

REVIEW ARTICLES

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PROBLEMS OF DOCUMENTATION

One of the commonplaces of our century, stated either in derogation or self-congratulation, is to cite the extraordinary growth of human knowledge and the resulting enrichment of our universe during the past hundred years. The internal consequences of progress within the scientific field on the other hand are less moving. At most, complaints are occasionally heard about its obvious evils: extreme specialization resulting from the extension of research and the inevitable separation of discipline from discipline and of scientific life from daily life as well—a separation which generates technical or psychological problems depending on whether one is more disturbed by the isolation of acts or the solitude of men; problems of communication in any case which, it is believed, admit of no real solution without the assurance of better circulation of information within the collective organization of research.

In theory, such remedies depend on two different kinds of action: those which add new ways to the existing *network*, and those which transform the rules of use, the *code*, to increase the flow of traffic within a given period of time. Such are, in effect, the precepts of an elementary cybernetics, the importance, if not the practice, of which may be observed daily in the crowded streets of Paris.

However, in the present organization of research, even first principles are often misunderstood. To combat specialization, separation, even alienation—the word is not too strong when one thinks of the pathological

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turn that specialization is taking today in some important fields of endeavor—we have been generally content to develop the existing means of communication. Year after year, international congresses and bulletins multiply the exchange of information among the various disciplines, while works or conferences of popularization struggle to maintain some links between, as someone innocently put it, “scholars and men.”

Now these remedies attack not the causes, but the consequences of the evils mentioned. Further, by a strange paradox, they themselves aggravate the situation they combat; for attendance at meetings and the reading of publications devoted to this beneficent crossing of the frontiers of knowledge mean effort and time which the scholar is unable to give to research itself within the frontiers; the final result is that the individual can keep abreast of the increasing body of knowledge only by limiting himself to an ever-smaller field. The remedies encourage the process whose evil effects it seeks to reduce.

The problem of communication must consequently be approached from another angle, doubtless that of a second and more radical sort of intervention, changing the very organization of the network. But first let us analyze the facts.

The work potential of the human organism is approximately fixed; on the other hand, the amount of work to be done is constantly increasing in every dimension. The relation between potential and amount of work has never been maintained except through the intermediary of a machinery, continuously adapted to new required operations. The distinction between physical and mental operations is no longer valid; according to the needs of the moment, the tool may be machine or method, each basically nothing but a formal version of the other. Such being the case, the deplorable dis-harmony between the measure of man on the one hand, and the increasing breadth of knowledge on the other, finally appears as nothing but a deficiency in machinery. Before sadly accepting the fatality of separation, we must be sure that all the instruments—machines and methods—which might give man at least a chance of harmonious knowledge are being properly utilized.

That is the aim of this study. It does not apply to the exact sciences, which for the most part have advanced so far that they have already dealt with the problems of methodology which we raise. Our concern is rather with humanistic studies, especially archeology, with which we are familiar. One soon finds in the present organization of archeological research a *schema* which is also valid for other sciences; in addition, recommendations

arising out of our analysis will readily lend themselves to abstract expression, applicable to the specialized meanings of each human “ology”—psychology, ethnology, etc.

The material remains of antiquity provide the archeologist with a body of material for study which has considerably increased during the past hundred years; this continuous growth poses problems of methodology which are all the more irritating in that they are obstinately ignored.

The facts, however, are known; as discoveries multiplied, the objects were acquired by various museums, dealers and private collectors, so that it is no longer possible to explore them exhaustively. We turn more and more frequently to publications where these objects are pictured and described; but the publications have multiplied in turn, and soon the obstacles momentarily surmounted by reproduction are raised again by the multiplicity and variety of the publications. As a result the elaboration of bibliographical documentation on certain subjects is often as slow and costly as a visit to all the sites, museums and collections which house the objects themselves.

This assertion usually draws the following answer: “Admitting the increase of material, tools of research are perfected at the same time so that the dynamic relationship between ever-increasing amounts of material and ever more efficiently trained minds is approximately constant.” This optimism soon disappears in practice; but its most serious fault is in masking, behind an affirmation which is theoretically plausible, the practical drawbacks of working methods which should be not perfected, but abandoned.

What are after all these modern tools which are supposed to assure the man engaged in research that he has the necessary intellectual grasp of the growing complexes of facts? They are of two sorts: those which speed the acquiring of factual knowledge—catalogues, for example—and those which aim rather to guide bibliographical research—bulletins or analytical répertoires.¹

1. *Bibliographies*

It is certainly easier today than it was fifty or a hundred years ago to assemble a list of studies relating to the subject one wishes to treat or to

1. This division is too systematic, for catalogues often lead to a bibliography, and *vice versa*; it is really less a question of two different sorts of tools than of two complementary functions of one diverse set. The exposé will nevertheless be more clear if this artificial but concrete aspect of the opposition is kept in mind.

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understand. A growing body of printed material offers at best a summary of knowledge, and at worst a list of the documents which as a whole describe the current state of the material in question.

These works have one inevitable defect: they become dated. No great harm is done if basic bibliographies obtained in this fashion can be kept up to date. This they can be, through periodical publications, particularly those which appear at regular intervals and include methodical tables and indexes; better still are those which, like bulletins and analytical répertoires, are nothing in themselves but tables and indexes.

Now these bibliographical works appear in most countries where archaeological research is underwritten by public or private subsidy; in addition, UNESCO has in recent years generously favored their development, so that the problem of bibliographical orientation can be considered nearly solved.

Few scholars, however, consider these solutions sufficient; where are they lacking? In quantity? To take but one example, few works or articles escape the attention of the *Répertoire d'art et d'archéologie*, a weighty publication; but the répertoire would remain insufficient even if its field were extended or its system of classification refined. For the fault here is not a quantitative one; the inadequacy of the instrument is not in its shape or size, but in its form; and rather than being insufficient, the instrument is inapplicable, at least for a whole range of operations which the man engaged in research must still attack with the time-worn weapons of scribes and copyists.

We want to be able to find, without great effort, the specialized literature on a given subject. With this aim in mind, we must first situate the subject in relation to the different systems of classification employed in the bibliographies consulted. The ideal classification is obviously one which would enable us to establish unequivocal relations between its different headings on the one hand, and the multiple aspects of whatever the subject might be on the other hand. If the headings are few and the subject vast, each heading is followed by a long list of references, among which the reader cannot know which ones really treat the particular phenomenon under consideration; in this case the bibliography is perhaps complete, but it is not necessarily pertinent. If on the other hand the headings are numerous and the subject a limited one, then each heading lists only a few references, surely useful to the reader but omitting those which, classified elsewhere because of their title or their major subject, nevertheless treat par-

tially and perhaps importantly the matter in question; in this case the bibliography is pertinent but not necessarily complete.

It would be complete if all the works cited and summarized were then analyzed into what might be called atoms of information—as in a very complete index—which would then appear under the different headings of the classification. If this method is impractical because of the effort and expense involved, present procedures of bibliographical documentation are only an unfortunate compromise between the two needs, pertinence and completeness, which are practically, if not theoretically, contradictory.

If the method is impractical . . . but is it? Yes, certainly, in the present organization of research; for if it were attempted, the material obstacles would be doubled because of an irresistible temptation to sin against reason: the analyst, breaking the written work into its component parts, would repeat in reverse the work done by the author.

But why do we use the conditional, since this happens every day? Save for a few exceptional works provided with elaborate *and* intelligently composed indexes, books and especially journals, where analytical tables are still so rare, must now be dissected one by one, broken down into notes or personal file cards according to the classifying criteria and the particular interests of each reader. And what is so dreadful about this, it might be, and is, in effect, asked, since personal invention has this as its price and since without original documentation no creation is possible?

This shows lack of understanding of the documentation under consideration, for in the last analysis the reassembled elements are essentially facts, identical on all reference cards, and in no way original since they are borrowed from a common fund of acquired knowledge. There is originality only in the choice and grouping of the data out of which personal, individual thought is developed.

The point of view, however, is open to challenge: are these facts, or do they merely have the appearance of facts, like those of, say, alchemy? The objection is surely valid when applied to certain fields of present-day study, let us take sociology for example, but it does not hold for archeology, which has the advantage of being concerned with concrete data generally accessible to direct and universal appraisal. There are even in archeology certain limits to the *objective* determination of facts, but they arise out of either a belated semantics which can be refined, or an advanced form of logic which doesn't yet affect the structure of archeology.

In short, only a confusion of two different aspects of research obliges the individual to collect facts in a personal file² for any and all practical purposes, that is, with a view toward unforeseeable operations he will perform with them throughout his career. These operations should doubtless be personal, but there is no reason at all for the collection to be personal; there is indeed every reason why it should not be, as we now propose to show.

The sin against reason mentioned by us above is not the only one of its type. As soon as factual documentation becomes the work and the property of scattered individuals, there is an extraordinary multiplicity of individual but approximately identical tasks, whose number and necessity increase proportionately with the discovery of new facts. The phenomenon then takes one of two equally revolting turns:

First possibility: Individuals accumulate a wide range of information to be applied not only to a work in progress, but to a whole scale of future studies. Now among this information there is always much that is common to several researchers, so that each of them undertakes a job of preventive exploration largely identical to that undertaken in other times and places. Given the paucity of individual contacts between one country and another—and sometimes within a single country—and given especially the sanctity of private property, which opposes exchanges of personal information, these methods are responsible for a remarkable waste of energy.

Second possibility: the scholar is sometimes content to examine current literature for the facts relating to his particular study. Thus personal documentation takes on a justifiably individual character; but the advantage is soon lost, for in this case it is necessary to go through approximately the same literature whenever a new study is begun. If one thinks of the time required to perform this sort of task (scattering of works, inaccessibility of many journals, inadequacy of libraries, etc.) he will admit that this method is in no way preferable to the first.

The two alternatives are equally open to criticism, and the refinement of informational procedures recommended above will not develop out of a research organization caught in such a dilemma; one who asks more in the name of reason will obtain, following these well-worn paths, only an increase in folly.

2. It will be objected that he is not obliged to do so. But he is, in the present state of affairs which reflects the opinion of many masters; a copious collection of these personal file cards, begun early and patiently added to throughout a lifetime, is the secret of success. If "success" were given a somewhat broader meaning, this individual collection might not be so highly recommended; but this is said to be another question.

2. Catalogues

We have shown the major source of the disadvantages listed to lie in the personal and private nature of a documentation which will not be materially reduced by even the most elaborate of bibliographical tools.

To depersonalize and collectivize the information would only partially solve the problem; we already have objective and public collections of archeological facts—catalogues—which are as manifestly inadequate as bulletins or bibliographical répertoires.

Catalogues are collections of facts gathered and classified according to one or more common characteristics (function, form, date, place, etc.); this choice of group characteristics should permit any individual to find conveniently, anywhere and any time, facts relevant to the various categories. It is thus possible to define an ideal classification for catalogues as has been done by us for bibliographical works; it is one whose headings correspond to the stable and communicable aspects—inter-subjectively if not objectively speaking—of the material classified.

A truism? Perhaps; but then why, in contradiction to the truism, are so many catalogues bad books? For the moment, let us not consider those in which uncertain theories about relations heretofore considered accidental lead to classifying methods too personal for common use.³ They are merely functional faults; structural defects are more serious, for they affect the value of good catalogues as well as bad.

a) The most obvious of these defects springs from the very nature of the printed work: it becomes dated. And naturally it dates faster as the increase of archeological knowledge is accelerated. Since on the other hand a catalogue is most often the work of one man, its periodic revisions depend on the resources and the good will of the author; they usually stop at his death, either because no one is found to continue the enterprise, or because the latter is found to be no longer useful, and its general, unchangeable structure out of date.

This fault disappears when the publication of the catalogue is entrusted not to an individual, but to a stable group, charged with keeping it abreast of new discoveries; this, for example, has been done with the *Corpus des Inscriptions semitiques*, whose authors have been named by the Institut de France since 1887. This is an excellent procedure, but one which cannot be

3. The most ordinary of these, unfortunately, is the presentation of documents in simple chronological order, where the chronology itself is based on an individual, and still questionable, interpretation of the documents themselves.

universally applied because of a second defect of printed catalogues, their rigidity.

b) By this second defect is meant the force of inertia exerted by such works against any regrouping whatever of documents distributed among the different headings of a classification “fixed” on paper.

Such a regrouping is a fundamental operation in research, repeated many times in the development of a synthesis, whose originality consists precisely in the establishment, by successive approximations, of well-reasoned regroupings among the different terms of one or more classifications. When the latter are simple, the operations are too, and in this case the “open” printed catalogue, kept constantly up to date by a permanent institution, is a tool perfectly adapted to its function; an example is catalogues of relatively narrow range, where the material described is limited to only a few classification variables. If on the other hand a great number of variables requires a complex classification system, operations are considerably hampered by the rigid structure unavoidable in a printed work.

Let us take an example. Suppose one wishes to publish a chronology of the prehistoric pottery of Iran. If he first presents the material in objective categories, as it should rightly be done, the following variables must be taken into account: place of origin, manufacturing techniques, forms, decorative processes, ornamental themes, and chronological periods already established. Thus we have many classification criteria, each susceptible of being broken down into multiple elements which the author arranges to his taste within a given structure. Depending on the configuration of this structure, facts relevant to a particular category may be grouped, or they may be scattered among subdivisions of more synthetic categories; the inadequacy of the instrument is seen in this latter case.

This structure necessarily separates data which are heterogeneous from one point of view but homogeneous from another; if the reader at a given moment is interested in the homogeneity of the data, he must look for them under numerous headings, then regroup them. Indexes no doubt simplify this task of breaking down material in the catalogue, but the job of putting it back together in a different order implies tedious copy-work—copies of drawings, copies of notes pertaining to each drawing; the more synthetic the nature of the catalogue, and the richer its material, the more time-consuming and frequent this copying job becomes.

The paradox—and it is a paradox to condemn the work of synthesis which all aspire to create—is only an apparent one. There are not a few organized structures in nature whose flexibility (here, adaptability to dif-

fering needs of readers) is inversely proportional to a certain degree of formal perfection (here, complex synthesis); it is not surprising to find similar ratios on the level of human organizations. This analogy not only permits understanding of the phenomenon, it also indicates the way in which one may hope to avoid the methodological obstacles it raises.

A. *Theoretical remedies*

In criticizing the inadequacy of the different forms in which archeological material is currently offered to the reader, we have twice before now suggested a sort of elementary atomistic theory, to be developed as new discoveries are made. Some works (*open catalogues*) and methods (analytical: indexes, bulletins, methodical tables) are aimed at this end, but never reach it because of the vices inherent in a particularly rigid institution, the book. Every book, or more generally speaking, every printed text, necessarily fits the fundamental elements of archeology—the atoms, if you will—into logical systems, if only into grammatical systems, where they are fixed by the mortar of words and clauses—the molecules, if you will—which seriously inhibit ready access and study.

Grammar is certainly not directly responsible for the veil which publication in book form ordinarily casts over the facts; but it cannot be denied that the desire to make a scientific work in archeology is still often merely the desire to publish a literary work, at least in that it must, in the opinion of the author, utilize the resources of grammar.

Those engaged in research are not unaware of this obstacle, which they try to overcome by a continual dissection of books; but we have already remarked the astonishing waste of time required to perform this collective Penelope's labor, where some endlessly take apart what others put together.

To sum up: the best present-day instruments of work are *open catalogues*—works of permanent bodies who form teams charged with keeping them up to date—and, on the other hand, individual collections of reference notes; but the first are presented in bound form (in every sense of the word), slowing down research, while the second, more flexible, unfortunately remain the exclusive property of their authors, all of whom perform analytical functions which are largely identical.

Would it not be possible to devise an instrument combining the mobility of the reference file and the public nature of the catalogue, while retaining the advantages of both? To continue the preceding analysis, we see that there are theoretically two ways of obtaining this result: either the

successive authors of an open catalogue should compose not only books but also reference files, or isolated scholars should pool their personal notes and agree on a systematic sharing of analytical material.

These two roads lead toward a common end; but each corresponds to a particular adaptation of working methods.

This common end is a center of documentation no longer exclusively bibliographical, but factual, where several files would contain the concrete data that are the material of archeological studies.

The roads of approach can be described as follows:

a) In the one case, scholars are grouped to construct in a limited field an objective and public documentation arranged on file cards; they may in addition publish from time to time works of synthesis grouping all or part of this documentation into particular conceptual structures.

b) In the other case, the individual documentation of each scholar, in a limited field, is communicated to a center which arranges it in a system of files available to all for consultation.

These methods are in no way intended to substitute the blind collection of facts for the constructive inquiry into connections between facts; as a matter of fact this latter task is not affected by the task here posed, that of simultaneously constructing a practical documentation, uniform and public, and a theoretical synthesis, original and private. It is true that, carried to extremes, such a requirement forbids the publication of works whose "thesis" is all too obviously a mere veil cast over a collection of laboriously gathered facts. But why complain, since these same facts would be put to better use in the archives of a documentary center? The *loss of information* acceptable in a work of genuine thought is inadmissible in one of these "forced theses."

After all, from the preparation to the publication of any text whatever there is always a falling off between the quality of the information *gathered* (here quantity is but one particular aspect of quality) and the quality of information *delivered* by the author in the text. *This degradation of information is completely independent of the theoretical value of the work*; and thus it is seen that the degradation is unacceptable, absurd, when this theoretical value approaches zero.

B. *Practical recommendations*

The second of these possible methods of revising the present organization of research raises more difficulties than the first, for the following reasons.

In the first place, few individuals would willingly surrender to a common pool a collection of data assembled with great difficulty,⁴ where it might lie dormant for years, or others might snap it up and deprive the original collector of enjoying the fruits of his labor, a jealously guarded privilege. This sense of property is doubtless inherited from a time when the publication of archeological documents, a humanistic effort, was as much the concern of belles-lettres as of antiquities (cf. l' Academie des Inscriptions et Belles-Lettres); the signed book was then the natural completion of an undertaking by a man of taste, whether archeologist or man of letters. Today, the often uninviting character of archeological publications is a convincing argument for anonymity. Unfortunately, although the individual is now aware of a certain banality in his contributions and would probably be willing to see them in the public domain, some universities keep the cult of private possession alive.

In the second place, and partly because of this same resistance to change offered by tradition and by institutions, few individuals would consent to spend all or part of their time merely organizing a documentation gathered by others. "Documentalists" are simply not equal to the task; it requires more than plain common sense, that lowest common denominator of all effective organizing processes. In fact, the material itself dictates the proper form for the document, and, ideally, a perfect organization is consonant with a perfect understanding of the facts organized. The organizing of material should therefore be done by practicing craftsmen, in this case archeologists, who are, today at least, unwilling to be "documentalists" for others.

The first method suggested above for achieving a better organization of research works avoids these obstacles, and it is the one that can be considered open today, within the very framework of existing traditions and institutions. Individuals working together in the study of a definite field will attempt to combine all useful aspects of the various informational procedures being used today. Isolated scholars are to borrow not documentation, but a method, analytical reduction, born of the need for effectiveness; from public organs of information they will borrow not methods, but documentation, born of the need for communicability, for publicity as we might say if the word had not acquired a new sense. The objective of such an association is neither a permanent sum of information nor a momentary synthesis of the knowledge acquired; it is rather both of these, since the

4. The example of Marcel Mauss distributing his file cards to his elementary students of ethnology is often cited but seldom imitated.

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documentation is constantly increasing, mobile but always public,⁵ as successive syntheses are printed, each based on a personal interpretation of documentation in a fixed state.

Such works are of course the only justification for documentation; but these two aspects of archeological research—collection and construction—need not necessarily overlap throughout the lifetime of a single person (individual or institution). Experience shows rather that there are scrupulous collectors who can build only poor numerical sums, as well as capable constructors who lack the courage to collect suitable amounts of data to give their syntheses a certain permanence. It is true that between these extremes a happy medium is always recommended; but it has not been demonstrated that more might not be gained by letting the individual act according to his own capacity and taste, instead of arbitrarily placing a premium on a certain bivalence. In any case, this division of labor is not imposed on anyone, and the very centers of documentation which we suggest would facilitate rather than hamper the free choice of a happy medium: the collector would no longer be required to invent in order to have the right (that is, the means) to collect; nor would the constructor be required to collect only those materials which enable him to construct.

This sort of organization not only benefits the active members of the association; theoretically it provides a healthier climate for the entire field. Scholars would no longer be able to operate according to traditional procedures; the very existence of an exhaustive and immediately accessible documentation should at least prevent him from publishing mere kaleidoscopic images of all or part of the same material, without great theoretical interest, for which others could more easily draw on the public fund of documentation. One is tempted to paraphrase an economic law in reverse and say that good public documentation chases out bad private literature, which is unfortunately true only in theory. In fact, bad literature survives. Suppose, for example, one undertakes a study of juvenile delinquency today in the large cities of France. He needs certain sociographical data on these cities (demographic and professional structure, etc.); formerly he would have consulted several more or less out-of-date works and brought them up to date by on-the-spot investigation. Today, the documentary service of INSEE (Institut National de la Statistique et des Études Économiques) provides the needed information within a few days, and the indi-

5. The "but" here is an answer to the opposite tendencies which characterize the documentation of the isolated scholar: mobile as long as it remains private, it becomes public only when fixed.

vidual can promptly turn to the real object of his study, the search for correlations. This is all very well, but the relative ease with which documentation is obtained leads to excesses. Innumerable specialists soon arrive on the scene, each offering a personal reconstruction of the *social reality* so readily dissected; instead of fading away, the kaleidoscopic images multiply. This evil may be due to the novelty of the system or to laxity in the “requirements for admission”; in any case, no one dares suggest that it be remedied by forcing every sociologist to conduct a regional population census. All things considered, this is often the situation in the field of archeology.

Several functional aspects of these organizations must now be stated more precisely. First of all, their field of investigation is necessarily limited as regards space, time, and the material to be studied. However, the breadth of the field varies appreciably according to the nature of the research undertaken on the material, an obvious fact so often overlooked in centers of documentation that we must devote at least a few words to it.

The usual aim of archeological inquiry is surely understood: to observe various connections among the documents gathered, which may be organized into coherent systems of historical relationships, with or without the support of similar relationships based on other sources of information. The establishment of these relationships is accompanied by a provisional sketch of the areas of relative homogeneity, at least as regards the material culture, discernible in time and terrain. It is in this way, through successive approximations, that an undertaking essentially preoccupied with historical relationships finally defines its own field of investigation.

But this preoccupation is not the only one deriving from archeological documents. Occasional total antitheses between material creations of historically related civilizations, and likewise occasional total analogies between material vestiges of civilizations which are, historically, clearly dissimilar, pose problems which are insoluble by historical analyses. To solve them, one must apply some atemporal solution—or at least one outside the idea of historical time—and suppose that certain groups of human facts either resist historical influences or ignore them, remaining or becoming the antithetical or homothetical *ensembles* which appear to the observer. Now that ethnologists, mythologists and linguists over a period of thirty years have little by little revealed certain structures underlying the various phenomena they consider, this hypothesis has become a less daring one. Archeology however, if not art history in general, has yet to submit its materials to this sort of examination.

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This is surprising, for the forms of certain documents (vessels, tools, ornaments, etc.) readily lend themselves to structural analysis; obstacles are raised partly by traditional thinking, doubtless partly by a genuine attraction of the instruments of work toward a single use, historical reconstruction. This last aspect of the present situation is what matters here; for when a new apparatus is being devised, it should at the outset be given a form which not only facilitates the old operations but also permits the material to be submitted to the new investigations.

It so happens that this need applies less to the nature of analytical reduction proper than to the mobility of the elements of research within inventories. Historical and structural research use a fixed body of materials, but within a common documentation the arrangements of elements are variable; the selection of variable arrangements from within the common data must be an easy operation. For example, suppose a collection of potteries whose techniques of manufacture and decorative themes and procedures are characteristic of a precise historical area, but whose forms are atypical and common to several distinct regions. In this case, morphological variables are only a secondary interest of the historian and it would be useless for him to classify them methodically for the whole area and surrounding regions. These same variables are nevertheless important for the structuralist, who needs this classification in order to regroup the forms not according to historical but rational areas, in the sense that the classification of pure bodies is called rational. Thus the scope of a single analytical observation (here, the form of the potteries) differs in the two cases, and a single element of reality is considered on the one hand accidental and not pertinent, and on the other hand essential and significant. It is indispensable then that one be able to abstract at any moment from a documentation, which is provisionally limited, in order to orient it relative to other dominant elements.

The problem thus stated is not original; it appears whenever the volume of a statistical documentation approaches a certain level beyond which the operations of material regrouping become more complicated than conceptual organization. A balance is re-established by mechanization of regrouping operations; most documentary centers (not bibliographical, but factual) today are tending to replace costly human handlers of catalogues and reference cards by machines—sorters, classifiers, tabulators—which furnish the desired information at less expense.

It is true that the introduction of mechanical tabulations in an institution of archeological research is hard to imagine. Not that there is any logical

obstacle; for many categories of objects (weapons, tools, ornaments, etc.), the documentation would lend itself as ideally to mechanical reduction as does that concerning automobiles, industries, populations, etc. The obstacle is economic, or more precisely, psychological.⁶ And it would be a utopian dream to try to impose an institution which no one is yet ready to pay for—neither those who would pay out of their pockets, taxpayers and public services which assume the cost of investment without direct, tangible benefits; nor those who pay out of themselves, that is, the scholars who would be forced first into a sort of temporary anonymity, then into a struggle for recognition, reoriented toward a triumph of quality over quantity.

It is unfortunately possible to draw inspiration from processes of mechanical tabulation without adopting the strict form of their most advanced applications. Thus the construction of a basic document, not yet punched but perhaps already coded,⁷ the first step in the process, might form the initial objective in a rational organization of the selected material.

These basic documents are merely analytical file cards relating to archeological facts like those collected in any kind of research or established for the collections of certain museums; but these private file cards are written up according to different rules in each case, rarely conceived as work instruments accessible to all comers. The basic documents of a public reference file offer the following advantages:

a) They are easily read, thanks to the material quality of both the document and its writing, which the individual lacks the means of perfecting to the same point.

b) They are read universally, thanks to strict definitions of the elements assembled in the document, definitions which attempt to avoid the characteristic ambiguity of personal terminologies or phrasing. The use of codes or numbers corresponding to facts or groups of facts determined by collective agreement (an image or a definition) also facilitates the communicability, if not the objectivity, of the facts catalogued.

c) They are rapidly sorted, thanks to the presentation of material in an order that is uniform for all the documents of a single file. Grouping opera-

6. "More precisely," because whenever universal psychological opposition is no longer backed by an outworn logic, it cites economic factors which are in fact the result, and not the cause, of the opposition. This is the classic phenomenon of resistance to investment in an economy which is neither liberal nor directed, but merely protected against the hazards of growth.

7. Coded, when it seems convenient to transcribe in numerical codes the successive values of a particular characteristic of the material catalogued, e.g., code of vase forms, code of ornaments, code of ceramic techniques, etc.

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tions are not yet the rapid work of a mechanical sorter, but they are no longer quite so fumbling as those of one whose thought is constantly interrupted by reasoned choices made from heterogeneous catalogues.

d) They are rapidly utilized, through the extraction (or photographic reproduction) of sorted cards, which avoids to a large extent the tedious copying of scattered information.

It is difficult to give a less abstract illustration of the working methods we advocate. In fact, once the principle of the new organization has been adopted and a field of experimentation chosen, the procedures and rules of their application will never take just one unchanging form.

Let us take as an example an inventory on file cards of the ornaments of Mycenaean pottery. This is the subject of a recent book which is excellent, but the source materials for which unfortunately exist only in the perishable papers of the author, in the form of notes capable of being sorted, rearranged, added to, etc. It would be obviously impossible to do any classifying operation without a clear general idea of the different kinds of ornaments characterizing this pottery. The preliminary knowledge need not be exhaustive; even a simple methodical sampling can provide it, but upon this knowledge must be based the first rough sketch of a classifying system, gradually modified by the accumulation of facts.

Choice of categories of phenomena to be reduced to reference cards, composition of the cards, structure and number of card files for each category—these are all problems whose solution then depends on the nature of the phenomena chosen. Similarly, the practical methods for public use of the documentation will doubtless represent compromises among the various needs, determined separately and from experience rather than logically and in advance.

Abstract expression of the proposed operations permits us to grasp the limits of their application in the whole body of human knowledge. From ceramics to metallurgy, from sculpture to architecture, the phenomena studied are always partially reducible to elements of information, clear and stable enough to be treated separately like so many provisional variables; the sum of these elements gives a relatively faithful image of the phenomena they serve to characterize. This is obviously a completely necessary condition for submitting the material to the processes of organization and investigation recommended above. More precisely, they become evident as soon as a science succeeds in isolating, within the mass of complex phenomena it observes, a large number of these elements or variables, out of

which it then attempts to evolve an increasingly economical system of explicative factors, real or virtual.

Thus it is not surprising that the sciences most advanced in matters of organization are those in which the facts studied lend themselves most easily to analytical reduction: in the human sciences, for example, the study of demography. True, the advantage has its dangers, for facility easily opens the way to arbitrary decisions: hence the alchemy of certain sociological systems; reasonable organization of research evidently does not end the need for reasonable “researches.” Not one of the tactical problems raised, once the strategy has been admitted, is essentially different, however, from those which individuals or organisms engaged in scientific research are trying to resolve today. And their attempts have been none too successful, as we have seen, because no tactic is any longer fruitful without some reorganization of strategy.