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Thoughts on the Re-organisation of Knowledge

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0. Introduction

Ever since the Greeks the classification of knowledge has inspired efforts towards a single system which could replace all others. Plato thought such an organisation would involve subjects. Aristotle believed a breakdown was needed in terms of basic methods such as theoretical, practical end productive. Since then thinkers ranging from Boethius, St. Thomas Aquinas and Bacon to Brunet, Hartwig, Brown, Dewey and Bliss have devoted their energies to new systems which excluded others.[1] Almost all these systems have focussed on verbal knowledge stored in manuscripts and books and have thereby overlooked the special characteristics of visual and numerical knowledge. This paper outlines a now approach to classification which would involve 1) an integration of earlier systems and 2) the development of systems sensitive to differences between verbal, visual and numerical knowledge.

1. Verbal Knowledge

At present major libraries are committed to a single system of classifications Library of Congress, Dewey, Göttingen etc. If these major systems were collated with the aid of computers it would be possible for a scholar to begin with a given title and learn under which heading it falls in different classification systems. If a

scholar also had access to other titles under a given subject heading, he would have an important new tool in searching for material in difficult subjects. In making such searches he would become aware of cultural differences in classification.

This approach could be taken much further. From the early seventeenth century onwards there are published subject lists in bibliographies such as Draud, Lipenius or Murhard. With the aid of computers one could take the titles Draud lists under say, perspective, and trace how many of these occur under architecture, optics or geometry in later bibliographies. In so doing one could explore how the contents and horizons of various subjects and fields have altered with time and how various categories of our own world view developed. Such study would lead to a new historical discipline of frameworks of knowledge.

At present bibliographies are limited to giving lists of existing books in a subject end, in rare cases, locations of these books. In future, a new type of historical bibliography could also record references to the book in question in earlier bibliographies. This would throw light on changes in the process of recording past knowledge: how early bibliographies may mention only the author, then author and short-title and only later become concerned with publishers, editions, variants etc. Knowledge of this changing recording process would give insights into the development of our modern historical consciousness. It would also reveal how progress has been intimately connected with progressive access to past knowledge. Other subject indexes found in national book lists -- Kayser, Pagliaini, Brinkman"s etc. -- could also be collated. At present a scholar wishing to master even a specific problem in a field needs to consult several hundred volumes. With the aid of e computer such searches of literature could be reduced to a question of minutes.

Such a systematic collation could be a first step towards a now form of systematic encyclopaedia which would integrate verbal, visual and numerical knowledge.

Fig. 1 Taccola

Fig. 2 Cozzarelli

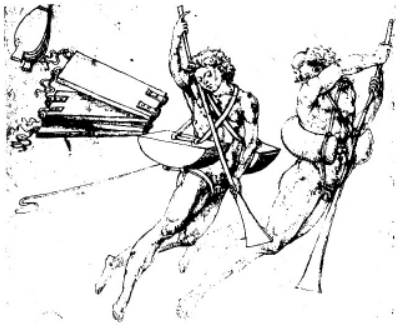

Fig. 3 Franceso di Giorgio Martini

Fig.4 Leonardo da Vinci

1-4 Fifteenth Century life-jackets

2. Visual Knowledge

Visual knowledge, --- paintings, photographs, drawings, sketches, diagrams ---, when compered with verbal knowledge, is in a near chaotic state. Many major art galleries and collections do not have comprehensive catalogues. There are a few major photographic archives of paintings such as the De Witt Collection, the Princeton and the Marburg Index, but these have not yet been systematically cross-indexed. A pilot project, supported by the Volkswagen Foundation, is underway to coordinate the *Marburg Index* with van der Waal'e *I c o n c 1 a s s*, a classification system specifically designed for visual images. With support from the Getty Foundation this system may also be applied to the De Witt Collection.Such projects could serve as e first step towards an encyclopaedia of our visual heritage which would provide insight into 1) the development of ideas; 2) the interplay of different media; 3) the relation of theory and practice; 4) the rise of realism and 5) of different levels of abstraction. Each of these will be considered in turn.

2.1 Development of Ideas

It has become popular to refer to an interplay between tradition and innovation. Unfortunately, the present dis-organisation of our visual knowledge does not permit this to be assessed seriously. Historians of art, notably those of the Warburg School, have made numerous sporadic demonstrations of the continuity of motifs from Antiquity through the Renaissance end into the modern period. Historians of science end technology concentrate on the first appearance of an invention or discovery and on its latest development. And while their approach assumes a continuity of tradition little effort is made to examine the details thereof. Misleading end even erroneous claims are often the result.

A concrete example: the invention of the life-jacket is often attributed to Leonardo de Vinci (fig. 4). An encyclopaedia of images thematically arranged would reveal at a glance that this invention was known to Taccola in the 1430'S (fig. 1) and thereafter to Cozzarelli (fig. 2) and Francesco di Giorgio Martini (fig. 3). Careful study of this tradition would reveal how much Leonardo owed to his elder contemporaries not only in terms of life-jackets, but in terms of other inventions also.

In the case of more complex inventions it would also be possible to trace how an idea emerges from a simple manual object to a complex mechanical device. Leonardo's drawings of catapults illustrate this admirably (figs. 5-12). This applies also to the development of inventions in different periods. A comprehensive encyclopaedia would not reveal a simple positivistic development. There would be waves of progress and troughs of regress and yet, underlying the complexity, an ongoing diversification of forms, a practical visualisation as it were of the Darwinian theory.

2.2 Different Media

The medium in which a thing is executed has traditionally played an important role in the classification of visual knowledge[2]. Hence the history of painting, sculpture, manuscript illustration end goldsmithing are often treated as individual subjects, and scholars tend to specialize in one of these. This approach obscures many realities of the past. In the Renaissance, for instance, Ghiberti was active as e goldsmith and sculptor. Michelangelo was equally famous as sculptor and painter.

An encyclopaedia of visual images would therefore trace the continuity of a motif such as Apollo through the sculptural tradition, and in turn correlate images of Apollo in other media ranging from medals end intaglio, through miniature drawings and paintings.

2.3 Practice and Theory

This question of different media leads, in turn, to subtle problems of relations between practice and theory. In the course of the Middle Ages there developed e category of treatises to which we refer as pattern books or model-books.[3] In the Renaissance there emerged a whole body of theoretical literature pertaining to perspective, architecture, engineering etc. It is commonly assumed that this literature outlined new horizons of theory which then inspired subsequent practice.

A close study of the literature on linear perspective confirms that the situation was more complex. The earliest manuscripts of Alberti contain no diagrams. Piero dells Francesca's *De prospectiva pingendi*, written c. 1480, contains no dramatic spatial scenes. His perspectival constructions are limited to isolated objects which, moreover, were long familiar to painting practice (e.g. figs. 13-14). In other words his theory was effectively a summary in mathematical terms of motifs from the realm of practice.

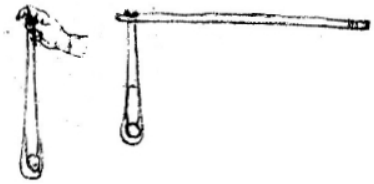

Fig. 5-6

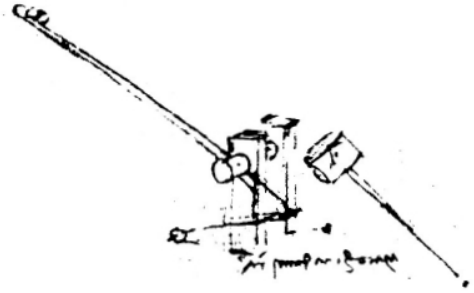

Fig. 7

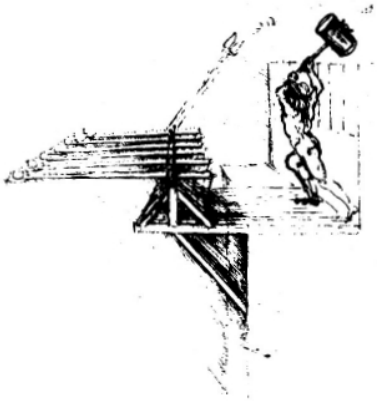

Fig. 8

Fig .9

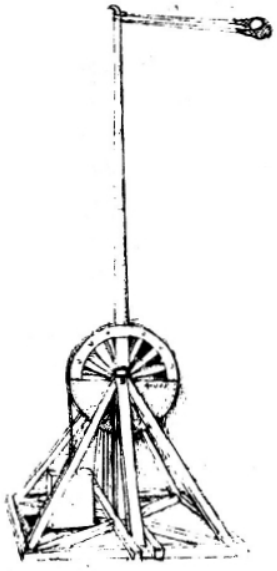

Fig. 10

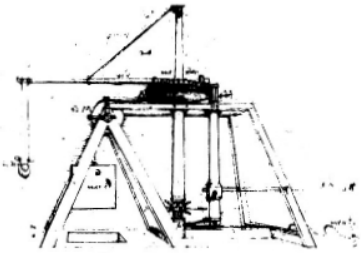

Fig. 11

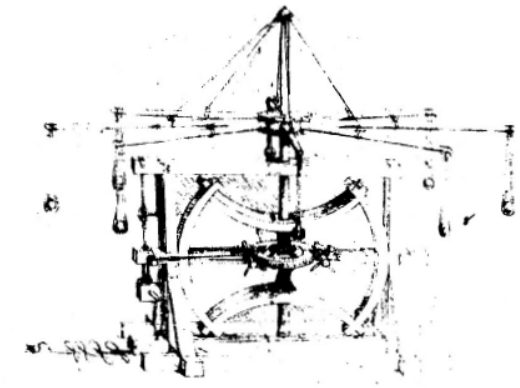

Fig. 12

Figures. 5- 12. Development of an idea in Leonardo's notebooks.

Fig. 13

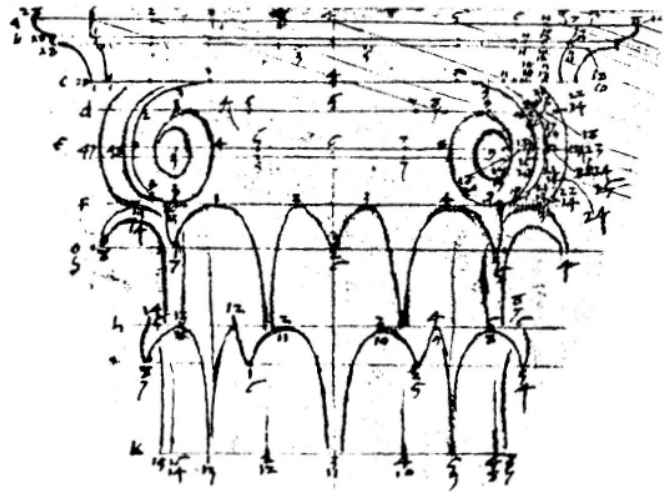

Fig. 14

Figures 13 – 14. Example how Piero della Francesca's Theory summarizes his paintings p[r]actice

There is evidence that the relation between theory as a summary of practice continued well into the sixteenth century. On the other hand model books would not have emerged as a separate body of literature if the examples which they offered had not had an impact on practice.

An encyclopaedia of visual images would reveal how theoreticians drew on their predecessors for both practice and theory in developing an expending corpus of published knowledge about various crafts, skills, techniques and methods. It would also reveal links between advances in practice and theory.

2.4 Realism

That which we term realism in art or literature is, in its simplest terms, e clearly defined relation between e representation and the original which it represents. Hence a photograph of, say, Nürnberg is realistic because the correspondence between photograph end original is one to one. The landmarks in Nürnberg could not be mistaken for those of any other city.

This connection between e given picture and an individual place or object has only developed gradually. As Gombrich[4] has noted, in Hartmann Schedel's *Nüremberg Chronic1e,* a picture of e city is often used to represent various cities. In other words a fifteenth century picture of a city was polyvalent and it took hundreds of years before this polyvalence was reduced and a picture of a city came to represent a specific city.

With an encyclopaedia of images one could study systematically this gradual process of what Gombrich would call matching between pictures and their originals, whereby visual images which had originally represented universal concepts eventually showed particular objects and scones in the natural world. Such a study of changing parameters of the fit or match between visual image and original would open new avenues for examining the development of realism.

At a future date these studies could go considerably further if the encyclopaedia of visual images were correlated with an equivalent thesaurus of verbal images. In the past generation there has, for example, been e considerable debate whether developments in literature had an important effect on realism in Greek art (Gombrich) or whether developments in Greek art were a catalyst to realism in Greek literature[5] (Hanfmann). The debate remains unresolved mainly because no scholar today possesses, nor can he hope to acquire by conventional means, the necessary knowledge.

In many cases the information that one would like to have is no longer extant. Even so there remains a great corpus of verbal and visual sources. An encyclopaedia would enable one to examine chronologically and topographically not only the relation between examples of Apollo but also verbal and visual

examples known to stem in simply verbal descriptions and visual descriptions of visual sources from verbal sources.

These relations, if systematically studied, would show how verbal and visual images have interacted in presentation, and how this interplay led to the discovery of fundmental differences between words and images and that however tempting is the analogy, *ut pictura poesis*, the realism of pictures is ultimately a world independent from the realism of words. This could lead to basic insights into the development of modern verbal end visual modes of communication.

2.5 Levels of Abstraction

At one time the representation of say, a skull, primarily involved drawings. Today our visual knowledge of skulls includes a whole spectrum of representations ranging from models and photographs to sketches and geometrical diagrams. Hence an encyclopaedia would trace how drawings of skulls have improved over the centuries, and also map out when and in what context these other forms of representation evolved. The number and complexity of these levels of abstraction with which information is recorded could prove important tools in cultural analysis.

3. Numerical Knowledge

At the simplest level this involves the use of numbers and relates to the history of measurement and quantification. An encyclopaedia would allow one to trace how rough approximations gradually led to standards and eventually fine measurements with tolerances.

Many phenomena in nature were not measured in early times because they were not visible. It was not until tracers were added to water end air that their direction could be clearly established. Hence an encyclopaedia could reveal how the history of quantification is intimately linked with the history of visualisation,[6] and give now insights into the development of our scientific world view.

4. Pilot Project

Such an encyclopaedia is a problem of decades if not of generations end before systematic efforts can be made, it will be necessary to explore how present technology can be adapted end developed to meet this challenge. At the outset e major computer firm might support a pilot project including an electronics end video expert and a scholar at a major historical library such as Wolfenbüttel. In the long run the results could be made public on a profit basis akin to cable television or video films today. Then the encyclopaedia would emerge an e venture profitable financially and to the general profit of mankind.

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[5] Ibid., p. 129.

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