

Kim H. Veltman

A Proposal Concerning the Reorganization of Knowledge

Originally written in July 1981.

Published in: *Information: Management, Sources and Other Studies: Essays in honour of Professor K. Navlani*, ed. Ashu Shokeen, I. V. Malhan, T. D. Tilwani, M. P. Satija, New Delhi: Ess Ess Publications, 2001, vol. II, pp. 12-35.

- 1) Introduction
 - 2) Practical Reasons
 - 3) Philosophical Reasons
 - 4) Natural World
 - 5) Man-Made World
 - 6) Interaction Between Man and His World
 - 7) Theory and Practice Reconsidered
 - 8) Culture Reconsidered
 - 9) Practical Steps.
-
-

1) Introduction

Imagine Mr. Gutenberg in 1450 going to the trustees of a large foundation with the proposal that manuscripts were an outmoded form of communication knowledge and that one should, henceforth, publish everything in the form of books. It would have sounded highly unlikely, if not impossible. Yet, in retrospect, Mr. Gutenberg's idea was undoubtedly a necessary and important step in the development of Western culture.

Today the suggestion that books have become an outmoded form of communicating knowledge and the idea that one should, in future, turn to a combination of visual screens linked with computers, will sound as unlikely and well nigh impossible as Mr. Gutenberg's proposal was then. Such a proposal is not a negation the value of what exists. The invention of printing did not lead to manuscripts being abandoned. Indeed their value has, if anything, increased. Similarly the development of computer based knowledge will not lead to books being abandoned. By rendering more accessible the treasure of historical knowledge, computers will throw more light on the precious value of the book and manuscript traditions.

The costs of a new encyclopaedia of knowledge would be staggering. It is the purpose of this essay to outline some practical and philosophical reasons why such a project is, nonetheless, desirable and in the long run economical. In the second part of this essay we shall provide a preliminary sketch of the proposed encyclopaedia in terms of a) the natural world, b) the man-made world and c) the interaction of man and his

world. This will lead to some reflections concerning concepts of theory and practice, and culture. In the concluding section some practical steps will be mentioned.

2) Practical Reasons

There are various practical, businesslike reasons that make the reorganization of knowledge a matter of increasing necessity. We shall consider five of these briefly: security, conservation, access, efficiency, and politics.

I) Security

A number of the most precious verbal and visual documents exist in single copies. In the event of a disaster, be it a flood, a fire or a war (cf. 1939-1945) such documents can be destroyed and lost forever. The idea of producing a secret library with microfilm copies of all these works does not resolve the problem, because such a library could again be eliminated by a single disaster be it an earthquake or a bomb. If, on the other hand, this information were computerized and transmitted to at least 50 leading libraries of the world, plus a few secret places one would have, so to speak, an insurance against disaster.

II) Conservation

Historical scholarship has a built-in predicament. Every historian knows the importance of returning to the sources. Yet when the source in question is a ninth century manuscript or even an incunable, then each turning of its folios contributes to deterioration. Conscientious librarians, therefore, have very good grounds for wishing that their best books had no readers. In the case of outstanding works the advent of facsimile editions has helped resolve this problem. On the other hand it is clearly unthinkable that one would start producing facsimile versions of great collections such as the British Library (BL) or the Bibliothèque Nationale (BN).

If such collections could be computerized then the great wealth of information that they contain would be available to scholars without their needing, in most cases, to consult the actual books. Much of the wear and tear produced by readers would thus be avoided. In cases such as the British Library where 70% of the rare book collection is in urgent need of restoration, this is not an insignificant consideration. Some questions, particularly those relating to the history of book production will, of course, continue to require first hand study of the sources.

III) Access

A great many books and historical documents lie in the libraries and archives of Europe. Notwithstanding increased mobility, a majority of scholars living in the United States, Canada, South Africa, Australia, New Zealand etc. have no hope of extended stays in Europe and will therefore never have access to the majority of the sources.

One might reasonably argue that a scholar should spend at least 12 months in a great library in order to get beyond a superficial appreciation of its contents. Yet what percentage even of European scholars has the possibility of spending a year in each of the British Library, the Bibliothèque Nationale, the Vatican, the Biblioteca Augusta in Wolfenbuttel and the Ambrosiana in Milan to mention only a half dozen of the greatest centres? At a certain level, access is as much a problem for Europeans as it is for those on other continents.

The existence of the BL, BN and NUC catalogues alone is so useful that one can hardly begin to measure the practical advantages that would accrue if one had a centralized index merely of the contents of all the great libraries. On computer this information would be equally available to scholars in Aix-en-Provence and Canberra.

IV) Efficiency

Scholars regularly work for an extended period of time on a single text in preparing a new edition or in developing a novel interpretation. Much of their work, however, involves checking references, hunting down quotes, illustrations etc. Here one typically needs weeks or months before one has received an obscure book or periodical via inter-library loan. Once in hand, a few minutes are often enough to trace the pages or lines in question. Getting there is not half the fun: it is ninety percent of the work.

If such materials were available by computer then a) the sources would be saved the wear and tear of travel; b) scholars would save a great deal of time now wasted on preliminaries, and have in minutes what now takes weeks or month.

V) Politics

There is a great danger in our times that computer technology is seen as an enemy of the human spirit and that technologists be seen as enemies of those in the humanities. The problem goes deeper. At the moment an estimated 70% of all computer technology is in the United States of America. There is a danger that the United States be seen as a symbol of technology and technocracy and that Europe, striving to maintain its traditional humanistic ideals, develops a policy of non-cooperation. Power politics could lead to confrontation that would be to the detriment of the entire civilized world.

The challenge thus lies with leading computer firms to invest in computerized study of historical materials which will result in new insights into the humanities and confirm that technology and freedom of the spirit can complement one another. Large firms such as IBM are at present concerned with showing that they are great firms. This would be an obvious project for such a quantum leap. It would attract the curiosity not only of scholars but also of all the media. Once sufficiently advanced the results of this project could be made accessible to the world in a manner comparable to cable TV. Eventually everyone could have their own home screens for the encyclopaedia of knowledge ranging from a single screen to multiple systems as described below. Hence while the initial investment costs will stretch far beyond the specialized tastes of university circles: it will

include everyman. Thus in the long run the venture will be profitable contributing at the same time to the resolution of frictions between America and Europe.

Such a project could equally play an important role in gradually resolving political tensions between the advanced world and the developing world. At present developing countries may aspire to gain access to technical knowledge, but there is no hope of their ever acquiring the historical knowledge on which Europe has based itself. Given an encyclopaedia of knowledge developing countries would have new horizons of access to historical knowledge. This would introduce them to the complexities of the European tradition: it would dispel simplified images of Europe as a place with feudal lords and rulers. It would make clear that many of the problems facing developing countries today, have also plagued Europe in the past. It would make it available much knowledge about other nations, would make clear the common humanity of man and thereby contribute greatly to remove many political animosities that arise purely out of ignorance.

3) Philosophical Reasons

In addition to these practical reasons there are also philosophical considerations that play a role. Here a brief detour into the realm of ideas will be necessary.

In Greek and Roman times science as we now know it was not possible because persons unconsciously imposed their verbal/mental-visual preconceptions onto their visual images, thus imbuing their records of the natural world with subjective aspects and precluding any clear distinction between subjective and objective reality (fig. 1. i).

This distinction between subject and object was made possible through the discovery of linear perspective whereby was introduced a systematic relationship between object and picture-plane independent of mental or other interference from the observer (fig.1.ii). This opened the way to objective science. But an apparent dichotomy now entered the scene. When the relation is between object and picture-plane, then the observer's role is excluded, and it is objective. When the relation is between the observer and the picture-plane it is subjective (fig.1.iii). The objective relation, linked with science thus appears opposed to subjectivity which is associated with art. Objectivity becomes an ideal and subjectivity emerges as something negative.

A quite different approach to the subject-object problem is possible (fig.2). The object in the natural world can be seen in terms of a spectrum including models, visual images on the picture-plane, abstract geometrical figures and algebraic formulae. In this spectrum objectivity is measured in terms of the accuracy of the fit between the various factors and the extent to which the relations established between them are reversible and repeatable. In this context the role of the subject, subjectivity, becomes one of construction and relation building, the accuracy of which is then tested quantitatively. Here, objectivity is the natural complement of subjectivity and the central role of the individual again comes into focus.

The problem in our day is that persons are working in each of these domains as if they were independent realities. There are model builders, geometrical figure makers and algebraic formulae constructors, but the relations between them are no longer apparent and the rhetoric of objectivity has set the role of the individual into the background. Approached in terms of such schemata there is an apparent opposition between subjective and objective activities (cf. fig. 2)

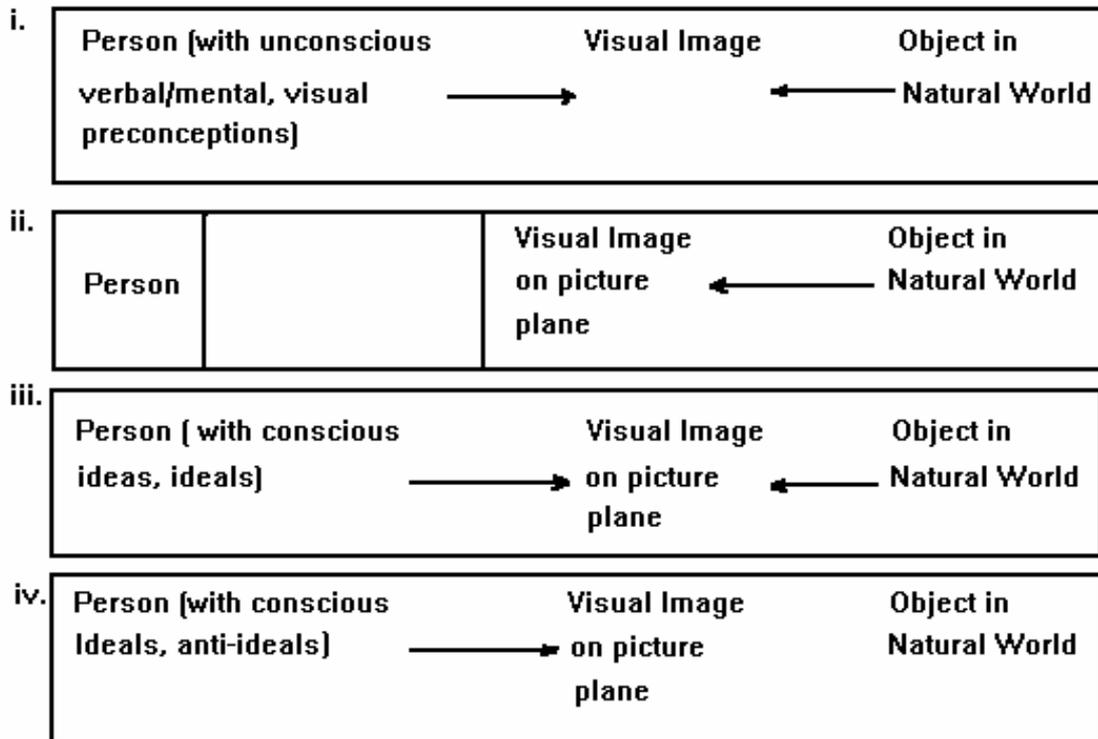


Fig. 1.i-iv. Different combinations of subject and object in the production of visual images. In Antiquity (i) subject and object remained intertwined. Renaissance perspective (ii) introduced the possibility of producing objective images geometrically even in the absence of an actual observer. It remained possible, however, to interpolate consciously onto this objective image subjective ideals (iii) or even to strive for a purely subjective image (iv).

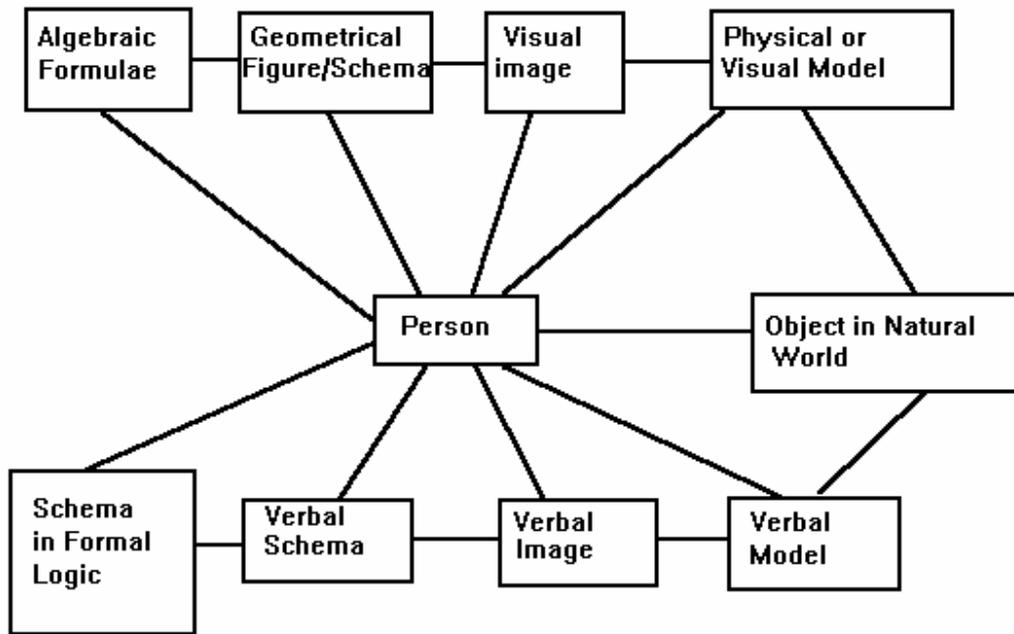


Fig. 2. An alternative approach to the subject/object problem. Geometrical figures, visual images, models and physical objects are seen in terms of the accuracy of the fit between various elements and their potential reversibility. The subject's role in this case becomes one of making models and geometrical figures as well as establishing relations. Hence subjectivity and objectivity emerge as interdependent activities. That which applies to images has parallels in the verbal image making process.

A systematic reorganization of knowledge in terms of different scales from micro-structures, through ordinary photographs to maps would serve to make apparent the nature of this spectrum from natural objects through concrete models to abstract formulae, and bring back into focus the central role of the individual as the builder of relations that can be tested quantitatively. Thereby the positive side of subjectivity will come back into focus. So too will the reason for many abstract levels of science, the relation of which to the visible world is often not clear at present.

Given such philosophical and practical reasons for reorganizing knowledge, we shall provide a brief sketch of what such an encyclopaedia of knowledge would involve, beginning with the natural world.

4) Natural World

Knowledge of the natural world can be subdivided into persons, things and places. We shall examine each of these in turn.

I) Person

At present bibliographical information about persons is scattered in national dictionaries of biography, dictionaries relating to fields of endeavour such as the *Dictionary of Scientific Biography* for historians of science and Thieme-Becker's *Künstlerlexikon* (fig. 3: missing) for historians of art, biographical dictionaries ranging from Jocher's *Gelehrten-Lexikon* and Zedler's *Universal-Lexikon* to the modern *Who's Who*, as well as biographies devoted to specific individuals.

The problem with all these sources is that they provide primarily verbal information. The *Dictionary of Scientific Biography* discusses Hero of Alexandria but provides no diagrams or reconstructions of his automata. Thieme-Becker's *Künstlerlexikon* refers the reader to museums and volumes of illustrations but does not provide a single picture. To obtain such visual information often requires writing to the museums in question and may take weeks or even months.

If a visual television-like screen were linked with a computer then the information available from these various biographical reference works could be coordinated with the portraits, engravings, statues, medals and other visual records of a person.

The life of an outstanding person such as Erasmus would not be limited to a few paragraphs concerning birth, publications and death. A complete record of the visual images of the man, including the portraits by Holbein, would allow one to picture him. Visual information of the place in which he was born, the various places where he lived and worked, as well as where he died, chronologically arranged, would accompany the verbal records of his *curriculum vitae*. To the extent that the sources permit, visual information in the form of maps could help one to trace in detail his various journeys. In certain cases one could follow his journeys day by day, city by city, on a map.

At a further stage one might develop special study rooms in which this wealth of information could be presented more effectively (fig.4). The historian concerned with Henry VIII might, for example, sit at a desk (A) and have, in addition, to his given document (B) six screens, Directly in front (C) would be a portrait of the king at the time. To the right would be a series of other portraits for comparison (D).

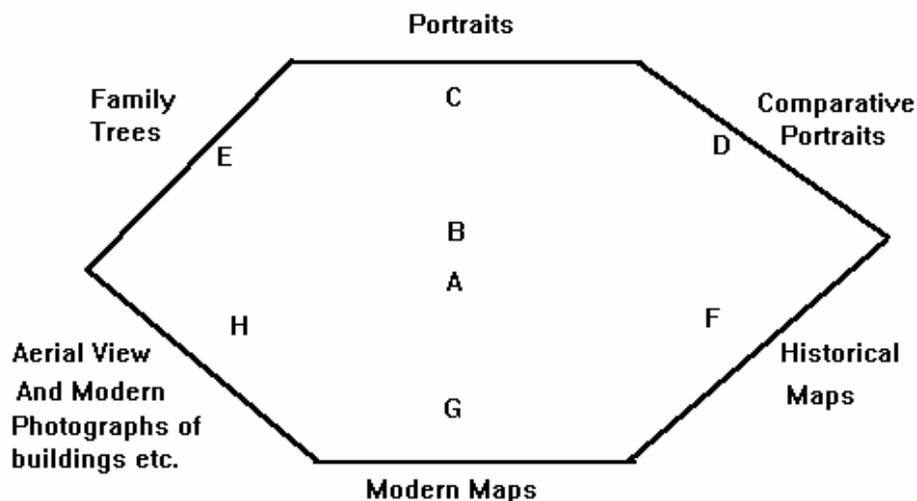


Fig. 4 Ground-plan of an historical contextual study room applied to person

On the left would be a family tree to remind him of genealogical context (E). Let us assume that the document involved the Tower of London. A further screen would involve an historical map of London (F) showing the tower at that time. For purposes of comparison, one would have also both a modern map (G) as well as aerial and other photographs (H) of the same. A large version of such a room could serve as a classroom.

In the case of the writings and paintings produced by these individuals, a first stage would be to record these, so that one could, for example, systematically project onto a screen various paintings of Michelangelo, focussing on details at will. A next stage would be to trace the history of various motifs in the painting, both in terms of antecedents and subsequent copies or transformations and not just in obvious cases such as the *Mona Lisa*.

At a later stage one would wish to explore the extent to which national viewpoints have influenced biographical interpretation. For instance, how one's estimates of Shakespeare's worth vary in England, France and Italy? In the case of the deeds of religious and political figures such as Mohammed this will become the more fascinating. For what one source will describe as a triumphal victory, the opposition will record as a dismal defeat. What the West knows as the Fall of Constantinople was seen quite differently by the victorious Turks in 1453.

If all sources describing persons and the events they caused were translated and available for comparison, then the extent to which religious and nationalistic convictions colour the recording process would come into focus.

In addition to detailed records of individual figures a coordinated encyclopaedia of knowledge would open the way for larger questions. The verbal records of authors such as Pliny or Diogenes Laertius are basic sources for our knowledge of distinguished persons in antiquity. The statistics of these records could be studied to determine what percentage of the individuals described by Pliny are politicians, what percentage are military men, artists, philosophers, musicians etc.? How do these compare, in turn, with the percentages found in a mediaeval or, for that matter, a modern equivalent? If there are marked trends in biography, what can these tell us about trends in cultural history?

At the same time any number of possible correlations can be tested to determine whether or not they are statistically relevant: for example, whether a relevant correlation exists between great painters, poets etc. and given latitudes/longitudes; or between outstanding figures in one profession and a given sign of the zodiac. For the modern period, in countries with census records, the data potentially available is, of course, much greater.

Or more basic questions: how many doctors of medicine or theology published books in the 16th century? Where were they? In the case of treatises on perspective, for instance, 70% were published North of the Alps. With the aid of maps it would be possible to visualize patterns of publishing or shifts in areas of learning.

ii) Things

A similar means of classification could be introduced with respect to things be they a) animal, b) mineral or c) vegetable.

a) Animal

Animals would be listed alphabetically. In the case of given animal such as the lion the computer would record theories re: its development; a chronological list of literary and scientific descriptions and references and a corresponding chronological list of visual records. These would be stored in such a way that they would permit ready shuffling. Hence it would be possible to obtain in chronological succession pictures of all large-scale bronze lions known to have been produced in Europe between 1200-1250. Or, adapting the methods of pattern recognition, one could programme the computer to make a search for all lions of a given iconographical type.

With such a method, the problem of the historical influence of Durer's engraving of a rhinoceros, which Gombrich has outlined with a few key examples, could be traced comprehensively for this or any other animal within minutes. This would open the way for studies of the comparative influence of iconographical types.

At a later stage one would wish to supplement these macroscopic records with records at the microscopic level, thus providing information when the first known dissections of the animals were made and building up to what is effectively a historical case history of each animal.

b-c) A corresponding procedure could be used in classifying things mineral and vegetable.

iii) Places

In terms of places one would wish to coordinate satellite and other aerial views with the information on maps contemporary and historical. These would, in turn, be aligned with the visual records of man-made constructions such that a student of the 16th century could, for example, see in succession all world maps produced in that century, then all maps of Europe, then maps of Italy, then of Umbria, then topographical maps of Florence, then visual records showing battles, royal entries or pageants in the city, then pictures of individual buildings.

For a city such as Florence the computer would, moreover, have stored a complete set of historical records. This, combined with the detailed information listed under the category of persons would open up whole new approaches for the cultural historian. It would, for example, be possible to trace the journey of his battles, entries, pageants, and related festivities on the other hand. In assessing the significance of such entries etc., comparisons quantitative and qualitative, could be made with contemporary, previous, and subsequent examples.

In having access to visual records ranging from world maps to topographical maps and ground plans of individual buildings the way would be open to a historical approach that was international and yet retained the very detailed information that is usually restricted to local histories.

5) The Man-Made World

The encyclopaedia of knowledge would also reorganize verbal and visual information concerning the man-made world and this under two basic headings i) material and ii) mental /spiritual.

i) Material

Under this heading would come all the constructions, instruments and inventions of man, ranging from castles, temples and cathedrals to burning mirrors, cranes, eyeglasses etc.

Each construction say, a castle such as Harlech, would serve a heading for information that would include ground-plans, historical pictures and modern photographs. As well as the relevant written documents there would in addition be cross-references to related structures. In the case of Harlech, for example, there would be reference to the other five

castles constructed by Edward I when he was conquering Northern Wales (1270-1290), namely, Caernarvon, Beaumarais, Conway, Rudlan and Flint.

In the case of a building such as the Parthenon it would be desirable to coordinate knowledge from different levels and scales: a European map on scale of 1: 5,000,000 showing Athens; a topographical map of Athens on a scale of 1: 50,000; an aerial photograph on a scale of 1:50; a ground-plan; a plaster cast on a scale of 1:1 and archaeological samples of building materials involving microscopic scales.

In addition one would wish to have a systematic arrangement of all the knowledge concerning like structures and a means of cross-referencing this information spatially and temporally. Hence it would be possible to see where the Parthenon is on a map in relation to all other temples in the Greek world from Ampurias in Spain through Uzuncaburc in Turkey. Temporal coordinates could then be introduced to clarify which temples were built in the seventh, sixth and fifth centuries respectively.

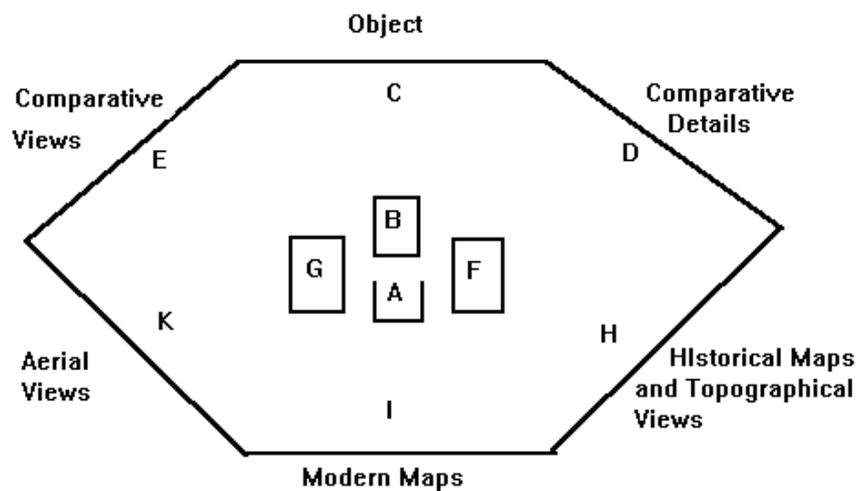


Fig. 5 Ground-plan of an historical contextual study room applied to man-made objects.

Similarly a systematic arrangement of all knowledge concerning parts of temples would be needed, such that a figure on a Parthenon frieze could be compared and contrasted

with figures on other Greek temple freizes, and ultimately with all other Greek sculpted figures.

Again one might have a special study room for viewing such information (fig. 5). A scholar could sit (A) in front of a control panel (B). In front of him they would have a picture of the Parthenon (C). Particular details such as columns, freizes etc. would be focussed on a second screen (D). For purposes of comparison either one large picture or multiple small pictures of other temples would appear on a further panel (F) and source material, i.e. historical references to the Parthenon in Greek and subsequent authors would be available on a further panel (G). A fourth screen would provide historical maps and topographical views of Athens (H), which could then be compared with both modern maps (I) and aerial views (K).

In the case of buiding such as the Colisseum which stands in a traditions of views of Roman monuments (*vedute*) by artists such as Martin Heemskerck, Francisco d'Hollanda, Androuet du Cerceau, Piranesi etc. the material would be all the richer and one could confront, in this study room, how perceptions of famous buildings have changed with time. Such a study room could again be expanded into classroom dimensions.

Besides such an historical contextual room one might at a later date also have a panoptical room (fig. 60). Here a viewer (at A) would sit in front of a

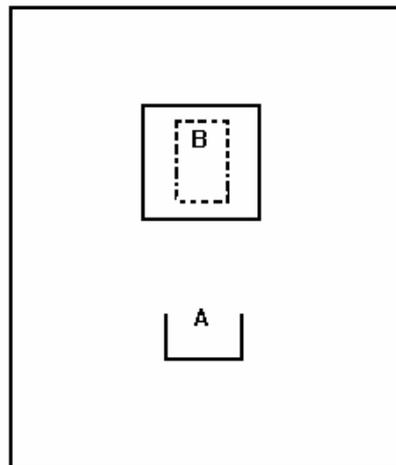


Fig. 6 Ground-plan of a panoptical study room.

ground-plan (B) of a building such as the Parthenon. On this ground-plan they would determine a viewpoint that interested them and projectors would then convey photos onto the walls and ceiling resulting in a panoramic view such as that available on the spot.

With the rapid development of laser technology it is feasible that effects of spatial versimilitude could in future be heightened still more.

The new encyclopaedia of knowledge, besides offering readier access to the myriad individual details, will also permit new surveys of general trends in human culture. With the aid of maps and pictures it will, for example, be possible to trace the development of the Greek temple as an institution of worship over time. The spread of this institution throughout the shores of the Mediterranean and to the limits of the Greek world can be followed, as can its demise as a basic place of worship. The architectural forms connected with religion (temple, synagogue, church, mosque), contest (hippodrome, coliseum), play (theatre) and other basic aspects of human culture can be examined and their evolution studied. One can trace, moreover, whether a civilization concentrated its building energies with edifices connected with the life after death of their key individual (tombs, pyramids), contest and play in the present life (colisseums and theatres), or future aspects of the present life (banks and insurance buildings).

In addition to alphabetical and chronological lists of man's material objects it would be useful to arrange instruments and inventions under categories such as extension of the senses, extension/intensification of the powers of nature and to correlate these geographically and chronologically to bring to light large trends in technology and culture.

ii) The Mental and Spiritual Man-Made World

Corresponding to the biographical list of real persons there would be a list of all supernatural, legendary or fictive persons/personifications, i.e. gods, heroes, literary figures and allegories. Each of these would again serve as headings for the relevant verbal and visual information.

In the case of an example such as Christ where historical reality combined with supernatural dimensions have generated a highly evolved iconography one would wish to introduce subheadings in the visual records such as Birth, Flight into Egypt, Virgin and Child, Presentation in the Temple, Last Supper, Death on the Cross, Taking Down from the Cross and Resurrection.

A geographical and chronological correlation of these themes would open the way to studies of iconographic trends, for example, whether birth, childhood, youth, death or resurrection received particular attention. These trends in the representation of the life of Christ could subsequently be compared with representations of the lives of various saints, heroes etc.

A systematic list of personifications, e.g. war as Mars, love as Venus etc. bringing together both verbal and visual records would open new avenues of study for comparative ethnology. Trends to verbalize certain themes and visualize others could also be identified.

That which applies to persons could be applied equally to imaginary things be they animal, such as the phoenix; mineral, such as the philosopher's stone; or vegetable, such as the elixir of life, or places, such as Atlantis or Mount Meru.

A similar method could be introduced to record the mathematical tradition. If the corpus of classical geometry were stored along with the various mediaeval manuscript versions it would be possible, through an adaptation of simple pattern recognition methods, to begin with a geometrical diagram in say, the writings of Galileo or Leonardo and to determine a) whether it had a classical precedent and b) via which of the mediaeval manuscript traditions it came.

There has been much talk in recent times of what the French have coined, *histoire des mentalités*. We have not even begun, however, to map out the limits of man's consciousness as recorded in the sources and to trace this change historically. To take a simple example: how many animals were known in *Old Testament* times? How many more were known by Aristotle, by Pliny, by Vincent of Beauvais, by the eighteenth century encyclopaedists and so on? One would wish to trace not only quantitative statistics but also to compare qualitative descriptions and to compare these culturally. Moreover, one would wish to compare the relative energies devoted to writing about different aspects of the natural world, showing, for instance, how one country is particularly concerned with flora and fauna while another is more attentive to minerals.

One could take modern classification tables of various genera and species and then trace temporally and spatially how knowledge of these was gradually acquired. This would not only apply to the perceived limits of everyday objects. In astronomy the changing limits of the universe could be reconstructed historically. With respect to religion one could catalogue descriptions of virtues and vices, as well as visual and verbal images of heaven and hell. Conceptual maps of legal consciousness could be developed showing the expansion of taboos and the proliferation of precepts both civil and penal as civilization expands.

6) The Interaction of Man and the Natural World

This heading could be subdivided into headings such as i) struggle/work, ii) leisure/play and iii) man en route.

I) struggle/work

This subheading would be further divided into persons and things. Struggle with persons would include records verbal and visual of fighting, battles, war. Among things animal, struggle would include hunting, the preparation of the thing hunted and the selling thereof. Among things mineral this heading would entail mining. Among things vegetable struggle/work would entail agriculture.

Such an arrangement would again open the way for studies in trends of expression, whether the emphasis of a period be on production/acquisition of a thing, on its preparation or on its consumption.

ii) leisure/play

This heading would include subdivisions as eating, drinking, dancing, singing, games and sport. Comparison with the previous category would reveal the trends whereby themes of struggle/work become themes of play/leisure: e.g. human fighting tends to become wrestling and play fighting; the task of hunting/fishing tends to become the sport thereof.

iii) man en route

This subheading would involve the theme of persons en route be it by foot, by horse, by carriage or more modern means.

7) Theory and Practice Reconsidered

Such a fundamental reorganization of man's knowledge brings into focus the enormous spectrum of scales ranging from electron microscopic analysis on the one hand, through normal photographs and maps to geometrical and algebraic abstractions of reality. This spectrum does not merely reflect the theory side of practice. For as this spectrum has evolved we have come to distinguish ever more clearly between descriptions, technical and imaginative explanations, prescriptions, proposals and creative conceptions. We distinguish between things that exist physically, between those that are planned to exist physically and those that are purely phantasy. We distinguish sharply between the structure of objects and their function.

All these are distinctions which did not exist even 500 years ago. (In optics, for instance, Kepler first made the distinction between real-imaginary images nearly four hundred years ago (1604). These distinctions are clearly linked with the development of the spectrum that we have just outlined, and raise the familiar chicken and egg problem: did the distinctions cause the spectrum or conversely? To answer this question will require a map of the entire spectrum and a sense of which aspects developed when and where.

Involved in these shifts is something very basic. Although the term "theory" is clearly derived from the Greek, literature devoted specifically to theory as opposed to practice appears to be another innovation of the Renaissance. In short man's awareness of the predictive and prescriptive dimensions of knowledge is closely bound up with this gradual discovery of a possible spectrum between the concreteness of everyday objects and the abstractions of geometrical and algebraic figures. To understand the spectrum is to discover the roots of distinctions that make distinctive the modern world.

8) Culture Reconsidered

There is much talk in our day of a superculture (Boulding) by means of which buildings are becoming standardized the world over: an airport in one country is effectively like an airport in another country. Culture, once a source of diversity, is now gaining overtones of monotonous regularity, becoming an offspin of regularized technology.

What is needed is a new survey of our historical heritage which will provide insights into a more complex view of the cultural process. At one level every-man participates in culture. Local persons decide on local costumes, on special dances, on parades and festivities, on the facades of houses. These very carefully defined expressions give to persons in all walks of life a sense of distinction and importance. The shepherd, the milkmaid, the butcher, the shoemaker, all have a conscious sense of their role in the microcosm. Persons in one region consciously build differently than persons in other regions. Each town is convinced that its way of proceeding is the best in the world and this pride gives it enormous strength. At this level culture is decentralized, is regional and emphasizes diversity.

At another level there is an international culture which draws its strength from this very diversity of the everyday. When Justinian wished to build Hagia Sophia he persuaded Diodorus of Miletus, who had been directing the Platonic academy in Athens, to work with Anthemius of Tralles. He imported marble and other materials from places stretching from Egypt to the Pyrenees, and drew on building styles from all over the Rome empire.

An encyclopaedic approach to these dimensions of culture would confirm that the number of builders, building materials, methods or styles is far more dynamic than is usually imagined. Different styles need not necessarily conflict: they can be combined in creative ways.

A greater awareness of these trends would, moreover, bring back into focus the central role played by everyman in the great moments of mankind. The great cathedrals of the Middle Ages were not built solely by great experts: for the most part they were built with the help of the average man.

In the last century it has become ever more the fashion to argue strictly in terms of economics: it being held that modern architecture needs to be ugly, because one cannot afford beauty. And yet we are living in an age where the average man has more free time than ever, to reconstruct his microcosm, the town, in the image of his ideals, such that the advantages of modern technology need not impair the expression of aesthetic and personal values, whereby the amazing and beautiful variety of the human spirit comes into an international sense of the human community.

9) Practical Steps

A project that may well take a few generations at least to accomplish must begin with caution. Perhaps even greater than the technological barriers are the psychological barriers that stand in the way of such a venture.

Ideally a chair in visualization might be established. The holder of this chair would be concerned with the problem of restructuring traditional approaches to history and seek to encourage students to explore new horizons using such techniques.¹

Ideally, the holder of this chair would gain the full cooperation of a major European (Siemens, Philips) or American (IBM) computer firm. Guided by their expertise they would make a fact-finding tour around the world, accompanied by one or more computer and or visual/electronics experts. With a clear knowledge of the present state of technology, one could then determine what technological advances or adjustments in equipment would be needed before embarking on a pilot project.

This clear one might begin with a relatively small project: coordinating various maps of Rome and photographs of Rome with the numerous books on Roman Antiquities (*vedute*) in the Renaissance.

Once the basic principles of recording and recall were clearly established one could develop sample packages of knowledge for the future encyclopaedia. These could then be judged by experts in various fields who would propose improvements.

A next stage might well be to tackle the challenge of recording all books under a subject heading such as *Geometria* or *Physica* in a library such as that at Wolfenbüttel, the result again being assessed by experts in the respective fields.

The way would then be set for the computerization of an entire library². The computerization of major European libraries would follow. Thereafter it would increasingly become a question of coordinating various national projects and developing computer facilities sufficiently large and complex to record the sum of this information and analyse it in fresh ways, cooperating with bodies such as the Gesellschaft für Information und Dokumentation in Germany and similar bodies elsewhere.

Once the major Western European collections have been systematically coordinated within a master programme, the project can be extended to include Eastern Europe. Here the stipulation can be made that future access to the West-European encyclopaedia requires present access to the present body of East-European knowledge. Mutual interest will thus serve to overcome ideological and political obstacles.

Meanwhile various related projects in the United States, Canada, Japan can be adjusted and fed into the master programme. Branch projects will spread to other advanced, developing and underdeveloped countries, probably co-ordinated under the auspices of UNESCO.

The procedure here outlined with respect to libraries applies equally to museums, galleries, archives etc.

As the project progresses an enormous amount of effort will be needed simply to supply the computers with the information at hand. Here an amendment of university promotion policy may prove of great use. At present tens of thousands of academics throughout the world write articles for specialist magazines which remain readily accessible to only a few in a narrow area of scholarship. If the academic value system awarded more points for pertinent contributions to the computerized encyclopaedia than for obscure articles, then the combined energy and expertise of the world's academics would become focussed on a single project.

The project might even catch the popular imagination. Then literally everyone could contribute. To find some item not yet recorded in the encyclopaedia might become a game, perhaps even a contest with honours and prizes. With everyman's cooperation, everyman's encyclopaedia would become reality much sooner.

Wolfenbüttel 1 December 1981

Notes

¹ Given the renown of the Germans for thoroughness and for historical precision it would be wise to create this chair at a German university. Among German universities it should be one with a great library and one where computer methods are already being explored. Göttingen is, in these respects, an ideal place, all the more so because of its close links with the Herzog August Bibliothek, which ranks among the greatest of rare book libraries.

² E.g. Herzog August Bibliothek.