each department.

The following lists are typical of the usual department symbols. Attention is called to the fact that similar departments use the same letter but the characteristic numeral changes. The prefix may represent the order of importance of each department in each group, or it may indicate the order of arrangement on the shop plan.

When preparing to symbolize the departments of any given plant, the first step should be to list all of the departments by groups. As mentioned above, the department limits must be determined by the functions performed by each room or parts of a room, or by the separation of the trades or classes of labor, or by the kinds of equipment used, or by the grades or classes of work performed in each room.

Having determined the department limits in this manner, similar departmental divisions should be listed in consecutive order. This order may be either alphabetical,

in degrees of importance, or again in the order of arrangement of one department to another, based on the route taken by the work passing through these departments. Inspection of the following lists of departments will readily show just how the grouping is determined. Care in arranging departmental groups using the same department letter will materially assist in the memorizing of each department symbol.

Another advantage of the group method, and by no means the least important, is the conservation of the letters of the alphabet. If this feature is carefully considered, the reader will find that the scope of the alphabet is amply sufficient to meet every practical requirement for any set of department symbols.

The department letter will not always be suggestive in the true sense of the word, but the exceptional cases are easily memorized.

One typical set of department symbols for a large plant:

1*A* Accounting Room
2*A* Cost Department
3*A* Credit Department
4*A* Billing Department
5*A* Filing Department

1*B* Sales Department
2*B* Order Department
3*B* Stenographic Department

1*C* Core Room No. 1
2*C* " No. 2
3*C* " No. 3
4*C* " No. 4

1*D* Delivery Department

1*E* Employment Department
2*E* Locker and Wash Room (Men)
3*E* Locker and Wash Room (Women)

1*F* Furnace Department No. 1
2*F* " No. 2

1*G* Garage
2*G* Stable

1*H* Heating Plant
2*H* Boiler Plant for Power
3*H* Engine Room Plant
4*H* Electric Generator Plant (Power)
5*H* Light Generator Plant
6*H* Air Compressor Plant

1*I* Inspection Department
2*I* Final Inspection

1*J* Janitors and Watchmen
2*J* Special Guards

1*K* Carpenter Room

1*L* Planning Room (Central)
2*L* " (Sub. No. 2)
3*L* " (Sub. No. 3)

1*M* Mold Room No. 1
2*M* " No. 2
3*M* " No. 3
4*M* " No. 4
5*M* " No. 5

1*N* Knockout Room No. 1
2*N* " No. 2

1*O* Time Keeping Department

1*P* Pattern Shop
2*P* Pattern Storage

1*Q* Sand Mixing Room
2*Q* Sand Handling Dept.

1*R* Receiving Room

1*S* Shipping Room

1*T* Trimming Room No. 1
2*T* Sand Blast Room for 1*T*
3*T* Trimming Room No. 2
4*T* Sand Blast Room for 3*T*

1*U* Engineering Department
2*U* Drawing Room
3*U* Photographic Department
4*U* Machine Shop No. 1
5*U* Tool Room for 4*U*
6*U* Machine Shop No. 2
7*U* Tool Room for 6*U*

1*V* Forge Shop (Light Work)
2*V* " (Heavy Work)
3*V* Heat Treating Department
4*V* Tempering Department

1*W* Welding Department

1*X* Store Room—Non Ferrous Metals
2*X* " —Lumber
3*X* " —Iron and Steel Rod, etc.
4*X* " —Structural Shapes
5*X* " —Sand
6*X* " —Oil
7*X* " —Coal
8*X* " —Coke
9*X* " —Pig Iron and Scrap
10*X* " —Miscellaneous
11*X* Move Material Foreman's Dept.

1*Y* Yard

1*Z* Maintenance Dept.

Any plant symbol (see Chapter II) may be used in combination with the above by simply prefixing the plant letter or symbol. In this manner we are able by the use of only three characters instantly to identify any one of seventy or more departments in any one of a number of plants. Thus *A*10*X* means "Miscellaneous Stores Room in Atlanta Plant"; or *C*2*F* means "No. 2 Furnace Room in Cleveland Plant," etc.

To further illustrate the symbolizing of departments the following list is given to show the actual symbols

used in a large foundry. This list covers a specific condition and is taken from actual practice, whereas the first list given above was a composite one.

DEPARTMENTAL SYMBOLS USED BY A FOUNDRY

1*A* Accounting Room
5*A* Filing Room

1*B* Local Sales Dept.

1*C* Core Room No. 1
2*C* " No. 2
3*C* " No. 3
4*C* " No. 4
5*C* " No. 5
6*C* " No. 6

1*D* Delivery Dept.

1*E* Employment Bureau

1*F* Furnace Room (Class *A* & *C*)
2*F* " (Class *B* only)

1*G* Garage

1*H* Heat, Light, and Power

1*I* Inspection Dept.

1*J* Janitors and Watchmen

1*K* Carpenter Shop

1*L* Planning Room

1*M* Molding Room No. 1 (Class *A*)
2*M* " No. 2 (Class *B*)
3*M* " No. 3 (Class *C*)
4*M* " No. 4 (Class *C*)
5*M* " No. 5 (Class *B*)
6*M* " No. 6

1*N* Knockout (Class *A* and *C*)
2*N* " (Class *B*)

1*O* Time Keeping

1*P* Pattern Shop
2*P* Pattern Storage

1*Q* Sand Mixing

1*R* Receiving Room

1*S* Shipping

1*T* Trimming Room (Class *A* and *C*)
2*T* Sand Blast (Class *A* and *C*)
3*T* Trimming Room (Class *B*)
4*T* Sand Blast (Class *B*)

1*U* Machinists
2*U* Brass Finishing Department
3*U* Tool Room

1*V* Forge Shop

1*W* Welding Department

1*X* Stores—Metal
2*X* " —Lumber
3*X* " —Iron, etc.
4*X* " —Miscellaneous
5*X* " —Sand
6*X* " —Oil
7*X* "
8*X* "
9*X* "
10*X* "
Available for New Stock Divisions
11*X* Move Material Foreman

1*Y* Yard Department

1*Z* Maintenance Department

3–C. Adaptation of Department Symbols to a Hospital

In order more fully to illustrate department symbolizing, the following list of some of the more important departments of a hospital is given with the corresponding symbols. To the hospital organization these departments symbols are just as suggestive, and just as easily memorized as the foregoing ones are to an industrial organization. This fact must not be lost sight of by the reader. One's familiarity with the "plant" has much to do with the ease of remembering the symbols used. The layman not familiar with a given condition may at first feel confused. It is only a temporary condition, however.

A Typical List of Hospital Department Symbols

1*A* Main Office
2*A* Superintendent's Office
3*A* Nurses' Office
4*A*
5*A* Filing Room

1*B* Library

1*C* Corridor No. 1
2*C* " No. 2
3*C* " No. 3

1*D* Doctor's Reception Room
2*D* Admitting Doctor's Office
3*D* Doctor's Dressing Room
4*D* Surgeon's Dressing Room
5*D* Students' and Visitors' Dressing Room
6*D* Dressing Room

1*E* Dining Room

1*F*

1*G* Garage
2*G* Stable

1*H* Heating Plant
2*H* Power Plant
3*H* Lighting Plant

1*I* Instrument Room No. 1
2*I* " No. 2

1*J* Janitors and Watchmen

1*K* Kitchen
2*K* Diet Kitchen

1*L* Clinical Laboratory
2*L* Surgical Laboratory
3*L* Medical Laboratory
4*L* Tissue Laboratory

1*M* Mortuary

1*N* Nitrous Oxide Mfg. Dept.

1*O* Anesthetic Room
2*O* Operating Room—Private
3*O* " " No. 1
4*O* " Amphitheater No. 1
5*O* " " No. 2

1*P* X-ray Dept. and Dark Room
2*P* X-ray Therapy
3*P* Photographing and Printing Room

1*Q*

1*R* Accident Room
2*R* Ambulance Room
3*R* Children's Room
4*R* Consultation Room
5*R* Cystoscopic Room
6*R* Dispensary
7*R* Examining Room
8*R* Gynecological Room
9*R* Medical Room
10*R* Nervous and Medical Room
11*R* Nose and Throat Room
12*R* Plaster Room
13*R* Reception Room
14*R* Surgical Room

1*S* Laundry
2*S* Ironing Room
3*S* Sewing Room
4*S* Sterilizing Room

1*T*

1*U*

1*V*

1*W* Ward 1
2*W* " 2
3*W* " 3
4*W* " 4

1*X* Bandage and Dressing Room
2*X* Commissary Dept.
3*X* Drug Room
4*X* Linen Room
5*X* Surgical Supplies, Splints, etc.

1*Y* Yard and Grounds

1*Z* Maintenance

The treatment of the above group of hospital department symbols will indicate how the various symbols were determined if the reader will review the remarks at the beginning of the section, page 11. In a few cases the standard department symbols have been used, such as 5*A*, 1*G*, 2*G*, 1*H*, 2*H*, 3*H*, 1*J*, and 1*X* to 5*X* for divisions of stores, 1*Y*, and 1*Z*. The other departments have been symbolized in groups in the most suggestive manner. The laundry departments are grouped under *S* arbitrarily. This is not suggestive, except, perhaps, of "soap suds." The use of *S* left *L* available for the extremely important laboratory departments; viz., clinical, surgical, medical, and tissue laboratories.

The *R* group in this particular case is used for the receiving, examining, and other rooms necessary to the treatment of patients. The various rooms are symbolized in alphabetical order in the example given, but any other

arrangement may be substituted if local conditions so require.

3–D. General Administrative, Financial, Sales, and Operating Divisions

In addition to the departmental symbolization of office and works departments, the general divisions of a manufacturing business have to be considered. The four chief general divisions into which any manufacturing business must be divided are administration, financial, sales, and operating. These divisions, and other subdivisions to be explained later, individually and collectively, work for and are necessary to the general conduct of a business. The size and kind of business determines to some extent just how far it is practicable to go when symbolizing these various general divisions. Since these general divisions are always indirect expense factors, the three-letter symbol has been adopted as a further aid in keeping this in mind. To differentiate in the case of other symbol groups, there is no other "three-letter" symbol used that has *G* for the first letter and *X* for the third letter. All these general division symbols are known as the *GX* divisions. The middle or second letter is different in each respective one, and is suggestive of the name of the general division which that particular symbol represents.

The following list is an exact copy of the author's standard key for the *G-X* symbol group:

General Divisions of the Organization

(Not directly chargeable to any plant)

Expenses of these Divisions to be Prorated to each Plant Monthly as they each Benefit

GAX General Administrative
GBX General Sales
GCX Comptroller's Office
GDX General Delivery
GEX " Employees, Liability Insurance, etc.

GFX	General	Finance
GGX	"	Garage
GHX	"	Heating, Lighting, and Power
GIX	"	Investigation (Legal and Patent work only)
GJX	"	Janitors, Watchmen, Special Guards, etc.
GKX	"	Katalogs, Advertising, Literature, etc.
GLX	"	Laboratory (Chemical); (Plant *R*)
GMX	"	Manager
GNX	"	
GOX	"	Organizing Engr. and Gen. Operating
GPX	"	Purchasing
GQX	"	
GRX	"	Research (Plant *R*)
GSX	"	Special Committee
GTX	"	Time Study and Technical
GUX	"	General Engineering (Plant *R*)
GVX	"	Vaults, Files, etc.
GWX	"	Welfare
GXX	"	Emergency (Expense Distribution only)
GYX	"	Yards, grounds, etc.
GZX	"	Maintenance

The ordinary business will, of course, use but a part of the above list.

It is practicable to apply this general division symbolization to a single plant as well as to a large business involving a number of plants. In the latter case, each plant carries its proportion of the *G-X* group expense. This expense is prorated monthly by the General Office (*GCX* division) based on the volume of business each plant does as compared to the total business of the company.

The method of determining the total *GAX* to *GZX* expense is explained in detail below in Chapter IV, section 4-D. Below is given a list of the *G-X* divisions actually used by one of the author's clients. The total expenses of the general divisions listed are prorated in this particular case over eight plants.

General Divisions of the Organization

(Not directly chargeable to any plant)

Expenses of these Divisions are Prorated to each Plant Monthly as they Each Benefit

GAX	General	Administrative
GBX	"	Sales
GCX	"	Comptroller's Office
GFX	"	Finance
GGX	"	Garage
GHX	"	Heating, Light, and Power
GIX	"	Investigation (Legal and Patent work only)
GJX	"	Janitors, Watchmen, Special Guards, etc.
GKX	"	Katalogs, Advertising, Literature, etc.
GLX	"	Laboratory (Chemical)
GOX	"	Organizing Engineer and General Operating
GPX	"	Purchasing
GRX	"	Research (Plant *R*)
GVX	"	Vaults, Files, etc.
GXX	"	Emergency (Expense Distribution only)
GZX	"	Maintenance

3–E. Departmental Subdivision

or purposes of routing, and to identify positively certain particular parts of any department, it becomes necessary to provide for a departmental subdivision. This is accomplished by the simple addition of a numeral after the department symbol. For example, it is necessary to subdivide a department into five sections, or to identify five different places within that department, such as the yard 1*Y*. Symbolize each part as 1*Y*1, 1*Y*2, 1*Y*3, 1*Y*4, and 1*Y*5. The same method is used for any department.

Ordinarily the department limits are covered by the symbol of that depatrment, as 1*A*, 2*B*, 4*U*, 6*X*, etc. As all equipment, work points and machines are identified by symbol, the combination of the two symbols (depart-

ment and equipment or work point symbols) is usually sufficient. In a case such as the example given in the preceding paragraph, where there is no equipment involved, the "subdivision" symbol is used.

The identification of work points in a department is accomplished by combination symbols. A particular machine, say *L*5, is in department 4*U*. The work point is therefore 4*UL*5. By this method routing of material is expedited and the definite place specified beyond question by four characters. Without a symbol it would be necessary to write "the machine is lathe number five in the number one machine shop."

The key to the equipment symbols used above will be found in Chapter V. In Chapter IV will be found a further example of combinations covering the expense *X* symbols. As explained later, the maintenance of the machine expressed in the example as 4*UL*5 is indicated by adding the symbol *X*6 (maintenance of equipment) to the symbol already developed, viz., 4*UL*5*X*6. It is believed that the simplicity of this part of the symbol system makes any lengthy explanation unnecessary.

To summarize: the symbol for any particular place in a department *not a work point* is indicated by a numeral added to the department symbol. If the place to be identified *is a work point* it must then of necessity constitute equipment and is identified by combining the department and equipment symbols.

CHAPTER IV

INDIRECT EXPENSE SYMBOLS

The foregoing chapters have described the symbol formation for plant, departments and subdivisions of departments. It now becomes necessary to provide a symbolic identification for expense of operation and maintenance of each plant, department, and part thereof.

The following expense symbolization covers only those divisions and items that are indirect items of expense and does not cover any items of direct cost of manufacture. The subject of indirect expense symbols is divided into five sections to meet the requirements of the author's cost subdivisions. This cost subdivision is fully described in the author's recent book "The Predetermination of True Costs and Relatively True Selling Prices." Each chief group of indirect expense symbols is discussed below in detail.

4–A. Plant Indirect Expense Symbols

There are certain indirect items of expense that cannot be prorated departmentally or into the machine rate, and must therefore go against the plant as a whole. These items are known as plant indirect expenses. All items of expense have for their characteristic letter the letter *X*.

This letter is used in combination with the plant letter, as *AX*, *BX*, *CX*, etc., depending on the plant the expense belongs to.

The total expenses are further subdivided into a number of items *X*1 to *X*56 inclusive. The same division is used throughout, whether for plant, departmental, general, or factory indirect expense. This subdivision will be further explained below. The prefix to the characters *X*1 to *X*56 determine the group to which the particular item belongs. The following list is typical and in this case is symbolized for *A* plant.

A Plant Indirect Expense Symbols

*AX*1 Salary of Managers and Superintendents not Including Clerical or other Labor
*AX*2 Clerical Wages
*AX*3 Other Labor
*AX*4 Supplies
*AX*5 Maintenance of Buildings and Structures

*AX*6 Maintenance of Equipment, Furniture and Fixtures,
*AX*7 Care of Plant
*AX*8 Miscellaneous Expenses, not Supplies
*AX*9 " Small Tool Expense
*AX*10 Experimental and Test Expense

*AX*11 Fuel
*AX*12 Maintenance of Electrical Equipment
*AX*13 " of Air Compressors and Piping
*AX*14 " of Boiler, Stacks and Accessories
*AX*15 " of Steam and Water Piping, Outside of Engine and Boiler Room

*AX*16 " of Oil Pumps
*AX*17 Heating System
*AX*18 Advertising
*AX*19 Traveling Expenses
*AX*20 Maintenance of Motor Trucks and Cars

*AX*21 Flask Expense
*AX*22 Sand

*AX*23 Injuries to Employees and Liability Insurance
*AX*24 Acetylene Apparatus Entire Maintenance and Supply Expense, Including Wages of Operator
*AX*25 Inventory Expense

*AX*26 Crucibles and Pots
*AX*27 Replacement of Stock Chills
*AX*28 Electricity Purchased Outside
*AX*29 Gas
*AX*30 Freight and Express

*AX*31 Defective and Damaged Material and Work Expense
*AX*32 All Bad Work Exclusive of *X*31
*AX*33 Telephone Expense
*AX*34 Telegram Expense
*AX*35 Postage

*AX*51 Legal Expense
*AX*52 Insurance
*AX*53 Taxes
*AX*54 Depreciation
*AX*55 Interest Expense
*AX*56 Metal Shrinkage

For the example under discussion it is only necessary to add that only such items are distributed into the *AX*1 to *AX*56 group as cannot be charged to some department of *A* plant. All other items are departmental indirect expenses and are distributed as explained below. (See 4–B.)

The above list of divisions for any one business is, of course, made up in sufficient detail to cover within the range of *X* numbers all items of expense. The same list of items then applies to not only the *AX*1, *BX*1 (if there is a *B* plant), etc., but to each department in each plant. By this method there is no confusion and each *X* number stands for the same thing. The single letter prefix indicates a plant division, or a 1*A* to 1*Z* type of prefix indicates a department group. General, equipment, and factory prefixes to these same *X* symbols are explained below in sections 4–C, 4–D, and 4–E.

4-B. Department Indirect Expense Symbols

The indirect expense symbols for departments are formed by prefixing to $X1$ to $X56$ inclusive the department symbol. In listing the departmental expense symbols for any one plant, say A plant, it is not necessary to use the plant letter, though theoretically it should precede the department expense symbol. $A1AX4$ tells at a glance that A plant department $1A$ supplies are referred to.

As previously explained, no one department will ordinarily use all $X1$ to $X56$ items. The simple method of procedure is therefore to list only those symbols used by each department of any plant. Bearing in mind then, that each X number always means the same thing, a list is made up as follows. The plant letter is omitted below in every case, as it may be assumed that the following departments apply to one plant—A plant. The following lists are really abstracts from an instruction. The note at the top of each list refers to the expense distribution into order groups A, B, C, etc. This distribution does not have any particular bearing on the subject of symbols. It does, however, become a necessary consideration monthly when the various departmental expenses are prorated over that month's product.

A Plant Department Expense Lists

*A*1*A*—Office

Total to be prorated to A, B, and C on the Total Direct Hour Basis

Account Symbols	
1AX1	Cashier's Salary
1AX2	Clerical Wages
1AX3	Other Labor (including Janitor, Telephone, Operator and Office Boy)
1AX4	Supplies
1AX5	Maintenance of Buildings and Structures

Account Symbols	
1*AX*6	Maintenance of Equipment, Furniture and Fixtures
1*AX*7	Care of
1*AX*8	Miscellaneous Dept. Expenses, not Supplies
1*AX*11	Fuel
1*AX*19	Traveling Expenses
1*AX*23	Injuries to Employees
1*AX*31	Defective and Damaged Material and Work
1*AX*32	All Bad Work Expense
1*AX*33	Telephone Calls
1*AX*34	Telegrams
1*AX*35	Postage

*A*1*B*—Local Sales Department

Total to be prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*BX*1	District Sales Manager's Salary
1*BX*2	Clerical Wages
1*BX*3	Other Labor (including Salesmen and Service Inspector)
1*BX*4	Supplies
1*BX*5	Maintenance of Buildings and Structures
1*BX*6	" of Equipment, Furniture and Fixtures
1*BX*7	Care of
1*BX*8	Miscellaneous Dept. Expense
1*BX*10	Experimental and Testing Expense
1*BX*18	Advertising Expense
1*BX*19	Traveling Expense (Sales only)
1*BX*20	Private Car Allowance Borne by the Company
1*BX*23	Injuries to Employees
1*BX*31	Defective and Damaged Material and Work
1*BX*32	All Bad Work Expense exclusive of 1*BX*31
1*BX*33	Telephone Calls
1*BX*34	Telegrams
1*BX*35	Postage

*A*5*C*—Core Rooms (1*C* to 5*C* Inclusive)

Total to be Prorated to *A*, *B*, and *C* on the 5*C* Total Direct Hour Basis

Account Symbols	
5*CX*1	Foremen's Wages
5*CX*2	Clerical Wages (including Shop Time Clerks)
5*CX*3	Other Labor
5*CX*4	Supplies
5*CX*5	Maintenance of Buildings and Structures
5*CX*6	Maintenance of Equipment, Furniture, and Fixtures
5*CX*7	Care of
5*CX*8	Miscellaneous Department Expense
5*CX*9	" Small Tools
5*CX*10	Experimental and Test Expense
5*CX*11	Fuel
5*CX*22	Sand
5*CX*23	Injuries to Employees
5*CX*25	Inventory Expense
5*CX*27	Replacement of Stock Chills
5*CX*31	Defective and Damaged Material and Work
5*CX*32	All Bad Work Expense Exclusive of 5*CX*31
5*CX*33	Telephone Calls
5*CX*34	Telegrams
5*CX*35	Postage

*A*1*D*—Delivery Department

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Pound Basis

1*DX*1	Foremen's Wages
1*DX*2	Clerical Wages
1*DX*3	Other Labor (including Truck Drivers)
1*DX*4	Supplies
1*DX*5	Maintenance of Buildings and Structures
1*DX*6	Maintenance of Equipment, Furniture and Fixtures
1*DX*7	Care of
1*DX*8	Miscellaneous Department Expense
1*DX*9	" Small Tools
1*DX*23	Injuries to Employees

Account Symbols

1*DX*25 Inventory Expense
1*DX*30 Outgoing Freight and Expense
1*DX*31 Defective and Damaged Material and Work
1*DX*32 All Bad Work Expense Exclusive of 1*DX*31
1*DX*33 Telephone Calls
1*DX*34 Telegrams
1*DX*35 Postage

*A*1*E*—Employment Bureau

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*EX*1 Employment Agent's Salary
1*EX*2 Clerical Wages
1*EX*3 Other Labor
1*EX*4 Supplies
1*EX*5 Maintenance of Buildings and Structures

1*EX*6 Maintenance of Equipment, Furniture, and Fixtures
1*EX*7 Care of
1*EX*8 Miscellaneous Dept. Expenses
1*EX*18 Advertising
1*EX*19 Traveling Expense

1*EX*23 Injuries to Employees
1*EX*31 Defective and Damaged Material and Work
1*EX*32 All Bad Work Expense Exclusive of 1*EX*31
1*EX*33 Telephone Calls
1*EX*34 Telegrams
1*EX*35 Postage

*A*1*F*—Aluminum Furnace Room

Total to be Prorated only to *A* and *C* on a Pound Basis

1*FX*1 Foremen's Wages
1*FX*2 Clerical Wages (including Shop Time Clerk)
1*FX*3 Other Labor
1*FX*4 Supplies (except Crucibles)
1*FX*5 Maintenance of Buildings and Structures

Account Symbols

1*FX*6 Maintenance of Equipment, Furniture and Fixtures
1*FX*7 Care of
1*FX*8 Miscellaneous Dept. Expense
1*FX*9 " Small Tools
1*FX*10 Experimental and Test Expense

1*FX*11 Fuel
1*FX*13 Maintenance of G. E. and Ingersoll-Rand Compressors and Piping for 1*F*
1*FX*23 Injuries to Employees
1*FX*25 Inventory Expense
1*FX*26 Crucibles and Pots, for Aluminum only

1*FX*31 Defective and Damaged Material and Work
1*FX*32 All Bad Work Expense exclusive of 1*FX*31
1*FX*33 Telephone Calls
1*FX*34 Telegrams
1*FX*35 Postage

A2F—Brass Furnace Room

Total to be Charged only to *B* on a Pound Basis

2*FX*1 Foremen's Wages
2*FX*2 Clerical Wages (including Shop Time Clerk)
2*FX*3 Other Labor
2*FX*4 Supplies (except Crucibles)
2*FX*5 Maintenance of Buildings and Structures

2*FX*6 " of Equipment, Furniture, and Fixtures
2*FX*7 Care of
2*FX*8 Miscellaneous Department Expense
2*FX*9 " Small Tools
2*FX*10 Experimental and Test Expense

2*FX*11 Fuel
2*FX*23 Injuries to Employees
2*FX*25 Inventory Expense
2*FX*26 Crucibles
2*FX*31 Defective and Damaged Material and Work

2*FX*32 All Bad Work Expense exclusive of 2*FX*31
2*FX*33 Telephone Calls
2*FX*34 Telegrams
2*FX*35 Postage

*A*1*G*—Garage

Total to be Prorated to *A*, *B*, and *C* on the Total Pound Basis

Account Symbols	
1*GX*1	Foremen's Wages (one-half to each a/c symbol)
1*GX*2	Clerical Wages
1*GX*3	Other Labor
1*GX*4	Supplies
1*GX*5	Maintenance of Buildings and Structures
1*GX*6	Maintenance of Equipment, Furniture, and Fixtures
1*GX*7	Care of
1*GX*8	Miscellaneous Department Expense
1*GX*9	" Small Tools
1*GX*10	Experimental and Test Expense
1*FX*11	Fuel
1*GX*20	Maintenance of Motor Trucks, not including Private Cars
1*GX*23	Injuries to Employees
1*GX*25	Inventory Expense
1*GX*31	Defective and Damaged Material and Work
1*GX*32	All Bad Work Expense exclusive of 1*GX*31
1*GX*33	Telephone Calls
1*GX*34	Telegrams
1*GX*35	Postage

*A*1*H*—Heat, Light, and Power

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*HX*1	Foremen's Wages
1*HX*2	Clerical Wages
1*HX*3	Other Labor
1*HX*4	Supplies
1*HX*5	Maintenance of Buildings and Structures
1*HX*6	" of Equipment, Furniture, and Fixtures
1*HX*7	Care of
1*HX*8	Miscellaneous Department Expense
1*HX*9	" Small Tools
1*HX*10	Experimental and Tests Expense

Account Symbols	
1*HX*11	Fuel
1*HX*12	Maintenance of Electrical Equipment in Entire Plant
1*HX*13	" of Air Compressors and Piping (exclusive 1*FX*13)
1*HX*14	" of Boiler, Stack, Pumps, and Accessories
1*HX*15	" of Steam and Water Piping Outside Engine and Boiler Room
1*HX*16	" of Oil Pumps
1*HX*17	" of A. B. Co., Indirect Heating System, entire.
1*HX*23	Injuries to Employees
1*HX*25	Inventory Expense
1*HX*28	Electricity Purchased Outside
1*HX*31	Defective and Damaged Material and Work
1*HX*32	All Bad Work Expense exclusive of 1*HX*31
1*HX*33	Telephone Calls
1*HX*34	Telegrams
1*HX*35	Postage

*A*1*I*—Inspection Department

Total to be Prorated only to *A* and *C*. Apply against *A* and *C* only and Applying on Direct Hour Basis for 1*I* Direct Hours only

1*IX*1	Chief Inspector
1*IX*2	Clerical Wages (including Shop Time Clerk)
1*IX*3	Other Labor (including Assistant Inspectors)
1*IX*4	Supplies
1*IX*5	Maintenance of Buildings and Structures
1*IX*6	" of Equipment, Furniture, and Fixtures
1*IX*7	Care of
1*IX*8	Miscellaneous Department Expense
1*IX*9	" Small Tools
1*IX*10	Experimental and Test Expense
1*IX*23	Injuries to Employees
1*IX*25	Inventory Expense
1*IX*29	Gas

Account Symbols

1*IX*31 Defective and Damaged Material and Work
1*IX*32 All Bad Work Expense exclusive of 1*IX*31
1*IX*33 Telephone Calls
1*IX*34 Telegrams
1*IX*35 Postage

*A*1*J*—Janitors and Watchmen

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*JX*1 Foremen's Wages
1*JX*2 Clerical Wages
1*JX*3 Other Labor
1*JX*4 Supplies
1*JX*5 Maintenance of Buildings and Structures
1*JX*6 " of Equipment, Furniture, and Fixtures
1*JX*7 Care of Department
1*JX*8 Miscellaneous Dept. Expense
1*JX*23 Injuries to Employees
1*JX*25 Inventory Expense
1*JX*31 Defective and Damaged Material and Work
1*JX*32 All Bad Work Expense exclusive of 1*JX*31
1*JX*33 Telephone Calls
1*JX*34 Telegrams
1*JX*35 Postage

*A*1*K*—Carpenter Shop

To be Listed with 1*U* and 1*P* as Part of Pattern Shop as a Separate Department not Applying to *A*, *B*, or *C* Costs. Add 1*KX* Expense Total to 1*PX* Expense Total and Divide the New Amount by the Total 1*P* Direct Hours to Determine the Hourly Burden for 1*P*.

1*KX*1 Foremen's Wages
1*KX*2 Clerical Wages (including Shop Time Clerk)
1*KX*3 Other Labor
1*KX*4 Supplies
1*KX*5 Maintenance of Buildings and Structures
1*KX*6 " of Equipment, Furniture, and Fixtures
1*KX*7 Care of

Account Symbols	
1*KX*8	Miscellaneous Dept. Expense
1*KX*9	" Small Tools
1*KX*10	Experimental and Test Expense
1*KX*21	Flask Expense
1*KX*23	Injuries to Employees
1*KX*25	Inventory Expense
1*KX*31	Defective and Damaged Material and Work
1*KX*32	All Bad Work Expense exclusive of 1*KX*31
1*KX*33	Telephone Calls
1*KX*34	Telegrams
1*KX*35	Postage

*A*1*L*—Planning Room

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*LX*1	Production Clerk's Salary
1*LX*2	Clerical Wages
1*LX*3	Other Labor
1*LX*4	Supplies
1*LX*5	Maintenance of Buildings and Structures
1*LX*6	" of Equipment, Furniture, and Fixtures
1*LX*7	Care of
1*LX*8	Miscellaneous Department Expense
1*LX*23	Injuries to Employees
1*LX*25	Inventory Expense
1*LX*31	Defective and Damaged Material and Work
1*LX*32	All Bad Work Expense exclusive of 1*LX*31
1*LX*33	Telephone Calls
1*LX*34	Telegrams
1*LX*35	Postage

*A*1*M*—Molding Room

Total to be Charged only to *A* and *C*. See following Sheet, Dept. 4*M*

1*MX*1	Foremen's Wages
1*MX*2	Clerical Wages (including Shop Time Clerk)
1*MX*3	Other Labor

Account Symbols	
1*MX*4	Supplies
1*MX*5	Maintenance of Buildings and Structures
1*MX*6	" of Equipment, Furniture, and Fixtures
1*MX*7	Care of
1*MX*8	Miscellaneous Department Expense
1*MX*9	" Small Tools
1*MX*10	Experimental and Test Expense
1*MX*22	Sand
1*MX*23	Injuries to Employees
1*MX*25	Inventory Expense
1*MX*27	Replacement of Stock Chills
1*MX*31	Defective and Damaged Material and Work
1*MX*32	All Bad Work Expense exclusive of 1*MX*31
1*MX*33	Telephone Calls
1*MX*34	Telegrams
1*MX*35	Postage

*A*4*M*—Molding Rooms (2*M* to 4*M* Inclusive)

Total to be Charged only to *A* and *C*. Add Total of this Sheet to 1*MX* Sheet and Divide by Total 1*M*, 2*M*, 3*M*, and 4*M* Direct Hours

4*MX*1	Foremen's Wages
4*MX*2	Clerical Wages (including Shop Time Clerks)
4*MX*3	Other Labor
4*MX*4	Supplies
4*MX*5	Maintenance of Buildings and Structures
4*MX*6	" of Equipment, Furniture, and Fixtures
4*MX*7	Care of
4*MX*8	Miscellaneous Department Expense
4*MX*9	" Small Tools
4*MX*10	Experimental and Test Expense
4*MX*22	Sand
4*MX*23	Injuries to Employees
4*MX*25	Inventory Expense
4*MX*27	Replacement of Stock Chills
4*MX*31	Defective and Damaged Material and Work

Account Symbols	
4*MX*32	All Bad Work Expense exclusive of 4*MX*31
4*MX*33	Telephone Calls
4*MX*34	Telegrams
4*MX*35	Postage

*A*5*M*—Brass Molding Room

Total to be Charged only to *B* Prorated on Basis of 5*M* Direct Hours

5*MX*1	Foremen's Wages
5*MX*2	Clerical Wages (including Shop Time Clerks)
5*MX*3	Other Labor
5*MX*4	Supplies
5*MX*5	Maintenance of Buildings and Structures
5*MX*6	" of Equipment, Furniture, and Fixtures
5*MX*7	Care of
5*MX*8	Miscellaneous Department Expense
5*MX*9	" Small Tools
5*MX*10	Experimental and Test Expense
5*MX*22	Sand
5*MX*23	Injuries to Employees
5*MX*25	Inventory Expense
5*MX*27	Replacement of Stock Chills
5*MX*31	Defective and Damaged Material and Work
5*MX*32	All Bad Work Expense exclusive of 5*MX*31
5*MX*33	Telephone Calls
5*MX*34	Telegrams
5*MX*35	Postage

*A*1*N*—Knockout Room

Total to be Prorated only to *A* and *C* Divided by Lynite Direct Core Hours

1*NX*1	Foremen's Wages
1*NX*2	Clerical Wages (including Shop Time Clerk)
1*NX*3	Other Labor
1*NX*4	Supplies
1*NX*5	Maintenance of Buildings and Structures

Account Symbols	
1*NX*6	Maintenance of Equipment, Furniture, and Fixtures
1*NX*7	Care of
1*NX*8	Miscellaneous Department Expense
1*NX*9	" Small Tools
1*NX*10	Experimental and Test Expense
1*NX*23	Injuries to Employees
1*NX*25	Inventory Expense
1*NX*31	Defective and Damaged Material and Work
1*NX*32	All Bad Work Expense exclusive of 1*NX*31
1*NX*33	Telephone Calls
1*NX*34	Telegrams
1*NX*35	Postage

A1O—Timekeeping

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*OX*1	Timekeeper's Wages
1*OX*2	Clerical Wages (not including Shop Time Clerks)
1*OX*3	Other Labor
1*OX*4	Supplies
1*OX*5	Maintenance of Buildings and Structures
1*OX*6	" of Equipment, Furniture, and Fixtures
1*OX*7	Care of
1*OX*8	Miscellaneous Department Expense
1*OX*23	Injuries to Employees
1*OX*25	Inventory Expense
1*OX*31	Defective and Damaged Material and Work
1*OX*32	All Bad Work Expense
1*OX*33	Telephone Calls
1*OX*34	Telegrams
1*OX*35	Postage

*A*1*P*—Pattern Shop

A Separate Department not Applying to Subdivisions *A*, *B*, and *C*. Add 1*PX*, 1*KX*, and 1*UX* Expense and Divide by the Total 1*P*, 1*K* and 1*U* Direct Hours to Determine the Total Pattern Shop Burden per Hour.

(Also see 1*K* and 1*U*)

Account Symbols	
1*PX*1	Foremen's Salary
1*PX*2	Clerical Wages (including Shop Time Clerks)
1*PX*3	Other Labor
1*PX*4	Supplies
1*PX*5	Maintenance of Buildings and Structures
1*PX*6	" of Equipment, Furniture, and Fixtures
1*PX*7	Care of
1*PX*8	Miscellaneous Department Expense
1*PX*9	" Small Tools
1*PX*10	Experimental and Test Expense
1*PX*23	Injuries to Employees
1*PX*25	Inventory of Expense
1*PX*31	Defective and Damaged Material and Work
1*PX*32	All Bad Work Expense exclusive of 1*PX*31
1*PX*33	Telephone Calls
1*PX*34	Telegrams
1*PX*35	Postage

*A*2*P*—Pattern Storage

Total to be Prorated to *A*, *B*, and *C* on a Basis of 5*C*, 1*M*, 4*M*, and 5*M* Direct Hours

2*PX*1	Pattern Clerk's Wages
2*PX*2	Clerical
2*PX*3	Other Labor
2*PX*4	Supplies
2*PX*5	Maintenance of Buildings and Structures
2*PX*6	" of Equipment, Furniture, and Fixtures
2*PX*7	Care of

Account Symbols	
2*PX*8	Miscellaneous Dept. Expense
2*PX*9	" Small Tools
2*PX*23	Injuries to Employees
2*PX*25	Inventory Expense
2*PX*31	Defective and Damaged Material and Work
2*PX*32	All Bad Work Expense exclusive of 2*PX*31
2*PX*33	Telephone Calls
2*PX*34	Telegrams
2*PX*35	Postage

*A*1*Q*—Sand Mixing (Core)

Total to be Prorated to *A*, *B*, and *C* on the Basis of 5*C* Direct Hours

1*QX*1	Foreman's Wages
1*QX*2	Clerical Wages (including Shop Time Clerks)
1*QX*3	Other Labor
1*QX*4	Supplies
1*QX*5	Maintenance of Buildings and Structures
1*QX*6	" of Equipment, Furniture, and Fixtures
1*QX*7	Care of
1*QX*8	Miscellaneous Dept. Expense
1*QX*9	" Small Tools
1*QX*10	Experimental and Test Expense
1*QX*23	Injuries to Employees
1*QX*25	Inventory Expense
1*QX*31	Defective and Damaged Material and Work
1*QX*32	All Bad Work Expense exclusive of 1*QX*31
1*QX*33	Telephone Calls
1*QX*34	Telegrams
1*QX*35	Postage

*A*1*R*—Receiving Room

Total to be Prorated to *A*, *B*, and *C* on the Total Direct Hour Basis

1*RX*1	Receiving Clerk's Salary
1*RX*2	Clerical Wages
1*RX*3	Other Labor
1*RX*4	Supplies
1*RX*5	Maintenance of Buildings and Structures

Account Symbols

1*RX*6 Maintenance of Equipment, Furniture, and Fixtures
1*RX*7 Care of
1*RX*8 Miscellaneous Dept. Expense
1*RX*19 Traveling Expense
1*RX*23 Injuries to Employees

1*RX*25 Inventory Expense
1*RX*30 Incoming Freight and Expense
1*RX*31 Defective and Damaged Material and Work
1*RX*32 All Bad Work Expense exclusive of 1*RX*31
1*RX*33 Telephone Calls

1*RX*34 Telegrams
1*RX*35 Postage

*A*1*S*—Shipping Room

Total to be Prorated to *A*, *B*, and *C* on the Total Pound Basis

1*SX*1 Shipping Clerk's Salary
1*SX*2 Clerical Wages
1*SX*3 Other Labor
1*SX*4 Supplies
1*SX*5 Maintenance of Buildings and Structures

1*SX*6 " of Equipment, Furniture, and Fixtures
1*SX*7 Care of
1*SX*8 Miscellaneous Dept. Expense
1*SX*23 Injuries to Employees
1*SX*25 Inventory Expense

1*SX*31 Defective and Damaged Material and Work
1*SX*32 All Bad Work Expense exclusive of 1*SX*31
1*SX*33 Telephone Calls
1*SX*34 Telegrams
1*SX*35 Postage

*A*1*T*—Trimming Room

Total to be Prorated only to *A* and *C*. Divide by Total 1*T* Direct Hours

1*TX*1 Foreman's Wages
1*TX*2 Clerical Wages (including Shop Time Clerk)

Account Symbols	
1*TX*3	Other Labor
1*TX*4	Supplies
1*TX*5	Maintenance of Buildings and Structures
1*TX*6	" of Equipment, Furniture, and Fixtures
1*TX*7	Care of
1*TX*8	Miscellaneous Dept. Expense
1*TX*9	" Small Tools
1*TX*23	Injuries to Employees
1*TX*25	Inventory Expense
1*TX*31	Defective and Damaged Material and Work
1*TX*32	All Bad Work Expense exclusive of 1*TX*31
1*TX*33	Telephone Calls
1*TX*34	Telegrams
1*TX*35	Postage

*A*2*T*—Sand Blasting Room

Total to be Prorated only to *A* and *C*. Divide by Total 2*T* Direct Hours

2*TX*1	Foreman's Wages
2*TX*2	Clerical Wages
2*TX*3	Other Labor
2*TX*4	Supplies
2*TX*5	Maintenance of Buildings and Structures
2*TX*6	" of Equipment, Furniture, and Fixtures
2*TX*7	Care of
2*TX*8	Miscellaneous Dept. Expense
2*TX*9	" Small Tools
2*TX*10	Experimental and Test Expense
2*TX*22	Sand
2*TX*23	Injuries to Employees
2*TX*25	Inventory Expense
2*TX*31	Defective and Damaged Material and Work
2*TX*32	All Bad Work Expense exclusive of 2*TX*31
2*TX*33	Telephone Calls
2*TX*34	Telegrams
2*TX*35	Postage

A3T—Brass Knockout, Inspection and Trimming Room

Total to be Charged only to *B*. Divide by Total 3*T* Direct Hours

Account Symbols	
3*TX*1	Foreman's Wages
3*TX*2	Clerical Wages (including Shop Time Clerks)
3*TX*3	Other Labor
3*TX*4	Supplies
3*TX*5	Maintenance of Buildings and Structures
3*TX*6	" of Equipment, Furniture, and Fixtures
3*TX*7	Care of
3*TX*8	Miscellaneous Dept. Expense
3*TX*9	" Small Tools
3*TX*10	Experimental and Test Expense
3*TX*23	Injuries to Employees
3*TX*25	Inventory Expense
3*TX*31	Defective and Damaged Material and Work
3*TX*32	All Bad Work Expense exclusive of 3*TX*31
3*TX*33	Telephone Calls
3*TX*34	Telegrams
3*TX*35	Postage

A4T—Sand Blasting Room for Brass Castings

Total to be Charged only to *B*. Divide by Total *B* Direct Hours

4*TX*1	Foreman's Wages
4*TX*2	Other Labor
4*TX*4	Supplies
4*TX*5	Maintenance of Buildings and Structures
4*TX*6	" of Equipment, Furniture, and Fixtures
4*TX*7	Care of
4*TX*8	Miscellaneous Department Expenses
4*TX*9	" Small Tools
4*TX*10	Experimental and Test Expense
4*TX*22	Sand

Account Symbols

4*TX*23 Injuries to Employees
4*TX*25 Inventory Expense
4*TX*31 Defective and Damaged Material and Work
4*TX*32 All Bad Work Expense exclusive of 4*TX*31
4*TX*33 Telephone Calls
4*TX*34 Telegrams
4*TX*35 Postage

*A*1*U*—Machinists

To be Listed with 1*K* and 1*P* as Part of Pattern Shop. As a Separate Department not Applying to *A*, *B*, or *C* Costs. (See Department 1*P*, page 36.)

1*UX*1 Foreman's Wages
1*UX*2 Clerical Wages
1*UX*3 Other Labor
1*UX*4 Supplies
1*UX*5 Maintenance of Buildings and Structures

1*UX*6 " of Equipment, Furniture, and Fixtures
1*UX*7 Care of
1*UX*8 Miscellaneous Department Expense
1*UX*9 " Small Tools
1*UX*23 Injuries to Employees

1*UX*25 Inventory Expense
1*UX*31 Defective and Damaged Material and Work
1*UX*32 All Bad Work Expense exclusive of 1*UX*31
1*UX*33 Telephone Calls
1*UX*34 Telegrams
1*UX*35 Postage

*A*2*U*—Brass Finishing Shop

Separate Dept. not Prorated to *A*, *B*, or *C*. Total 2*UX* Expense to be Divided by Total 2*U* Direct Hours to Determine the 2*U* Hourly Burden

2*UX*1 Foreman's Wages
2*UX*2 Clerical Wages (including Shop Time Clerks)
2*UX*3 Other Labor

Account Symbols	
2*UX*4	Supplies
2*UX*5	Maintenance of Buildings and Structures
2*UX*6	" of Equipment, Furniture, and Fixtures
2*UX*7	Care of
2*UX*8	Miscellaneous Department Expense
2*UX*9	" Small Tools
2*UX*23	Injuries to Employees
2*UX*25	Inventory Expense
2*UX*31	Defective and Damaged Material and Work
2*UX*32	All Bad Work Expense exclusive of 2*UX*31
2*UX*33	Telephone Calls
2*UX*34	Telegrams
2*UX*35	Postage

*A*1*V*—Forge Shop

Total to be Prorated to *A*, *B*, and *C* on Total Direct Hour Basis

1*VX*1	Foreman's Wages
1*VX*3	Other Labor
1*VX*4	Supplies
1*VX*5	Maintenance of Buildings and Structures
1*VX*6	" of Equipment, Furniture, and Fixtures
1*VX*7	Care of
1*VX*8	Miscellaneous Department expense
1*VX*9	" Small Tools
1*VX*10	Experimental and Test Expense
1*VX*11	Fuel
1*VX*23	Injuries to Employees
1*VX*25	Inventory Expense
1*VX*31	Defective and Damaged Material and Work
1*VX*32	All Bad Work Expense exclusive of 1*VX*31
1*VX*33	Telephone Calls
1*VX*34	Telegrams
1*VX*35	Postage

*A*1*W*—Welding Department

Total to be Prorated to *A* and *C*. Divide by Total 1*W* Direct Hours

Account Symbols	
1*WX*1	Foreman's Wages
1*WX*2	Clerical Wages (including Shop Time Clerks)
1*WX*3	Other Labor (exclusive of 1*WX*24)
1*WX*4	Supplies
1*WX*5	Maintenance of Buildings and Structures
1*WX*6	" of Equipment, Furniture, and Fixtures
1*WX*7	Care of
1*WX*8	Miscellaneous Department Expense
1*WX*9	" Small Tools
1*WX*23	Injuries to Employees
1*WX*24	Acetylene House—Entire Maintenance and Supply Expense—Including Wages
1*WX*25	Inventory Expense
1*WX*31	Defective and Damaged Material and Work
1*WX*32	All Bad Work Expense exclusive of 1*WX*31
1*WX*33	Telephone Calls
1*WX*34	Telegrams
1*WX*35	Postage

*A*10*X*—(Stores 1*X* to 10*X* Inclusive)

Total to be Prorated to *A*, *B*, and *C* on a Total Pound Basis

10*XX*1	Stock Keeper's Wages
10*XX*2	Clerical Wages
10*XX*3	Other Labor
10*XX*4	Supplies
10*XX*5	Maintenance of Buildings and Structures
10*XX*6	" of Equipment, Furniture, and Fixtures
10*XX*7	Care of
10*XX*8	Miscellaneous Department Expense
10*XX*9	" Small Tools
10*XX*23	Injuries to Employees

Account Symbols

10*XX*25 Inventory Expense
10*XX*31 Defective and Damaged Material and Work
10*XX*32 All Bad Work Expense exclusive of 10*XX*31
10*XX*33 Telephone Calls
10*XX*34 Telegrams
10*XX*35 Postage

*A*11*X*—Move Material Department

Total to be Prorated to *A*, *B*, and *C* on Total Pound Basis

11*XX*1 Foreman's Wages
11*XX*2 Clerical Wages
11*XX*3 Other Labor
11*XX*4 Supplies
11*XX*5 Maintenance of Buildings and Structures

11*XX*6 " of Equipment, Furniture, and Fixtures
11*XX*7 Care of
11*XX*8 Miscellaneous Department Expense
11*XX*9 " Small Tools
11*XX*23 Injuries to Employees

11*XX*25 Inventory Expense
11*XX*31 Defective and Damaged Material and Work
11*XX*32 All Bad Work Expense exclusive of 11*XX*31
11*XX*33 Telephone Calls
11*XX*34 Telegrams
11*XX*35 Postage

*A*1*Y*—Yard Department

Total to be Prorated to *A*, *B*, and *C* on a Total Direct Hour Basis

1*YX*1 Foremen's Wages
1*YX*2 Clerical Wages
1*YX*3 Other Labor
1*YX*4 Supplies
1*YX*5 Maintenance of Fence, Yard, Structures, Drains. Grading, etc.

Account Symbols	
1*YX*6	Maintenance of Equipment, Furniture, and Fixtures
1*YX*7	Care of
1*YX*8	Miscellaneous Dept. Expense
1*YX*9	" Small Tools
1*YX*23	Injuries to Employees
1*YX*25	Inventory Expense
1*YX*31	Defective and Damaged Material and Work
1*YX*32	All Bad Work Expense exclusive of 1*YX*31
1*YX*33	Telephone Calls
1*YX*34	Telegrams
1*YX*35	Postage

*A*1*Z*—Maintenance Department

Total to be Prorated to *A*, *B*, and *C* on Total Direct Hour Basis

1*ZX*1	Foreman's Wages
1*ZX*2	Clerical Wages (including Shop Time Clerks)
1*ZX*3	Other Labor
1*ZX*4	Supplies
1*ZX*5	Maintenance of Buildings and Structures
1*ZX*6	" of Equipment, Furniture, and Fixtures
1*ZX*7	Care of
1*ZX*8	Miscellaneous Department Expense
1*ZX*23	Injuries to Employees
1*ZX*25	Inventory Expense
1*ZX*31	Defective and Damaged Material and Work
1*ZX*32	All Bad Work Expense exclusive of 1*ZX*31
1*ZX*33	Telephone Calls
1*ZX*34	Telegrams
1*ZX*35	Postage

If the reader will carefully study the foregoing departmental indirect expense symbol analysis he will have no difficulty in preparing one to suit his own needs. The items have been determined after careful study. Those which may be used in practically every case are *X*1 to *X*11 inclusive, *X*17, *X*18, *X*19, *X*20, *X*23, *X*25, *X*28, *X*29,

*X*31, *X*32, *X*33, *X*34, *X*35, and *X*51 to *X*56 inclusive. The special requirements of any specific business can be fully covered by the remaining *X* numbers.

4–C. General Indirect Expense Symbols

The method of determining the general indirect expense is exactly the same as that described above in 4–A for plant indirect expense. The list of items covered by the expense subdivisions *X*1 to *X*56 inclusive also apply to the *GAX* to *GXX* group of general divisions. The actual description of each of the 56 items is also practically the same with one or two modifications.

*GAX*1, of course, includes only the salary of the administrative head (the president or chairman of the board), depending on the type of organization. *GBX*1 covers the salary of the general sales manager and so on down the list. Some of the *GX* divisions use more of the items 1 to 56 than others. This is governed, of course, by the functions of each *GX* division.

The general research division *GRX* will use items that perhaps the *GCX* or *GBX* group will have no expenditures for. This is true also of the *GLX*, *GOX*, *GTX*, and perhaps some others of the *GX* group. A careful analysis of the detail of the particular case to which symbols are to be applied will regulate the amount of division necessary to get a practicable analysis of indirect expense for these general divisions.

The general indirect expense symbols are formed by the addition of a numeral from 1 to 56 to the general division symbol. The form of symbol appears thus, *GAX*1, *GAX*2, etc. The following list of general expense divisions in condensed form may be readily understood if the fact is borne in mind that each of the *GX* group should be provided with its own list of just what items its expense is divided into. As above explained, these

items are chosen from the same list that is given complete in Chapter IV, section 4–A. The only difference is that for each of the following *GX* groups the title of the incumbent whose salary is covered by *X*1 is changed and one group may need fewer or more of the 56 items. In no case will all of the 56 be used in by any one group.

List of General Expense Symbols

Total Expenses of these Divisions are to be Prorated to each Plant Monthly

*GAX*1 to 56	General	Administrative
*GBX*1 to 56	"	Sales
*GCX*1 to 56	"	Comptroller's Office, Cleveland
*GDX*1 to 56	"	Delivery
*GEX*1 to 56	"	Employees, Liability Insurance, etc.
*GFX*1 to 56	"	Finance
*GGX*1 to 56	"	Garage
*GHX*1 to 56	"	Heating, Light, and Power
*GIX*1 to 56	"	Investigation (Legal and Patent Work only)
*GJX*1 to 56	"	Janitors, Watchmen, Special Guards, etc.
*GKX*1 to 56	"	Katalogs, Advertising, Literature, etc.
*GLX*1 to 56	"	Laboratory (Chemical)
*GMX*1 to 56	"	Manager
*GNX*1 to 56	"	
*GOX*1 to 56	"	Organizing Engineer and General Operating
*GPX*1 to 56	"	Purchasing
*GQX*1 to 56	"	
*GRX*1 to 56	"	Research (Plant *R*)
*GSX*1 to 56	"	Special Committee
*GTX*1 to 56	"	Time Study and Technical
*GUX*1 to 56	"	Engineering
*GVX*1 to 56	"	Vaults, Files, etc.
*GWX*1 to 56	"	Welfare
*GXX*1 to 56	"	Emergency (Expense Distribution only)
*GYX*1 to 56	"	Yards, Grounds, etc.
*GZX*1 to 56	"	Maintenance

4–D. Equipment Indirect Expense Symbols

In the foregoing pages the analysis of plant and departmental indirect expense has been explained in detail. In the lists of indirect expense subdivisions it will be noticed that *X*6 always represents maintenance of equipment. This symbol used in combination with any plant, department, or general division always represents the total expense for the period covered and for the plant or department indicated by the prefixed symbol.

The symbol *X*6 preceded by *A* represents maintenance of equipment in plant *A* not identified with any one department. The symbol so written, *AX*6, will be rarely, if ever, used. In the majority of cases the symbol will indicate departmental equipment, as, for example, the prefix 2*U* or 5*M*. The list as invariably reported will, therefore, be 2*UX*6, 5*MX*6, or 3*TX*6, etc.

The reader should not overlook the fact that the subject is only the total expense divisions *X*6 as it appears monthly in the final report of indirect expense. Therefore, on the operating statement will be found among other divisions, the item *X*6 preceded as above explained by either the plant letter *A*, *B*, *C*, etc. (*AX*6, *BX*6, *CX*6), or by a department symbol as 1*AX*6, 1*BX*6, 3*CX*6, 4*MX*6, 1*GX*6, etc.

The figures reported in total are made up from the machine or work point indirect expense list arranged by equipment symbol. This *X*6 analysis is obtained by devoting one column of a set of cost sheets to each equipment symbol in each department or plant. Each column is headed with *X*6 symbol in combination with the equipment symbol.

To further illustrate: various machines in 2*U* have a consecutive set of columns headed, say *X*6*L*1, *X*6*L*2, *X*6*L*3, *X*6*D*1, *X*6*B*2, etc. All maintenance charges are daily posted to the column headed by the machine symbol

on which each item of such expense was incurred. The totals are listed each month by machine symbol. Each department total is reported in a lump sum as shown (in section 4–B) against *X*6.

In practice the distribution of maintenance expense *X*6, is after all, a very simple matter. As the symbol *X*6 is universally used to represent the same thing, and this is true of all *X* symbols, the simple addition of any equipment symbol is all that is necessary to get a complete maintenance expense analysis. All equipment has its own symbol plainly stenciled in 3″ letters so that no employee can fail to identify each unit. This method assures accurate recording of charges on the part of timekeepers, maintenance men, foremen, stock keepers, or others having to do with expenditures of this kind.

In plants having equipment that is used in various departments, the *X*6 distribution may be reported in total, monthly, as a local plant item, such as *AX*6, *BX*6, etc., but ordinarily, as above explained, the totals are distributed to each department. The key to all equipment symbols is described below in Chapter VI, sections 6–A and 6–B.

4–E. Factory Indirect Expense Symbols

Indirect expense of maintenance of buildings and structures is always represented by *X*5. This indirect expense is handled in substantially the same way as has been explained above for equipment. In the case of factory maintenance, symbol *X*5, one has, on the whole, fewer subdivisions to follow. Aside from the expense *X*5 against the plant as a whole, the only divisions possible, are those provided for by the department symbolization.

If the reader will refer back to Chapter III, section 3–A, he will find emphasis has been laid on the importance of carefully defining department limits. Great importance

is attached to this phase of the subject. The proper analysis of indirect expense, and its accurate distribution later, to the product manufactured, cannot be brought under correct and adequate control unless the caution given in 3–A has been carefully heeded.

Working now on the assumption that the department limits have been correctly defined and symbolized, the expense of maintenance of buildings and structures pertaining to each department can be readily controlled. It should be explained here that the term "buildings and structures" as used here covers all fixtures, etc., not specified as belonging to the equipment group. In other words, all movable equipment and apparatus not actually part of the building itself, nor necessary to it as a building, belongs in the equipment class. Chapter VI, sections 6–A and 6–B, cover this in detail.

It is therefore evident that the limitations of the use of the symbol $X5$ are very definitely determined by the department symbols. It is also evident that all $X5$ expenditures must be identified in detail by the prefix consisting of the department symbol. If the reader will refer back to Chapter IV, section 4–B, he will see $X5$ used in combination with the department symbol. The indirect expense is, therefore, expressed as $1AX5$, $1BX5$, etc., as the case may be.

The use of $X5$ is also possible in connection with maintenance expenditures on land or buildings that cannot be conveniently split up over several departments. If there are several departments in one building and this building and probably others of the plant (say A plant) are being repainted, the cost should be charged to $AX5$. On the other hand, if the expenditure is one that can readily be subdivided it should be charged to the departments benefiting by such expenditure.

CHAPTER V

ORDER AND JOB GROUP SYMBOLS

5–A. Order Group Symbols

To subdivide properly a variety of product to permit of correct costing, it becomes necessary to have a series of general order symbols. These symbols, like all others in the system, have a formation distinct in themselves. The general order symbols consist of a characteristic letter followed by a numeral and small letter, which formation is important as will be explained later.

The use of order symbols has a very important bearing on costs, as they permit of a subdivision of orders and a classification of product that is otherwise impossible. This classification is absolutely necessary to true costs, both direct and indirect. The grouping of product into order groups and the subdivision of each order of each group is necessary before the order is received. It should first be done by the estimator before a quotation is made. When the order is finally booked, the order clerk should classify and subdivide the order to agree with the estimator's record.

The author's order group letters have been standardized to the following:

*A*1*a* and upwards—*A* Class Product
*B*1*a* " —*B* Class Product
*C*1*a* " —*C* Class Product
*D*1*a* " —*D* Class Product

*F*1 and upwards—Buildings and Structures
*L*1 " —Stock Orders
*M*1*a* " —Miscellaneous Orders for Product
*P*1 " —Plant Equipment
*X*1, etc., are Expense Symbols as above explained in these pages

The above order groups may be extended to suit any desired grouping, though for the advantage of standardization, *F*, *L*, *P*, and *X* should always be used as above mentioned. All the remaining letters of the alphabet are available and will meet every need. In the author's experience it has not become necessary to itemize the *F*, *L*, and *P* groups, and of course the standard numbers for the *X* symbol group covers the indirect subdivisions. As all the *F*, *L*, and *P* orders originate with the producing plant, each order can be made to conform to the desired subdivision. This is preferable in these cases, and it is simply a case of issuing a sufficient number of orders to suit the requirements of each case.

Order groups *A*1*a*, *B*1*a*, *C*1*a*, *D*1*a*, *M*1*a*, and any other similar groups (not *F*, *L*, *P*, and *X*) represent only product being manufactured to sell to customers, official and duly approved orders for which have been received and booked. It is, of course, desirable to use suggestive letters for these groups so that the characteristic letter will help to identify the product to be supplied on that particular order.

Each order group symbol should be used in combination with the plant letter. Thus, *AA*1*a* means an *A* plant order, Group *A*; *CA*10*a* represents a *C* plant order, group *A*, serial number 10, item *a*. If there is but one plant, the plant letter may be omitted.

If an order has four items, the order symbol would be for example, *A*120*a*–*d*. This shows at a glance that *A*120 has four items, *a*, *b*, *c*, and *d*. The general order form is so arranged that the order symbol may be shown

as above written, *A*120*a–d*. In the body of the order to the left a narrow column is provided so that each item letter, *a*, *b*, *c*, and *d*, may appear in the margin beside the specification of each item. In referring to any item of an order, say *A*120*a–d*, each item would be spoken of or recorded as *A*120*a*, *A*120*b*, *A*120*c*, or *A*120*d*. If an order has but one item, it always has the suffix *a*; for example; *A*1261*a* indicates at a glance that there is but one item. The above explanation applies, of course, to any of the "product" order groups. See Chapter X, section 10–C, for a further description of sub-class symbols.

Orders for new factory or land, or additions and betterments are issued in the *F* group. For the reasons already explained, there is no necessity for itemizing this group. The same is also true of *P* group, which applies only to new equipment, additions or betterment, exclusive of that covered by the *F* group. Each successive order in any group takes the next open number.

The *L* order group represents "lots" of one kind, type and size to be made at one time and only for stock. These stock orders when completed are closed out and the total cost of same determines the figure at which each different lot is charged into stores.

If a lot of say, 10 machines, parts for which were in stock or coming through for stock, were to be assembled, an *L* order, say *L*560, would be issued to cover same. The material would be drawn from stock on a material list and charged to order *L*560, on which the assembling was to be done. The assembling time of *L*560 plus the assembling process rates, plus the material drawn from stock, will give the total cost of *L*560.

5–B. Work Numbers

Modern management methods involve careful analysis of orders into operations before the work is permitted to be processed in the shops. The analysis should include

all departments having anything to do with any operation on any piece of any order. The general order is usually issued only in duplicate or triplicate when these methods are used. All shop work is routed in detail from the Planning Room by the medium of the work order.

The work order is usually a $5'' \times 3''$ form. One work order is issued in triplicate for each operation of each piece. One copy remains in a numerical file, a second copy remains on the planning board and the triplicate copy goes to the department which is to do the work called for by that particular work order.

Work orders are identified by the work number which appears on each. All time is charged to this work number by the shop time clerks. Whenever time is spent on any work number the work numbers are canceled as fast as each work order is completed. All time is transposed to the order symbol before the job time card coupon reaches the cost clerks for distribution to the cost sheet for that particular order. This transposing is done through the medium of the numerical file copy referred to in the preceding paragraphs.

The various columns on the cost sheet are headed by the work numbers used on that particular job, which prevents posting time or material charges to the wrong cost sheet, or into the wrong column. A check is also established to prevent time being put through for work orders already canceled. Work orders are also issued for work to be charged to any group of $X1$ to $X56$ indirect expense items.

The work order series are plain numbers starting at 1 and running to 99,999 and repeating. This series of plain numbers is the only one used, as all other symbols have letters in combination with numerals. The early numbers become canceled long before 99,999 has been reached, so there is no danger of duplication of figures between two series.

CHAPTER VI

EQUIPMENT SYMBOLS

EQUIPMENT symbols are necessary to the definite identification of each piece of equipment. These symbols are also absolutely essential to the determination of process rates as a means of distributing indirect expense. The equipment symbol is formed by two letters followed by a numeral. The first of these letters is the plant letter. The second letter indicates the class or kind of apparatus or equipment. The numeral following these two letters is the serial number of each piece of equipment of its class.

The use of a plant letter for the first character may at times seem unnecessary, but the reader must not overlook the fact that unlimited expansion has been provided for. If the scheme described in these pages is followed in detail, considerable confusion will be avoided in event of sudden expansion. Present-day business undergoes many changes. The not unusual rapid growth of so many of our industries proves how difficult it is to try to predict what the probable future of a business will be.

For obvious reasons, it therefore becomes necessary to assume that sufficient flexibility must be assured to meet any unexpected demand in the way of sudden additions. The symbolizing of equipment is also very important from an accounting standpoint. All physical inventory items, identified by symbols, constitutes an invaluable record for the comptroller. It assures absolute check on all property items, both in connection with current values, process rates and last, but not least, depreciation.

The greater number of plants there are, the more necessity for starting right and maintaining definite control of all equipment items. If the records are to be kept correctly and up to date, symbols are almost an absolute necessity. In this connection, the reader should note that all *P* orders, see Chapter V, section 5–A, should show the equipment symbol for each item at the time the order is originated. If the *P* orders are properly made out and complete in detail, including the symbol, then all succeeding records can easily be kept correct. The method automatically controls the origin of all equipment symbols and assures both accounting room and production department an easy check on all cost distributions.

If the reader will refer to Chapter II, he will find a typical list of plant symbols, viz.:

A—Atlanta Plant
B—Baltimore Plant
C—Cleveland Plant
D—Detroit Plant
E—Erie Plant
F—Fitchburg Plant
G—Galveston Plant
N—Newton Plant
R—Research Plant

Based on the scheme above outlined, the first letter represents the plant. The second letter the class of equipment, and the numeral the serial number of that particular item. A piece of apparatus belonging in the *DA* class will be, for example, *DA*1, *DA*3, etc. Likewise, equipment belonging in the *DC* class would be symbolized *DC*6, *DC*261, etc. The equipment symbol should be plainly stenciled in 3″ letters on the front of each machine or apparatus whenever its size will permit. Otherwise stamp the symbol into the main part, at the front. When using a stamp, indicate its location by stenciling a circle around the imprint.

The following is a typical list of equipment classifications adapted to the requirements of plant *N*. The list below, though adapted to a particular plant, contains standard divisions which can be used by almost any kind of business with little or no change. Where the class description is not sufficient definitely to describe what belongs in that group an explanation has been added. No attempt has been made to list every possible article that can come into any one group. On the other hand, the following list is in sufficient detail to be self-explanatory.

Typical List of Equipment Symbols

(Listed for Plant *N*)

NA—Air Compressors, Blowers and Fans.

(*NA*1 and upward)

Includes air tanks and all characteristic accessories, such as air lines, piping, etc. Also includes stoves, foundations, pipe hangers, trenches, and miscellaneous necessary fastenings, and all labor of installation.

NB—Boring and Drilling Machines

(*NB*1 and upward)

NC—Conveying, Elevating, and Hoisting Machinery

(*NC*1 and upward)

Includes industrial and overhead railway systems with rolling stock, elevators, traveling cranes, hand hoists, hand trucks, platform trucks, gravity conveyors, sand elevators, and hoppers, transfer tables, loading cranes. Also includes foundations, pipe hangers, trenches, pits and miscellaneous fastenings and all labor of installation.

ND—Presses, etc.

(*ND*1 and upward)

NE—Electric Motor and Other Electrical Equipment, Generators, etc.

(*NE*1 and upward)

Includes all motors, wiring for light and power, lamps, transformers, generators, magnetos, call-bells, etc. Also includes foundations, pipe hangers, trenches, and miscellaneous necessary fastenings, and all labor of installation.

NF—Furnaces, Ovens and Forges

(*NF*1 and upward)

Includes all melting furnaces, grating, etc., with cost of excavation for furnace pits, oil burners for heating furnaces, etc. Also blacksmith's forges, etc. Also includes skimming barrel and hood used in extracting good aluminum from skimmings. Also includes foundations, pipe hangers, trenches, and miscellaneous necessary fastenings, and all labor of installation. Also all ovens, forges, etc.

NG—Grinders, Buffing Wheels, etc.

(*NG*1 and upward)

Includes emery wheel stands, abrasive equipment, buffing wheels and sand blast outfit complete. Also includes foundations, pipe hangers, trenches, pits, and miscellaneous fastenings, and all labor of installation.

NH—Boiler Room and Like Equipment

(*NH*1 and upward)

Includes boiler and all characteristic accessories, such as feed pumps, vacuum pumps, oil pumps, traps, etc. Also includes all steam pipes, and fittings throughout the entire plant. Also all foundations, pipe hangers, trenches, and miscellaneous necessary fastenings and all labor of installation. Also furnaces with entire system of steam pipes and radiation for heating of offices.

NI—Instruments and Apparatus

(*NI*1 and upward)

Such as pyrometers, time clocks, gauges, etc. Also all scales and weight apparatus, etc. Also fastenings, supports, and labor of installation.

NJ—Jigs, Special Fixtures, Angle and Surface Plates, etc., not in *NZ* Class

(*NJ*1 and upward)

NK—Keyseating Machines other than Milling Type

(*NK*1 and upward)

NL—Lathes

(*NL*1 and upward)

NM—Milling and Gear-cutting Machines

(*NM*1 and upward)

NN—Not Otherwise Classified

(*NN*1 and upward)

Includes all equipment, apparatus, etc., not indicated by any of the other classes in this list. It should be noted that only enough detail is given for each class clearly to indicate what equipment belongs in that class.

NO—Ovens and Dryers

(*NO*1 and upward)

Includes first cost of all core ovens, comprising such items as foundations, excavation for firing pits, construction material, core oven trucks, etc. Also pipe hangers, trenches and miscellaneous necessary fastenings and connections and all labor of installation.

NP—Planers, Slotting and Shaping Machines

(*NP*1 and upward)

Includes shafting, hangers, pulleys, gears, chains, belting, etc. Also fastenings, supports and labor of installation.

NQ—Sand Working Machines

(*NQ*1 and upward)

Molding and core making machines, sand mixers, screens, etc.

NR—Research and Laboratory Equipment (Special)

(*NR*1 and upward)

NS—Sawing Machinery, not Wood Working

(*NS*1 and upward)

Includes wood and metal flasks, jackets, bottom boards, etc.

NU—Welding Equipment

(*NU*1 and upward)

Includes such items as acetylene gas generators with piping to welding room, welding torches, welding furnaces, oxygen tanks, etc. Also includes foundations, pipe hangers, trenches, and miscellaneous necessary fastenings, and all labor of installation.

NV—Vises, Bench and Stands Forming a Work Point.

(*NV*1 and upward)

NW—Wood Working Machinery

(*NW*1 and upward)

Includes such items as circular saws and tables, joiners, wood planers, trimmers, wood-working speed lathes, and other typical wood-working machinery not used for metal.

NX—Storage Tanks, Benches, Racks, Bins, etc.

(*NX*1 and upward)

Includes all such items as furniture, fixtures, storage tanks, racks, stock bins, core benches and racks, molders' benches and racks, core carriers, clothes lockers, time clerks' and formen's desks, sand bins, chill bins, metal bins, clock-card cases and racks, water tanks, lantern cases, work-order cases, core and molding horses, tables and seats in wash room, shelving, machine oil tanks, gasolene tanks, gasolene pumps, inspection and solderers' benches, testing pans, water test, chipping blocks, rubbish bins inside plant, heating stoves. Also contents of superintendent's office. Also includes large fuel oil storage tanks, also concrete foundations and all fuel oil pipes and fittings up to, but not including burners for furnace and ovens, for which see classification in *DF* and *DO* respectively.

NY—Yard Equipment

(*NY*1 and upward)

Includes bins in yard, such as rubbish bins and iron pot bins. Also lawn mowers, dump wagons, dump carts, etc.

NZ—Miscellaneous Small Tools

(*NZ*1 and upward)

Includes drills, taps, reamers, collets, arbors, forged tools, cutters, insert tools and holders, dogs, drivers, etc., etc., property in tool room group and miscellaneous.

CHAPTER VII

DRAWING SYMBOLS

DRAWINGS may be divided into two chief classes. Assembly drawings depict a group of several or more parts, layouts incident to designing, timing of mechanical motions, etc., etc. All drawings belong in the "assembly" class that are not "details" of only one piece. If a sheet shows more than one piece, even though each is figured in detail with ample views, such a sheet is properly classed with the "assembly" group as far as this discussion of drawing symbols is concerned.

The other class covers those drawings which are "details," each sheet depicting but *one kind, design, and size of piece.* Modern methods of management require an exactness of detail and flexibility that makes necessary a separate drawing sheet for each different piece. The symbolizing of these "detail" sheets is made to conform to the requirements of piece symbols also, as will be explained below.

All drawings, whether "assembly" or "detail," consist primarily of a characteristic letter followed by a dash and a numeral. In the case of the "detail" sheets a letter *X* follows the numeral.

The characteristic letter forming part of all drawing symbols indicates the size of the drawing sheet. This identification becomes necessary for filing purposes. It is evident that various sizes of sheets must be used not only for the sake of convenience and economy, but also to save space. A layout or assembly will often require a 36″×48″

sheet, whereas the detail of a screw or bolt needs but a $6'' \times 9''$ sheet. The sizes of sheets indicated by the first letter of the symbol forms a direct reference to the drawer file in which it may be found, or in which it belongs. The numeral indicates its position in that drawer in relation to other sheets of the same size. The standard sheet sizes identified by letter are as follows:

A Size— 6×9 Inches (Used chiefly for written records of standard commercial articles)
B " — 9×12 "
C " —12×18 "
D " —18×24 "
E " —24×36 "
F " —36×48 "
G " —48×72 "
S " —Special sizes

Drawings belonging in the assembly group are symbolized by using the sheet letter representing the size of sheet on which the drawing is made, followed by the next open serial number for that size. The dash must always be used immediately after the latter so as to maintain the symbol formation. This symbol formation does not then duplicate any other kind of symbol. Accordingly, the first "assembly" drawing made on an *F* sheet ($36'' \times 48''$) has the Symbol *F*–1. The second drawing on same size sheet will be symbolized *F*–2; the third *F*–3, and so on. Symbols such as *G*–261, *E*–218, etc., therefore represent assembly drawings on various size sheets.

Detail drawings are symbolized in exactly the same manner, except that the numeral is followed by the letter *X*. This letter *X* is always used to indicate a single piece. Drawing *C*–126 means a drawing showing several parts, whereas drawing *C*–127*X* means a drawing of a single piece shown in complete detail. There is never any duplication of numbers, however, for any one size of sheet.

If the last number in the *C* group was *C*–126 for an assembly and the next *C* sheet was to be used for a detail drawing, it would carry the symbol *C*–127*X*.

There are certain modifications in the way of suffixes to be considered in connection with the detail drawings of pieces mentioned in the preceding paragraph. These modifications become necessary when establishing piece symbols to conform to the detail drawing symbols. As above explained, the *X* forming part of a drawing symbol indicates a single piece. The piece may be machined special and would require a new drawing and symbol. Modifications of machining details are indicated by adding a letter after the *X*, as *C*–192*XA* or *G*–1216*XB*, etc. A pattern altered from standard is identified by suffixing a number. Symbol *G*–129*X*1 means a drawing showing a pattern alteration of a part originally constructed as per drawing *G*–129*X*.

The following chapter fully discusses the method of symbolizing pieces. It is only necessary to mention them here in emphasis of the fact that the detail drawing symbol is identical with the piece symbol. This should be borne in mind when considering the above mentioned modifications, and when studying Chapter VIII.

All sheets of the same characteristic letter, file in the same or adjacent drawers, or compartments of the same drawer. If there are several different parts formed by modifications of, for example, part *C*–129*X*, they might be known as *C*–129*X*1, *C*–129*X*2, *C*–129*XA*, and *C*–129*X*B. In this case, they will all be found in the *C* drawer or compartment in numerical order as shown above. The drawing *C*–129*X* will be immediately below drawing *C*–128 (or *C*–128*X* if it happens to be a detail sheet). Following *C*–129*X* will be found *C*–129*X*1 and so on.

There will be brought into use as time goes on a number of standard commercial articles. These articles must be symbolized for identification purposes as explained below

in Chapter VIII. In the majority of cases it will not be necessary to make a drawing of each of these pieces. The best method of identification is to symbolize them in the *A* group as *A*–162–*X*, etc. For each piece so symbolized, an *A* sheet should be symbolized and filed. The drawing sheet should bear a written description of the piece, the maker's name, number, size, style, catalog number and date, and any other data that are necessary to form a complete record and specifications for the drafting room. Do not overlook the fact that the engineering or drafting room must have a detail drawing record (either drawn or written) of every part symbol described below in Chapter VIII. These written records can be readily made on the *A* sheets. The *A* group in the majority of cases will therefore indicate commercial parts that can be purchased ready for use.

Drawing filing cases must, of course, be provided with drawers or compartments of the proper sizes to take the above-mentioned sizes of sheets, namely, *A*, *B*, *C*, *D*, *F*, and *G*. By this arrangement all *A* size sheets (6″×9″) will be together, or in adjacent compartments. They will be arranged numerically in the order of the number following the characteristic "sheet" letter. This same arrangement is followed throughout for each size of drawing sheet.

The reader is referred to Chapter VIII, wherein the piece symbol formation is described, and to Chapter X, wherein jig, tool, and gauge symbols and core box symbols are explained. Drawings for parts symbolized under each of these groups must bear the same symbol as the part depicted on said drawing. Jig and tool drawings should be depicted complete on a single sheet. Such parts are manufactured in special departments and it is necessary that the drawing show all the parts as an important step toward accuracy. A drawing of tool $\frac{D\text{–}1120X}{J3\text{–}4}$ is therefore

identified by the symbol mentioned. On the other hand, drawing for equipment coming into the group described in Chapter VI should be symbolized in detail as for all other drawings first mentioned in this Chapter. The same plan also applies to gauges.

CHAPTER VIII

PIECE SYMBOLS

PIECE symbols have caused more argument than perhaps any other set of symbols in use in modern organization work. As stated above, the writer, after years of experience with various forms of symbols, prefers the arbitrary number system to all others. A plain number, however, without letters is not sufficient for two reasons: first, the plain number which is not accompanied by a letter is liable to conflict with other numbers; second, changes or modifications of a piece must be indicated in such a way as to be absolutely apparent at a glance.

All pieces should be symbolized without regard to whether they are to be made or purchased. All pieces are to have the same kind of symbols, consisting of a letter, a numeral, and the letter *X*, even though special and never to be used more than once. The reason for starting the symbol with the characteristic letter has been explained above, under Drawing Symbols, Chapter VII. All commercial articles, such as standard bolts, screws, nuts, taper pins, keys, wrenches, oil cups, washers, etc., should be symbolized, commencing at *A*–1*X*. This should be systematically done and a symbol provided for each kind and size of each article as listed in the maker's catalog, as fast as it comes into use. These articles should preferably be symbolized *A*–1*X* and upward, and a written record made on the *A* sheet of the same symbol. See end of Chapter VII.

The parts made by the firm should next be symbolized, taking for the first piece the next unused number under

the drawing sheet group on which it is drawn. It should be systematically done by taking parts in the alphabetical order of their names and also in the order of their size. For example, if the first machine is "*A* Type" all *A* parts should be symbolized first; if the "*A* types" consisted of say six sizes, the first size piece (alphabetically) would be symbolized first and the other five sizes of the piece would take the next five consecutive numbers, providing the prefix letter is the same. After taking all pieces of all sizes in the "*A* Type" the next type, *B*, for example, would be treated likewise, and so on through all the different types and sizes. The explanation is made on the supposition that there are already existing machines and parts in use to be symbolized. New parts should be symbolized in the order of their coming into use, and arbitrarily. It is easier in fact to be methodical in the arrangement of symbols than to go at it in a haphazard manner. A step in the right direction can be taken at the time the machine is being designed and while the material list is being created. The parts should be arranged systematically on the material list in groups and in the order in which they will be required by the shop, either by kinds of material or kinds of work, depending on the business involved.

It is a very good scheme in symbolizing new parts to arrange them so that all iron castings, for instance, come together; after which may come bronze castings, steel castings, forgings, miscellaneous pieces, etc. Each new piece is symbolized by the use of the next unused number under the sheet letter of the drawing group on which it appears. If one major piece requires one or two less important parts to make it complete, such as caps, or brackets, these would naturally be listed next and symbolized under the proper letter, before symbolizing a new piece. It should be borne in mind that the foregoing order is in no way essential to the scheme of symbols involved, but is simply

a small detail tending to a methodical way of doing a thing and so is preferable to an unsystematic method.

Having provided for the piece symbol proper, it becomes necessary to provide for alterations or changes to pieces which have been already symbolized. There are two chief changes to be provided for; one, that which is made to a pattern before the casting is made, and the other, that which is simply a change in the dimension or shape, due solely to machining, where a standard rough piece is used.

It is conceivable that a standard pattern of a wheel or gear, or some such common and regularly used piece, might be made slightly "special" a great many times by a slight alteration in the pattern. As there may be no limit to such possible changes, a number is added to the piece symbol after the suffix letter *X*. If a piece is to be made by an alteration to an existing pattern, say *D*–1120*X*, a new piece made from this altered pattern would be known as *D*–1120*X*1. The numeral after the *X* is to show that the pattern *D*–1120*X* was altered, and indicates at once that a wholly new pattern is not required. The symbol, of course, originates in the drafting room, as also does the design of the piece. It is good practice to use existing patterns as far as possible, if the changes are such as not permanently to injure or weaken the pattern for use as originally intended. If the same pattern later had some other alteration or addition to make, the new piece would be known as *D*–1120*X*2.

Where a change is entirely a difference in machining a standard rough piece, a letter is added to the end of the symbol after the suffix letter *X*, to indicate such a change in machining. A letter is used because it is not likely that the same piece would be machined in more than twenty-six different ways. For example, here is a standard casting, symbol *D*–1120*X*, the only change required for a new piece being in the machining of it; the special piece would then be symbolized *D*–1120*XA*, the additional suffix letter *A*

indicating a change in the finishing. It is known at a glance that the rough piece *D*–1120*X* is the one to be used and the letter *A* indicates that it is the first machining change. To further illustrate this point, a blank bolt might be known as *A*–621*XA*; if the same blank was used for a bolt faced under the head or otherwise different from above, it would be known as *A*–621*XB*. As above stated, it is not likely that any one rough part would be machined in more than twenty-six different ways. In the event of a standard pattern from which are to be made two special pieces by altering the pattern, making two castings alike and then machining one slightly different from the other, one of these pieces would be known as *D*–1120*X*2 and the other as *D*–1120*X*2*A*.

This scheme, as worked out in practice, has repeatedly ved that there is a distinct advantage in having the above described combination of numbers and letters as suffixes to the original piece-symbol suffix *X*. Of course, all piece symbols must be properly indexed in the piece symbol index. The piece symbol index is a double one on the card system—having one set of cards arranged numerically from *A*–1*X* up. In general groups, they are arranged alphabetically according to the prefix or characteristic letter. In a numerical index, if indexing piece *D*–1120*X*, it would, of course, come in its proper position after *D*–1119*X*. Should there be a modification of this piece known as *D*–1120*X*1, the card for such piece should follow the card *D*–1120*X*. If there is still another card *D*–1120*XA*, it would come in behind the last mentioned *D*–1120*X*1. The following arrangement will show how the alphabetical index is arranged:

Arms
- *A* Type
  - 1 size
  - 2 "
  - 3 "
  - 4 "
  - 5 "
  - 6 "
- *B* Type
  - 1 "
  - 2 "
  - 3 "
  - 4 "
  - 5 "
  - 6 "
- *C* Type
  - 1 "
  - 2 "
  - 3 "
  - 4 "
  - 5 "
  - 6 "

There is a method of symbolizing pieces, known as the group scheme, which has also worked satisfactorily in practice to a limited extent. The scheme, however, has the same disadvantage as the mnemonic symbol system, namely, that it is more or less restricted and cannot be universally applied to any kind of business. A group scheme with a characteristic letter or letters followed or preceded by a numeral adapted to one kind of business will not fit another line. The trouble in developing any but a purely arbitrary symbol system is that the tendency is to work toward the mnemonic feature by trying to make the symbol suggestive. The scheme is absolutely impracticable if carried to any great extent. The tendency is toward complication, and while the symbols may be shortened by such method perhaps by one character, the slight saving is of no consequence and it ceases to exist if there is any great variety of pieces. Almost any simple piece symbol will soon reach five characters, not including the suffixes added to represent alterations or variations from standard, such as have been described.

Each different piece *must* have its detail drawing. The piece symbols here described are, therefore, identical with the drawing symbol. In other words, the arbitrary system actually eliminates duplication of work by not having both a drawing symbol and a piece symbol to refer to. One symbol does for both. The advantage in time, writing of forms, space and directness of reference is obvious.

Stores cards and all other records pertaining to pieces must, of course, use the piece symbols for identification purposes. This applies to orders, material cards, requisitions, purchase orders, work orders, etc. The ordinary practice, as the reader is probably aware, requires on all the above forms either lengthy written descriptions or duplication of work by having different symbols for drawings and pieces.

The greatest value in the author's form of piece symbol is really due to the simple method of guarding against errors and duplication when altered parts are used. In other words, there is no excuse for making an entirely new pattern for *D*–1261*X*1 when it is perfectly plain that pattern *D*–1261*X* is to be altered as indicated by the suffix numeral 1. Likewise, the stores-keeper has no excuse for ordering new material for part *A*–126*XA* when it is evident that stock part *A*–126*X* can be machined special to drawing *A*–126*XA* to make the new part. There is also a great deal of time saved in referring to and in checking up stores and other records, when using the described form of piece symbol.

No attempt should be made to include in the piece symbol formation any part of the trade symbol for the completed article or machine ready for the market. Standardization of design, the fact that some parts of several machines or other product are used, and the use of standard commercial articles makes such a method impracticable. Incidentally the piece symbol would be made more cumbersome and the same piece would also have many different

symbols, necessitating the use of both a shop symbol to act as a manufacturing record, and a different symbol for the drawing of each piece. As a material list of each machine is in any case an essential, the said material list will be sufficient to identify any piece of any machine. The arbitrary system of piece symbols is therefore the most simple, takes the place of two or three symbols, and makes the material list or bill of material a more compact record.

The above facts are often entirely overlooked, though lack of knowledge of the formation and use of symbols accounts for so many cumbersome methods for identifying drawings, parts, machines and material lists. Material lists themselves should be identified by the order group symbol on which the machine was built. If the machine was a stock or standard design, an *L* order group symbol identifies the material list.

CHAPTER IX

OPERATION SYMBOLS

The symbolization of operations covers a broad and diversified field. The use of operation symbols has been exceedingly limited, though for purposes of record particularly, there is greater need of them than any one group. The word "operation," as here used, is intended to cover the entire field of action. The Century definition of "operation" is (1) "action; working agency; exertion of power or influence. (2) A specific act or activity. (3) A course or action or series of acts by which some result is accomplished."

It is necessary in keeping complete records to symbolize the various operations or acts necessary to carry out the routine, as well as to record certain acts which have been performed. The later record may perhaps be considered as a matter of historical importance to each respective concern. The formation of the operation symbol should consist of two letters, since practice has proved the two-letter symbol to be a simple form to remember and adequate in use.

9–A. Industrial Operation Symbols

There is little need of much explanation as to how operation symbols are used in industrial work. They greatly expedite the work of issuing work orders and other documents and aid in furnishing a completeness of detail

which without them would often be sacrificed for the sake of speed, particularly under the pressure of the day's work.

If orders, records, etc., are filled out complete and in an explicit manner by using words fully spelled, it is obvious that a great deal of time and space has been unnecessarily consumed when compared with what would have been spent had operation symbols been used instead of words. The saving of time and space is extremely important in production and routing records, or in any records essential to the predetermining of operations where later entries must note how and when those operations were actually completed. An accurate record which will show a complete history of an order over a period of months and in complete detail for filing, under the symbol system need be no larger than the average size business letterhead. If the old method be used, an equivalent record would consist of many pages of the same size. Such records cannot readily be deciphered by a stranger or one having casual access to them, so confidential matters of firm interest remain with the employees having charge of the various parts of the system or with others properly authorized or interested.

The use of two-letter symbols to cover operations or activities gives sufficient scope to meet any particular branch of business or profession. The two-letter symbol will, in a majority of cases, result in a symbol which is phonetic and to a marked degree meets the requirements of the mnemonic system. For example, symbols *BO* bore, *BX* box, *TN* turn, *TH* thread, and *XP* experiment, are perfectly suggestive and easily remembered. By the use of two letters it is possible to get 676 different symbols, which is more than sufficient for any one business or profession. A large majority of the requirements of all of our industrial establishments can be well covered within that range.

To meet the requirements of some specific case, it is not unreasonable to suppose that three-letter symbols might possibly have advantages. On the other hand, working always toward standardization, the author believes adherence to the two-letter operation symbol will fully meet all practical requirements. The use of operation symbols to meet any one particular trade or profession will ordinarily require but comparatively few of the total number of available symbols under the two-letter system.

In the case of the surgical and medical groups (see Chapter XI), any one of these symbols is liable to come into use at any time. Therefore, the lists in Chapter XI are made rather complete. The student in considering the standard key herewith, must not forget that the symbols representing items in the surgical column, or the medical column, can be easily remembered by the surgeon or the doctor, owing to their knowledge of and familiarity with the terms themselves. The same is true of the following symbols used in the industrial pursuits, which, to the professional man might seem confusing and cumbersome at first glance. The author believes that the following list will prove self-explanatory.

Industrial Operation Symbols

AD Alter Design
AE Alter Equipment
AF Alter Flask
AG Alter Drawing
AJ Adjust
AL Alteration
AM Morning
AN Anneal
AP Alter Pattern
AR Arrest
AS Assemble
AT Attest
AU Audit
AV Approve
AX Assist
AZ Analyze

BA Balance
BB Babbitt
BC Brick (briquette)
BD Band
BE Break (burst)
BF Buff, buffing
BG Backing (Back Off)
BH Broach
BI Bead

BJ Balance Journal
BK Bake
BL Boil
BM Box Mill
BN Bend
BO Bore
BP Bump
BQ Blank
BR Brand
BS Burnishing
BT Blueprint
BU Bush
BV Bevel, scarf
BW Bibliography
BX Box
BY Buy
BZ Braze

CA Cancel
CB Counterbore
CC Set Chills
CD Checked
CE Center
CF Chamfer
CG Charge
CH Case Harden
CI Cement
CJ Cabbage
CK Chuck
CL Clean
CM Compress
CN Condemn
CO Cut Off
CP Chip
CQ Cut Sand
CR Credit
CS Countersink
CT Cut Teeth
CU Cup
CV Cut V (or cut V groove)
CW Cold work, or roll
CX Crate
CY Certify
CZ Carbonize

DA Detail Account
DB Distribute
DC Dictate
DD Deduct, Discount
DE Design
DF Defective
DG Drawing
DH Drop Hammering (forge)
DI Dip
DJ Develop Structure
DK Drink
DL Drill
DM Dismantle
DN Done (completed)
DO Dump Out
DP Don't Proceed
DQ Drift
DR Debit
DS Dress
DT Draw Temper
DU Dowel
DV Deliver
DW Draw
DX Detail
DY Dry
DZ Dissolve

EA Eat
EB Equipment Broken Down
EC Entered on Card
ED Edit
EG Exchange
EJ Eject
EL Elastic Limit
EN Elongation
EO Electric Deposition
EP Entered on Production Card
ER Erect
ES Erase

ET Etch
EU Eutectic Determination
EV Evacuate
EX Express

FA Face
FB Form Ball (spherical)
FC Force on
FD Foundry Delay
FE File
FF Fold (or double)
FG Flange
FH Finish
FI Fill
FL Flux (skim)
FM Forming (shape)
FN Flatten
FO Forge
FP Fill, partially
FR Fire
FS Forming Seat
FT Fit
FU Fit Up
FW Follow
FX Fix (Fixation)
FY Fly
FZ Freeze

GA Grind Angle
GC Grind Circle
GE Grease
GF Grind Fine
GH Graphical Recording
GI Get Information
GJ Gauge (Working)
GL Glue Up
GM Gauge (Master)
GR Grind
GS Grind Surface (face)
GT Graze Test
GV Groove
GW Wire Grind
GZ Glaze

HA Handle
HC Held up to Check
HD Head
HE Hole
HF Hand Finishing
HG Heat Tinting
HH Heat
HL Helping
HM Hammer, Pound, or Strike
HN Harden
HO Held up by Office
HP Horse Power Determination
HR Held up for Repairs
HS Heat Specimen
HT Heat Treating
HU Held Up
HV Harrow
HW Hot Work or Roll
HZ Homogenizing

IB Issue Bonus Chart
IC Issue Credit
ID Issue Debit
IE Interest
IG Internal Grind
II Issue Instruction Card
IJ Inject
IL Install
IM Impact Test
IN Inspect
IO Issue Order
IP Issue Pattern
IQ Inquiry, Question
IR Instruct
IS Issue Stock
IT Issue Tools and Jigs
IU Issue
IV Invoice (or Bill)
IW Issue Work Order

IX In Stock
IZ In Process

JD Jingle (Dry)
JG Jig
JM Jump
JN Join (Joiner)
JO Jolt
JW Jingle (Wet)

KA Kast (Cast)
KC Kollect (Collect)
KD Kompare Data (Compare)
KE Key
KG Knocking Off Gates
KH Kone (Cone)
KK Knockout Kores (Cores)
KL Kooling (Cooling)
KM Klamp (Clamp)
KN Kounting (Counting)
KO Koin (Coin)
KP Kaliper (Caliper)
KQ Krank (Crank)
KR Koloring (Coloring)
KS Key Seat
KT Kutting (Cut or Cutting)
KU Kore (Core) Up
KV Kultivate (Cultivate)

LA Lap
LB Laboring
LC List Complete
LD Load
LE Laminate
LG Lag
LH Lithograph
LI Let in (or Sink)
LM Limit
LO Lay Out
LP List Partially
LQ Liquidate
LR Leather
LS List Operations
LT List
LU Line Up (Align)
LV List Invoices

MA Mail
MC Make Cores
MD Mold
ME Mend
MF Make Flask
MG Manage
MI Miscellaneous
MJ Make Jigs or Tools
MK Make
ML Mill
MM Moved to Machine
MN Machine
MO Mortise
MP Material Provided
MR Measure
MS Make Time Study
MT Melt
MU Make Up
MV Move
MX Mix
MY Micrometer, Use

NA Name
NB Note
NC New Core in Use
NF Note and File
NH No Help
NI Nail (Spike)
NL Knurl (Nurl)
NN Noon
NO Notch
NP Nickel Plate
NR Note and Return
NW Note and Follow
NY Notify

OD Overhead
OG Oil Groove

OH Oil Harden
OI Order Issued
OK O.K. (or Correct)
OL Oil
OM Operate Machines
OO Open out (Open)
OP Operate
OR Ordered
OV Overhaul

PA Paint
PB Plant Breakdown
PC Pinch
PD Processing Deferred
PE Prepare Equipment
PF Pattern Delivered to the Foundry
PG Posting
PH Photograph
PI Print
PJ Plow
PK Pack
PL Plane
PM Afternoon
PN Pattern (Make)
PO Polish
PP Point, Sharpen
PQ Prick (or Center) Punch
PR Press (Stamp)
PS Purchase
PT Pulling Pot
PU Punch
PV Pulverize
PW Prepare Work
PX Part, or Split Off
PY Plumbing
PZ Photostat

QN Quench
QO Quote
QY Query
QZ Quiz

RA Radius
RB Remove Burr (Fins)
RC Repairing Core
RD Rub Down
RE Receive
RF Rough
RG Routing (Dispatch)
RH Reduce Head
RI Riddle
RJ Reject
RK Record
RL Roll
RM Ream
RN Refine
RO Resume Operation
RP Replace
RQ Requisition
RR Repair
RS Recess
RT Rivet
RU Route
RV Relieve
RW Report
RY Reply
RZ Reduce

SA Saw, Slot, or Slit
SB Sand Blast
SC Scrape (Scour)
SD Solder or Sweat On
SE Stake
SF Spot Face
SG Swage
SH Ship
SI Sift
SJ Shave
SK Shrink
SL Sell
SM Sample Submitted
SN Spin
SO Sort
SP Scrap

SQ Squeeze
SR Straighten
SS Select Specimens
ST Start
SU Set Up (Set, Setting)
SV Shovel, Spade
SW Soften
SX Survey
SY Sweep
SZ Sherardize

TA Taper
TB Tabulate
TC Transcribe
TD Take Down
TE Temper
TF Tend Furnace
TH Thread
TI Tin
TK Take Temperature
TL Trowel
TM Trim
TN Turn
TO Take Out
TP Tap
TQ Temper Sand
TR Trace
TS Tensile Strength (test for)
TT Test
TU Tumble
TV Throttle
TW Tumble (Wet)
TX Tax
TY Tumble (Dry)

UC Undercut
UD Unload
UR Urge
UV Unveil (uncover)

VA Vaporize
VL Volplane
VN Voucher Net
VO Voucher
VP Voucher Proximo
VR Varnish
VS Voucher Special
VZ Visé

WA Waiting for Approval
WD Wind
WE Write
WG Wring
WH Write (Shorthand)
WI Waiting for Information
WK Work
WL Weld
WM Waiting for Material
WN Wire Straighten
WO Water
WP Waiting for Pattern
WR Wrapping
WS Wash
WT Want
WV Wave
WX Wax
WY Weigh

XA Examine
XD Extrude
XM Examine Metallurgically
XP Experiment
XS Examine Stereoscopically
XT Extract
XV Excavate

9–B. Chemical Symbols

The science of chemistry has been very thoroughly symbolized. The use of these symbols shows exactly how any result has been obtained. The scientific name of any resultant chemical mixture cannot, however, be indicated by the use of the existing chemical symbols. For the sake of convenience and brevity, it is undoubtedly desirable to be able to symbolize the scientific names used in organic chemistry. Why should there not be the same advantage in using symbols in this field as in others referred to in this book?

With this end in view, the author has, in connection with his study of the subject, ventured to suggest the following adaptation of his scheme of symbols to the practical and commercial routine incident to organic chemistry. The scheme suggested in no way interferes with, or alters, any existing symbols. Furthermore, the reader must bear in mind that the new symbols are intended for use in an entirely new way. For obvious reasons there can be no logic in attempting to change the present chemical symbols which are already so thoroughly standardized among nations.

The present inorganic symbols consist of either a single letter as A for Argon, C for Carbon, H for Hydrogen, or two letters, as Al for Aluminum, Cu for Copper, Mn for Manganese, etc. The complete list of known inorganic symbols is given be low as a matter of record.

Atomic Symbols

Al Aluminum	B Boron
Sb Antimony	Br Bromine
A Argon	
As Arsenic	Cd Cadmium
	Cs Caesium
Ba Barium	Ca Calcium
Bi Bismuth	C Carbon

Ce Cerium
Cl Chlorine
Cr Chromium
Co Cobalt
Cb Columbium
Cu Copper

Dy Dysprosium

Er Erbium
Eu Europium

F Fluorine

Gd Gadolinium
Ga Gallium
Ge Germanium
Gl Glucinum
Au Gold

He Helium
H Hydrogen

In Indium
I Iodine
Ir Iridium
Fe Iron

Kr Krypton

La Lanthanum
Pb Lead
Li Lithium
Lu Lutecium

Mg Magnesium
Mn Manganese
Hg Mercury
Mo Molybdenum

Nd Neodymium
Ne Neon
Ni Nickel
N Nitrogen

Os Osmium
O Oxygen

Pd Palladium
P Phosphorus
Pt Platinum
K Potassium
Pr Praseodymium

Ra Radium
Rh Rhodium
Rb Rubidium
Ru Ruthenium

Sm Samarium
Sc Scandium
Se Selenium
Si Silicon
Ag Silver
Na Sodium
Sr Strontium
S Sulphur

Ta Tantalum
Te Tellurium
Tb Terbium
Tl Thallium
Th Thorium
Tm Thulium
Sn Tin
Ti Titanium
W Tungsten

U Uranium

V Vanadium

Xe Xenon

Yb Ytterbium
Yt Yttrium

Zn Zinc
Zr Zirconium

By adopting a characteristic formation for the organic symbol group, the author believes that confusion will be avoided and a further advantage obtained in that the available number of two-letter symbols will not be decreased by having to avoid using letters already taken by the inorganic group. A sub-class symbol letter is also used in some cases, so as to simplify the whole scheme. By this method the same root symbol can be used and various derivatives identified by the simple addition of a sub-class symbol. For example, the symbol for Hexa is, let us say, *hX*. Hexane will therefore be symbolized *hXa*, Hexene will be *hXe*, Hexoic *hXc*, Hexose *hXs*, Hexyl *hXl*, and Hexylene *hXn*. Certain sub-class symbol prefixes have been adopted which may be used in a similar manner. The Greek alphabet is also used in exactly the same manner as has already been adopted in connection with the organic symbol system. The following lists include both prefixes and suffixes. The new organic symbols are also listed in sufficiently complete detail to require but little additional explanation. New derivatives of roots listed below can be readily symbolized by amplifying the scheme herein outlined, or by new combinations.

The task of symbolizing has been complicated by frequent cases of nomenclature which follow no fixed rule, but through which there have arisen many terms whose endings are not true suffixes, although appearing to be so.

Sub-class Symbols

Prefix Series	Greek Alphabet	Suffixes
or ortho	α	*a* ane
ma meta·	β	*c* oic
pa para	γ	*d* ide
vn vicinal	δ	*e* ene
sm symmetrical	ϵ	*i* ine
mn mono	ζ	*k* ic
di di	η	*l* yl

SUB-CLASS SYMBOLS—*Continued*

Prefix Series	Greek Alphabet	Suffixes
tr tri	θ	*n* ylene
te tetra	ι	*o* ino
pn pent	κ	*s* ose
hx hexa	λ	*t* ate
hp hepta	μ	*x* oxy (see prefix ox)
ok octa	ν	*y* ite
nn nona	ξ	
dk deca	o	
ud undeca	π	
dd dodeca	ρ	
	σ	
ck cyclo	τ	
	υ	
pr primary	ϕ	
sc secondary	χ	
ty tertiary	ψ	
	ω	
dx dextro		
lv laevo		
ia inactive		
nm normal		
io iso		
ne neo		
ox oxy (see suffix *x*)		

In addition to the above sub-class symbols the numerals 1, 2, 3, etc., are used in combination. Examples given at the end of this chapter illustrate such combinations.

aT Acet	*aDk* Adipic
aTt Acetate	*aIy* Adonite
aTk Acetic	*oH* Alcohol
aTl Acetyl	*aUk* Allomucic
aTn Acetylene	*aX* Alloxan
aC Acid	*aL* Allyl
aK Acrose	*aMk* Amic
aRk Acrylic	*aMd* Amide
aE Aldehyde	*aMi* Amine

aMo Amino
aYl Amyl
aYe Amylene
aGk Angelic
aN Anhydride
aH Anthracene
aQ Anthraquinone
aAk Arachidic
aVk Azelaic
aO Azo
aZ Azone

bRk Barbituric
bZ Benz (or Benzene)
bOk Benzoic
bZl Benzyl
bOl Benzoyl
bLk Brassylic
bTa Butane
bTe Butene
bTl Butyl
bTn Butylene
bTk Butyric

cO Cacodyl
cPk Capric
cL Caramel
cA Carbinol
cBk Carbonic
cX Carboxyl
cBl Carbonyl
cKk Cerotic
cR Ceryl
cT Cetyl
cHk Cholic
cQk Cimicic

cMk Cinnamic
cNk Citraconic
cIt Citrate
cIk Citric
cC Collicine
cE Creatine
cEi Creatinine
cTk Crotonic
cY Cyan
cYk Cyanic
cYd Cyanide
cYt Cyanate

dK Deca
dZ Diazo
dM Diazonium
dDa Dodecane
dU Durene

eE Ether
eEx Ethoxy
eEl Ethyl
eUk Erucic
eRy Erythrite
eRk Erythritic
eRs Erythrose
eTa Ethane
eTk Ethanic
eTn Ethylene
eTd Ethylidene

fS Fluorescein
fMt Formate
fMk Formic
fM Formo
fUk Fumaric

gTk Galactonic
gRk Geranic
gKs Glucose
gLk Glyceric
gL Glycerine
gLl Glyceryl
gUk Gulonic

hB Haemoglobin
hP Hepta
hPa Heptane
hPc Heptoic
hPs Heptose

hPl Heptyl
hPn Heptylene
hX Hexa
hXa Hexane
hXe Hexene
hXc Hexoic
hXs Hexose
hXl Hexyl
hXn Hexylene
hI Hydrazine
hO Hydrazone
hD Hydro
hDx Hydroxy
hYk Hyenic
hGk Hypogaeic

iD Imide
iM Imino
iG Indigo
iL Indol
iX Indoxyl
iS Iodoso
iN Iodonium
iKk Itaconic

kN Ketone
kS Ketose

lM Lacmoid
lTs Lactose
lRk Lauric
lN Laurinol
lLs Levulose
lOk Linoleic
lD Lutidine

mLk Malonic
mLl Malonyl
mSs Maltose
mNy Mannite
mGk Margaric
mIk Melissic
mCk Mellitic
mH Menthane
mE Menthene
mO Menthol
mR Mercaptan
mKk Mesaconic
mY Mesitylene
mYk Mesitylenic
mTa Methane
mTk Methanic
mTx Methoxy
mTl Methyl
mTn Methylene
mUk Mucic

nL Naphthalene
nP Naphtho
nPl Naphthyl
nT Nitrile
nR Nitro
nS Nitroso
nNa Nonane
nNc Nonoic
nNs Nonose
nNl Nonyl

oKa Octane
oKc Octoic
oKs Octose
oKl Octyl
oNk Oenanthylic
oOk Oleic
oC Orcein
oZ Osazone
oS Osones
oXt Oxalate
oXk Oxalic
oXl Oxalyl
oE Oxime

pMk Palmitic
pGk Pelargonic
pN Pent
pNa Pentane
pNe Pentene

pNs Pentose
pNl Pentyl
pT Phenanthrone
pH Phen
pO Phenol
pOt Phenolate
pHl Phenyl
pHn Phenylene
pLk Phthalic
pQ Picoline
pEk Pimelic
pI Pinene
pR Propargyl
pPa Propane
pPe Propene
pPk Propanic (Propionic)
pPl Propyl
pPn Propylene
pU Purin
pY Pyridine

qL Quinoline
qN Quinone

rCk Racemic
rMy Rhamnite
rMs Rhamnose
rBs Ribose

sSk Saccharic
sCs Saccharose
sBk Sorbic
sBy Sorbite
sT Starch
sRk Stearic
sUk Suberic
sKt Succinate
sKk Succinic
sLt Sulphonate
sLk Sulphonic
sF Sulphone

tTk Tartaric
tTt Tartrate
tCk Teracrylic

uD Undeca
uA Urea
uR Ureid

vRk Valeric
vY Valylene

xGk Xanthogenic
xN Xanthone
xYy Xylite
xYs Xylose

The following examples will suffice to show the reader the difference between the old and the new symbols.

1, 2, 3 Trimethyl Benzoic Aldehyde

Chemical Symbol, $(CH_3)_3C_6H_2CHO$

New Symbol, 123 *tr mTl bOk aE*

Note.—The scientific name and the new symbol locate the various chemical groups definitely, but the chemical symbol does not. It merely indicates their presence.

v-m-Aldehydo Salicylic Acid
or
Vicinal Meta Aldehydo Hydroxy Benzoic Acid

Chemical Symbol, $(HO)(COOH)C_6H_3CHO$

New Symbol, *vn ma aE hDx bOk aC*

Note.—In this case also the chemical symbol fails definitely to locate the various chemical groups. The new symbol does.

o-Cresol
or
Ortho Methyl Phenol

Chemical Symbol, $(CH_3)C_6H_4(OH)$

New Symbol, *or mTl pO*

Note.—In this case the symbol is as long as the name provided that in giving the name the usual practice is followed in abbreviating (equivalent to symbolizing) the word "ortho." However, both are shorter than the indefinite chemical symbol.

Ethyl Benzyl Aceto Acetate

Chemical Symbol, $C_2H_3O \cdot CH(C_7H_7) \cdot CO_2C_2H_5$
or
$CH_3CO \cdot CH(C_6H_5CH_2)COOCH_2CH_3$

New Symbol, *eEl bZl aT aTt*

Amyl Acetate

Chemical Symbol, $C_7H_{14}O_2$
or
$CH_3(CH_2)_4CH_3CO_2$

New Symbol, *aYl aTt*

Methyl Benzyl Ketone

Chemical Symbol, $CH_3CO \cdot CH_2 \cdot C_6H_5$

New Symbol, *mTl bZl kN*

Phenyl Benzyl Carbinol

Chemical Symbol, $C_6H_5 \cdot CH_2 \cdot CH(OH)C_6H_5$

New Symbol, *pHl bZl cA*

PHENYL NAPHTHALENE

Chemical Symbol, $C_6H_5 \cdot C_{10}H_7$

New Symbol, *pHl nL*

NOTE.—Here again the chemical symbol tells only that one phenyl group is present together with other carbon and hydrogen atoms in definite proportion. The new symbol tells the chemist that, and also how the carbon and hydrogen atoms are arranged.

PROPIONYL PROPIONIC ALDEHYDE

Chemical Symbol, $C_2H_5 \cdot CO \cdot CHCH_3 \cdot CHO$

New Symbol, *pPl pPk aE*

VANILLIN (Artificial Vanilla)

The scientific name for this may be written:

META METHOXY PARA OXY BENZOIC ALDEHYDE
or
3, 4, 1 METHOXY OXY BENZOIC ALDEHYDE

Chemical Symbol, $C_6H_3(CH_3O)(OH)(CHO)$

New Symbol, *ma mTx pax bOk aE*
or
341 *mTx x bOk aE*

SECONDARY BUTYLMALONIC ACID

Chemical Symbol, $CH_3 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH(COOH)_2$
or
$CH_3(CH_2)_3CH(CO_2H)_2$

New Symbol, *sc bTl mLk aC*

ANGELIC ACID

Chemical Symbol, $CH_3 \cdot CH \cdot CH_3C \cdot COOH$

New Symbol, *aGk aC*

NORMAL DODECANEDICARBONIC ACID

Chemical Symbol, $CO_2H \cdot (CH_2)_{12} \cdot COOH$

New Symbol, *nm dDa di cBk aC*

ETHYL ANGELATE

Chemical Symbol, $CH_3 \cdot CH \cdot CH_3C \cdot CO_2C_2H_5$

New Symbol, *eEl aGt*

Benzoyl Cyclobutane

Chemical Symbol, $C_4H_7 \cdot CO \cdot C_6H_5$

New Symbol, *bOl ckbTa*

The inorganic chemical symbols are so designed that they tell definitely the number and something of the arrangement of the atoms entering into a chemical compound. These symbols therefore refer to chemical relationships rather than to any fixed form of nomenclature. The chemist, due to his familiarity with various chemical laws and rules, is able to name the compound of which a particular arrangement and number of atoms is characteristic.

Thus the chemist knows that NaCl stands for sodium chloride, although the symbol itself merely indicates the union of one atom of chlorine with one atom of sodium.

Similarly, NaClO indicates the union of one atom each of sodium, chlorine, and oxygen. The chemist calls this sodium hypochlorite.

$NaClO_2$ indicates the union of one atom of sodium with one of chlorine and two of oxygen. The chemist calls this sodium chlorite.

Continuing this series, we find

$NaClO_3$—sodium chlorate; and
$NaClO_4$—sodium perchlorate

Although the chemical symbols (as is pointed out above) do not suggest the name of a compound to the layman, there are certain groups of atoms with which the chemist is familiar which suggest to him the name of the compound represented. This same grouping of atoms in characteristic manner is found in organic chemistry, but the symbols are often ambiguous and usually are much more complex than the ones found in inorganic chemistry. Because of this, it is often impossible to interpret an organic symbol without the aid of its scientific

name or its so-called structural formula. It seemed advisable, therefore, in working out a new method of symbolizing organic compounds, to use the scientific name as the basis of the new system.

Other inorganic chemical symbols are illustrated below:

HNO_3	Nitric Acid
KNO_3	Potassium Nitrate
$Cu(NO_3)_2$	Copper Nitrate
$NaOH$	Sodium Hydroxide (Caustic Soda)
NH_4OH	Ammonium Hydroxide
$Al_2(SO_4)_3$	Aluminum Sulphate
$FeSO_4$	Ferrous Sulphate
$Fe_2(SO_4)_3$	Ferric Sulphate
$Ca_3(PO_4)_2$	Tri Calcium Phosphate
HCN	Hydrocyanic Acid
Fe_2O_3	Ferric Oxide
CuO	Cupric Oxide

In the list of new organic symbols most of the terms used will be found to refer to groups consisting of carbon, hydrogen, and oxygen. However, nitrogen-containing groups are also included. The procedure to be followed when other elements are present is illustrated below:

Chloral (tri chlor aldehyde)

tr Cl aE

or

Cl_3 *aE*

Iodoform (tri iodo methane)

tr I mTa

or

I_3 *mTa*

Ethyl Sulphur Alcohol

eTl S oH

Sodium Acetate

Na aTt

Zinc Di Methyl

Zn di mTl

CHAPTER X

MISCELLANEOUS SYMBOL GROUPS

There are a number of miscellaneous groups of symbols necessary to a business or profession, some of which are indicated above. These symbols also have a distinct and characteristic formation, so as to preserve their class identity and to eliminate any chance of their being confused with any other class or form of symbol. These miscellaneous symbol groups are fully as important in themselves as any of the larger groups described in the foregoing chapters. A description of each group is given below in sufficient detail to enable the reader readily to adopt any or all of them to his own particular case.

10–A. Jigs and Tool Symbols

This symbol group is used only in connection with special jigs or tools designed for use in connection with some particular part. Tools or jigs that may be used for a wide range of work are symbolized in the equipment group as explained above in Chapter VI. If the reader will refer to the equipment group he will see under *NJ* a description of the items belonging in the equipment group *J*.

Attention is also called to the *Z* group, Chapter VI, which includes all miscellaneous small tools for general shop use.

As this section deals with the jigs and tools specially prepared for one particular article, it is therefore logical to use the "piece symbol" of that article for the main part of the jig or tool symbol. Let us assume that we have a special jig or tool for piece *D*–1120*X*. The first jig or tool should be identified by the symbol *JI*, used in combination with the piece symbol *D*–1120*X*, but marked under it, as follows:

$$\frac{D\text{–}1120X}{JI\text{–}1} \text{ (if there is but one jig).}$$

If the part is to be machined by the use of several jigs or special tools, say a total of four, then each of the said jigs or special tools will be symbolized respectively, $\frac{D\text{–}1120X}{J1\text{–}4}$, $\frac{D\text{–}1120X}{J2\text{–}4}$, $\frac{D\text{–}1120X}{J3\text{–}4}$, and $\frac{D\text{–}1120X}{J4\text{–}4}$. By this method, the piece symbol is always used in combination with the jig symbol. The scheme of placing the jig symbol beneath the symbol of the piece makes the symbol less complex in appearance and helps to readily identify this group of symbols.

The same method applies to cases of special tools when it is desirable to differentiate between tools and jigs. The reader will find that special tools and jigs may for all practical purposes be included in the *J* group as above explained. If for any special reason it seems desirable to separate these groups, use *J* for jigs and *T* for tools. *G* is used for gauges and *MG* for master gauges as explained below.

Drawings for jigs, tools, and gauges, and the method of symbolizing them has been described above in Chapter VII. Each separate loose piece of any one jig or tool should bear the jig symbol. It will assure its identification if it becomes misplaced.

Theoretically, a drawing is a tool, and is so considered

in practice as far as tool-room service is concerned. A pattern and its core boxes are also tools in every sense of the word. There is no advantage, however, in the author's opinion, in symbolizing the foregoing, as tools. The one symbol will suffice for detail drawing and for pattern and for the piece itself when it is desirable actually to stamp the piece symbol into the casting or forging. Practical requirements and use always explain what is referred to. One either asks for drawing, pattern, piece, or tool *D*–1120*X*. There is no confusion and no need of a different symbol to meet each of these four requirements.

The method for symbolizing jigs and tools also applies to gauge symbols. The only difference is that the letter *G* is used, instead of *J* or *T*. The first of a set of say three gauges for part *D*–1120*X* would be marked $\frac{D\text{–}1120X}{G1\text{–}3}$, the second $\frac{D\text{–}1120X}{G2\text{–}3}$ and the third would be $\frac{D\text{–}1120X}{G3\text{–}3}$.

The author wishes to emphasize the fact that all of the foregoing jig, tool, and gauge symbols are for working jigs, tools, and gauges only. All "master" or standard jigs, tools, and gauges are symbolized by prefixing the letter *M* before the *J*, *T*, or *G*. The master jig for $\frac{D\text{–}1120X}{J2\text{–}3}$ will be symbolized $\frac{D\text{–}1120X}{MJ2\text{–}3}$. Likewise, the master gauge for $\frac{D\text{–}1120X}{G3\text{–}3}$ will be symbolized $\frac{D\text{–}1120X}{MG3\text{–}3}$. By this method any master jig, tool, or gauge is easily identified and is not likely to get into use in the shop without being immediately discovered. See section 10–G at end of this chapter for sub-class symbols.

10–B. Pattern Symbols

The foregoing pages have explained the formation of drawing, piece, and pattern symbols and the advantage of using but the one symbol for all three. In the case of the actual pattern itself, it becomes necessary to provide for duplicate sets of patterns. This group of symbols is formed in the same way as explained above for jigs, tools, and gauges. The letter *P* is used to indicate "pattern" for working purposes and *MP* for master pattern. The pattern will be stamped for example, $\frac{D\text{–}1120X}{P1\text{–}6}$. The figure 6 shows that there are six sets of patterns. The next duplicate pattern will be $\frac{D\text{–}1120X}{P2\text{–}6}$ and so on. In the event there is a master pattern, the master will be identified as $\frac{D\text{–}1120X}{MP1\text{–}6}$ and so on.

Core boxes belonging to a pattern are symbolized under exactly the same principle except that the letter *C* is used for working core boxes and *MC* for master core boxes. Using the same example applied to core boxes, we have $\frac{D\text{–}1120X}{C1\text{–}6}$, $\frac{D\text{–}1120X}{C2\text{–}6}$, and so on. Each core box and piece thereof should be stamped with its symbol. All master core boxes will be symbolized by the use of *MC* as $\frac{D\text{–}1120X}{MC1\text{–}6}$.

The reader will notice that the piece symbol (for example *D*–1120*X*) has been preserved as the root for all these various symbol groups. There can be no mistake, and a drawing, pattern, core box, jig, tool or gauge for one piece cannot be confused with one belonging to some other piece. Such a mistake often results in considerable expense in spoiled work before it is discovered. See section 10–G at the end of this chapter for sub-class symbols.

10-C. Individual Part Manufacturing Symbols and Assembly Manufacturing Symbols

For purposes of identifying the various pieces manufactured, each, especially large or important parts of a machine, should be given an individual manufacturing symbol. This symbol will consist of the order symbol followed by a letter, as *L*–401*A*, or *L*–401*G*, or again *M*–2809*V*, etc. The final letter of the symbol will be different on each piece built on a certain order, but the order symbol remains the same. It is apparent by inspection that parts with a manufacturing symbol *L*–401*A*, *L*–401*B*, etc., were built on the same stock job, viz., *L*–401. If a stock job, *L*–401, calls for twelve pieces, then the manufacturing symbols run from *L*–401*A* to *L*–401*L*, inclusive. The same method of course applies to any manufacturing done on any series of order numbers, but such is an exception, as it is desirable to manufacture mostly on stock jobs. These numbers are always preceded by the letter *L*, and are the only job numbers used for the manufacturing of one or more single pieces exactly alike for stock.

The individual part manufacturing symbols on frames will in all cases be stamped on the main casting at some predetermined space, instead of marking the piece promiscuously. Care must be taken when filling and rubbing down not to cover the manufacturing number. The space bearing the manufacturing symbol should be indicated by a white circle painted around it for easy identification. It is desirable, however, that the final coat of paint with a little machine filler should thoroughly cover the symbol previous to shipping, so that there will be no possibility of the customer finding it and mistaking it for the shop or serial number. Other articles will be numbered likewise as the necessity presents itself, and in all cases, excepting on frames or columns which bear the "shop number,"

the manufacturing symbol must be plain and in a conspicuous place. The manufacturing symbol should be stamped on the article as soon as it arrives at the works, or if in stock, as soon as it is withdrawn from stock and before any work is done on it.

Assembly manufacturing symbols are ordinarily stamped on the name plate or tablet attached to the main part of the completed machine in a conspicuous place. It is also well to chip a smooth rectangular place on the main casting and stamp the serial number into the metal. This will preserve the number in the event the name plate becomes detached and lost. The assembly manufacturing symbol is a plain number starting at 1 and running in unbroken sequence regardless of the size, class, or type of finished machine, preceded by the letters *MFG*. A separate record is kept in the engineering office, filed by symbol in card form, with a description of the apparatus to which each assembly manufacturing symbol applies. The symbol file is an index, therefore, to the order, material list, and drawings covering the product identified by such manufacturing symbol. Assembly manufacturing symbols have the formation *MFG*–1 and upwards.

10–D. Filing Symbols

A comprehensive scheme of filing requires a rather complicated system of symbols. The following outline is given as an illustration of a scheme of symbols used by the author for his own personal files. In the development of a filing system the characteristic letters of the symbol must suit the specific conditions for which it is devised. The following is not offered as a standard key, because it will not be exactly duplicated for other lines of business. A complete general index of $3'' \times 5''$ cards should include all data necessary to locate any matter whatsoever of which there is any record. This index will,

in most cases, be on the double or triple cross-index system, and in many cases, matter will be indexed under as many suggestive "catch names" as possible, to insure its easy location. Generally speaking, the alphabetical index will locate the record at once without cross reference. The specific matter is classified as below. The numerals are arbitrary and used consecutively, each new record being given the next progressive number after the last one used in the group or classification in which it belongs, as indicated by the first letter of the symbol.

The first letter of the symbol indicates the group or classification. The second letter indicates in which file the record will be found. In the case of a card file a numeral indicating one dimension of the card, 3 for 3×5, 4 for 4×6, and 5 for 5×8, comes between the first and second letter of the symbol.

Key to First Letter of the Symbol

A Author (F. A. P.)
B Buildings, etc., exclusive of Equipment
C Comments and Criticisms
D Data and Statistics
E Engineering Society Publications
F Forms
G Graphical Records, Charts, etc.
H
I Instructions
J Jigs, Tools, Cutters, Forming, Bending and Other Implements, Fixtures, etc.
K Katalogs, Advertising Matter, etc.
L Letters, Proposals, and Contracts
M Machinery, Power Plant Equipment, Data, Records of, etc.
N Notes, Memoranda, Minutes, etc.
O Organization and Management
P Photographs, Pictures, etc.
Q Queries
R Reports, Recommendations, Rehabilitation Data, etc.
S Speed Data and Records, Time Studies, etc.
T

U Unclassified Matter of all Descriptions
V Government and States Acts, Laws, etc.
W Wage Systems, Workers, Unions, Welfare Work, etc.
X Experiments, Results of Original Investigations, etc.
Y Instruments, Slide Rule, etc.
Z Symbols

KEY TO SECOND LETTER OF THE SYMBOL

A Albums
B Bookcase or Book Files, Loose Leaf Binders, etc.
3*C* Card File, 3×5 card
4*C* " 4×6 "
5*C* " 5×8 "
D Drawers, Case of
F Folders, Letter Size, in Vertical Filing Cabinet
K Katalog Filing Case
S Safe

EXAMPLES.—The symbol *BB*120 indicates building data, etc., in a book case, serial number 120.

*SF*116 indicates a speed record in folder 116, in vertical filing cabinet.

*RF*12 indicates report, etc., in folder 12, filed in vertical filing cabinet.

*RB*20 indicates a report in book form, number 20 in book case.

*LF*26 is a letter, filed in a folder in correspondence file, serial number 26.

*D*3*C*20 is data on a 3″×5″ card, number 20.

The numeral is in all cases arbitrary, except that it is desirable to be as systematic as possible at the start when indexing. Future additions must take the next open number in the correct classification, which number will indicate the order in which matter was accumulated or filed. In the case of books be sure to have a clear index card, so as quickly to locate the page number when indexing specific matter.

For letters, in the general index there will be found under *L* in the proper position a large tab card headed "Letters." Behind this will be inserted a complete set of alphabetical guide cards for Letters Only. This brings

all letters together in the index. Forms, under *FOR*, have a large tab card labeled "Forms" followed by a set of alphabetical guides. A form can thus be readily found by form name. All of one company's forms will be indexed on one or more cards and found under the firm name in the general index. Data on similar subjects under the same classification, may be filed in different places, owing to the various forms in which the subjects may be. All of one classification, however, will be together in each different file and the method is unlimited in its scope and expansiveness.

It is evident that a bound book of reports could not occupy the same file as the original copy of a single report—of comparatively few pages—which would naturally go into a vertical file folder. Brief memoranda occupying but small space but in large variety should be written on cards and filed in the general index. If put into other card-filing cases, they would be indexed in the general index which would refer by symbol to the correct file. If there is no symbol reference on the general index card, it is obvious that the said card is the only record on file.

10–E. Forms, Literature, and Miscellaneous Symbols

In the author's experience, the most convenient symbols for this group are formed by the combination of three letters followed by a numeral. Forms that the author has applied in his own practice are symbolized *FAP*1 and upward. In addition to forms there are several other chief groups of literature, etc. These divisions are indicated in the following list:

Miscellaneous Symbol Groups

*AGR*1 and upward—Alloys, Research
*ANY*1 " —Analysis
*AUT*1 " —Auto

*BKK*1 and upward —Books
*BON*1 " —Bonus Chart
*BOX*1 " —Box
*BUL*1 " —Bulletins

*CAR*1 " —Car
*CHK*1 " —Check
*CHR*1 " —Chart
*CRE*1 " —Credit Memorandum
*CRT*1 " —Crate
*CWT*1 " —Cold Work Formula

*DEB*1 " —Debit
*DEL*1 " —Delivery
*DIS*1 " —Display

*ELO*1 " —Elemental Operations
*EXP*1 " — Experiment

*FAP*1 " —Author's Forms
*FOR*1 " —Formula

*GRL*1 " —Graphical Record
*GRP*1 " —General Research Problem

*HTT*1 " —Heat Treating Formula
*HWT*1 " —Hot Work Formula

*INC*1 " —Instruction Card
*INS*1 " —Instruction
*INV*1 " —Invoice

*KAT*1 " —Katalogs
*KEE*1 " —Keys and Locks

*LET*1 " —Letters
*LOT*1 " —Lot
*LTR*1 " —Lecture

*MAL*1 " —Mail Advertising Matter
*MCB*1 " —Make Core on Bench
*MCH*1 " —Memo Charge
*MCM*1 " —Make Core on Machine
*MEM*1 " —Memorandum
*MFG*1 " —Assembly Manufacturing Symbols
*MIS*1 " —Miscellaneous
*MVO*1 " —Memo of Verbal Order

*PAC*1	and upward	—Package
*PAM*1	"	—Pamphlets
*PAT*1	"	—Patent
*PHO*1	"	—Photographs
*POP*1	"	—Popular Magazines
*POS*1	"	—Pouring Speed
*POT*1	"	—Pouring Temperature
*PRO*1	"	—Problem
*PUR*1	"	—Purchase Order
*RCT*1	"	—Receipt
*REP*1	"	—Report
*RET*1	"	—Return Order
*REQ*1	"	—Requisition
*SAL*1	"	—Sales Order
*SAM*1	"	—Samples Received
*SDP*1	"	—Standard
*SER*1	"	—Serial
*SHR*1	"	—Shipper's Report
*SHX*1	"	—Show Expenses
*STS*1	"	—Standard Time Sheets
*TDP*1	"	—Trade Papers Space
*TMS*1	"	—Time Study
*TRA*1	"	—Trailer
*TRK*1	"	—Truck
*TRP*1	"	—Trip
*TST*1	"	—Test
*URG*1	"	—Urge
*VIS*1	"	—Visit
*VOU*1	"	—Voucher
*WAG*1	"	—Wages

EXAMPLE SHOWING SYMBOL FORMATION FOR CORE WORK CLASSIFICATION

		Symbol	*Combinations*
Method	Bench	*MCB*	*MCBa*
	Machine	*MCM*	*MCBc*
			MCBe
Class (No Chills)	Plain	*a*	*MCMa*
	Irregular	*c*	*MCMc*
	Complicated	*e*	*MCMe*

	Symbols		*Combinations*
Construction	With Chills	1	If by Bench, Class *a*, and with construction 1, 3, 6, and 7, Symbol will be *MCBa*1367
	With Wires	2	
	With Nails	3	
	With Rods	4	
	With Hooks	5	
	With Loose Pieces	6	
	Use bedding sand	7	
Weight of Core	Numeral to indicate weight in pounds, as: 10 = 10 lb. core		If above core *MCBa*1367 weighs 10 lbs., then symbol will be *MCBa*1367–10

This three-letter symbol group also should be used for symbolizing different types and sizes of product, for example,

*DRL*1, 2, 3, etc., for Drill Presses
*ENG*1, 2, 3, etc., for Engines
*CAR*1, 2, 3, etc., for Cars

These symbols when used for a product should be marked or stamped in a conspicuous place. When name plates are used, the symbol should be marked on the plate.

The above groups will indicate how the chief divisions are arranged. Each different book, form, catalog, bulletin circular letter, etc., as it is issued, takes the next open number in the group in which it belongs. All sales and follow-up records can be made more complete by the use of this scheme of symbols. Each different piece of literature is more easily identified and kept track of. The formation and use of this group of symbols is so simple that no further explanation is necessary. The symbol should be printed on the outer cover and on the title page of books, catalogs and pamphlets and at the middle of the top of other printed matter.

There is one more very necessary symbol for this group, viz., *LOT*1 and upward. This symbol represents "lots" of material, scrap, parts, etc., that are of a heterogeneous nature and not worth identifying individually.

This symbol also applies to classes of materials that are handled and priced at one average. Each lot may be tagged and the symbol, say *LOT*101, used on all records, store cards, etc. When the lot *LOT*101 is disposed of, the symbol is never used again. This form of symbol is very effective when used to identify lumber, miscellaneous sizes and shapes of steel, plates, old metal, different consignments of bulk material, etc. A separate stores card should be filed for each different lot symbol. Material used from any lot should be charged out by the use of the lot symbol, say *LOT*121, etc.

In a plant of any size, there will be a large number of locks and keys to keep track of. If the locks have been standardized and "master keyed," the problem is greatly simplified. In any case, however, each lock and key should be definitely listed and symbolized. Each lock should be symbolized, using symbol group *KEE*1 and upward. Each key is symbolized with the same symbol as the lock to which it belongs.

The foregoing explanations are probably sufficient to describe the varied uses to which the miscellaneous symbol groups can be applied. As first stated, the miscellaneous group consists of three suggestive letters followed by a numeral. Each new symbol of any division takes the next unused number.

10–F. Account Symbols

Account symbols are used to identify control accounts into which are distributed expenditures not finally recorded under some specific symbol group. These account symbols consist of a numeral followed by the letter *A*. The first account symbol should start with 30*A*, as there will then never be any possibility of confusing an account symbol with one of the *A* department divisions.

If the reader will refer to Chapter III, sections 3–A and 3–B, it will be seen that the department symbols are

formed by a numeral followed by a letter. As it is improbable that the *A* group of departments will ever use more than a few numbers, certainly never more than 30, there can be no confusion if the account symbols start at 30*A*.

The following typical list of account symbols is given further to illustrate the use of this group of symbols:

SALES ACCOUNTS

30*A* Lynite Sales
30½*A* " " Returns and Allowances
31*A* Lynux Sales
31½*A* " " Returns and Allowances
32*A* Lynux 98 Sales
32½*A* " " Returns and Allowances
33*A* Miscellaneous Sales
33½*A* " " Returns and Allowances
34*A* Pattern Shop Sales
34½*A* " " " Returns and Allowances
35*A* Lynite Sales to 2*U*
35½*A* " " " Returns and Allowances
36*A* Lynux Sales to 2*U*
36½*A* " " " Returns and Allowances
37*A* 2*U* Sales of Finished Lynite
37½*A* 2*U* " " " Returns and Allowances
38*A* 2*U* " " Lynux
38½*A* 2*U* " " " Returns and Allowances
39*A* Sales of Lynite Castings from Permanent Molds
39½*A* " " " " " Returns and Allowances
40*A* Sales of Dies
41*A* Consignment of "Sample" Sales Account
42*A* Regular Sales from Stock
42½*A* " " " " Returns and Allowances
(Used by Allyne Brass Fdry. only)
43*A* Coupling Sales from Stock
43½*A* " " " " Returns and Allowances
44*A* 2*U* Miscellaneous Sales

44½*A* 2*U* Miscellaneous Sales Returns and Allowances
45*A* 2*U* Babbitt Bearings Sales
45½*A* 2*U* " " " Returns and Allowances

46*A* Lynite Piston Sales
46½*A* " " " Returns and Allowances
47*A* Aluminum Fuse Part Sales
47½*A* " " " " Returns and Allowances
48*A* Brass Fuse Part Sales
48½*A* " " " " Returns and Allowances

Control Account

51*A* Aluminum Purchases
52*A* Brass Purchases
53*A* Stores Account
54*A* Sundry Service Account
55*A* Shop Pay Roll Account
56*A* Office Pay Roll Account
57*A* Merchandise (Used by Allyne Brass Fdry. Co. only)

Direct Material and Labor Expense Accounts

60*A*–*A* Aluminum Orders
61*A*–*C* " Orders
62*A*–*B* Brass Orders
63*A*–*L* Stock Orders
64*A*–*M* Miscellaneous Orders

65*A*
66*A*–1*P* Pattern Shop Orders
67*A*–2*U* Machine Shop Orders
68*A* Aluminum Body Work (Elmwood)
69*A* Die Orders

70*A*–*A* Permanent Mold Casting Orders—*A* Class
71*A*–*C* " " " " —*C* Class
72*A*–*F* " " " " —*F* Class
73*A* Special Outside Machining Account

Property

101*A* Real Estate
102*A* Buildings and Structures
103*A* Core Ovens and Core Equipment

104*A* Furnaces
105*A* Molding Machines and Equipment

106*A* Machinery and Tools
107*A* Pipes and Fittings
108*A* Fire Equipment
109*A* Electric Light and Wiring Equipment
110*A* Benches, Racks, etc.

111*A* Belting and Belt Lacing
112*A* Office Fruniture and Fixtures
113*A* Trucking and Stable Equipment
114*A* Other Property
115*A* Patents and Patent Fees

116*A* Power Equipment
117*A*
118*A* Dies
119*A* Cleaning Room Equipment (Niagara)
120*A* Patterns

121*A* Wood Flasks
122*A* Metal Flasks
123*A* Core Plates
124*A* Portable Tools
125*A* Laboratory Equipment

126*A* Machine Shop Equipment (Detroit)
127*A* Equipment Transfer
128*A* Pattern Shop Equipment, Cleveland, Detroit, and Niagara
129*A* Die Casting Process
130*A* Research Plant Equipment

140*A* Patents and Patent Fees
141*A* Tools for Couplings
142*A* Patterns for Couplings
143*A* Nickel Plating Equipment
} Used by Allyne Brass Fdry. Co. only

Indirect Expense Accounts

1*X* Salaries—Mgrs., Supts., Department Heads
2*X* " —Clerical
3*X* Other Labor
4*X* Supplies
5*X* Maintenance of Buildings and Structures

6*X* Maintenance of Equipment, Furniture, and Fixtures
7*X* Care of
8*X* Miscellaneous Expense (Not Supplies)
9*X* " Small Tool Expense
10*X* Experimental and Test Expense

11*X* Fuel
12*X* Maintenance of Electrical Equipment
13*X* " Air Compressor and Piping
14*X* " Boiler, Stocks, and Accessories
15*X* " Steam and Water Piping

16*X* " Oil Pumps
17*X* " Heating System
18*X* Advertising
19*X* Traveling Expense
20*X* Local Motor Truck and Car Expense

21*X* Flask Expense
22*X* Sand
23*X* Injuries to Employees, Insurance, etc.
24*X* Acetylene House, Entire Maintenance and Supply Expense, including Wages
25*X* Inventory Expense

26*X* Crucible Expense
27*X* Chills Expense
28*X* Electrical Power Expense Purchased Outside
29*X* Gas
30*X* Freight and Expense

31*X* Defective and Damaged Casting Expense
32*X* Bad Work Expense exclusive of 31*X*
33*X* Telephone
34*X* Telegraph and Telegrams
35*X* Postage

Local General Expense

51*X* Legal Expense
52*X* Insurance (everything except 23*X*)
53*X* Taxes
54*X* Depreciation
55*X* Interest Expense (Net)
56*X* Metal Shrinkage

General Overhead Expense Account Groups

Subdivisions 1 to 56 same as above list, for each of the following:

GAX	General Administrative	(*GAX*1 to *GAX*56 Inc.)
GBX	" Sales	(*GBX*1 to *GBX*56 ")
GCX	" Comptroller's Office	(*GCX*1 to *GCX*56 ")
GFX	" Finance	(*GFX*1 to *GFX*56 ")
GGX	" Garage	(*GGX*1 to *GGX*56 ")
GHX	" Heating, Light, and Power	(*GHX*1 to *GHX*56 ")
GIX	" Investigation (Legal and Patent Work only)	(*GIX*1 to *GIX*56 ")
GJX	" Janitors, Watchmen, Special Guards, etc.	(*GJX*1 to *GJX*56 ")
GKX	" Katalogs, Advertising, Literature	(*GKX*1 to *GKX*56 ")
GLX	" Laboratory (Chemical)	(*GLX*1 to *GLX*56 ")
GOX	" Organizing Engr. and General Operating	(*GOX*1 to *GOX*56 ")
GPX	" Purchasing	(*GPX*1 to *GPX*56 ")
GRX	" General Research (Plant *R*)	(*GRX*1 to *GRX*56 ")
GVX	" Vaults, Files, etc.	(*GVX*1 to *GVX*56 ")
GXX	" Emergency (Expense Distribution only)	(*GXX*1 to *GXX*56 ")
GZX	" Maintenance	(*GZX*1 to *GZX*56 ")

General Accounts

201*A*	Pattern Shop Expense	(1*PX*1 to 1*PX*32 ")
202*A*	Prepaid Interest	
203*A*	Accrued Interest	
204*A*	Discount Allowed	
205*A*	" Earned	
206*A*	Taxes Accrued	
207*A*	Insurance Prepaid	
208*A*	Excess Metal Expense	
209*A*	Insurance Reserve	
210*A*	Unclaimed Wages	
211*A*	Capital Stock Taxes—State of Ohio	
212*A*	Prepaid Credit Department Expense	

213*A* Prepaid Rental Account
214*A* Reserve for Dividends Niagara Plant

2*U* Expense Accounts

301*A* Machine Shop (2*U*) Aluminum Rough Castings
302*A* " " (2*U*) Regular Brass Rough Castings
Above two accounts are charged by amounts of constituent invoices at end of month representing castings shipped by foundry to 2*U*.

303*A* Machine Shop (2*U*) Bronze Castings for Babbitt Bearings
304*A* " " (2*U*) Indirect Expense (2*UX*1 to 2*UX*32 inc.)
305*A* Babbitt Metal Stores Account

10–G. Sub-classification Symbols

Sub-classification symbols are always used in connection with one or another of the symbol groups described in these pages. Sub-class symbols are always "lower case" letters. The reader will note that elsewhere throughout this book, "caps" have always been used except in Chapter V, under section 5–A, where sub-class symbols are referred to in connection with order symbols, and in Chapters IX, X and XI.

In the first case above mentioned, the use of sub-class symbols *a*, *b*, *c*, *d*, *e*, *f*, etc., indicates a division or itemization of an order into sections. Therefore the same principle applies to other subdivisions, as for example in Chapter IX, lower case letter always being used. All the possible uses for sub-class letters have purposely been left out of the text elsewhere in this book, except under 5–A, Chapter V, and in Chapters IX, X and XI. This was done so as to let the reader more readily understand the foregoing before attempting to describe certain refinements to the possible confusion of the student. The specific condition to which symbols must be applied regulate to some extent the use of sub-class symbols. The author can often do nicely without them. At other times they are quite neces-

sary. If the reader will refer to sections 10–A and 10–B at the commencement of this Chapter, he will find no reference to any means of identifying small parts of any one jig, tool, gauge, or core box.

If one wishes to get a sub-class identification for jig $\frac{D\text{–}1120X}{J1\text{–}4}$ so as to identify each of say three parts of that jig, use sub-class letters after the jig part (J) of the symbol; for example $\frac{D\text{–}1120X}{J1a\text{–}c\text{–}4}$, $\frac{D\text{–}1120X}{J1b\text{–}c\text{–}4}$, and $\frac{D\text{–}1120X}{J1c\text{–}c\text{–}4}$. The small letters show that jig $J1$ has three loose pieces a, b, and c. The same principle applies to the T or G group, for the MJ, MT, MG groups and for the P and MP groups. In the case of a pattern $\frac{D\text{–}1120X}{P1\text{–}6}$, assuming the pattern consists of 4 pieces, each separate piece of the No. 1 pattern will then be symbolized $\frac{D\text{–}1120X}{P1a\text{–}d\text{–}6}$, $\frac{D\text{–}1120X}{P1b\text{–}d\text{–}6}$, $\frac{D\text{–}1120X}{P1c\text{–}d\text{–}6}$, and $\frac{D\text{–}1120X}{P1d\text{–}d\text{–}6}$, respectively.

To illustrate further the use of sub-classification symbols, suppose that the operation symbol (see Chapter XI) for "amputation" (AM) is to be used to specify a specific amputation. As all major amputations are classified, the following sub-class symbols will be used, viz.,

AM sh	Amputation at	*shoulder*
AM ua	"	through *upper arm*
AM ma	"	" *middle arm*
AM la	"	" *lower arm*

The *sub-class* symbols *always* consist of small letters. The words in italics in the above list indicate the words for which the sub-class symbols stand. Near the end of Chapter XI will be found a rather complete list of sub-class symbols applied to the "operation" symbols for the surgical and diagnosis groups.

CHAPTER XI

ANATOMICAL SYMBOLS

In the foregoing pages, reference has been made to the application of symbols to professional records. To illustrate such an application, the following pages give a rather complete record of symbols adapted to the chief requirements of the doctor and surgeon. This field presents considerable complication, and it is believed the following treatment of the subject will convince the reader of the flexibility of the system described.

The following symbols were prepared primarily for the use of Dr. B. B. Neubauer, General Surgeon, Cleveland, Ohio, who assisted the author particularly in avoiding duplications. Dr. Neubauer values this system in keeping records because it further protects the confidence between patient and doctor. *Obviously the curious layman cannot interpret such records.*

11–A. Human Plant and Department Symbols

Following out the scheme for *plant* symbols described in Chapter II, the two human plants (sexes) are readily identified by the use of a single letter, viz.,

F Female
M Male

The above letters *F* or *M*, therefore, represent the sex of the patient for whom any record is made. The letter

may be followed by any of the symbols given below, thereby resulting in a clear and definite record consisting of only a few characters, in place of the ordinary record consisting of many words.

The regions of the body are likewise symbolized in accordance with the scheme of department symbols described in Chapter III. For purposes of symbolization, each region of the body as recognized by the surgeon or doctor is recognized here as a department. As a department symbol is a numeral followed by a letter, we have the following adaptation:

DEPARTMENTS OF THE BODY

Head:

1*H* Forehead
2*H* Supraorbital Region
3*H* Parietal Region
4*H* Occipital Region
5*H* Temporal Region
6*H* Auricle
7*H* Mastoid Region

Face:

1*F* Nasal Region
2*F* Upper Lip
3*F* Lower Lip
4*F* Chin
5*F* Upper Eyelid
6*F* Lower Eyelid
7*F* Infraorbital Region
8*F* Buccal Region
9*F* Zygomatic Region
10*F* Parotideomasseteric Region
(Including Retromandibular Fossa)

Neck:

1*N* Submental Region
2*N* Hyoid Region
3*N* Subhyoid Region
4*N* Laryngeal Region
5*N* Thyroid Region

Neck—*Continued*

6*N* Suprasternal Region
(Including Jugular Fossa)
7*N* Submaxillary Region
8*N* Carotid Fossa
9*N* Sternocleidomastoid Region
(Including Lesser Supraclavicular Fossa)
10*N* Lateral Neck Region
(Including Greater Supraclavicular Fossa and Omoclavicular Triangle)
11*N* Back of the Neck
(Including Nape of Neck and Nucha Depression)

Chest:

1*C* Sternal Region
2*C* Clavicular Region
3*C* Infraclavicular Region
(Including Deltoideopectoral Triangle)
4*C* Mammary Region
5*C* Inframammary Region
6*C* Axillary Region
7*C* Axillary Fossa
8*C* Lateral Costal Region

Abdomen:

1*A* Epigastric Region
2*A* Right Hypochondriac Region
3*A* Left Hypochondriac Region
4*A* Umbilical Region
5*A* Lateral Abdominal Region
6*A* Pubic Region
7*A* Inguinal Region

Back:

1*B* Median Region of Back
2*B* Interscapular Region
3*B* Scapular Region
4*B* Suprascapular Region
5*B* Infrascapular Region
6*B* Lumbar Region
7*B* Hip Region
8*B* Sacral Region
9*B* Gluteal Region

Perineal Region:

1*P* Anal Region
2*P* Urogenital Region
3*P* Penis
4*P* Scrotum
5*P* Vulva

Upper Extremity:

1*U* Acromial Region
2*U* Deltoid Region
3*U* .....Brachial Region
(Insert the words: Anterior, Lateral, Medial, or Posterior)
4*U* .....Elbow Region
(Insert the words: Anterior. Lateral, Medial, or Posterior)
5*U* .....Forearm Region

(Insert the words: Volar, Dorsal, Radial, or Ulnar)
6*U* Dorsal Region of Hand
7*U* Volar Region of Hand
8*U* Dorsal Surface of .....
(Insert the word: Finger or Thumb)
9*U* Volar Surface of .....
(Insert the word: Finger or Thumb)
10*U* Region of ..... Nail
(Insert the word: Finger or Thumb)

Lower Extremity:

1*L* Subinguinal Region
2*L* Trochanteric Region
3*L* ..... Femoral Region
(Insert the words: Anterior, Lateral, Medial, or Posterior)
4*L* Patellar Region
5*L* ..... Region of Knee
(Insert the word: Anterior or Posterior)
6*L* Popliteal Region
7*L* ..... Crural Region
(Insert the words: Anterior, Lateral, Medial, or Posterior)
8*L* Lateral Malleolar Region
9*L* Medial Malleolar Region
10*L* Calcaneal Region
11*L* Dorsum of Foot
12*L* Sole of Foot
13*L* Dorsal Surface of Toe

Lower Extremity—*Continued*
14*L* Plantar Surface of Toe
15*L* Region of Toe Nail

As an example of the above used in combination, *M*1*H* is the symbol for *male forehead; F*3*F* represents *female lower lip,* etc.

11–B. Diagnostic Symbols

11–Ba. The Alimentary System
11–Bb. The Cardio-Vascular System
11–Bc. The Connective Tissue
11–Bd. The Ductless Glands
11–Be. The Muscular System
11–Bf. The Nervous System
11–Bg. The Osseous System
11–Bh. The Reproductive System (Female Genital Organs)
11–Bi. The Reproductive System (Male Genital Organs)
11–Bj. Mammary Gland
11–Bk. The Respiratory System
11–Bl. The Sense Organs
11–Bm. Tegumentary System
11–Bn. Urinary System

The symbols for pathological conditions consist of two letters. In cases where two letters are not in themselves sufficient to cover a specific condition, recourse is had to the addition of a sub-class symbol. The sub-class symbols used in the following list are fully described in the last section of this Chapter (see 11–D). The application below of the two-letter "operation" symbol, also in section 11–C, is in accordance with the use of this symbol group as explained in Chapter IX, sections 9–A and 9–B.

The following arrangement is substantially in accordance with the classification and order given in "A Terminology of Disease" adopted by Columbia University, 1910.

11–Ba. The Alimentary System

Intestines:

IC	Intestinal Colic
CTac	Acute Colitis
CTch	Chronic Colitis
CN	Constipation
DS	Diverticulitis of .....
DIaq	Acquired Diverticulum of Intestine
DU	Duodenitis
ENac	Acute Enteritis
ENch	Chronic Enteritis
ENmb	Membraneous Enteritis
EC	Enterocolitis
EL	Enteroliths
ET	Enteroptosis
FS	Fistula between ..... and .....
FF	Fecal Fistula
GI	Gangrene of Intestine
GE	Gastroenteritis
IM	Intestinal Hemorrhage
ILac	Acute Ileus
ILch	Chronic Ileus
IF	Impacted Feces
IN	Intussusception
FHre	Femoral Hernia, reducible
FHir	" " irreducible
FHst	" " strangulated
GHre	Gluteal Hernia, reducible
GHir	" " irreducible
GHst	" " strangulated
IHcg,re	Inguinal Hernia, congenital, reducible
IHcg,ir	" " " irreducible
IHcg,st	" " " strangulated
IHdr	" " direct
IHid	" " indirect
IHif	" " infantile
LHre	Lumbar Hernia, reducible
LHir	" " irreducible
LHst	" " strangulated
UHre	Umbilical Hernia, reducible
UHir	" " irreducible
UHst	" " strangulated

Intestines—*Continued*

UHcg	Umbilical Hernia, congenital
NH	Internal Hernia
KHre	Ischiatic Hernia, reducible
KHir	" " irreducible
KHst	" " strangulated
OHre	Obturator Hernia, reducible
OHir	" " irreducible
OHst	" " strangulated
VHcg,re	Ventral Hernia, congenital, reducible
VHcg,ir	" " " irreducible
VHcg,st	" " " strangulated
VHlr,re	" " lateral, reducible
VHlr,ir	" " " irreducible
VHlr,st	" " " strangulated
VHmd,re	" " medium, reducible
VHmd,ir	" " " irreducible
VHmd,st	" " " strangulated

Liver:

LVab	Abscess of Liver
AL	Amyloid Liver
LVac,at	Acute Yellow Atrophy of Liver
LVau,cz	Atrophic Cirrhosis of Liver
LVhk,cz	Hypertrophic Cirrhosis of Liver
LVdm	Deformity of Liver
LVfa	Fatty Liver
LVdg	Functional Derangement of Liver
HT	Hepatoptosis
PB	Perihepatitis
YP	Pylephlebitis

Bile Passages:

CGct	Catarrhal Cholangitis
CGsu	Suppurative Cholangitis
CCct	Catarrhal Cholecystitis
CCsu	Suppurative Cholecystitis
CCgg	Gangrenous Cholecystitis
CL	Cholelithiasis
CDcq	Cystic Duct Calculus
BD	Common Bile Duct
BDcq	Common Bile Duct Calculus
HDcq	Hepatic Duct Calculus

Bile Passages—*Continued*

GBhd	Hydrops of Gall Bladder
FSbtGB,DD	Fistula between Gall Bladder and Duodenum
FSbtCD,DD	" " Cystic Duct and Duodenum
FSbtGB,CO	" " Gall Bladder and Colon
FSbtCD,CO	" " Cystic Duct and Colon
FSbtGB,SM	" " Gall Bladder and Stomach
FSbtCD,SM	" " the Cystic Duct and Stomach
IT	Icterus Neonatorum
JNct	Catarrhal Jaundice
GBpf	Perforation of Gall Bladder
CDsn	Stenosis of Cystic Duct
BDsn	" of Common Bile Duct

Mucous Membrane of Mouth:

EU	Elongation of Uvula
MM	Mucous Cyst of Mouth
NM	Noma
RN	Ranula
STap	Aphthous Stomatitis
STct	Catarrhal Stomatitis
STmr	Mercurial Stomatitis
STuc	Ulcerative Stomatitis
DCuc	Decubital Ulcer of Mucous Membrane of Mouth

Mucous Membrane of Tongue:

TNab	Abscess of Tongue
GLac,pa	Acute Parenchymatous Glossitis
GLch,pa	Chronic Parenchymatous Glossitis
GLac,sl	Acute Superficial Glossitis
GLch,sl	Chronic Superficial Glossitis
LThy	Hypertrophy of Lingual Tonsil
MG	Macroglossia
TNcy	Mucous Cyst of Tongue
TNuc	Ulcer of Tongue

Mucous Membrane of Teeth and Gums:

ARab	Alveolar Abscess
CA	Caries of Teeth
PC	Paradental Cysts
GV	Gingivitis
PD	Periodontitis

Mucous Membrane of Teeth and Gums—*Continued*

PP	Pulpitis
PA	Pyorrhea Alveolaris

Œsophagus:

ESdi	Dilatation of Œsophagus
ESdv	Diverticulum of Œsophagus
ESfs	Fistula of Œsophagus
ESac	Œsophagitis, acute
ESch	Œsophagitis, chronic
ESsu	Suppurative Œsophagitis
ESmr	Œsophagitis, mercurial
ESpf	Perforation of Œsophagus
ESru	Rupture of Œsophagus
ESsp	Spasm of Œsophagus
ESsr	Stricture of Œsophagus
EScc,sr	Cicatricial Stricture of Œsophagus
ESuc	Ulcer of Œsophagus

Pancreas:

PKab	Abscess of Pancreas
PKat	Atrophy of Pancreas
PKcq	Calculus in Pancreas
PKcy	Cyst of Pancreas
PKhm	Hemorrhage into Pancreas
PKob,du	Obstruction of Pancreatic Duct
PKac	Acute Pancreatitis
PKch	Chronic Pancreatitis

Peritoneum:

PNad	Peritoneal Adhesions
AS	Ascites
CS	Chylous Ascites
CM	Cyst of Mesentery
PNhm,cv	Hemorrhage in Peritoneal Cavity
PNab	Peritoneal Abscess
PNac,lo	Acute Local Peritonitis
PNac,df	Acute Diffuse Peritonitis
PNch	Chronic Peritonitis
PNpr	Progressive Fibrino-purulent Peritonitis

Omentum:

OMab	Omental Abscess
OMcy	Cyst of Omentum
OMtn	Torsion of Omentum

Retroperitoneal Tissue:

PFab	Perinephritic Abscess
PVab	Prevesical Abscess
RTab	Retrocecal Abscess
SBab	Subphrenic Abscess
PLcl	Pelvic Cellulitis
PVcl	Prevesical Cellulitis
RPhm	Retroperitoneal Hemorrhage

Pharynx, Tonsils and Nasopharynx:

PEab	Peritonsillar Abscess
RFab	Retropharingeal Abscess
AD	Adenoids
TLcq	Calculus in Tonsil
TLhy	Hypertrophy of Tonsils
FGac	Acute Pharyngitis
FGch	Chronic Pharyngitis
SF	Stricture of Fauces
SFcc	Cicatricial Stricture of Fauces
TLac	Acute Follicular Tonsillitis
TLch	Chronic Tonsillitis

Rectum, Anus, and Perirectal Tissue:

FA	Fissure of the Anus
FO	Fistula in Ano
RMhm	Hemorrhage from Rectum
HH	Hemorrhoids
PQsc,ab	Periproctitis with Subcutaneous Abscess
PQsm,ab	" " Submucous Abscess
PQil,ab	" " Ischiorectal Abscess
PY	Proctitis
PJ	Proctalgia
RMic,pl	Prolapse of Rectum (incomplete)
RMcp,pl	Prolapse of Rectum (complete)
PI	Pruritis Ani
RMsp	Spasm of Rectum
RMsr	Stricture of Rectum
RMsr,cc	Cicatricial Stricture of Rectum
RMuc	Ulcer of Rectum

Salivary Glands:

SVgl,fs	Salivary Gland Fistula
SVdu,cq	" Duct Calculus

Salivary Glands—*Continued*

SVdu,fs	Salivary Duct Fistula
RDgl,fs	Parotid Gland Fistula
RDdu,cq	" Duct Calculus
RDdu,fs	" " Fistula
SXgl,fs	Submaxillary Gland Fistula
SXdu,cq	" Duct Calculus
SXdu,fs	" " Fistula
SLgl,fs	Sublingual Gland Fistula
SLdu,cq	" Duct Calculus
SLdu,fs	" " Fistula
SAsu	Suppurative Sialadenitis
SAtx	Toxic Sialadenitis
SD	Sialodochitis
SDsu	Suppurative Sialodochitis

Stomach:

AC	Achylia Gastrica
AY	Achlorhydria
SMay	Atony of Stomach
SMcn	Hour-Glass Contraction of Stomach
SMac,di	Acute Dilatation of Stomach
SMch,di	Chronic Dilatation of Stomach
DP	Dyspepsia
DPnv	Nervous Dyspepsia
SMfs	Fistula of Stomach
FSbtSM,GB	Fistula between Stomach and Gall Bladder
FSbtSM,DD	" " " " Duodenum
FSbtSM,CO	" " " " Colon
POsnSM	Stenosis of Pyloric End of Stomach
CRsnSM	" of Cardiac End of Stomach
POcc,snSM	Cicatricial Stenosis of Pyloric End of Stomach
CRcc,snSM	" " of Cardiac End of Stomach
GSac,ct	Acute Catarrhal Gastritis
GSch,ct	Chronic Catarrhal Gastritis
GSsu	Suppurative Gastritis
GT	Gastroptosis
HS	Hematemesis
HA	Hyperchlorhydria
HG	Hyperchilia Gastrica
HY	Hypochlorhydria
CRsp	Cardiospasm

Stomach—*Continued*

POsp	Pylorospasm
SMuc	Ulcer of Stomach
SMuc,pf	Perforated Ulcer of Stomach

Vermiform Appendix

AXac,ct	Acute Catarrhal Appendicitis
AXsu	Suppurative Appendicitis
AXgg	Gangrenous Appendicitis
AXac	Acute Appendicitis
AXac,PNac,lo	Acute Appendicitis with Acute Local Peritonitis
AXac,PNab	" " " Peritoneal Abscess
AXac,ab	" " " Abscess
AXacPNac,df	" " " Acute Diffuse Peritonitis
AXacPNpu	" " " Progressive Fibrino-Purulent Peritonitis
AXch	Chronic Appendicitis
AXfs	Fistula of Appendix
AXfs,btSM	Fistula between Appendix and Stomach
AXfs,btGB	" " " " Gall Bladder
AXfs,btDD	" " " " Duodenum
AXfs,btCO	" " " " Colon
AXfs,btRM	" " " " Rectum
AXfs,btVG	" " " " Vagina
AXfs,btUB	" " " " Urinary Bladder
AXhd	Hydrops of Appendix

11–Bb. The Cardio-vascular System

Blood:

ANpe	Pernicious Anemia
ANsi	Simple Anemia
ANsk	Splenic Anemia
KL	Chlorosis
HF	Hemophilia
LKac,lm	Acute Lymphatic Leukemia
LKch,lm	Chronic Lymphatic Leukemia
LKmy	Myelogenous Leukemia
LN	Leukanemia
LKpo	Pseudoleukemia
PH	Polycythemia
SK	Scurvy
SKif	Infantile Scurvy

Blood Vessels—Arteries:

AA	Aneurysm of ..... Artery
AV	Arteriovenous Aneurysm of ..... Artery
AO	Aortitis
ATgn	General Arteriosclerosis
AIsu	Suppurative Arteritis
EM	Embolism
TM	Thrombosis

Blood Vessels—Veins:

FB	Phlebitis
FBsu	Suppurative Phlebitis of ..... Vein
FBtm	Thrombophlebitis of ..... Vein
FBcq	Phlebitis with Calculus
VV	Varicose Veins

Heart:

HRam	Aneurysm of Heart
AP	Angina Pectoris
HRat	Atrophy of Heart
BC	Bradycardia
CRac,di	Acute Cardiac Dilatation
CRch,di	Chronic Cardiac Dilatation
EKac	Acute Endocarditis
EKch	Chronic Endocarditis
HRfa	Fatty Heart
HRbl	Heart Block
CRhy	Cardiac Hypertrophy
CRch,is	Chronic Cardiac Insufficiency
MCac	Acute Myocarditis
MCch	Chronic Myocarditis
CRpp	Cardiac Palpitation
HRru	Rupture of Heart
SY	Syncope
TC	Tachycardia
CRch,vl,dz	Chronic Cardiac Valvular Disease

Pericardium

PMah	Adherent Pericardium
PMhm	Hemopericardium
PMhd	Hydropericardium
PMpn	Pneumopericardium
PRac,fb	Acute Fibrinous Pericarditis

Pericardium—*Continued*

PRmo	Mediastino-Pericarditis
PRsb	Serofibrinous Pericarditis
PRsu	Suppurative Pericarditis

Lymph Glands and Lymphatic Vessels:

LGab	Abscess of Lymph Glands
LGcy	Lymphatic Cyst of .....
EF	Elephantiasis
TDfs	Fistula of Thoracic Duct
LMac	Acute Lymphadenitis
LMch	Chronic Lymphadenitis
LX	Lymphangiectasis of .....
LGac	Acute Lymphangitis of .....
LR	Lymphorrhea

Spleen:

SPab	Abscess of Spleen
SPao	Amyloid Spleen
SPcy	Cyst of Spleen
SPik	Infarct of Spleen
SPru,so	Spontaneous Rupture of Spleen
SSac	Acute Splenitis
SSch,ii	Chronic Interstitial Splenitis
SE	Splenoptosis

11–Bc. The Connective Tissue

MSab	Abscess of Mediastinum
MScl	Cellulitis of Mediastinum
OBcl	Cellulitis of Orbit
LA	Ludwig's Angina

11–Bd. The Ductless Glands

Hypophysis:

AK	Acromegaly

Suprarenal Glands:

SGab	Abscess of Suprarenal Glands
AZ	Addison's Disease

Thyroid Glands and Parathyroid Glands:

TYab	Abscess of Thyroids
XG	Exophthalmic Goitre
XDif	Infantile Myxœdema
XDop	Operative Myxœdema
XDso	Spontaneous Myxœdema
TP	Tetany Parathyropriva
TYac	Acute Thyroid Inflammation
TYch	Chronic Thyroid Inflammation

Thymus:

TGpt	Persistent Thymus Gland
LS	Status Lymphaticus

11–Be. The Muscular System

Bursæ:

BRch	Chronic Bursitis of ..... Bursa
BRsu	Suppurative Bursitis of ..... Bursa
BRvs	Villous Bursitis of ..... Bursa

Muscles:

MUab	Abscess of ..... Muscle
MUat	Atrophy of Muscles of .....
MUhn	Hernia of ..... Muscle
MYpr,os	Progressive Ossifying Myositis
MYse	Sclerotic Myositis
MYsu	Suppurative Myositis of ..... Muscle
MYtr,os	Traumatic Ossifying Myositis
MOcg	Myotonia Congenita
MYac,py	Acute Polymyositis
RUac,mu	Acute Muscular Rheumatism of .....
RUch,mu	Chronic Muscular Rheumatism of .....

Aponeuroses:

FCcn,pz	Contraction of Plantar Fascia
FCcn,pm	Dupuytren's Contraction of Palmar Fascia

Tendons and Tendon Sheaths:

GO	Ganglion
TSfb	Fibrinous Tenosynovitis of ..... Muscle
TSsx	Serous Tenosynovitis of ..... Muscle
TSsu	Suppurative Tenosynovitis of ..... Muscle

11–Bf. The Nervous System

Brain and Cerebral Meninges:

BNab	Abscess of Brain
CE	Cerebral Arteriosclerosis
BNcm	Compression of Brain
BNcy	Cyst of Brain
EIac	Acute Encephalitis
CIfg	Fungus Cerebri
HP	Hemiplegia
CBhm	Hemorrhage into Cerebrum
CUhm	Hemorrhage into Cerebellum
MDhm	Hemorrhage into Medulla
PZhm	Hemorrhage into Pons
XRhm	Extradural Hemorrhage
SRhm	Subdural Hemorrhage
CIhn	Hernia Cerebri
HCch	Chronic Hydrocephalus
LJci,su	Suppurative Cerebral Leptomeningitis
PGia,hm	Internal Hemorrhagic Pachymeningitis
PGsu,ci	Suppurative Cerebral Pachymeningitis
BP	Bulbar Paralysis
BNtu	Tumor of Brain

Diseases of the Mind:

DMps	Paralytic Dementia
DMpi	Primary Dementia
DMsd	Secondary Dementia
DMsy	Senile Dementia
ID	Idiocy
IB	Imbecility
ISer	Circular Insanity
ISep	Epileptic Insanity
MA	Mania
ML	Melancholia
MF	Microcephalus
PU	Paronia

Nerves:

NV	Nerve
NVcm	Compression of ..... Nerve
NG	Neuralgia of ..... Nerve

Nerves—*Continued*

NU	Neuritis
NUmp	Multiple Neuritis
NVps	Paralysis of ..... Nerve
ZS	Zoster

Nervous Diseases of Unknown Origin

AE	Angioneurotic Œdema
AG	Aretnegryposis
AH	Athetosis
CP	Catalepsy
CK	Chorea
CKch,pr	Chronic Progressive Chorea
IK	Intermittent Claudication
KV	Convulsions
KVif	Infantile Convulsions
DI	Diabetes Insipidus
EP	Epilepsy
EPjk	Jacksonian Epilepsy
EA	Erythromelagia
HO	Hiccough
HK	Hypochondriasis
HI	Hysteria
HEpr,fc	Progressive Facial Hemiatrophy
MZ	Ménière's Disease
MI	Migraine
NS	Neurasthenia
NR	Neuroses
NRok	Occupation Neurosis
NRtr	Traumatic Neurosis
NT	Night Terrors
AJps	Paralysis Agitans
PX	Paramyoclonus Multiplex
RZ	Reynaud's Disease
SN	Somnambulism
BS	Blephorospasm
AMck,sp	Clonic Arm Spasm
DFck,sp	" Diaphragm Spasm
FEck,sp	" Facial Spasm
LEck,sp	" Leg Spasm
NKck,sp	" Neck Spasm
SUck,sg	" Shoulder Spasm

Nervous Diseases of Unknown Origin—*Continued*

SUck,tg	Clonic Tongue Spasm
SUha	Habit Spasm
SUnd	Nodding Spasm
SUsz	Saltatory Spasm
SY	Spasmodic Torticollis
YM	Stammering
SH	Stuttering
VT	Vertigo

Spinal Cord and Spinal Meninges:

CZdz	Caisson Disease
SCcm	Compression of Spinal Cord
MTpr	Progressive Muscular Dystrophy
HL	Hematomyelia
HQ	Hematorrhachis
LJsu,sq	Suppurative Spinal Leptomeningitis
MQdn	Disseminated Myelitis
MQtv	Transverse Myelitis
PGsu,sq	Suppurative Spinal Pachymeningitis
PSac,as,sq	Acute Ascending Spinal Paralysis
PSif,tc	Infantile Spastic Paralysis
LE	Paraplegia
LEaz	Ataxic Paraplegia
LEhr,tc	Hereditary Spastic Paraplegia
MPac,aa	Acute Anterior Poliomyelitis
MPch,aa	Chronic Anterior Poliomyelitis
MPpx	Posterior Poliomyelitis of ..... Ganglion
SIai,lr	Amyotrophic Lateral Sclerosis
SIdn	Disseminated Sclerosis
SIlr	Lateral Sclerosis
SV	Syringomyelia
TA	Tabes Dorsalis

11–Bg. The Osseous System

Bones and Cartilages:

CQ	Caries
CJ	Chondritis of .....
CF	Chondrodystrophia Fœtalis
CY	Coccygodynia
MW	Disease of "Mother of Pearl Workers"

Bones and Cartilages—*Continued*

JS	Disease of "Jute Spinners"
FM	Fragilitas Ossium
LO	Leontiasis Ossea
OD	Osteitis Deformans
OR	Osteitis Fibrosa
OP	Pulmonary Osteoarthropathy
OI	Osteogenesis Imperfecta
OS	Osteomalacia
OLac,su	Acute Suppurative Osteomyelitis of .....
OLch,su	Chronic Suppurative Osteomyelitis of .....
OC	Osteopsathyrosis
OTac	Acute Periostitis of .....
OTch	Chronic Periostitis of .....
RK	Rickets

Joints:

BA	Bony Ankylosis of ..... Joint
FK	Fibrous Ankylosis of ..... Joint
AF	Arthritis Deformans
NA	Neuropathic Arthritis of ..... Joint
AWna	Arthritis Nodosa
AWsu	Suppurative Arthritis of ..... Joint
AWac,tx	Acute Toxic Arthritis of ..... Joint
AWch,tx	Chronic Toxic Arthritis of ..... Joint
AWvs	Villous Arthritis of ..... Joint
RHch,ar	Chronic Articular Rheumatism

11–Bh. The Reproductive System

(Female Genital Organs)

Female Urethra:

UAab	Urethral Abscess of Female Urethra
UAcq	Calculus in Female Urethra
UAcw	Caruncle of Female Urethra
UAfs	Fistula of Female Urethra
UApl	Prolapse of Female Urethra
UAsr	Stricture of Female Urethra
UAac	Acute Urethritis of Female Urethra
UAch	Chronic Urethritis of Female Urethra

Ovaries:

OVab	Abscess of Ovary
OVat	Atrophy of Ovary
OVcy,rt	Retention Cyst of Ovary
OVcy	Cystic Ovary
OVhm	Hemorrhage in Ovary
OVhn	Hernia of Ovary
OVnr	Neuralgia of Ovary
OOac	Acute Oophoritis
OOch	Chronic Oopharitis
OVpl	Prolapse of Ovary
OVtn	Torsion of Ovary

Uterine Tubes:

HZ	Hematosalpinx
HX	Hydrosalpinx
UTpl	Prolapse of Uterine Tube
PU	Pyosalpinx
SQac	Acute Salpingitis
SQch	Chronic Salpingitis
SO	Salpingo-Oophoritis
UTtn	Torsion of Uterine Tube

Uterus and Ligaments of Uterus:

URab	Abscess of Uterus
AQ	Amenorrhea
URaf	Anteflexion of Uterus
URae	Atresia of Uterus
URat	Atrophy of Uterus
BLcy	Cyst of Broad Ligament
DY	Dysmenorrhea
EDac	Acute Endometritis
EDch	Chronic Endometritis
URer,cx	Erosion of Cervix Uteri
HW	Hematometra
RLhd	Hydrocele of Round Ligament
YD	Hydrometra
URcx,hy	Hypertrophy of Cervix Uteri
URif	Infantile Uterus
URiv	Inversion of Uterus
URcx,lc	Old Laceration of Cervix Uteri
MH	Menorrhagia
MEac	Acute Metritis

Uterus and Ligament of Uterus—*Continued*

MEch	Chronic Metritis
MR	Metrorrhagia
URoc,cj	Occlusion of Cervical Canal of Uterus
URpl,pj	Partial Prolapse of Uterus
URpl,cp	Complete Prolapse of Uterus
PW	Pyometra
URrv	Retroversion of Uterus
UTru	Rupture of Uterus
URcj,sn	Stenosis of Cervical Canal of Uterus
URsv	Subinvolution of Uterus
URtn	Torsion of Uterus

Pregnancy and Associated Conditions:

ABcp	Complete Abortion
ABic	Incomplete Abortion
ABtd	Threatened Abortion
EG	Ectopic Gestation
EGru	Ruptured Ectopic Gestation
EGur	Unruptured Ectopic Gestation
YL	Puerperal Eclampsia
HMax,ph	Accidental Hemorrhage Parturition
HMax,pg	Accidental Hemorrhage Pregnancy
HMpd	Post Partum Hemhorrage
HB	Hydatidiform Mole
HJ	Hydramnion
MBrt	Retained Placenta and Membranes
URru	Rupture of Uterus

Vagina and Pelvic Floor

VGae	Atresia of Vagina
VGcy	Cyst of Vagina
RVfs	Rectovaginal Fistula
UVfs	Ureterovaginal Fistula
UGfs	Urethrovaginal Fistula
VNfs	Vesicovaginal Fistula
LCol,pw	Old Laceration of Pelvic Floor
LCrc,pw	Recent Laceration of Pelvic Floor
VI	Paravaginitis
VWpl,aa	Prolapse of Anterior Vaginal Wall
VWpl,px	Prolapse of Posterior Vaginal Wall
RXpw	Relaxation of Pelvic Floor

Vagina and Pelvic Floor—*Continued*

VGac	Acute Vaginitis
VGch	Chronic Vaginitis

Vulva and Gland of Bartholin

BHab	Abscess of Gland of Bartholin
VUab	Abscess of Vulva
CXad	Adhesions of Clitoris
LBad	Adhesions of Labia
VUat	Atrophy of Vulva
BHcy	Cyst of Gland of Bartholin
VUet	Elephantiasis of Vulva
VUhe	Hematoma of Vulva
VUhc	Hydrocele of Vulva
CXhy	Hypertrophy of Clitoris
HNhy	Hypertrophy of Hymen
LBhy,mj	Hypertrophy of Labia Majora
LBhy,mi	" " " Minora
VUoc	Occlusion of Vulva
VUpb	Pruritus Vulvæ
VSac	Acute Vulvitis
VSch	Chronic Vulvitis
VUuc	Ulcer of Vulva

11–Bi. The Reproductive System

(Male Genital Organs)

Male Urethra:

UAab	Urethral Abscess of Male Urethra
UAcq	Calculus of Male Urethra
UAfs	Fistula of Male Urethra
UAfs,rr	Rectourethral Fistula
UAhm	Urethral Hemorrhage
UAsr	Stricture of Male Urethra
UAsr,sw	Spasmodic Stricture of Male Urethra
UAuc	Ulcer of Urethra
UAac	Acute Urethritis of Male Urethra
UAch	Chronic Urethritis of Male Urethra

Bulbourethral Gland

BBab	Abscess of Bulbourethral Gland
BBcy	Cyst of Bulbourethral Gland

Penis:

BJ	Balanoposthitis
RC	Redundant Prepuce

Prostate:

PTab	Abscess of Prostate
PTat	Atrophy of Prostate
PTcq	Calculus of Prostate
PThy	Hypertrophy of Prostate
PTac	Acute Prostatitis
PTch	Chronic Prostatitis

Seminal Vesicles:

VEab	Abscess of Vesicles Seminal
VEco	Concretions of Vesicles Seminal
VEcy	Cyst of Vesicles Seminal
VKac	Acute Vesiculitis Seminal
VKch	Chronic Vesiculitis Seminal

Spermatic Cord and Coats of the Testicle and Cord:

TVht	Hematocele of Tunica Vaginalis
TVhc	Hydrocele of Tunica Vaginalis
CVht	Hematocele of Spermatic Cord
CVhc	Hydrocele of Spermatic Cord
CVtn	Torsion of Spermatic Cord
VA	Varicocele

Testicle:

EBab	Abscess of Epididymis
TEab	Abscess of Testicle
TEat	Atrophy of Testicle
EBac	Acute Epididymitis
EBch	Chronic Epididymitis
TEhn	Hernia Testis
IP	Impotence
TEnr	Neuralgia of Testicle
OKac	Acute Orchitis
OKch	Chronic Orchitis

11–Bj. Mammary Gland

Mammary Gland:

MNab	Abscess of Mammary Gland
MNrr,ab	Retromammary Abscess
AU	Agalactia
MNat	Atrophy of Mammary Gland
NPfr	Fissure of Nipple
MNfs	Fistula of Mammary Gland
GC	Galactocele
GA	Galactorrhea
MNhy	Hypertrophy of Mammary Gland
MX	Mammillitis
MVac	Acute Mastitis
MVch	Chronic Mastitis
MVch,cy	Chronic Cystic Mastitis
MVaj	Mastitis of Adolescence
MVnb	Mastitis of New-born
MK	Mastodynia
RI	Retention of Milk

11–Bk. The Respiratory System

Bronchi and Trachea:

ZM	Asthma
BI	Bronchiectasis
BIac	Acute Bronchitis
BIch	Chronic Bronchitis
BIfo	Fibrinous Bronchitis
TKfs	Fistula of Trachea
TOfs	Tracheoœsophageal Fistula
BKsn	Stenosis of Bronchus
TKsn	" of Trachea
TI	Trachitis
TQ	Tracheocele
BKuc	Ulcer of Bronchus
TKuc	Ulcer of Trachea

Larynx:

LZab	Abscess of Larynx
LZfs	Fistula of Larynx
LYac	Acute Laryngitis

Larynx—*Continued*

LYch	Chronic Laryngitis
LH	Laryngismus Stridulus
GGed	Œdema of Glottis
LZsn	Stenosis of Larynx
LZsn,cc	Cicatricial Stenosis of Larynx
LZuc	Ulcer of Larynx

Lungs:

LLab	Abscess of Lung
ZZ	Atelectasis
ZE	Pulmonary Emphysema
ZEio	Pulmonary Interlobulary Emphysema
LLsy,ef	Senile Ephysema of the Lungs
LLgg	Gangrene of Lung
HU	Hemoptysis
LLhn	Hernia of Lung
LLik	Infarct of Lung
LLed	Œdema of Lung
NObr	Bronchopneumonia
NOii	Interstitial Pneumonia
NOlb	Lobar Pneumonia
NB	Pneumonoconiosis

Pleuræ:

UD	Pleuritic Adhesions
CW	Chylothorax
TFfs	Thoracoabdominal Fistula
TJfs	Thoracogastric Fistula
TRfs	Thoracointestinal Fistula
TH	Hemothorax
YT	Hydrothorax
UCac,fo	Acute Fibrinous Pleurisy
UCch,fo	Chronic Fibrinous Pleurisy
UCsb	Serofibrinous Pleurisy
UCsu	Suppurative Pleurisy
NX	Pneumothorax
NO	Pyopneumothorax

Nasal Cavity:

NZab	Abscess of Nasal Septum
YS	Anosmia
NZde	Deviation of Nasal Septum
EX	Epistaxis

Nasal Cavity—*Continued*

HV	Hay Fever
ZN	Ozena
NZpf	Perforation of Nasal Septum
REac	Acute Rhinitis
REau	Atrophic Rhinitis
REhk	Hypertrophic Rhinitis
RA	Rhinoliths
NZrp	Spur on Nasal Septum
NFuc	Ulcer of Nasal Passage

Nasal Cavity Accessory Sinuses:

EEeh	Empyema Ethmoidal Sinus
EEmx	Empyema Maxillary Sinus
EEfe	Empyema Sphenoidal Sinus
ZIeh	Ethmoidal Sinusitis
ZIff	Frontal Sinusitis
ZImx	Maxillary Sinusitis
ZIfe	Sphenoidal Sinusitis

11–Bl. The Sense Organs

Organ of Hearing:

KC	Accumulation of Cerumen
OZal	Ankylosis of Ossicles
OZcs	Caries of Ossicles
DX	Deafness
DQ	Deaf-Mutism
MGfs	Mastoid Fistula
LNhm	Hemorrhage into Labyrinth
MGac	Acute Mastoiditis
MGch	Chronic Mastoiditis
JTac	Acute Myringitis
JTch	Chronic Myringitis
ON	Necrosis of Ossicles
OJea	Otitis Externa
OJac,ia	Acute Otitis Interna
OJch,ia	Chronic Otitis Interna
OJac,md	Acute Otitis Media
OJch,md	Chronic Otitis Media
EJac	Acute Eustachian Salpingitis
EJch	Chronic Eustachian Salpingitis
TU	Tinnitus Aurium

Organ of Vision and Lacrimal Apparatus:

KUab	Abscess of Caruncle
KOab	Abscess of Cornea
EYat	Atrophy of Eye Ball
OAat	" of Optic Nerve
BE	Blepharitis
BM	Blepharophimosis
BO	Blepharoptosis
BU	Blepharospasm
KT	Cataract
KD	Chalazion
KA	Choroiditis
KNac	Acute Conjunctivitis
KNch	Chronic Conjunctivitis
KNpk	Phlyctenular Conjunctivitis
KY	Cyclitis
LIcy	Cyst of Lacrimal Gland
DA	Dacryoadenitis
DJ	Dacryocystitis
DQ	Dacryops
DR	Detachment of Retina
DL	Diplopia
KEds	Dislocation of Crystalline Lens
EQ	Ectropion
EO	Entropion
EZ	Exophthalmos
EZpv	Pulsating Exophthalmos
EH	Epiphora
ER	Episcleritis
LQgl,fs	Fistula of Lacrimal Gland
LQsj,fs	" " " Sac
GKac	Acute Glaucoma
GKch	Chronic Glaucoma
JAhm	Hemhorrhage into Anterior Chamber
RRhm	" into Retina
VBhm	" into Vitreous Body
OE	Hordeolum
II	Iridochoroiditis
IY	Iridocyclitis
IR	Iritis
KI	Keratitis
KIpk	Phlyctenular Keratitis

Organ of Vision and Lacrimal Apparatus—*Continued*

LU	Leukoma
LF	Meibomian Lithiasis
VM	Muscæ Volitantes
OU	Optic Neuritis
IQ	Nystagmus
VDot	Opacity of Vitreous Body
UZ	Phthisis Bulbi
TZ	Pterygium
TX	Ptosis
RG	Retinitis
EV	Esotropia
EW	Exotropia
TW	Tenonitis
KNuc	Ulcer of Conjunctiva
KOuc	Ulcer of Cornea
ZCuc	Ulcer of Sclera
UV	Uveitis

11–Bm. Tegumentary System

Skin, Hair, Nails, and Glands of Skin:

KF	Chromophytosis
KB	Clavus
KM	Comedo
DK	Dermatitis Herpetiformis
DN	" Medicamentosa
DV	" Venenata
IE	Erythema Induratum
NE	" Nodosum
FI	Folliculitis
FL	Furunculosis
IA	Ichthyosis
IO	Impetigo
IU	" Herpetiformis
IW	Intertrigo
KP	Keratosis Pilaris
LP	Lentigo
LW	Leukoderma
RS	Lichen Ruber
FN	Mycosis Fungoides
RO	Rhinophyma

Skin, Hair, Nails, and Glands of Skin—*Continued*

RJ	Rosacea
UK	Urticaria
BZ	Bromidrosis
UI	Uridrosis
PB	Dermatitis Seborrhœica
OQ	Onychauxis
OX	Onychia
OG	Onychogryphosis

11–Bn. Urinary System

Kidneys:

KGcd	Congestion of Kidney
KGcy	Cystic Kidney
KGfs	Fistula of Kidney
KGik	Infarct of Kidney
KGik,zp	Septic Infarct of Kidney
UMac	Acute Uremia
UMch	Chronic Uremia

Ureter:

URcq	Calculus in Ureter
URce	Ureteral Colic
URcy	Cyst of Ureter
URfs	Fistula of Ureter
RRfs	Rectoureteral Fistula
URsr	Stricture of Ureter
URac	Acute Ureteritis
URch	Chronic Ureteritis

Urinary Bladder:

UBab	Abscess of Urinary Bladder Wall
UBay	Atony of Urinary Bladder
UBcq	Calculus in Urinary Bladder
UBcn	Contraction of Urinary Bladder
UBdi	Dilatation of Urinary Bladder
UBfs	Fistula of Urinary Bladder
RWfs	Rectovesical Fistula
VCfs	Vesicointestinal Fistula
VRfs	Vesicouterine Fistula
VJfs	Vesicovaginal Fistula
UBhn	Hernia of Urinary Bladder

UBhy	Hypertrophy of Urinary Bladder
UBij	Incontinence of Urinary Bladder
UBno	Neurosis of Urinary Bladder
UBps	Paralysis of Urinary Bladder
UE	Retention of Urine
UBsj	Sacculation of Urinary Bladder
UBsp	Spasm of Urinary Bladder
UBuc	Ulcer of Urinary Bladder

11–C. Surgical Symbols

The following list of symbols applying to surgery will need no explanation, as their formation is based on the same principle described in section 11–B. For the sake of convenience the surgical list has been alphabetically arranged by symbol.

AB Arteriophlebotomy
AC Amputation Cervix
AD Appendecostomy
AE Anesthetize
AF Arteriorrhaphy
AG Adrenotomy
AM Amputations

AH Aneurismorrhaphy
AI Adenoidectomy
AJ Adrenorrhaphy
AK Arthrectomy
AL Arthroclasia

AMit	Interscapulo-Thoracic Amputation	
AMsh	Amputation at Shoulder	
AMua	"	through Upper Arm
AMma	"	" Middle Arm
AMla	"	" Lower Arm
AMel	"	at Elbow
AMuf	"	through Upper Forearm
AMmf	"	" Middle Forearm
AMlf	"	" Lower Forearm
AMwr	"	at Wrist
AMmc	"	through Metacarpus
AMfn	"	of Finger
AMth	"	of Thumb
AMhp	"	at Hip
AMut	"	through Upper Thigh
AMmt	"	" Middle Thigh
AMlt	"	" Lower Thigh

AMne	Amputation	at	Knee
AMul	"	through	Upper Leg
AMml	"	"	Middle Leg
AMll	"	"	Lower Leg
AMak	"	at	Ankle
AMts	"	through	Tarsus
AMms	"	"	Metatarsus
AMto	"	of	Toe

AN Anastomosis
AO Adrenectomy
AP Appendectomy
AQ Arthrodesis
AR Artificial Respiration
AS Aspiration
AT Arthrotomy
AU Amputation of Uvula
AV Arterio-venous Anastomosis
AX Arthroplasty
AY Arteriotomy

BA Bronchotomy
BB Bacterial Test
BC Bronchoscopy
BD Bandage
BF Blepharoplasty
BG Bone Grafting
BI Boiling Water Injections
BK Baking
BP Bone Plating
BS Bone Suturing
BT Blood Test
BW Bone Wiring
BY Bronchoplasty

CA Colporrhaphy Anterior
CB Cauterize
CC Cæcostomy
CD Choledochotomy
CE Cholecystenterostomy
CF Craniectomy
CG Cephalotomy
CH Cephalotripsy
CI Colonic Irrigation
CJ Circumcision
CK Canthoplasty
CL Colostomy
CM Cholecystectomy
CN Craniotomy
CO Colectomy
CP Cupping
CR Clitoridectomy
CS Choledochostomy
CT Cholecystostomy
CU Catheterization Ureters
CV Colotomy
CW Cholecystotomy
CX Cleft Palate Operation
CY Cystoscopy
CZ Catheterize

DA Dilatation Anus
DC Dilatation and Curretage
DD Duodeno-cholecystotomy
DE Dislocation of Eye
DF Disinfect
DG Duodeno-enterostomy
DH Duodenorrhaphy
DI Dissecting
DK Decapitation
DL Dislocation of Lens
DM Decompression
DN Dilatation Colon
DO Duodenostomy

DP Drape
DQ Dermatectomy Partial
DR Drainage of
DS Dressing
DT Duodenotomy
DU Douche
DV Delivery
DX Dermanoplasty
DY Dermatoplasty
DZ Diagnose

EA Embryotomy
EB Embryoctomy
EC Embryectomy
ED Epididymotomy
EE Enteroenterostomy
EF Esophagorrhaphy
EG Esophagoscopy
EH Enterorrhaphy
EI Enucleation
EJ Esophagostomy
EK Entoptoscopy
EL Enterostomy
EM Epididymectomy
EN Extension
EO Enterotomy
EP Enterpolasty
EQ Esophagoplasty
ER Esophagotomy
ES Epicystotomy
ET Electric Treatment
EU Epiploplexy
EV Entorectomy
EW Excision of
EX Exercise
EY Esophagectomy
EZ Enteroplexy

FC Feces Test
FD Feeding
FO Fasciotomy
FR Fracture Reduction
FS Frontal Sinusotomy
FT Fraradic Treatment
FX Fixation of

GA Gastro-anastomosis
GB Gastroduodenostomy
GC Gastrocolotomy
GD Gastrodiaphanoscopy
GE Gastroplasty
GF Gastroelytrotomy
GG Gastroenterotomy
GH Gastro-pylorectomy
GI Glossoplasty
GJ Gastro Jejunostomy
GK Glossotomy
GL Glossectomy
GM Gastrotomy
GN Gastro-Gastrostomy
GO Gastrorrhaphy
GP Gastro-Plication
GR Gastrectomy
GS Gastroscopy
GT Galvanic Treatment
GX Gastropexy
GY Gastrostomy
GZ Genyplasty

HB Hematoscopy
HC Hyperdermoclysis
HD Hydrocele Operation
HE Helcoplasty
HF Hernio-Celiotomy
HG Hernio-Enterotomy
HH Hepatorrhaphy
HI Hepatotomy
HJ Hepatectomy Partial
HL Harelip Repair
HM Hysterotomotokia (Cæsarian Section)
HN Herniotomy
HO Hemorrhoid Operation
HP Hysteropexy

HR Herniorrhaphy
HS Hysterorrhaphy
HT Hypophysectomy
HX Hepatopexy
HY Hysterectomy

IA Induction of Abortion
ID Iridectomy
IΓ Infusion of
IH Iliorrhaphy
IJ Injection of
IL Intubation
IN Incudectomy
IO Ileostomy
IP Ischio-Pubiotomy
IR Ileoproctostomy
IZ Incision

JC Jejunocolostomy
JO Jejunoilestomy
JR Jejunorrhaphy
JS Jejunostomy

KP Keratoplasty
KR Kerectomy
KT Keratocentesis
KY Keratotomy

LA Lymphadenectomy
LB Liberation of Adhesions
LD Logadectomy
LG Laryngectomy
LI Ligation
LJ Laryngotomy
LN Laryngoscopy
LO Laparotomy
LP Lumbar Puncture
LR Laminectomy
LS Litholapaxy
LU Lumbar Ureterostomy
LV Lavage
LY Lithotomy

MA Mastectomy
MD Mastoidotomy
ME Myectomy
MF Myorrhaphy
MI Multiple Incisions
MJ Marginplasty
MK Mastotomy
MM Mammotomy
MN Manipulation
MO Move to Operating Room
MR Myomectomy
MS Massage
MT Muscle Transplantation
MU Myotomy
MX Maxillary Sinusotomy
MY Myomotomy

NC Necrotomy
NE Neurectomy
NF Nasal Feeding
NL Nephrolithotomy
NO Nephrostomy
NP Nephrorrhaphy
NR Nephrectomy
NS Nerve Stretching
NT Neurotomy
NU Neurorrhaphy
NX Nephropexy
NY Nephrotomy

OC Onychotomy
OD Orchidotomy
OE Orchidectomy
OK Orchidorrhaphy
OL Ophthalmascopy
OM Omentopexy
OO Oophorectomy
OP Operation Penis
OR Osteotomy
OS Osteoplasty
OT Ostectomy
OV Oophorotomy

OX Oophoropexy
OY Ossiculectomy
OZ Operations Miscellaneous

PA Paracentesis
PB Phlebotomy
PC Proctoscopy
PD Proctorrhaphy
PE Pericardiorrhaphy
PG Pharyngotomy
PH Pan Hysterectomy
PI Peritomy
PK Prostatotomy
PL Pyloroplasty
PM Pneumotomy
PN Perineorrhaphy
PO Plastic Operation
PP Prepare Patient
PQ Proctotomy
PR Prostatectomy
PS Proctectomy
PT Post Operative Treatment
PU Periostectomy
PV Pelviotomy
PW Phlebectomy
PX Pancreatorrhaphy
PY Pylorectomy
PZ Pancreatotomy

RB Removal Foreign Body
RD Reduction of Dislocation
RC Rectococcypexia
RE Resection
RF Rectal Feeding
RI Rectal Irrigation
RN Refraction
RO Remove from Operating Room
RP Rectopexy
RR Rectorrhaphy
RS Rhinoplasty
RT Rachidotomy
RU Refracture

SA Salpingectomy
SB Salpingo-oophorectomy
SC Spermato-cystotomy
SD Sigmoidectomy
SE Splenectomy
SF Sialolithotomy
SG Skin Grafting
SH Sialoadenectomy
SI Splenotomy
SJ Spinal Injection
SK Scarification
SL Sclerotomy
SM Splenorrhaphy
SO Splenopexy
SP Spondylotomy
SQ Spinal Puncture
SR Submucous Resection
ST Surgical Treatment
SU Suspension Uterus
SV Sphenoidal Sinusotomy
SW Suture of
SX Sigmoidoscopy
SY Symphysiotomy
SZ Sterilize

TA Tourniquet Application
TB Tracheobroncoscopy
TC Thoracostomy
TD Test Feeding
TE Tenorrhaphy
TF Transfusion
TG Tattooing
TH Thyroidectomy
TI Thymusotomy
TK Thoracentesis
TL Tonsilectomy
TM Thymusectomy
TN Tenotomy
TO Trachelorrhaphy
TP Trephine
TQ Tracheloplasty
TR Tracheotomy

TS Tendon Stretching
TT Tendon Transplantation
TU Turbinectomy
TV Tenosynovectomy
TW Thoracoplasty
TX Teeth Extraction
TY Thoracotomy
TZ Tarsorrhaphy

UA Ureteral Anastomosis
UC Uretero-Colostomy
UE Ureterectomy
UI Uterine Irrigation
UL Uretero-Lithotomy
UM Ureterostomy
UO Ureterorrhaphy
UP Uretero-Enterostomy
UR Urethral Irrigation
US Uranoplasty
UT Ureterotomy
UU Uretero-Ureterostomy
UW Urethrectomy
UX Urine Examination
UY Urethrotomy
UZ Uretero-Cystostomy

VA Varix Anastomic
VC Vaccination
VD Vaginal Dilatation
VE Vesiculotomy
VG Vaginal Irrigation
VH Vaginal Hysterectomy
VI Vesicle Irrigation
VL Vaginal Celiotomy
VS Vaginal Cæarean Section
VY Vasectomy

WA Wiring for Aneurysm
WS Wash Stomach
WT Wasserman Test

XM Examine Patient
XT X-ray Treatment
XX X-ray Examination

11–D. Anatomical Sub-class Symbols

The use of sub-class symbols greatly simplifies a problem of the scope illustrated in the second section (11-B) of this chapter. Many different conditions of one organ, or other part of the body, can be described by using the same main symbol followed by different sub-class symbols. This point is well illustrated, for example, by referring back to "Œsophagus," under section 11–Ba, where the main symbol *ES* is shown with *thirteen* combinations of sub-class symbols.

The reader is again reminded that although to the layman the symbols shown in this chapter may appear confusing, that to the surgeon or medical man they can be easily memorized owing to familiarity with the subject, based on years of study. Following is an alphabetically

arranged key of all the sub-class symbols used in the preceding pages of this chapter. This list will be found self-explanatory.

Anatomical Sub-class Symbols

aa anterior
ab abscess
ac acute
ad adhesions
ae atresia
af anteflexion
ag arrest of growth
ah adherent
ai amyothropic
aj adolescence
ak ankle
al ankylosis
am aneurism
an absence
ao amyloid
ap aphthous
aq acquired
ar articular
as ascending
at atrophy
au atrophic
ax accidental
ay atony
az ataxic

bl block
br broncho
bt between

ca carcinoma
cc cicatricial
cd congestion
ce colic
cg congenital
ch chronic
ci cerebral
cj cervical canal
ck clonic
cl cellulitis
cm compression
cn contraction
co concretions
cp complete
cq calculus
cr circular
cs caries
ct catarrhal
cu cross union
cv cavity
cw caruncle
cx cervix
cy cyst
cz cirrhosis

de deviation
df diffuse
dg derangement
di dilatation
dl delayed
dm deformity
dn disseminated
dp depression
dr direct
ds dislocation
du duct
dv diverticulum
dz disease

ea externa
ec excessive callus
ed œdema
ef emphysema
eg exuberance of growth
eh ethmoidal

el elbow
em embolism
ep epileptic
er erosion
et elephantiasis
ey empyema
ex exostosis

fa fatty
fb fibrous
fc facial
fe sphenoidal
ff frontal
fg fungus
fi fibrous union
fn finger
fo fibrinous
fr fissure
fs fistula
ft fracture
fu faulty union

gc gonococcus
gg gangrene
gl gland
gn general
go ganglion

ha habit
hc hydrocele
hd hydrops
he hematoma
hk hypertrophic
hm hemorrhage
hn hernia
hp hip
hr hereditary
ht hematocele
hy hypertrophy

ia internal
ic incomplete
id indirect
if infantile
ii interstitial
ij incontinence
ik infarct
il ischiorectal
im inflammation
in indurated
io interlobulary
ip impacted
ir irreducible
is insufficiency
it interscapulo-thoracic
iv inversion

jk Jacksonian

la lower arm
lb lobar
lc laceration
lf lower forearm
ll lower leg
lm lymphatic
lo local
lr lateral
lt lower thigh

ma middle arm
mb membranous
mc metacarpus
md median
me metastasis
mf middle forearm
mi minora
mj majora
ml middle leg
mo mediastino
mp multiple
mr mercurial
ms metatarsus
mt middle thigh
mu muscular
mx maxillary
my myelogenous

na nodosa
nb new born
nd nodding
ne knee
ni non-indurated
no neurosis
nr neuralgia
nu non-union
nv nervous

ob obstruction
oc occlusion
ok occupational
ol old
op operative
os ossifying
ot opacity

pa parenchymatous
pb pruritis
pc painful callus
pd post partum
pe pernicious
pf perforation
pg pregnancy
ph parturition
pi primary
pj partial
pk phlyctenular
pl prolapse
pm palmar
pn pneumo
po pseudo
pp palpitation
pr progressive
ps paralysis (paralytic)
pt persistent
pu purulent
pv pulsating
pw pelvic-floor
px posterior
py poly
pz plantar

rc recent
re reducible
rp spur
rr rectro
rt retention
ru rupture (ruptured)
rv retro version

sa sub acute
sb serofibrinous
sc subcutaneous
sd secondary
se sclerotic
sf syphilitic
sh shoulder
si simple
sj sac
sk splenic
sl superficial
sm submucous
sn stenosis
so spontaneous
sp spasm
sq spinal
sr stricture
ss syphilis
st strangulated
su suppurative
sv subinvolution
sw spasmodic
sx serous
sy senile
sz saltatory

tb tuberculosis
tc spastic
td threatened
tg tongue
th thumb
tm thrombosis
tn torsion
to toe
tr traumatic

ts tarsus
tu tumor
tv transverse
tx toxic

ua upper arm
uc ulcer
uf upper forearm
ul upper leg
um umbilical
ur unruptured
ut upper thigh

vl valvular
vn ventral
vs villous

wc weakness of callus
wr wrist

zp septic

CHAPTER XII

RÉSUMÉ

In treating the subject of symbols throughout the previous chapters, the author has aimed to cover the more important groups in sufficient detail fully to illustrate their formation and adaptability. It is, of course, evident that the *actual detail* used will not absolutely cover every existing condition, but the scheme of symbolizing could be adopted as a practical standard, since its divisions cover items recognized by general use. Regardless of whether or not certain subdivisions can be used in detail, the important hypothesis remains that any or all of the group formations can be utilized and as a standard such as a single letter for a plant symbol, a numeral followed by a letter for a department symbol, or the letter *X* followed by a numeral for an expense subdivision, and so on.

To adopt, as a standard, the use of a single letter for a plant symbol does not indicate that the scheme is worthless because a concern has more than twenty-six plants. Let a single capital letter be the symbol for a plant, in case of the need to utilize the same letter for more than one plant, follow the capital by a small letter indicating the location or some other individual characteristic of each plant. For instance, a concern building a new plant known as *N* is still using an old plant known by the same symbol. The former is located at Newburgh Heights and takes a small *n* after the capital to indicate its location. When the older *N* plant steps out of existence, the only *N* plant will have no further need for its small letter appendage—*Nn* becomes *N*.

In the case of department symbols, standardization branches interdepartmentally, so that in the majority of cases, the symbol representing a department in one plant corresponds to all representing the same department in any plant. In the composite groups listed above in Chapter III, the reader can select for use those symbols applying to the departments he actually wishes to symbolize. If one has only an accounting and a cost department, use 1*A* and 2*A* only. Sometimes expansion may require the use of 3*A*, 4*A*, and 5*A*. The same principle should be applied all the way down the list. If for the present 1*B*, representing sales department, will cover the order and stenographic division, use only 1*B*. There will be time enough for 2*B* and 3*B* when the 1*B* division no longer meets the demands of the problem, and the same applies to all of the general divisions described in section 3–D of Chapter III. It has been the aim to make the detail sufficiently complete to provide for a large percentage of actual conditions. Any amplification can be readily provided to suit the demands of the more intricate problems.

In the case of the indirect expense subdivisions, Chapter IV, *X*1, to *X*56, etc., the reader will find that 90 per cent or more of the items listed in detail can be actually applied without change of any kind. Items *X*1 to *X*56 are practically fixed standards except perhaps *X*21, *X*22, *X*24, *X*26, *X*27, and *X*56. All of the *X* symbol divisions just mentioned apply to either plant, department, or general indirect expenditures. Maintenance of factory, *X*5, and maintenance of equipment, *X*6, are also fixed standards. The latter is to be subdivided as explained in section 4–D, Chapter IV, to each piece of equipment by symbol.

The order group and work number symbols described in Chapter V are sufficiently standardized to admit of practically universal application.

In the case of equipment symbols described in Chapter VI, a standard division has been developed that will cover

a very wide field. The plant prefix letter forming the first character of the symbol will of course vary to suit special conditions, but the second letter representing the equipment group proper will conform to the standard division listed.

Complete standardization of drawing symbols described in Chapter VII is possible in every case without deviating from the scheme as laid down. The drawing symbol group is the basis of the piece symbol group and is actually a part of it, so it is obvious that the piece symbol standard explained in Chapter VIII is also automatically provided for. Under the method described for drawing and piece symbols, a great deal of duplication and waste labor has been eliminated, which must stand as an argument in favor of the method.

Chapter IX treats in considerable detail of the formation and use of operation symbols. The group is one that, of course, covers an almost infinite number of possible actions. As a logical way to standardize in this group, the author has adopted the method of using a general division or list of operation, in complete detail, for each different kind of business or profession. A symbol used to identify an industrial operation will be duplicated in form to identify a surgical operation and again for operations in various lines of activity. On the other hand, there is no duplication or confusion in actual practice, as individuals using the industrial list of symbols do not also use the surgical or et cetera lists.

The argument may be advanced that both the surgical and diagnostical lists will be used by the same institution or by the same individuals. There is a distinct line of demarkation between surgical and diagnostical records. They have to do with two distinct professions. The physician's terms of diagnosis are different from the surgeon's, and the method of filing helps to avoid confusion.

The foregoing discussion of operation symbols arranged by groups, professional or otherwise, will readily illustrate

how a great field can be satisfactorily covered by the two-letter operation symbol, and still avoid confusion. The standard key given in Chapter IX can therefore be used without change. Following the examples given in that chapter, symbols for any new group can be readily devised.

Some of the more common groups of miscellaneous symbol formations are given in Chapter X. These groups can be adopted substantially as described and without change. Symbols shown in sections 10–A and 10–B of Chapter X are dependent on the standard fixed for drawing symbols (Chapter VII) and piece symbols (Chapter VIII) and need no further explanation. Manufacturing symbols and serial numbers described in section 10–C are comparatively standardized as can be the form and literature symbols described in section 10–E. Filing symbols are, of course, subject to revision from the example given in section 10–D, which describes the author's adaptation to his personal needs. Account symbols described in section 10–F cannot be standardized as to detail, but must be arranged to suit each problem.

Although several exceptions must be recognized as to the general use of certain detail in miscellaneous symbol groups, the general group formations can, without exception, be universally adopted. In fact, any attempt to change the group formations will only lead to error and confusion, while complications will accumulate and no advantage accrue. In the preface to these pages will be found a caution against trying modifications as such procedure will prove more detrimental than helpful.

Every individual abbreviates more or less and everyone has his own kind of abbreviation. What is the result? One person can rarely ever read another's condensed notes; in fact the originator of such notes is often unable to interpret them after they are a few days old. The use of symbols eliminates tnis difficulty and makes the comparison or exchange of abbreviated notes a desirable and practicable

possibility. In other words, symbols are nothing more than *standardized abbreviations.* The advantages of using such a standardization in a business of *any* size is obvious, and when nearly all of the common abbreviations in the form of symbols can be standardized in use between different plants, the value of such standardization is greatly enhanced.

The author hopes that his general scheme of symbolizing may prove sufficiently attractive to interest those in all fields of activity, so that they will adapt it to their own uses and that "general use" may become the authority which shall establish the system as a standard.

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