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# SPECIAL LIBRARIES

*Official Journal of the Special Libraries Association*

VOLUME 46

OCTOBER 1955

NUMBER 8

## Essentials for Document Retrieval

*R. A. Fairthorne*

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## How to Approach the Reference Question

*Dorothy J. Forman*

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## Handling Visual Aid Material

*Beverly Hickok*

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## Films on Salesmanship and Industrial Relations

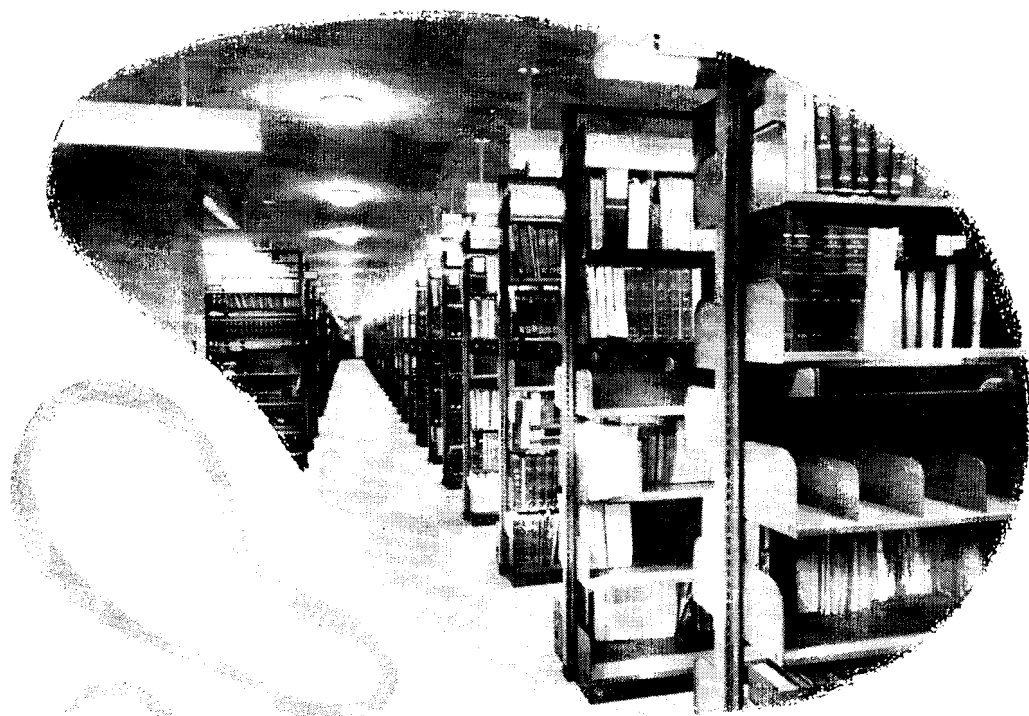
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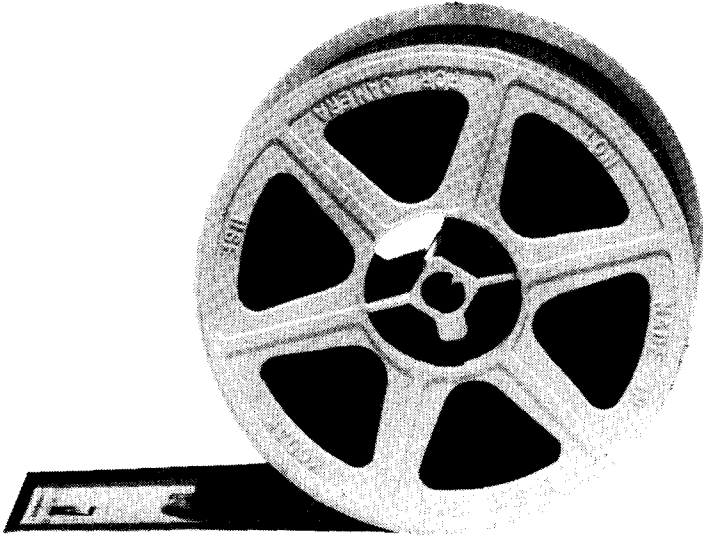
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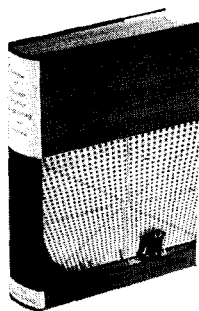
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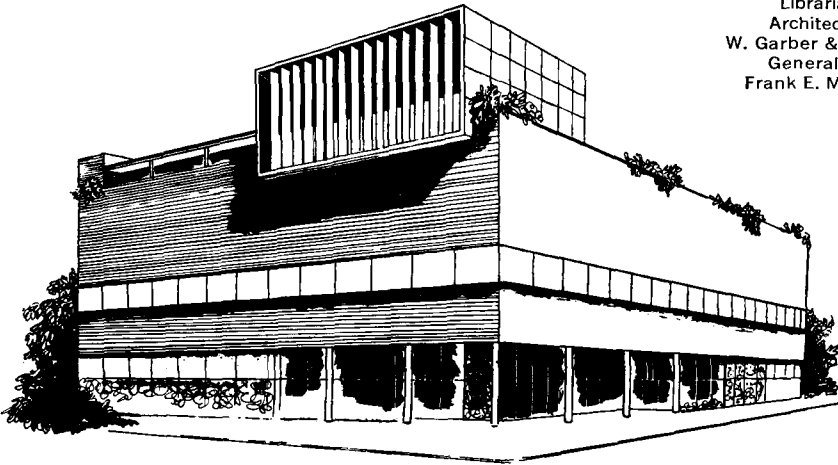
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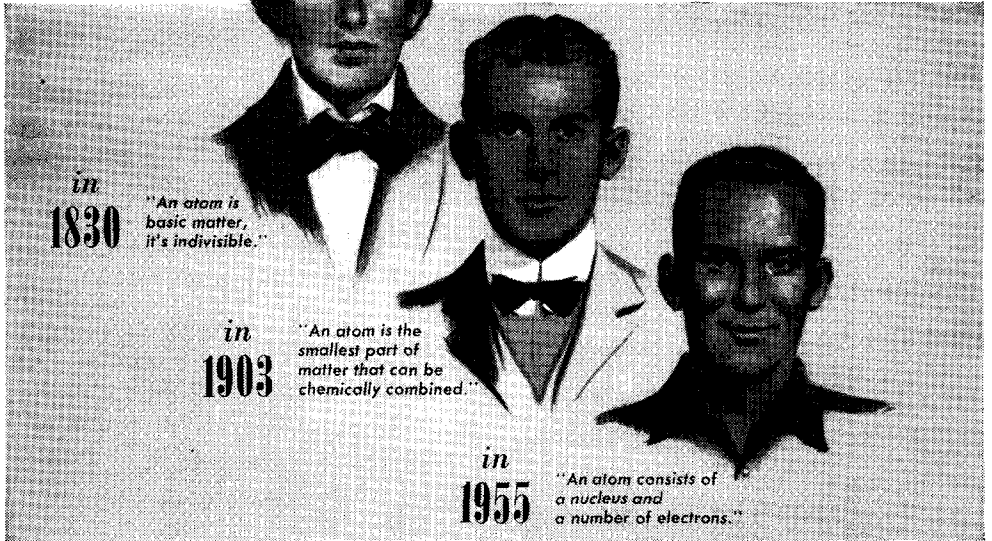
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in  
1830

"An atom is  
basic matter,  
it's indivisible."

in  
1903

"An atom is the  
smallest part of  
matter that can be  
chemically combined."

in  
1955

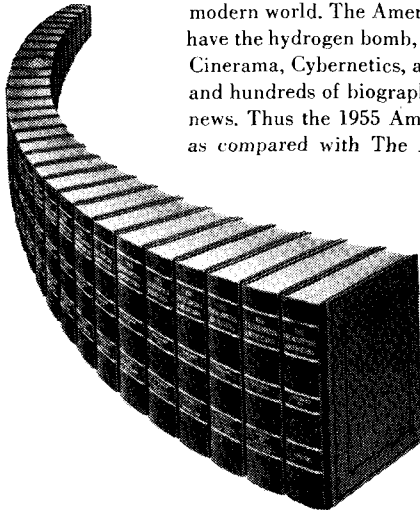
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# SLA—LAG OR OPTIMALIZATION?

**T**HE TREMENDOUS accelerating accretion to our body of knowledge poses a grave problem both to those who must ferret through such morass and to those who must maintain it. The simultaneous unfolding of electronics and atomics portends increased research development that will be felt on varying levels. Projected "crash" programs in development will demand an equal tempo in research methods. Further attenuation in the library field will continue unless determined effort is made to resolve the ensuing problems.

Such neophyte sciences as information theory and cybernetics are being analyzed by harbingers of bibliographic control. Refinements in integrated data processing and mechanical search are becoming increasingly important in technological progress. The present developments in data storage, the increased storage densities of various media used along with the acceleration in scanning speeds are primitive antecedents of future information retrieval techniques.

Experts prophesy that the employment of such methods and devices will primarily occur in government and scientific fields where present prototypes are already being refined. The initial cost of custom installations will preclude their use by any but the large library. However, some segment of the process or equipment will undoubtedly fall within the financial scope of all libraries. Already commercial data processing centers for the resolution of scientific and business problems are available on an hourly basis. The future may provide information storage and retrieval centers on a similar basis for the smaller library. Facsimile transmission and direct long-distance dialing to and from the centers would make more information more accessible to more people than ever before.

All of this cannot and will not be undertaken this year or next, but the experts prophesy that it will be a reality within ten years more or less. Already there is a new and growing field for information research teams, information and documentation specialists. The cataloguer may still be employed for Dewey, but the specialist in encoding may become paramount.

The problem for us is to help resolve the classification problems involved in the utilization of such apparatus. Dr. Gould H. Cloud in the September issue of *SPECIAL LIBRARIES* states: "There's 'gold in them thar hills' for those who equip themselves and go after it." No one can equip himself, much less go after it, unless there is an awareness of the problem. This awareness has not been sufficiently generalized. As a step in this direction the Executive Board of the Special Libraries Association voted unanimously to co-sponsor in company with some seven other organizations a three-day conference on "The Practical Utilization of Recorded Knowledge—Present and Future" at the Western Reserve University School of Library Science on January 16-18, 1956.

An additional step was co-sponsoring a session on "Current Technical Documentation in Europe and America" in Detroit, at the June convention, with the Advisory Group for Aeronautical Research and Development. The papers of that session are being presented in *SPECIAL LIBRARIES*. One of these papers "Essentials for Document Retrieval," was based on information theory and is included in this issue. It is claimed that the application of information theory can lead to establishing a minimum cost for marking documents and clerical processes.

Although to some, theories in the Fairthorne paper may seem more advanced than those presently employed, it is believed that the administrative librarian of the future must become aware of their portent. These steps are but the initial aspects of attempts to resolve a "new philosophy of librarianship."

CHESTER M. LEWIS, *President*

# ESSENTIALS FOR DOCUMENT RETRIEVAL

R. A. FAIRTHORNE\*

*Royal Aircraft Establishment, Farnborough, Hants, England*

## Introduction

**R**ETRIEVAL of recorded information is a special case of mechanical translation. What is called a "library query", but in fact is a text description couched in any ethnic or specialist language, has to be translated into a language whose vocabulary is the documents, texts, or other records of the library. The semantics of this language are widely known only when the text description is strictly a description of text, such as a quotation or title of a book, because all that is called for here is recognition of certain characters, or their synonyms, in the given order. When the description is not of the text itself, but of its content, what it "means" or "stands for", the semantics are wider and vaguer. They are known with exactness to at most one person, the enquirer. Sooner or later he must examine the retrieved items and decide for himself what they are about from his point of view. The delegated clerical part of documents retrieval therefore must be fairly coarse grained semantically. On the one hand it must not make dis-

criminations so fine that there is a large risk of relevant documents being overlooked through differences in interpretation by different users. On the other hand it must not be so indiscriminate as to produce selections so diluted with irrelevancies that their rejection by individual inspection is too costly.

At the input or "query" stage, the client's specification must be pre-edited by translation into a synonym-free language of document content description. Whether this is best done by the client or librarian, and how far it can be done mechanically, are disputable matters at the moment. Nevertheless it must be done if any of the intermediate stages of retrieval are to be mechanical.

By "mechanical" I denote operations carried out strictly according to some pre-specified complete and consistent set of rules. The term does not imply that ironmongery, transistors, punched-cards are used in whole or part at any stage, though marked physical events or material objects of some kind obviously must be used. What is implied is that the activities demand neither resource, discovery, initiative, nor invention. Any such activities can be mechanized, in the hardware sense, by anyone with the necessary skill, finance, time and inclination.

"Clerical" operations are mechanical operations involving observation, identification, and manipulation of inscribed material objects according to some procedure. It is important to remember

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\* Prepared for the joint AGARD-SLA Meeting, June 17, 1955, on "Current Technical Documentation in Europe and America", held at Kresge-Hooker Scientific Library, Wayne University, Detroit. Space limitations have necessitated some abridgment of the text from that presented in RAE Library Memorandum No. 23, dated April 1955. Other European papers presented at that meeting are scheduled for publication in the February 1956 issue of *SPECIAL LIBRARIES*.

that these manipulations and objects must include those for observation, identification, and inscription. Neglect of say typing, moving papers about, etc., leads to remarkably unbalanced estimates of the cost and efficiency of a system. This fallacy persisted a curiously long time in computation, where devices were produced to perform addition and multiplication alone, whereas at least two-thirds of the work really goes to non-arithmetical operation such as transfer and copying. This is even more pertinent in clerical systems where not only the cost of inscription must be considered, but also that due to the storage space and weight of the inscribed objects.

### Semantic Structure

This paper is concerned mainly with clerical aspects of retrieval; those parts that can be delegated to skilful and obedient people or machines. This is not the whole story; if the system has no wider semantics than the clerical operations demanded by inscriptions, it is just a cud-chewing pastime. The point is that these wider semantics can be confined to input and output, the intermediate searching operations being purely mechanical. What we seek are ways to reduce the overall costs of retrieval, including those of overlooking relevant items and of inspecting irrelevant ones. To do this we need a special language of "document content relevancies" into which the original natural language request can be translated.

This language of "document content relevancies" is a matter for librarians and subject specialists in close collaboration. Whatever form it takes, it must not be, *first*, some platonic map of absolute truth or of all knowledge. This would be quite irrelevant to documents, whose contents are what they are, not what they ought to be. *Secondly* it must not be a "missionary" classification. The temptation to educate—i.e., lay down

the law—is strong in all of us. Nevertheless although a well thought out library retrieval system is educational in a sense, the sense is only that in which earthquakes, good women, and eating too much ice cream are educational. It must not, *thirdly*, try to reflect every shade of relation between concepts, and every shade of concept. *Fourthly*, it must not degenerate into obsession with particular codes, gadgets, special alphabets, bad (or even good) mathematics for its own sakes, whang-bars and gimmicks of every sort and description. The basic task is to correlate specifications of content with those documents that will satisfy the specifier, giving due weight to expert opinion on the likely pattern of demand in the near future and allowing for addition of novel and unpredicted items or syntheses. This will establish a network, not of truth, knowledge, or opinion, but of relevance of recorded information to actual and expected specifications.

This network relating requirements and documents will underly all systems for document retrieval. It is for the system designer to pick out the particular aspects of the network—and the particular point of view that he is using—and match them with the particular clerical machinery to be used. In general, particular systems will be coarser-grained than the relevance network, the designer using a rougher sketch map showing only the items and relations he is using. The document-content-relevance scheme need be mapped once only and modified only to keep step with changing patterns of information supply and demand—also, inevitably, to rectify errors.

### Relation Between Prescription and Retrieval Text

The basic relevance network must be as detailed in items and their relations as any retrieval system that will be based on it. How coarse-grained can it

be? Clearly very many specifications, expressed originally in different forms and different languages, will be satisfied by the same block of documents. Such specifications are synonymous or "equivalent", and all must be translated into one distinct description in our language of document relevancies. Ultimately all specifications can be lumped together as synonymous and given the same answer; to wit, references to all documents everywhere. This certainly produces the required document if it exists, and is the only way in which it can be produced. However, it fails to fulfil the first, if overlooked, requirement of all retrieval systems: to aid document retrieval.

To find the limit of useful refinement or detail, recall that the finer our discrimination is between specifications, the smaller the group of documents or part of a document that can satisfy any one of them. This follows from the second basic requirement of a retrieval system: that the documents indicated in response to a given specification must include all those indicated by any sharpening of this specification. For convenience, we will refer to the specifications corresponding to included documents as being "included" in the specification corresponding to including documents. Thus, as you sharpen your specification you decrease the amount of text satisfying it. At the same time you are increasing the amount of text required to state it.

If the specification can be made so fine-grained as to denote less text than can give the information sought, it is over-detailed. In practice over-refinement means that several specifications correspond to the same mark. That is, we have created synonyms once more after taking great pains to omit them.

A special case is that in which the specification and the text satisfying it and the connecting markings can be made the same—for instance, search

for a quotation, proper name, value in a mathematical table or dictionary corresponding to a given entry. Here the information sought is not in the text itself, which is known to begin with, but some associated linguistic or derived and strictly equivalent information such as location, value, or translation. For instance, a library catalog translates specification by bibliographical reference into specification by location.

At best, then, we can get out only the same amount of relevant information as we put in, and this can happen only in purely clerical systems expressed without ambiguity in their most compact forms. Specifications more refined than this either specify a block of text too small to carry the equivalent relevant information, or they become synonymous with other specifications. Either way we get out less relevant information than we put in.

Suppose we coarsen the specification by making it vaguer, so that it contains less relevant information. It will retrieve a larger amount of text, and therefore of irrelevant text. Recall the second basic requirement of retrieval systems, that texts retrieved in response to a given specification must include all texts retrieved by any sharpening of this specification. If this requirement has been fulfilled, the bulk of text retrieved by the vaguer specification will certainly contain any particular item, and the information given by it, retrieved by sharpening this specification. However, the increase in textual information has been traded against loss of information about its location. The vaguer the specification the larger the uncertainty of location.

The enquirer asking for recorded information "about" something or other is asking for more information than he can give in his specification. We have just seen that he can get it only if diluted by irrelevant texts. The best any retrieval system can do is to ensure

that there is no more dilution than is inevitably needed to compensate for the vagueness of the specification.

Telephone numbers and their corresponding addresses are synonymous, so use of a telephone directory illustrates the kind of elaborate operation needed to deal with an infiltration of synonyms into a clerical system.

The language of document-retrieval is always much more compact than that of the required texts. Tentatively, the absolute limit of refinement to which the basic semantic network should be carried is where the description retrieves less than a hundred times its own bulk of script.

This applies to the basic network only. Any actual working retrieval system must use a coarser version. How coarse can be calculated by the techniques of communication theory, given the informational properties of the notational and text languages, the costs of overlooking relevant and inspecting irrelevant items, the relative costs of catering for average or for exceptional queries and, most important of all, the size both of basic elements and of the documentary collections itself.

### Resolution and Size

The principle that the coarser the documentary elements, the coarser must be the retrieval system is well known and occasionally practised. The number of items is equally important, but only a few retrieval systems take account of it. Yet clearly, if we are not to have several descriptions designating the same item, the common part of these descriptions is the sharpest semantic element you can use. Consider the extreme case of a library containing one text only. Every possible description in the semantic network falls into one of three categories with respect to this solitary text. In ascending order of vagueness the description (A) is not relevant to the document (but may be relevant to subsequent acces-

sions), (B) is relevant to the document, (C) may or may not be relevant to the document because, perhaps, we have not yet reached the point of classifying it or we cannot make up our mind. Thus the whole network can be shrunk into or "mapped on" the following simple structure.



Fig. 1

Similarly, if we start with the coarsest possible semantic network, that with one "subject", S, only, we get the same diagram, "C" signifying "may or may not be S"; B, "examined and judged to be S"; A, "examined and judged to be not S". Here the collection of documents has to be mapped on to the diagram, and marked accordingly.

There is a completely free choice of marking or notation. However, because retrieval systems purport to help not hinder retrieval, the marking system is compelled to have a certain structure. The universal principle of Least Effort shows that category C must be marked by not being marked at all. Also the marking of category A must be more elaborate than that of B, because A really belongs to an extension of the system to more "subjects" or to more documents.

The system of marking, or notation, not only links descriptions with documents, it also must specify the operations needed for retrieval. Thus it must reflect in its own structure the partial orderings of these as well. Also there must be quantitative relations between all four so that elaboration of marking, sharpness of specification, and precision of the operations, increase together as the dilution of the retrieved documents decreases.

If this be done it follows that as the number of documents increases, the corresponding elaborations in the system will always be possible and always compatible with the original system. The original ordinal structure can be unaltered, marks and operations will not be amended, but appended. In other

treating them as equivalent and giving them the same name. On the diagram all chains joining the point representing "one or more of the equivalent descriptions" to that representing "satisfying all the equivalent descriptions" will then shrink to a point. Thus in Fig. 2 if one no longer discriminates between

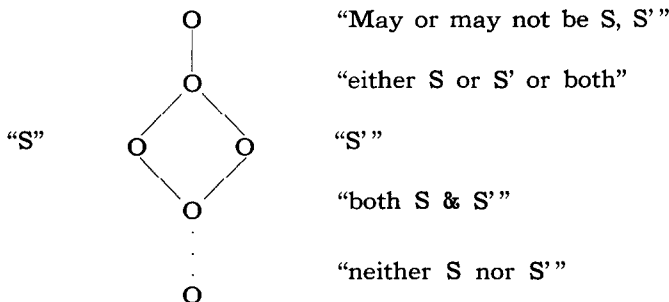


Fig. 2

words the original system can be regarded as embedded in the new, or the new as being built round the original. For instance, if we decide to extend Fig. 1 to two "subjects" S, S' we get Fig. 2. The dotted line to the lowest category indicates that its status is temporary.

Fig. 2 is clearly built round Fig. 1, whichever of the four center elements one considers as having been the original "subject" before extension. Similarly the structure for three subjects can be built round Fig. 2. It has twenty elements, represented as points in a diagram, and the number increases rapidly with the number of subjects if the complete diagram is drawn; for instance six subjects have 7,828,354 distinct descriptions involving them. Only some of these will be needed for any system, and for no system must the detail exceed that needed to isolate a textual unit.

The network is coarsened and contracted to suit the size of the collection by "confounding" descriptions; that is,

the two descriptions, the central lozenge contracts into a point and the diagram degenerates into that appropriate to Fig. 1; to wit, the diagram appropriate to one "subject" only.

Particular systems of document retrieval do not alter the resolution of the network so much as they alter the relational structure. They alter the choice of the most specific elements rather than their number, and delete connecting lines, or even add to, and elaborate, existing connecting lines. Thus the UDC deletes lines to leave downward-spreading non-overlapping "trees", in which there is at most one route leading from an upper to a lower point. "Joint-attribute" systems, such as Zato-coding, delete all but routes fanning upwards from the most specific descriptions to give more general but less numerous descriptions. Others delete all but some pattern that can be factorized as the product of simple patterns.

The kinds of pattern we deal with here can be multiplied together in two

ways, one producing a less ordered pattern, the "cardinal product", the other, a more ordered pattern, the "ordinal product".

In fact, the arithmetic of patterns is a direct extension of ordinary arithmetic. Evidently it is a most useful tool to librarians for the synthesis or factorization of existing patterns from or into simpler patterns on the one hand and on the other, generation by ordinal multiplication of the factors of more ordered patterns for listing or cataloging. Librarians are the empirical pioneers here; mathematicians have had to borrow library terms such as "lexicographic" to discuss the algebras of order.

The number of elements in these products are the product of the number of elements in their factors. Therefore the semantic resolution of elements in the factors can be less than those of the product, usually much less. In "joint attribute" systems the set of working descriptions is or could be generated as the product of relatively few and small disjunct, partially ordered, or chain ordered sets of much more diffuse descriptive elements.

Some existing systems use factor sets much more finely detailed and elaborately ordered than the size of the documentary collection demands or ever will demand. The product of even small "trees" of detail appropriate to, say, the UDC is an enormously large set of descriptions most of which must be empty (i.e. with no corresponding text) or synonymous. The reverse, and much more difficult, factorizing operation is the clerical tool for filtering out synonyms.

The structure of the more general retrieval system of the future will be the product of prime factors and, to that extent, will use techniques appropriate to "joint-attribute" systems. The prime factors, however, will be partially ordered sets requiring the techniques of

the "classical" classification systems. That is, they will be single elements, chains, or trees. These three types of pattern are "prime" in that they cannot be expressed as the cardinal product of simpler patterns. The syntactical structures of the classical systems are therefore soundly based as far as they go. They can be taken further, but the real weakness of most systems has been semantic; the descriptive elements have been associated too closely with linguistic entities. The semantic content of the prime factors just adequate to represent a schedule without too many empty descriptions will not be complete descriptions, still less will it correspond directly with grammatical elements such as the words and phrases of ordinary discourse.

Use of technical terms is not always wise or even kind in papers like this, which purpose to be written in everyday language. When technical terms are already used wrongly and confusingly, their correct use must be indicated. Of late "multi-dimensional" has achieved great popularity in documentation. There is no harm in this provided that authors and readers are both aware that it does *not* mean multi-dimensional. When it does connote something, it appears to connote "multiply-connected". Entities of interest to documentalists are in general both multi-dimensional and multiply-connected. These attributes are independent and important, so their confusion will lead and has led to much grief.

Connectivity is here concerned with the connections or incidences of elements. Thus an element in a traditional classificatory "tree" is unconnected or singly-connected to any other element. The descriptive elements of a conjunctive or "joint-attribute" system are multiply-connected to their component attributes.

The "dimension" of an element of a partially ordered set is the length (i.e.



number of "links") of the longest downward chain from this element. In other words, it is the "height" of the element above the lowest point of the diagram. This interpretation agrees with the geometrical concept of dimension; diagrams and parts of diagrams are often recognizable as picturing the edges and vertices of cubes and other multi-dimensional bodies.

If we consider once more the conjunctive retrieval systems we see that they are low-dimensional. Some indeed are uni-dimensional, the working descriptions all lying on the same level. All are multiply-connected by their very nature. Dimensionality and connectivity are fundamental and independent characteristics of documentary systems. They cannot be used interchangeably or irresponsibly without calling up a false picture.

This section has indicated that given the original detailed network of descriptions and relevancies, this can be contracted and coarsened to fit the "grain" of the documentary collection by factorizing, confounding, or omitting parts of it.

However no documents will be retrieved by just matching them with descriptions. Physical operations are needed also. These must have a correspondingly fine structure and resolution, but no more. Location of shelf, volume, chapter heading or paragraph and recognition of their markings entail increasingly great physical precision and discrimination with corresponding increases of cost, complexity, and fragility.

The notation and marking of the items links operations, descriptions, and documents. Making these marks is also an operation. So operations and notations also must be matched in structure and resolution to the documents and the descriptions. We will now outline the operations.

## Retrieval Operations

Retrieval can be achieved only by one or more distilling stages. These consist of Inspection and Rejection (or selection), these operations being repeated at higher resolution on the smaller and more concentrated fraction of non-rejected (or selected) items.

Distillation covers at the one extreme, exhaustive and minute examination of the entire collection in which the second operation, rejection, is costless. At the other extreme, it covers random selection, where inspection is costless.

Both these extremes are practical methods, widely used. The first is best for very small collections and for situations where the cost of overlooking information predominates, or where it is essential to establish non-existence of the item. Such cases, common in experimental, research, and legal contexts, demand a large final fraction diluted with irrelevances rather than a small concentrated one which risks omitting relevancies. The second method, random selection, is the best when urgency or laziness is the overwhelming consideration, the cost of overlooking information being negligible or neglected.

Clearly an indefinite number of distillation strategies can be devised within these extremes, the number of stages, the size and concentration of the final fraction, the extent and tactics of the sampling procedures, and so on depend on the purpose of the retrieval system within the particular context.

In clerical contexts, distillation covers the general task of "Access" by successive refinement of size of objects, observational acuity, precision of manipulation, and criteria of control. This is illustrated by such familiar activities as access to files through marked rooms, cabinets, and adjacent file covers; location of wanted part of a tape record or film by multiple-speed scanning with observational means ranging from rough estimates of length of film spooled,

through inspection of edge marks or indicator, to looking at or listening to the image content; two-dimensional access, radially across and peripherally along the grooves, to specified parts of gramophone records; finally multi-dimensional access to text, by way of index or of contents list, chapter, section, paragraph or page; formally and geometrically two-dimensional access to keyboards and type cases. Location of marked objects became a problem as soon as man started marking objects intentionally.

Though there are many variants of the problem, the fundamentals are clear enough. Systems of access can work only by applying a limited and specified repertory of actions to a set of material objects (or physical events) marked in a specified way, the actions being determined unambiguously by the marks and, in general, by previous actions. For instance, when looking for a particular house number one can tell whether to go up or down the street only by remembering the previous actions; to wit, the last number inspected and which way you went afterwards. This example shows also that the actions are not confined to the scanning; there are capital and maintenance actions also. Here the capital is represented by storage of the number language used for the house numbers and the recognitive and ordinal properties of its script. Clearly the marking language and its script very much effect the complication and extent of the inspection mechanism.

One can "mark" an object not only by changing it intrinsically in some recognisable way, but also by changing it relative to its environment by putting it in a pigeonhole, on one side, face up and so on. With enough accuracy for this paper these may be called respectively "inscribing" and "ordering" the item. (Alternatively: "marking" and "parking".) Note, however, that to inscribe anything some material object

must be moved to make the inscription, and either the inscribing device must be moved to and away from the inscribed object, or the object to or away from the device. This last severely limits such devices as the Rapid Selector when called upon to produce legible information as well as to scan it.

Similarly scanning for inspection entails movement of the scanner or scanners, or of the collection. Also such movement includes that for marking objects as having been inspected and, if inspected, whether rejected or selected. For instance, we usually move so that inspected and rejected books remain on the shelf to our left, while selected ones are put on one side. Such marking by "ordering" has the great advantage of being both legible and volatile, in that it can be made obvious that the objects are in a different position and such "marking" can be removed without trace. The simplicity is rather deceptive; "ordering" will work only if the collection is maintained in order, and the scanner can memorize its route. If order is maintained, the collection itself can be used as part of the memory mechanism; in fact, as its own map.

Simple maintenance entails complex distillation agents. The UDC, for example, marks books by marshalling them, so distillation involves only physical location of the segregated parts with successively higher physical precision. The markings on the books are mainly to maintain the fixed order segregation demands; the same markings in the catalog to indicate the route. If order were not maintained, the UDC number would become only a description of the book without indication of how to find it. The UDC would then no longer be a marshalling system where items of similar content are marked by segregation and ordered to form larger segregations of wider content, but would be merely a notation for document descriptions.

The segregation principle is extremely efficient, even beyond the limits of strict validity, provided that average performance alone is considered. In some applications, like research or military affairs, it may be more important to meet unusual demands than to have a good average performance. Such applications demand specially modified or designed retrieval systems, but the basic principles are the same.

Segregation combined with multi-dimensional access evidently is much more efficient than linear scanning when there is little doubt as to location or when several individual searches are going on at once. Consider, search along a tape or strip of film. For a given resolution of detail there is a maximum speed of scanning, so the average time to find one item will vary directly with the number of items. Suppose the tape cut into strips which are then pasted under each other like lines of text in a book. Then if we scan, at the same speed, downwards to the correct line, and then span-wise along to the required item, the average time of access can be reduced to be proportional to the square root of the number of items. Similarly if there are three levels the time can be made proportional to the cube root of the items. The price to be paid for multi-dimensional access is increased complication of the recognitive and interpretive devices and directives. There must be corresponding notational complication, because changes of level and resolution must be signalled and acted on. The simple serial approach is a physical realization of the number language in which the  $n^{\text{th}}$  item is represented by  $n$  chalk marks in sequence, and any device for doing it is quite literally a clerical "analogue" computer. Multi-dimensional approach is a physical realization of the radix number languages, such as decimal and £. s. d., where numbers are represented by specification as sums of parts of decreasing magnitude. Devices

for dealing with this are clerical radix computers (usually, alas, called "digital" computers). Machine and manually handled card systems are familiar examples.

Multi-level access is most efficient when the partitioning is so carried out that the average cost of locating and recognizing a unit is the same on each level. If some essential factors are omitted, one can deduce from this various interesting but baleful conclusions about the optimum number of levels. Some of these have crept into clerical and documentation folk-lore, but are valid only over the range where the costs of recognizing and handling vary little with the resolution.

Outside this range, many considerations affect the best number of levels of access. Very low resolutions are expensive; high resolutions are also expensive because they demand precise manipulative and sensing equipment.

Resolution in time is exceedingly expensive; partially because high frequency discrimination entails very precise and complex apparatus, but mainly because of the immense power requirements. For a given size and mass of marked object, the power increases with the cube of the speed of the operations. Marked objects that can be recognized and handled by human beings cannot be much smaller than they are at present. Nevertheless in many contexts documentation operations must be speeded up to deal with the exponentially increasing number of documents and the demands made upon them. Here there is no alternative; to avoid prohibitive power costs we must reduce the size of the marked objects, and use devices of high temporal and spatial resolution for strictly clerical operations. Necessarily these will be automatic.

So far as recognition and obedience to complicated directive are concerned, apparatus can be currently supplied to

any specification. Even commercially available devices can recognize and initiate suitable responses to anything from several hundred to several thousands of ten figure decimal numbers per second, or equivalents in words or patterns. Current devices for inscribed objects are much slower, dealing with at most some hundreds of inscribed characters per second. If the size of the tallies be considerably decreased and the versatility of the machines increased we should easily be able to achieve the required speeds with current technologies.

A fundamental restraint on the number of levels of access is "overhead" cost associated with change of level. For example, when scanning a tape or film at high speed you cannot locate with certainty the segment you require because the resolution is too coarse. You have to stop as near as you can and search slowly at higher resolution till you find it.

If resolution is carried too far "blurring" at the ends of sub-divisions will obscure the subdivisions, and it will be as effective to ignore them and inspect each item separately. When, for instance, a book index shows that several references we want are fairly close together we turn page by page the whole block spanned by the references, rather than locate each relevant page separately.

Clearly the physics and grammar of the marking can aggravate the difficulties of distillation and one seeks, *first*, some method of marking that links the physical operations of sensing and selection; *second*, a notation such that its pragmatics impose rejection or selection according to rule, and whose syntax corresponds to that of the descriptions. For instance the hole-or-slot marking characteristic of an edge-marked card satisfy, within the scope of human manipulation, the first requirement; whether good use is made of this property

depends on the notation.

Whatever the physical form of the notation, usefully it can initiate distillation procedures only—that is, the extraction of successive groups of items each included in the previously extracted group. Inasmuch as it initiates other operations, it is inefficient.

We have seen already that for retrieval the only relation between descriptions relevant to retrieval, as opposed to those within a single description, is also that of inclusion; in the sense that one description includes another if all items satisfying the second also satisfy the first.

The matters dealt with in this section can be treated quantitatively and precisely by the mathematical techniques of mechanics and communication theory and, almost certainly, of what is called "linear programming". Not all problems in these fields have been formulated, let alone solved, but enough is known even now on how to give reasonable limits even if precise methods are not yet available. Even the roughest numerical estimate of the pragmatic implications of any specific proposal are preferable to purely verbal assessment.

### Structure of Notation

Notation links items, descriptions, and retrieval operations. Only in a library which has one user, yourself, can it be anything you care to make it. Otherwise it can only be anything you can make others accept. Thus a list of completely arbitrary marks would work, provided there were enough distinct marks, if users would agree to them. It might well work better than an alleged systematic notation about whose interpretation users do not agree. However there are certain formal requirements which any notation should satisfy, one at least out of necessity, others for convenience.

The necessary requirement is that the notation should supply enough distinct marks to distinguish between distinct descriptions, operations and units of text. When semantic, operational, and textual resolution have been matched, matching of the notational resolution with any one of these implies matching with the other two. An immediate consequence of this requirement is that notation must allow for increase in the number of descriptions or items, otherwise there will not be enough marks to go round.

The only workable way to extend or amend inscriptions is to append others. Deletion and alteration are prohibitively laborious. Scope for expansion can be given by allowing so many reserve "sites" for each expected doubling of holdings or subject interests. Whatever physical form the sites and marks may take—positions on page, film, in the environment, or in time, and written, punched, moved, or other controllable and detectable states—syntax of the notation and physics of its script must allow for such extension.

One relation is common to all pairs of descriptions, distillations and sets of texts. In some definable sense one of the pair "includes (or is equal to)" the other, or it does not. We have already said that one description "includes" another if the set of texts satisfying it contains all texts satisfying the other. Similarly, a distillation operation includes another if the texts it operates on include all those operated on by the other.

Thus, if the system has been constructed to eliminate all synonymous descriptions, operations, and texts, the same network of inclusion relations applies to all these three parts of the system.

Notational patterns can be given useful inclusion relations also. Any significant pattern produced by erasing parts of a pattern can be said to be included

by the latter. Thus, in the UDC notation, any class mark includes all the (more general) marks formed by erasing successive digits from the right. In edge or surface punched cards, one pattern includes another if it is punched wherever the other is punched.

Difficulties arise only when the significant elements of the pattern are not completely disentangled, as in speech and pictures; and when there are synonyms such as accents in speech, and varieties of handwriting, and sizes and faces of type. In these examples the difficulties are unavoidable.

Evidently the same notation can be "written" in various ways which preserve its syntax and relations to descriptions, operations, and texts. Nevertheless convenience in detecting inclusion between "words" will vary greatly with the script used. For example, if UDC class numbers are printed in the same type face, retrieval can be carried out by anybody or anything that can compare the shapes. What the shapes are is a matter of convenience, so long as they can be translated without ambiguity into the standard decimal-arabic numeral language when communicating with other users.

When the notation has the correct structure its script—the alphabet of characters and rules for using them—must be matched with available observational and operational facilities. For instance, both the Batten ("Peek-a-boo") system and "Uniterm" have equivalent notations. In Batten the names of description components, and in "Uniterm" of verbal components, are simply the lists of documents to which the component applies or in which the word occurs. Thus documents simultaneously having a number of descriptive or verbal components are listed by the common part included in all the names of these components. In Batten, the script is multi-dimensional—card, row, and column—and the alphabet has

two characters—hole and no hole. Thus the holes common to various components are found visually by superimposing the names (lists) of the components in register. This simplicity of script and operations, calling only for detection of the presence or absence of a dot, hole, or the like and simple comparison, allows the Batten system to be made as compact as current resolution of observing devices permits. This balances the disadvantage that the notation itself is intrinsically bulky.

The clerical part of the Uniterm system uses, instead of a hole or no hole in a definite position, the serial number of the document. Position, like the arabic numeration, is arranged to facilitate visual comparison of the contents of cards; i.e. to find serial numbers common to the lists. Information about the serial number can be derived from its position alone, but this information is not used. The notation is therefore more bulky than Batten. Because of the relative complication of its script it cannot be compressed so highly as can the Batten system.

Both these systems are in the first instance uni-dimensional with regard to access. The serial numbers of documents are extracted from the name of their description by appropriate comparison techniques applied to the "letters" of that name. The collection of documents is then searched once, document by document, for those with the right serial numbers. This search can be made multi-dimensional if the documents are marshalled by serial number, but this is not intrinsic to the system.

In both systems the size of the notation for a description increases with the sharpness of the description, as it must do. The more detailed the description the more cards make up its "name". The converse holds only within limits. Descriptions more general than those catered for by the system can be synthesized only by making out new cards

including all serial numbers carried on cards that are the names of descriptions included in the more general one.

Therefore the most general and vaguest description of all, "unexamined, but one of our holdings", must be a card carrying all serial numbers and, more important, all cards should carry the serial numbers of unexamined documents. For, as we have seen, an unexamined document is potentially the answer to any library query, and we must not prevent others looking at documents just because we have not looked at them ourselves.

To prevent this we should not punch holes in Batten cards in the sites representing documents that satisfy the specification; we should start with completely perforated or transparent cards and fill in the sites that do *not* satisfy it. This will bring all documents, examined or not, within scope of retrieval, which is an essential requirement. Also, the less we know about a document, the less clerical work we have to do to describe it, because we do not list items but blacklist them. This procedure is particularly easy with photo-electrically scanned cards, but does not appear to be used anywhere. Documents, that, for the moment, can be described only as belonging to the collection, should demand no retrieval mark at all. This is to allow for future description and, if not so obviously, documents that have been found to fit not existing descriptive category must be given the most complicated mark available. Otherwise extension by adding extra digits or letters might convert it into some existing mark.

Evidently retrieval operations will be much aided if the notation structure allows inclusion relations between the marks. These relations will run the other way to the inclusion relations of the descriptions, operations, and texts. For a vague description demands a simpler mark than does a sharper de-

scription included in it. So the mark for any description should include all marks denoting the vaguer descriptions that include it.

The inclusion network of notation therefore should be the same as that for descriptions, operations, and items, but upside-down. Technically it will be the "dual" of these.

The largest common part included by two or more elements is called, amongst other names, the "meet" or "product" of these elements. For example, the product of two edge-notched card patterns is the pattern of notches seen when the two cards are held in register.

The least element including two or more elements is called the "join" or "sum" of these elements. The sum of edge-notched card patterns is the pattern notched in every place, but in no other places are the component patterns notched in.

To some elements, in certain types of network, there may correspond one or more "complements". These are elements with which its product is the "nul" element (i.e. they do not "overlap") and its sum is the "universal" element (i.e. the highest, most inclusive element, assumed to be unique). The relation of element and complement, when it or they exist, is that of photographic negative to positive. Subject descriptions have no complements, for the complement of subject, *A*, is the set of all subjects that are "not *A*"; but no subject can be committed as permanently "not" some other subject, for one never knows.

Complements, when they exist, can do so only relative to existing parts of the system, and are such that the sum and products of the related elements are not the "nul" and "universal" elements, but the greatest and least elements (which must be unique) in the part considered. The network is only "relatively" complemented.

This point has been elaborated because, if unique complementation is assumed within a system, the system is incapable of expansion. Attempts to allow extension will, and do, cause absurdities. This assumption is implicit in any argument based on the representation of retrieval systems as Boolean algebras. As the present writer warned some eight years ago, Boolean algebra is not valid here. It is still not valid, but it is fashionable.

At most, therefore, we allow relative complements and work with the "sum" and "product" only. We assume also that any two elements have no more than one sum and one product. They may have neither. Conjunctive "joint-attribute" systems usually either cannot form sums of categories, or can do so only by extra clerical operations.

Because the notational network should be the dual (the upside-down version) of the descriptive, operational, or document collection inclusion network, the mark corresponding to the sum of descriptions should be the product of the marks for the summed descriptions, and the mark corresponding to a product of descriptions should be the sum of the marks for the factor descriptions. Thus descriptions, operations, documents, and notation will be consistently in tune. Within the range of its validity, the UDC system is so harmonized, as are some conjunctive systems, such as "Zatocoding".

Consider the "two-subject classification" of Fig. 2. The corresponding notational network will have the same shape, because the figure is the same when turned upside-down.

Theoretically we have now the complete solution. In any system, the inclusion network common to descriptions, operations, and sets of documents is formed by erasing parts of the complete network generated by a set of *n* original descriptions, etc., when joined

in all possible ways by the connectives "&" and "or".

The notation for any system derived from this lattice must have the structure, with relation to pattern-inclusion, dual to that of the system. That is, its diagram will be that of the system turned upside-down.

A notation to deal with all possible combinations under "&" "or" would be unwieldy. For evidently there must be enough digits for the notation to span from "unexamined" to "miscellaneous". The complete network generated by  $n$  descriptions is  $2^n$  dimensional and therefore demands at least a  $2^n$  binary-digit notation to mark its elements unambiguously; but in practice we do not want to mark every possible combination, only any of them that may arise and be worth bothering about. Workable notations, and associated operations, that allow this can be devised in many ways, and there is wide scope for research and application in this field alone.

### General Conclusions

This analysis shows present systems to be unnecessarily restricted in the type of compound descriptions they permit and extensions for which they can allow. Few allow, or conveniently allow, both sums and products, and even then the possibility seems accidental. In general one connective alone is explicit; the sum in UDC and the like, the product in conjunctive systems. Notation is kept compact by

ignoring descriptions considered too general or too specific. That is, only the middle zone of the diagram is used and, too often, the "unexamined" and "no description yet available" classes are ignored. Neglect of the first makes unprocessed accessions invisible; neglect of the last compels faulty description within the existing schedule.

Although current activity and criticism is directed towards the problem of retrieving items specified by the conjunction or product of descriptions, the corresponding problem in alternations or sums is equally urgent. It is essential that if there is any uncertainty about which description or "category" fits a document, then this document must be allotted no more than the sharpest description that contains all the possibilities. This will be the sum of the alternative descriptions. Furthermore this document must be retrieved as a putative answer to a search directed under any of the alternative descriptions.

Both conditions will be satisfied if the notation extends systematically upwards into sums, as well as downwards into products.

In general this is not so. The UDC system satisfies both conditions only for items within the same main division.

Retrieval systems must be capable of extension upwards into greater vagueness, and of future sharpening. Otherwise we cannot deal subsequently with new patterns of activity and, in the meantime, the document is either invisible (unprocessed) or mis-labelled.

**THE EXECUTIVE BOARD and ADVISORY COUNCIL**  
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# How to Approach the Reference Question\*

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*Although this paper is based on the approach to reference questions in a metallurgical library, the procedures used are applicable to all libraries.*

**T**ODAY, THE METALLURGIST, no matter what his particular specialty, will know something about each of the following:

1. Ore preparation and refining
2. Physical, chemical and mechanical properties of metals
3. Heat treatment and its applications
4. Various uses of metals in industry — not only those of which the final product is composed, but also the materials which form the equipment used in the manufacture of the product such as machine tools; metals treatment and finishing; and the fabrication of metals
5. Inspection and testing methods, both destructive and non-destructive
6. Joining and bonding of metals
7. Powder metallurgy
8. Wear and corrosion

In addition to the above, the expanding field of knowledge in nuclear science, gas turbines, and jet propulsion has brought about a need for more information about the properties and behavior of metals and alloys at high temperatures and in the field of cryogenics, the properties of metals at low temperatures.

In the approach to reference problems in metallurgy, due to the many new processes and new alloys in use today, the librarian must be able, in considering the question at hand, to

perceive in what phase of knowledge the topic falls. At times, a certain amount of mental gymnastics is required in order to catch the meaning of the question. A phrase or word used by the inquirer may be associated with a subject that the reference worker has experienced previously. For example, the librarian receives, via the telephone, a request for information regarding the removal of chills from cast iron which might, also, according to the person making the request, be found under inoculations and cooling and heat treatment. The librarian knew of the existence of "chills" and that the subject was not new. In such a case, the natural approach was to look first in the library's card catalog and then in books covering the general subject of metallurgy.

The indexes of these books referred to pages and, in some cases, complete chapters on the effects of chill, chill restraining elements, etc. The book finally used in answering the question was *Alloy Cast irons*<sup>1</sup> which contained a bibliography of twenty-seven articles on the subject to which the inquirer might refer in carrying on his research.

This ability to distinguish between the "new" and the "old" is a very important trait in approaching reference questions. When considering a subject of recent origin such as a new product, a new manufacturing process or a device, one will depend upon the most recent periodicals and the indexes that cover this literature. Due to the time lag in publishing and indexing articles of current interests the librarian may,

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\* Paper presented before a meeting of the Metals Division at the SLA 46th Annual Convention, Detroit, Michigan, June 14, 1955.

at times, have to resort to preprints of papers given at meetings of the various technical societies for information. For instance, the development of a new nickel base alloy capable of withstanding the high temperatures of gas turbine engines in jet aircraft was reported upon at the annual meeting of the Society of Automotive Engineers in January 1955. This is an important paper because a major obstacle in the development of better jet and turbine engines has been the metal temperature limit for turbine blades and buckets. At the time of this writing, the only place where this information is available in public print is in the SAE preprint<sup>2</sup> issued at the time of the meeting.

To return to the consideration of the question itself, the librarian must use good judgment in questioning the patron regarding the material sought because he may be a specialist who knows more about the subject than is written in books, or he may be entirely ignorant of the subject matter and is asking the librarian for information. In the latter case, the patron may resent the librarian's questioning and have the attitude that if he knew all the answers he would not be asking the librarian for assistance.

Where the librarian knows her client, he may be approachable and willing to help place the topic in the scheme of knowledge so that the reference worker may, with her own experience of the library collection, go directly to the material required. When the person involved is a highly-placed executive, the librarian must not waste his valuable time, but must take the question, define or find a definition of terms used, and seek the information as quickly as possible herself.

Every reference worker must take heed of the fact that a question is to be answered no matter who asks it. It should always be recognized that the question is important to the person asking it and no distinction should be

made between the inquirer who wishes information on how to build a cupboard for his home or the employee who requests the latest article on shell molding.

When the subject is such that a particular date or author is not important in the search and one is using the periodical indexes—*Engineering Index*, *Industrial Arts Index* or *Chemical Abstracts*—from the subject standpoint, it is usually better to approach the search by beginning with the latest indexes and working backwards. In addition to finding the latest developments, bibliographies will be found that will cover earlier works. In recent years, authors have recognized increasingly the value of a good bibliography. The references they list are usually selective and pertinent and the bibliography will, in many cases, contain enough references to completely answer the question and will save many hours of going through long lists of articles in the various periodical indexes.

#### Evaluating Reference Tools

In using reference tools the librarian learns to compare and evaluate them for the type of material they contain. The various compilations of specifications should be checked for completeness and how well they are kept up to date, either by supplements or by revised sheets where they are issued in loose-leaf arrangement.

Statistical compilations must be compared for recentness of information and for coverage both in time and in subject matter. Accuracy and reliability are the most important considerations in evaluating statistical handbooks. The *Minerals Yearbook* published by the U. S. Bureau of Mines is the authoritative work on minerals production for this country and contains handbook information on various developments. These production statistics form the basis for many other statistical compilations in the field. The sequence of

information in statistical sources should be noted as to whether it follows classified, chronological or alphabetical order. The index should be examined for completeness and an adequate complement of cross-references.

Dictionaries should be chosen for their completeness and recentness. New terms are constantly appearing and the librarian should keep her collection of subject dictionaries as up to date as possible. Many books and articles have valuable glossaries which aid greatly in defining these new terms as they come into use.

#### **Other Information Sources**

An important source of information for any library is the local telephone directory. It is surprising to find out how many people, from the secretary to the general manager to the research worker, lose sight of the material that can be obtained from a telephone call. How many of you have had a request for a trade catalog or technical information obtainable from a manufacturer that can be had by calling the firm or its representative listed in the telephone directory. If the patron is afraid that he will be bothered with salesmen, the librarian can telephone or write for the required information.

The embassies of foreign nations can supply a name or address that is difficult to locate. City, county and state officials are always helpful and a telephone call will expedite the receipt of publications or information required.

A most important approach to reference questions is the use of the resources of other libraries and outside sources of information. Not only should the librarian know and make use of the material available in her own town or city but also those of large cities such as the Engineering Societies Library in New York and The John Crerar Library in Chicago.

When the periodical reference is known, recourse to the *Union List of Serials* or the *Union List of Technical Periodicals* published by the Special Libraries Association will give the location of the periodical in the libraries in the United States and Canada. We find that all libraries rather than loaning valuable books and periodicals would prefer that reproductions such as photostats, microfilms or autostats be purchased.

The librarian with a small collection and limited resources available locally would do well to consider at times the services offered by the Research Information Service of The John Crerar Library. This was established January 1, 1947 to make a special library research service available to industry and business. It is intended for those to whom it would be advantageous to have literature research done by skilled personnel in the library, and who are prepared to reimburse the library for the cost of such service. It provides complete library service for any company which does not have a professionally staffed company library and special project research for companies whose library needs are partially met within their own establishment. A detailed pamphlet describing the service has been published by the John Crerar Library and may be obtained along with other pertinent information by writing: Research Information Service, The John Crerar Library, 86 East Randolph Street, Chicago 1, Illinois.

#### **Translations**

In obtaining a translation of an article, it is at times quicker to try the various sources of translations to see if one has been made rather than to wait for a translator to do it. Special Libraries Association maintains a pool of translations which have been donated by government agencies, universities, technical societies and industries inter-

ested in a wider dissemination of foreign literature through cooperation. By making these translations generally available, the Association and The John Crerar Library, which houses and operates the Pool, also intend that much expensive duplication of translation work will be avoided. When available in paper copies, translations may be borrowed for a service charge and photoprint or microfilm copies may be obtained at the regular rates charged by the Crerar Library. Inquiries should be addressed to the SLA Translations Pool, the John Crerar Library, 86 East Randolph Street, Chicago 1, Illinois.

Russian translations formerly held by the Pool have been turned over to the National Science Foundation. This organization maintains the Scientific Translations Center which is housed in the Science Division, Library of Congress. A monthly *Bibliography of Translations* from Russian Scientific and Technical Literature is published listing translations deposited in or loaned to the Center. Another source of translations of Russian scientific and technical literature is the Department of Scientific and Industrial Research of Great Britain which publishes the monthly *Translated Contents Lists of Russian Periodicals*. A cooperative scheme for preparing Russian translations has been instituted by the Department and translations of articles listed will be made if two or more requests are received for the same article with those making the requests sharing the costs. The *Translated Contents Lists* with further details is available on subscription from Her Majesty's Stationery Office, P. O. Box 569, London, S.E. 1, England.

The foremost translator of metallurgical articles whose work is well known to all members of the Metals Division is Henry Brutcher, Technical Translations, P. O. Box 157, Altadena, California. In the past thirty years, Mr. Brutcher has made slightly over 3,500

translations in this field. Some 2,800 are covered in an index issued in 1951 which contains an author index, a numerical list of the translations, a price list and a list of available catalog sections. The latter is arranged alphabetically by subject and each subject has been assigned a number. The catalog section on titanium alloys, for example, is numbered C-449 and lists all the available translations on this subject, giving the title, author, original source, a brief abstract of the contents, the number of words and the price. The latest list of catalog sections is available upon request from Mr. Brutcher. Separate catalog sections may be obtained by asking for them by number. At the present time, Mr. Brutcher is working upon a subject index to his translations.

In addition to the above sources for translations, a list of others may be found in *Technical Libraries* by Lucille Jackson, published by Special Libraries Association, 1951.

The approaches to answering the varied reference questions asked in a metallurgical library are many in number. Only a few are discussed here. Other reference workers have worked out their own "short-cuts" which aid them in serving their clientele.

## References

- <sup>1</sup> American Foundrymen's Association. Gray Iron Division. Alloy Cast Irons Committee. *Alloy Cast Irons*. 2nd ed. Chicago, Ill.: American Foundrymen's Association, 1955.
- <sup>2</sup> HANINK, D. W. and others. *Development of a new gas turbine super alloy GMR-235*. (SAE preprint no. 453.) Presented at annual meeting, Society of Automotive Engineers, Detroit, Michigan, January 10-14, 1955.

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*As long as the supply lasts, copies of this paper, with additional bibliography not reprinted here, may be obtained from Special Libraries Association, 31 East Tenth Street, New York 3, N. Y.*

# HANDLING VISUAL AID MATERIAL\*

BEVERLY HICKOK

*Librarian, Institute of Transportation and Traffic Engineering,  
University of California, Richmond, California*

A LARGE PERCENTAGE of special librarians are in industry and a relatively small percentage of them are called upon to handle teaching aids. However it does seem highly probable that almost all have men on their staffs who are called upon for papers at conventions, speeches before local groups, or for articles for magazines. Our men at the Institute never consider presenting a paper without a set of some sort of visual aids, or submitting an article without illustrations of some kind. Although large organizations would undoubtedly have a separate department to handle visual aids, many smaller organizations assign such a job to the library.

In our library, we are responsible for six types of visual aids: slides, photographs (consisting of both negatives and prints), Visual Casts, films, display pictures, and maps. We catalog all of these except the display pictures, and, in addition, we assign classification numbers to the maps.

## General Cataloging Procedures

In general, we follow the same rules for cataloging the different varieties of visual aids. An accession number is assigned each item, and catalog cards are typed for each related group of items, or, if necessary, for each individual item.

For example, if a professor brings in a box of new slides we first attempt to

obtain all possible information from him in regard to them, such as the subject, if they were prepared for a particular paper, and, if so, what the title is, and the date and occasion of the meeting. We have separate card catalogs for each different category of visual aids, usually with three or more cards typed for each item, or preferably, each group of items.

Complete information as known is given on the shelf-list card. The number or numbers assigned are typed in the usual left-hand corner of the card, and if we have different forms of the same visual aid, we make cross-references under the number, such as Negative 2359, *see also* Print 1934 and Visual Cast 248. If a title is given for an individual slide or group of slides, it is typed on the top line. If not, a descriptive title is made up. After the words "Prepared for", the name of the man responsible is given. After the word "For", the reason for the preparation is given. After the word "Date", the approximate date of preparation is given. After the word "Source", the exact or approximate source is given. Tracings are listed for subject heading or headings and also for the name of the man responsible for the preparation. We have found that this last card is extremely useful not only because the man himself is very apt to want the slides again, but because the other men tend to think of them as the slides prepared for Professor Smith for the Highway Research Board meeting in 1953. Naturally, the subject heading cards and the added entry card for the

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\* Based on a paper presented before the Transportation Division at the 46th annual meeting of the Special Libraries Association, Detroit, Michigan, June 13, 1955.

man are brief two-line cards.

Nothing is noted on the visual aid itself but the number assigned to it. Negatives, prints and Visual Casts are kept in 9 x 12 envelopes, which have been slit up one side. They are filed in vertical file drawers separated by type. Nothing is noted on the envelopes but the number, which is written in ink in the top right-hand corner. When a visual aid is checked out, the numbered envelope remains in the file, and, if necessary, a spare envelope is given to the person for carrying purposes.

### **Instructions for the Different Categories**

#### **PHOTOGRAPHS**

Each negative is marked with white ink in one corner and each print in black ink on the back, and they are filed in envelopes in separate vertical file drawers. In the beginning, if prints had been made of a negative they were kept with the negative in the same envelope. However, we finally decided it was better to keep the two forms separately, as the men didn't seem to be interested in both at the same time, and it was easier to keep an accurate count of them. As of our last monthly report to the Director of our Institute, we have 1368 negatives and 521 prints.

#### **SLIDES**

We have two sizes of slides, and as of our last report we have 647 of the 2 x 2, and 296 of the 3¼ x 4. The 3¼ x 4 are marked with small labels in the top right corner, and the 2 x 2 are marked in ink in the opening on the top of the slide mount.

We have a special cabinet to house both sizes of slides. It comes equipped with a diffusing screen, but we also had an illuminating arrangement made in the shop which consists of a panel with three fluorescent lights. The person using the cabinet pulls out the panel and plugs it in, pulls out the diffusing screen, the frame in which he is inter-

ested, and then proceeds to make his selection of slides. Each 2 x 2 frame holds 120 slides and each 3¼ x 4 frame holds forty slides, so that each slide is given a frame number plus a slide number. Our cabinet has about forty-five frames in it, although only about a third of them are filled at the present time. The lighting arrangement takes up the space of about seven frames, but we think it is well worth it.

#### **VISUAL CASTS**

Visual Casts do not seem to be generally popular as yet, but our men find them very useful. They are 5 x 7 transparencies in 8⅓ x 9 paper mounts which are used with a special Visual Cast machine. As of our last report, we have 494 of them in the library. In my opinion, there are four advantages to Visual Casts over regular slides. The speaker can face the audience and have the slide projected on the screen in back of him; he can use a grease pencil to mark the transparency and have the marks show up on the screen behind him; they are not breakable; and they are light weight and easily carried.

#### **FILMS**

We have only 41 films so far, and they are kept in cans, with the accession number conspicuously marked with both grease pencil and mystik tape. We keep them arranged by number in a legal size vertical file, but naturally they are of assorted sizes which makes for awkward handling.

#### **DISPLAY PICTURES**

We have made no attempt to catalog pictures. We started saving pictures from calendars and colored ads from magazines if they had anything whatsoever to do with any form of transportation. We then pasted them on colored mounting paper and displayed them on the walls of our library. Our Director was so pleased with the re-

sults that he decided it would be a splendid idea if we prepared pictures to decorate the hall which extends the entire length of our headquarters building. Theoretically, the plan is that the pictures will be changed periodically; however, in practice, we don't seem to find too much free time for our art work.

Fortunately, we have a map case, and we have one drawer reserved for mounting supplies and one for our pictures. We keep the pictures in brown wrapping paper pasted together to form large envelopes, and arranged by broad subject headings such as railroads, airplanes, and Christmas.

#### MAPS

Unfortunately we inherited such a large group of maps at one time that we have never been able to find time to catalog the largest percentage of our map collection. Most of it we have merely divided geographically and filed in drawers in our map case. At the present time, we have only 75 maps cataloged and probably several hundred uncataloged.

The information on the shelf-list card includes such information as author or issuing agency, title, date, scale and number of sheets. We have devised a simple classification scheme. The primary arrangement is geographic, and we

have used 10 for United States and 15 for California, with a breakdown under California of .2 for sections, .4 for counties, and .6 for cities. We have used letters as designations for subjects, as P for Population and TR for Transportation. Transportation, of course, is further broken down by numbers for the various forms, as TR6 for Highway and TR8 for Railroad. This of course is followed by the Cutter number and date. Examples would be 15.2, TR6C65, 1948, which is the number for a set of highway district maps issued by the California Division of Highways, and 10, TR4U355, 1951, which is the number for a map of the U. S. air transportation system issued by the U. S. Civil Aeronautics Board.

#### Conclusion

The growth in the use of visual aids in our own library over the seven years of its existence has been very marked. Apparently this is a common trend today, and special librarians will undoubtedly be called upon by their staff members more and more in the future to handle a variety of them.

We may all complain about the special problems involved, but it seems to me that many of us will be unable to avoid them. We might as well start now to examine the best techniques for handling them.

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## SLA Scholarships

The Scholarship and Student Loan Fund Committee of Special Libraries Association announces two \$500.00 scholarships to be granted for the academic year 1956-1957 for graduate study in librarianship, leading to a degree at an accredited library school. Applicants must be college graduates of high academic achievement who need financial assistance in obtaining the professional education necessary for work in the special library field.

Application blanks and details of eligibility for the scholarship awards may be obtained from the Executive Secretary, Special Libraries Association, 31 East Tenth Street, New York 3, N. Y. Applications must be received by the Scholarship and Student Loan Fund Committee of the Association by March 1, 1956. The awards will be announced at the annual convention of the Association in Pittsburgh, Pennsylvania, June 1956.

# Films on Salesmanship and Industrial Relations

FORREST ALTER\*

*Librarian, Film Council of America, Evanston, Illinois*

THE FILM COUNCIL OF AMERICA is a nonprofit organization for the encouragement of the production, distribution, and use of films, especially in the field of adult education. Requests for information reach the FCA Library from industry, schools, churches, and individuals whose affiliations and interests are not explained.

Many of the requests are for films on specific topics: chinchilla raising, fingerprinting, marching bands, Rodin, adoption, leathercraft, Indonesia. Others are more general and for fields in which there are dozens of films. Two of the general requests frequently received from industrial concerns are for films on salesmanship and on industrial relations. Since many special librarians undoubtedly are asked to locate films on these two topics, we are presenting here a bibliography of filmographies which cover the two fields.

FILM RESEARCH ASSOCIATES, 304 Pinebrook Boulevard, New Rochelle, New York, have published the following Staff Service Bulletins:

- No. 11. *Guide to Motion Pictures, Slide-films and Recordings for Improving Salesmanship*. Edited by C. Armor. 1950. (Out of print.)
- No. 12. *Guide to Motion Pictures, Slide-films and Recordings for Improving Human Relations and Supervisory Techniques*. Edited by C. Armor. 1950. (Out of print.)

- No. 13. *Film Guide for Economic Education*. Edited by B. V. Fuerst. 1950. \$1.50.
- No. 14. *Film Guide for Improving Office Practices*. Edited by B. V. Fuerst. 1950. \$1.50.
- No. 15. *Film Guide on Production and Management Methods*. Edited by S. J. Pollack. 1951. \$1.50.
- No. 16. *Film Guide for Department and Specialty Stores*. Edited by H. McKee, A. Saum, and A. Hanjoglou. 1952. \$2.00.
- No. 17. *Film Guide on Industrial Relations*. Edited by G. Mihaly. 1952. \$3.00.

These are brought up to date in the *Educational Film Guide* published by The H. W. Wilson Company. The eleventh edition of the *Guide* lists over 11,000 films, and supplements are issued semiannually. A subscription to the *Guide* is \$12.50, and this includes the basic guide, published in 1953, semiannual and annual supplements in 1954, 1955, and 1956, and a semiannual supplement in 1957.

THE NATIONAL METAL TRADES ASSOCIATION, 122 South Michigan Avenue, Chicago 3, Illinois, publishes an *Industrial Film Bibliography* which is now in its third edition (1952) and for which the latest supplement is that of August 1954. The basic work sells for \$2.00; the supplement, for \$1.00. This is quite a large list and useful to others than firms in the metal trades field. There is a wide range of subjects covered in this bibliography, including Economics and Business, Handicapped Personnel, Health and Safety, Industrial Engineering, Industrial Management,

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\* Mr. Alter is on leave of absence from FCA having accepted a one-year assignment as liaison representative of the Adult Education Association to the National Institute of Adult Education (England and Wales).



Machine Shop, Office Practice, Personnel Management, Supervision, and Welding.

Another publication which is useful is *See . . . Hear . . . Mr. Businessman . . .*, the 1954-1955 catalog of the AUDIO-VISUAL EXTENSION SERVICE, EVENING AND EXTENSION DIVISION, BERNARD M. BARUCH SCHOOL OF BUSINESS AND PUBLIC ADMINISTRATION, The City College, 17 Lexington Avenue, New York 10, New York. There is no charge for this catalog which lists films and filmstrips on such topics as Business Management, Human Relations, Industrial Management, Industrial Production Techniques, Office Management, Personnel Management, Retailing, Salesmanship, and Time and Motion Study.

*Dun's Review and Modern Industry*, 99 Church Street, New York 8, New York, which has a section on Films for Management has issued free film lists on Human Relations, Salesmanship, Employee Training, Manufacturing Techniques, Work Simplification and Motion Study, Management Methods, and Economics Education along with a list of *Addresses of Film Sources* for the titles listed. These lists are not annotated, but films reviewed in recent issues of the magazine are starred and other filmographies and catalogs in the same field are listed.

BUSINESS EDUCATION FILMS, Film Center Building, 630 Ninth Avenue, New York 36, New York, have "more than 160 titles of rental motion pictures for Commercial Education teachers and training directors" listed in their 1954-1955 catalog.

*Bulletin 22*, August 1952, of the NEW YORK STATE SCHOOL OF INDUSTRIAL AND LABOR RELATIONS, Cornell University, Ithaca, New York, is *A Guide to Audio-Visual Materials in Industrial and Labor Relations* by J. J. Jehring. The subtitle is *A List of Films, Filmstrips, and Recordings Used by*

*Management, Unions, and Educators*. The bulletin is free to New York State residents and 25 cents to others.

BUSINESS SCREEN MAGAZINES, INC., 7064 N. Sheridan Road, Chicago, Illinois, brings out from time to time *The Index of Training Films*. The revised third edition including a 1954 Supplement sells for \$2.00.

An *Annotated Bibliography of Audio-Visual Aids for Management Development Programs*, second edition, was compiled by Charles Hebert for the Fourth Utility Management Workshop and the Sixth Industrial Research Conference held by the Department of Industrial and Management Engineering, Columbia University, in May and June 1955. This list, published by RESEARCH SERVICE, 353 West 57th Street, New York 19, New York, sells for \$2.50.

NATIONAL SALES EXECUTIVES, The Shelton, New York 17, New York, has for sale at \$3.00 *A Guide to Films and Their Uses by Sales Executives*, copyright 1951. This booklet has material on producing sales films, on using films in sales training programs, lists films and filmstrips on sales subjects, and has a bibliography of books and pamphlets prepared for the person who is only partially familiar with the audio-visual field.

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#### CHART ON DESK-TOP COPIERS

A chart on "Desk-top" Copiers, listing cost of the various machines, address of manufacturers, cost and shelf life of paper, type of material copied, maximum size of paper, and other pertinent information, has been prepared by Jo Ann Aufdenkamp, librarian of the Federal Reserve Bank of Chicago.

Anyone wishing a copy of this chart should write to Miss Aufdenkamp at the Federal Reserve Bank of Chicago, Box 834, Chicago 90, Illinois.

## Have you heard . . .

### **Emergency Measures for Flood Damage**

The Library Binding Institute has prepared a brochure with instructions to librarians on emergency measures to salvage and preserve books and periodicals damaged by the flood. Copies may be obtained gratis by writing Library Binding Institute, 10 State Street, Boston 9, Massachusetts. In a similar emergency in 1937, it was possible to save or restore almost ninety per cent of the books and periodicals, despite their immersion in water and mud, when proper procedures were adopted.

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### **Discontinues Wholesale Import Division**

The British Book Centre, Inc., of New York is discontinuing its Wholesale Import Division. Only titles which are available from stock will be supplied in the future; unfilled orders for imported titles will be returned to customers as soon as possible. The British Book Centre will continue to operate its Retail and Library Divisions.

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### **Claiming Serials by Camera**

The following account is reprinted from the July 1955 issue of the *Armed Forces Medical Library News*:

"An efficient system for checking on missing serial issues is an indispensable tool in the operation of the acquisition program of any large research library. In general, two steps are necessary:

- (1) Skipped issues must be claimed as soon as later issues are received, and
- (2) All entries in the receipt record of current journals must be examined regularly for gaps. If reminders are not sent promptly, important journal issues may go out of print, with serious losses to the indexing and reference services of the library.

"Conventional procedures for this type of follow-up require a large number of

typing man-hours, which is a commodity in short supply . . . in most libraries. It was believed at AFML that the application of the Bibliofax Camera . . . would entirely eliminate the typing from the claiming process. Accordingly, preparation for conversion to photography was begun almost a year ago by redesigning the serial record cards.

"A comparison of the new and old systems might be helpful. Under the old system of following up a missing issue, it was necessary to type, on one side of a form postal card, the title and issues desired; on the other side of the card the complete address of the journal was typed. Under the photographic system the serial checker writes the number of the missing issue on a small slip. A photograph is taken of this slip superimposed upon the title and address section of the entry card with a mask bearing a standard message to the dealer. The resulting photoprint is a claim notice ready to be slipped into a window envelope and mailed."

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### **Sale of Periodicals Department**

The Periodicals Department of The H. W. Wilson Company has been sold to the Back Issues Corporation, an affiliate of Kraus Periodicals, Inc.

The combined stock of the two companies makes this one of the largest sources for single issue acquisitions in the world. The Back Issues Corporation, 16 East 46th Street, New York 17, N. Y., will operate as an independent organization specializing in back issues of magazines.

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### **Far East Reference List**

The School of Oriental and African Studies (London) has prepared a cumulation of the first twelve issues of their monthly list of periodical articles on the Far East and Southeast Asia. The

articles, all in western languages, are drawn from a wide range of periodicals. Scientific and technical subjects are excluded, but items on the history of science have been included. The area covered comprises the whole of Asia, (except for India, Pakistan, Ceylon and areas to the west of these), the islands of the Pacific, Australia and New Zealand.

Requests for a copy of the cumulation, accompanied by 70 cents (5s.), may be sent to The Librarian, School of Oriental & African Studies, University of London, W.C. 1, England.

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#### **James Thomson Shotwell Library**

The library of the Carnegie Endowment for International Peace has been named the James Thomson Shotwell Library in honor of Dr. James T. Shotwell, historian, educator, author and President Emeritus of the organization. The library, specializing in basic books and bibliographical guides in the field of international relations, is located in the Carnegie Endowment International Center, United Nations Plaza at 46th Street, New York City. Lee Ash is librarian and Grant Dean, cataloguer.

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#### **The Submarine Library**

The collection of The Submarine Library in Groton, Connecticut, is devoted to the history of the submarine from its beginnings to today's atomic age. Volumes in the library range from a semi-historical account of a diving bell built for Alexander the Great through a compilation of the published material on the construction of the U.S.S. *Nautilus*. Information is not limited to American submarines exclusively; through contacts in the major ship-building nations of the world, the staff has acquired considerable information about submarine development in other countries. The growing collection of literature in the library consists of some 1,200 books and pamphlets, current magazines and bound volumes,

plus extensive files of clippings, photographs, and articles devoted to submarine history. There are also models of famous submarines, paintings and drawings of submersibles, and other memorabilia representing nearly two centuries of submarine development.

For engineers, students, librarians, or naval representatives, the Submarine Library offers facts and figures on some 500 submarines which have been in the service of this country. The library specializes in issuing authentic submarine lists, production figures, historical facts on early craft, and lists of bibliographic material.

The Submarine Library is a unit of the Electric Boat Division of General Dynamics Corporation. SLA member Donald Shepard is librarian of the new and growing collection which was formally opened with appropriate dedication ceremonies on April 11, 1955.

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#### **Library of the HSPA Experiment Station**

The library of the Hawaiian Sugar Planters' Association Experiment Station in Honolulu is an essential arm of science serving the work of the HSPA Station. Founded in 1907, the library's collection has grown to about 33,000 volumes exclusive of thousands of unbound pamphlets and the Project File. A unique and vitally important part of the library and the Station, the Project File is comprised of some 2,500 individual files containing a wealth of data on Hawaiian plantations and Station experiments plus general information on sugar. Station scientists and technicians as well as researchers from many other organizations use the library constantly.

Mabel Fraser, who retired this year as librarian, is credited with the building of one of the world's largest private libraries devoted to tropical agriculture. SLA member Charlotta M. Hoskins succeeded Miss Fraser as librarian of the HSPA Experiment Station.

## NOTES ON SLA MEMBERS

SLA member Rice Estes has been named librarian and associate professor of library science at Pratt Institute, Brooklyn, New York. Mr. Estes, who comes to Pratt from George Washington University, where he has been chief assistant librarian since 1953, will also be acting dean of the Pratt Institute Library School.

Mr. Estes has been active in the American Library Association, New York Library Club, District of Columbia Library Association, Special Libraries Association, for which he served on a number of committees, and the Connecticut Library Association, of which he is a former secretary. He has published many articles in various professional journals.

Alma C. Mitchell, acting editor of *SPECIAL LIBRARIES*, was named Outstanding Woman of Essex County (New Jersey) for 1955-56 by the Executive Council of the Women's Service Clubs of Essex County. The *Newark Evening News* of September 13, 1955, carried an announcement of the honor in an article accompanied by a photograph of Miss Mitchell.

A charter member of SLA's New Jersey Chapter and its first president, Miss Mitchell is also a former president of the Association. Until May of 1955 she was librarian of the Public Service Electric & Gas Company in Newark.

Dr. Simone Schwind, president of SLA's Oak Ridge Chapter, attended the International Conference on the Peaceful Uses of Atomic Energy in Geneva, Switzerland, August 8-20, 1955, as a member of the U. S. Secretariat Staff.

Also participating in the activities around the Geneva Conference were SLA members Donald B. Davis, Mrs. Charlotte Chestnut, and Alden G. Greene. They prepared a card catalog of the unclassified Atomic Energy Commission's reports which was shipped to Geneva drawer by drawer.

## SLA AUTHORS IN PRINT

BOHNERT, LEA M.: Two methods of organizing technical information for search. *American Documentation*, vol. 6, no. 3, July 1955, p. 134-151.

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CHAIT, FRIEDA W.: Index to the building laws of the City of New York. 1955. 103p. Available from Record Press, 214 William Street, New York, N. Y., at \$2.00.

\* \* \*

CLAPP, VERNER W.: Type is tanglefoot. *Library Journal*, vol. 80, no. 15, September 1, 1955, p. 1747-1753.

\* \* \*

CUNNINGHAM, EILEEN R. (with the collaboration of Eleanor G. Steinke): Classification for medical literature. 4th ed. rev. 1955. 184p. Available from Vanderbilt University Press, Nashville 5, Tenn., at \$2.75.

\* \* \*

DITZLER, FERN: Micro Switch, Division of Minneapolis-Honeywell Regulator Company. *Illinois Libraries*, vol. 37, no. 6, June 1955, p. 179-181.

\* \* \*

GRIFFITH, VERNA H.: The Librarian is a member of the faculty. *Nursing Outlook*, vol. 3, no. 7, July 1955, p. 369-371.

\* \* \*

SHENITZ, HELEN A.: The Vestiges of Old Russia in Alaska. *Russian Review*, vol. 14, no. 1, January 1955, p. 55-59.

\* \* \*

SOUTHERN, WALTER A.: European chemical documentation services. *The Library Quarterly*, vol. 25, no. 3, July 1955, p. 235-242.

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## OBITUARY

BARBARA HEATH, military intelligence research specialist in geography at the Army Map Service library in Washington, D. C., died on August 31, 1955.

A native of Hartford, Connecticut, Miss Heath received a bachelor of science degree at Colby College, Waterville, Me. Later she did postgraduate work there and taught in New England before coming to Washington.

Miss Heath was a member of SLA's Washington, D. C. Chapter, and until recently she was chairman of the chapter's geography and map group. She was also a member of the Association of American Geographers.

## NEW SERIAL PUBLICATIONS

### JOURNAL OF ELECTRONICS

Publication of Volume I, Number 1, of a new periodical, *Journal of Electronics*, has been announced by Academic Press Inc., distributors of the *Journal* in the United States and Canada. The *Journal* will serve as a forum for electron physicists, solid state physicists, chemists, and engineers, and will contain accounts of both theoretical and experimental work.

Dr. J. Thomson of the Royal Naval Scientific Service will act as editor. Volume I, consisting of about six hundred pages, which will be released in six parts, is priced at \$15.40; single issues are available at \$2.80. Orders originating in the United States and Canada should be addressed to Academic Press Inc., 125 East 23rd Street, New York 10, N. Y.

Reports of original research by scientists from the United States, Great Britain, Germany, Holland, and Switzerland are scheduled for inclusion in Volume I, Number 2.

### UNITED STATES GAZETTEERS

The Office of Geography, U. S. Department of the Interior, has issued a new series of United States gazetteers with officially approved place names. *Number 1* of this series, which will cover the world, is on British East Africa. It lists places and geographic features by approved name with cross references from variant names. The publication designates for each name the entity to which it applies (such as a populated place or a mountain), the latitude and longitude, the area or administrative division in which the feature is located, and some of the maps, charts or books used as source materials. *Gazetteer Number 1* may be ordered from the Superintendent of Documents, Washington 25, D. C. at \$2.75 a copy.

*Gazetteer Number 2* is on Madagascar, Réunion, and Comoro Islands. The price is \$2.50 a copy.

## BOOK REVIEWS

BOOKS, LIBRARIES, LIBRARIANS. Contributions to Library Literature. Selected by *John David Marshall, Wayne Shirley, and Louis Shores*. Hamden, Conn.: The Shoe String Press, 1955. 432p. \$6.

The idea of an anthology of readings in librarianship first occurred to John David Marshall during his second year of graduate study. The result is this delightful volume. These essays have been reprinted from many and varied sources and are excellent examples of our professional writings. They are not only informative and instructive, but above all, interesting reading. The articles should be an inspiration not only to those who have already entered the charmed circle of librarianship but also to those contemplating doing so.

The book is divided into four sections: Books and Reading; Libraries; Librarians and Librarianship; and Notable Statements of the Librarian's Profession. Among the authors are Sir Winston Churchill, Mary W. Plummer, Louis Shores, Dwight D. Eisenhower, Dorothy Canfield Fisher, Ralph A. Ulveling, Ruth Savord, Arthur E. Bostwick, Archibald MacLeish, Wayne Shirley, Robert B. Downs, Leon Carnovsky and David H. Clift. The book ends with a "Code of Ethics for Librarians."

For those who wish to have an insight into the many phases of the library profession, this book is highly recommended.

ALMA C. MITCHILL

\* \* \*

INFORMATION PROCESSING EQUIPMENT. Edited by *Milburn P. Doss*. New York: Reinhold, 1955. 270p. \$7.50.

The material in this book was first presented in 1953 at a symposium entitled "Equipment for the Preparation, Reproduction and Utilization of Technical Information" sponsored by the Division of Chemical Literature of the American Chemical Society. Its contents are intended to assist the reader in deciding on the type of equipment most nearly meeting his requirements. Each chapter has a bibliography and the entire book is indexed. Special librarians interested in applications of photographic methods will find pertinent material throughout the volume, but particularly in chapters two, four and five, entitled: Lenseless Copying with Sensitized Papers; Microcopying, Methods and Uses; and Xerography; Dry Photographic Copying.

Other chapters deal with offset printing, preparation of slides, audio-methods, punched cards and numerical data-handling machines. The book has a high reference value being well supplied with detailed data, glossaries, addresses of manufacturers and other facts.

ROBERT S. BRAY

# Off the Press . . .

Information furnished the editorial office on new publications is not always complete. Omission of a price does not necessarily indicate that the publication is free.

## Bibliographies

- ARAB LEAGUE BIBLIOGRAPHY. By *B. J. Boutros-Ghali*. New York: Carnegie Endowment for International Peace (James T. Shotwell Library) August 1955. Mimeographed. 4p. Gratis.
- BASIC READING LIST FOR FIRE, CASUALTY, MARINE INSURANCE, AND BONDING. New York: Insurance Society of New York (107 William Street) July 1955. Mimeographed. 10p. Gratis.
- A basic and annotated bibliography in the fields of non-life insurance.
- BIBLIOGRAPHY OF HERALDRY, INSIGNIA, CRESTS, MEDALS. Special Bibliography No. 2. Prepared by *Olen C. Jeffries*. Fort Sill, Oklahoma: The Artillery & Guided Missile School Library, 1955. 22p. Mimeographed. Gratis.
- A bibliography of materials in The Artillery & Guided Missile School Library.
- A BIBLIOGRAPHY ON SOUTH AMERICAN ECONOMIC AFFAIRS. Articles in Nineteenth-Century Periodicals. By *Tom B. Jones* and others. Minneapolis: University of Minnesota Press, 1955. 146p. Paper, \$5.50.
- Almost 10,000 entries and cross-references grouped under eleven South American nations with nine subheadings under each. In addition to Spanish, Portuguese and English, the bibliography includes articles in French, German, Italian, Swedish, Danish and Dutch. Over 225 periodicals are indexed.
- ELECTRONICS IN BUSINESS: A DESCRIPTIVE REFERENCE GUIDE. Edited by *Herbert F. Klingman*. New York: Controllership Foundation (2 Park Avenue) 1955. 176p. \$2.
- A descriptive reference guide to sources of information on electronics in business. Brings up to date the 1954 study, *Business Applications of Electronic Machines*, and includes the items which appeared therein.
- EXECUTIVE COMPENSATION. (Selected References No. 65.) Princeton, N. J.: Princeton University (Industrial Relations Section) September 1955. 4p. 20 cents.
- A GUARANTEED ANNUAL WAGE. (Bulletin of the Business Information Bureau, Vol. 26, No. 2.) Cleveland, Ohio: Cleveland Public Library, Mar.-Aug. 1955. 4p. 25 cents.
- An annotated list of references, largely of recent date.
- THE GUARANTEED ANNUAL WAGE AND BUSINESS STABILIZATION. A Bibliography. Selected by *Henry C. Thole* and *Charles C. Gibbons*. Kalamazoo, Michigan: The W. E. Upjohn Institute for Community Research, 1955. 13p. Gratis.
- INCENTIVE WAGE SYSTEMS. A Selected Annotated Bibliography. (Bibliographical Series No. 83.) Princeton, N. J.: Princeton University (Industrial Relations Section) 1955. 24p. 50 cents.
- INFRARED: A LIBRARY OF CONGRESS BIBLIOGRAPHY. Compiled by *Clement R. Brown* and others. Washington, D. C.: Department of Commerce (Office of Technical Services) 1955. \$3.
- Includes references to literature published from 1935-1951 on infrared radiation and its applications in science, technology, and industry.
- ISLAND BIBLIOGRAPHIES. Publication 335. By *Marie-Hélène Sachet* and *F. Raymond Fosberg*. Washington, D. C.: National Academy of Sciences—National Research Council, 1955. 577p. \$6.
- Includes bibliographies on Micronesian Botany, Land Ecology of Coral Atolls, and the Vegetation of the Tropical Pacific Islands. Annotated and extensively cross-indexed by subject and geographically.
- LEASING OF INDUSTRIAL EQUIPMENT. Reference List No. 16. Boston, Mass.: Harvard University (Baker Library, Graduate School of Business Administration) May 1955. Mimeographed. 4p. Gratis.
- A selected list of recent references on leasing of machinery and transportation equipment.
- LIST OF SWEDISH TECHNICAL PERIODICALS. Compiled by *Dr. Carl Björkbom*. Stockholm: The Swedish Institute, 1955. Mimeographed. 15p.
- Classified under broad subject headings, the listing includes the subscription (in Swedish crowns), place of publication, and frequency of issues. Swedish text.
- MAGAZINES FOR THE BUSINESS EXECUTIVE. Reference List No. 3, Revised. Boston, Mass.: Harvard University (Baker Library) May 1955. Mimeographed. 7p. Gratis.
- A list of some 100 American magazines representing the principal fields of business activity. Preference has been given to those which

are indexed in *Industrial Arts Index* and *Public Affairs Information Service*.

**MANAGEMENT PLANNING AND CONTROL.** An Annotated Bibliography. Prepared by the Controllership. Foundation. Edited by *Herbert F. Klingman*. New York: Controllership Foundation (1 East 42nd St.) 1955. 176p. Paper, \$6.50.

Material on management planning and control published up to January 1, 1955, in the U. S., Great Britain, France, Canada, Australia and New Zealand. Organized by seven topical classifications.

**NARCOTIC ADDICTION.** A List of References. Washington, D. C.: Armed Forces Medical Library, 1955. Gratis.

### Dictionaries

**CONCISE ENGLISH-CHINESE DICTIONARY.** By *Shau Wing Chan*. 2nd ed. Stanford, Calif.: Stanford University Press, 1955. 433p. \$6.50.

Includes the material in the 1946 edition plus an Addendum which provides about 500 additional English key-word entries.

**DICTIONARIES — BRITISH AND AMERICAN.** By *James Root Hulbert*. New York: Philosophical Library, 1955. 108p. \$2.50.

Development of the English dictionary from Anglo-Saxon times to the present. One section deals with the tasks of an editor of a modern dictionary.

**DICTIONARIES OF FOREIGN LANGUAGES.** A Bibliographical Guide to the General and Technical Dictionaries of the Chief Foreign Languages, with Historical and Explanatory Notes and References. By *Robert L. Collison*. New York: Hafner, 1955. 210p. \$4.

A bibliography of over 1,400 general and specialized dictionaries, covering 255 languages and dialects with details of publication, historical data and explanatory notes.

**DICTIONARY OF LEGAL TERMS — SPANISH-ENGLISH AND ENGLISH-SPANISH.** By *Louis A. Robb*. New York: Wiley, 1955. 228p. \$8.

**THE MODERN TEXTILE DICTIONARY.** By *George E. Linton*. New York: Duell, Sloan and Pearce — Little, Brown, 1955. 772p. \$12.50.

Totalling 12,000 terms, the dictionary covers all phases of textile production and manufacture. It includes terms both old and new, domestic and foreign, technical terms and phrases of established importance. Illustrated with pictures, diagrams and flow charts, weave constructions, etc.

## CALENDAR

### OCTOBER 17-21

National Metals Congress. Philadelphia.

### OCTOBER 19-21

SLA Metals Division. Philadelphia. Sylvania Hotel. Fall Meeting.

### OCTOBER 20

SLA Philadelphia Council and SLA Metals Division. Philadelphia. Joint Dinner Meeting.

### NOVEMBER 2-4

American Documentation Institute. Philadelphia. Sherwood Hotel. Annual Meeting. Exhibition of Documentation Devices.

### NOVEMBER 3-5

SLA Executive Board and Advisory Council. New York City. Statler Hotel. Fall Meeting.

### NOVEMBER 14-18

American Public Health Association. Kansas City, Missouri. Municipal Auditorium. 83rd Annual Meeting.

### NOVEMBER 22-25

First International Congress on Documentation of Applied Chemistry. London. Lecture Theatre of the Institut Francais du Royaume Uni, Queensberry Place, South Kensington.

### NOVEMBER 26

Eastern College Librarians. New York City. McMillin Academic Theater. Columbia University. 41st Annual Meeting.

### NOVEMBER 30

SLA Pittsburgh Chapter. Hagan Corporation. Lecture and Demonstration — "Book Repair and Bindings."

### DECEMBER 28-29

American Association for the Advancement of Science. Atlanta, Georgia. 1955 Winter Meeting. Conference on Scientific Editorial Problems.

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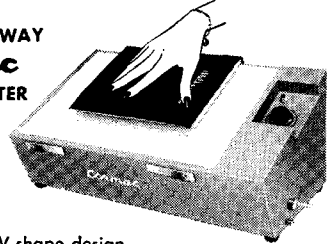
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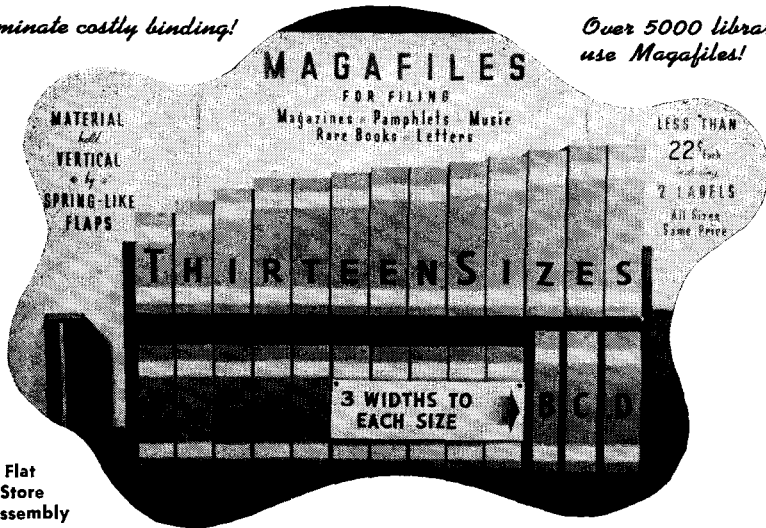
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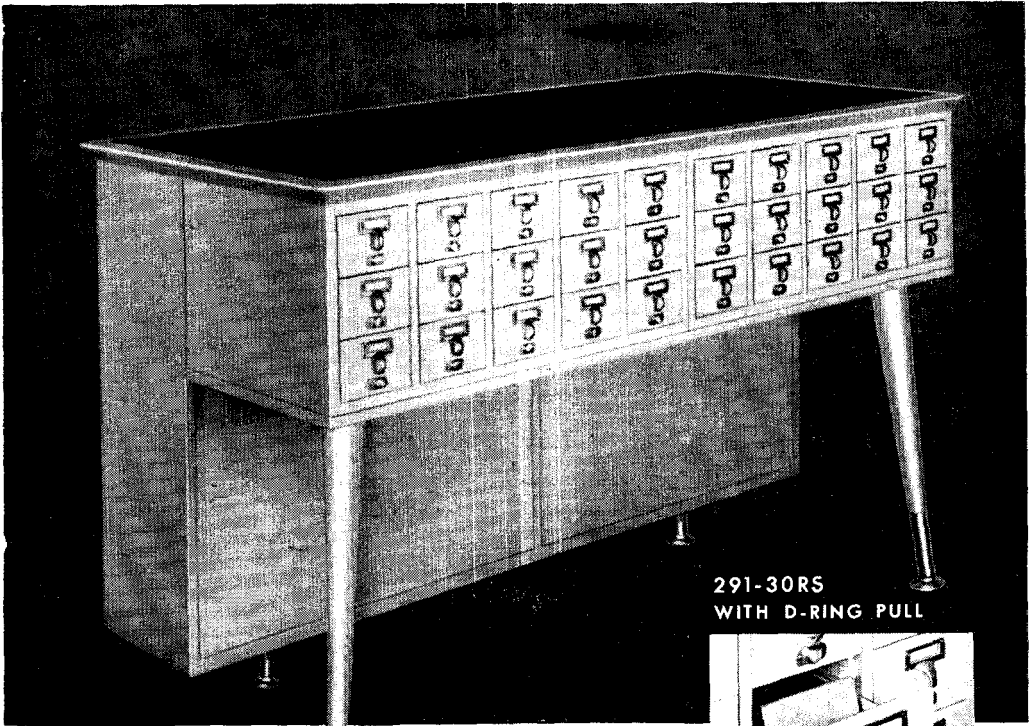
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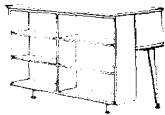
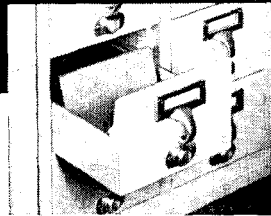
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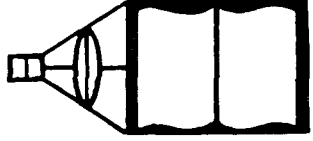


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