



UC Berkeley School of Information

The Organization of Knowledge

Concepts of Information i218
Geoff Nunberg

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Itinerary: 3/9/11

Knowledge and information

Defining "knowledge"

The anthropology of knowledge

Changing frames of knowledge, 1500-1800

Organizing knowledge

Material representations of knowledge, 1

Systems of organization

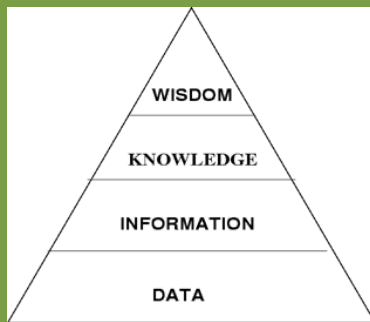
The Encyclopédie

Alphabet and theme

Material representations of knowledge, 2

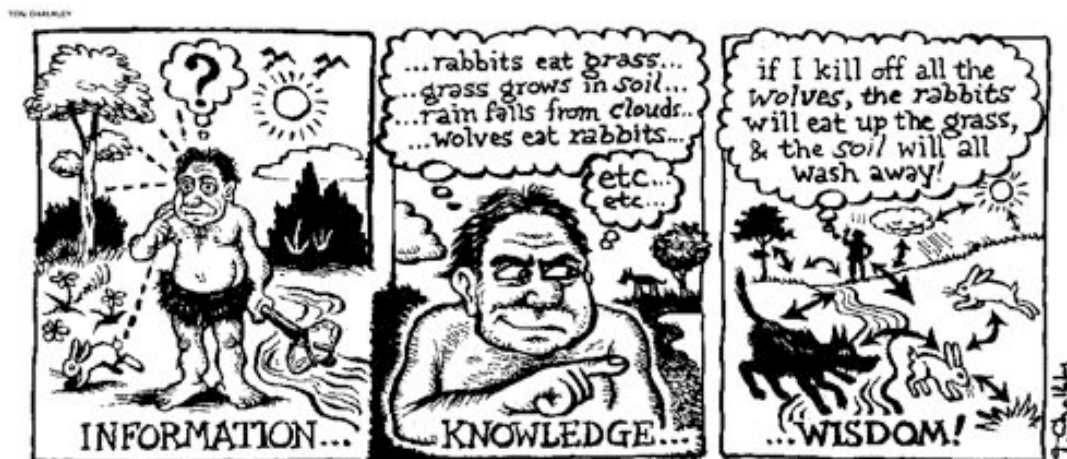


"knowledge" and "information"



A spurious semantic field

Data are facts and statistics that can be quantified, measured, counted, and stored. Information is data that has been categorized, counted, and thus given meaning, relevance, or purpose. Knowledge is information that has been given meaning and taken to a higher level. Knowledge emerges from analysis, reflection upon, and synthesis of information. *Dr. Donald Hawkins, Information Today*





"information" and "knowledge"

Data are sensory stimuli that we perceive through our senses. Information is data that has been processed into a form that is meaningful to the recipient. Knowledge is what has understood and evaluated by the knower.

Prof. Shifra Baruchson–Arbib, Bar Ilan University, Israel

Data are the basic individual items of numeric or other information, garnered through observation.... Information is that which is conveyed, and possibly amenable to analysis and interpretation, through data.... Knowledge is the general understanding and awareness garnered from accumulated information, tempered by experience, enabling new contexts to be envisaged.

Dr. Quentin L. Burrell, Isle of Man International Business School, Isle of Man



"knowledge" and "information"

Data are raw material of information, typically numeric. Information is data which is collected together with commentary, context and analysis so as to be meaningful to others. Knowledge is a combination of information and a person's experience, intuition and expertise. Prof. Charles Oppenheim, Loughborough University, UK

Data are facts that are the result of observation or measurement. Information is meaningful data. ... Knowledge is internalized or understood information that can be used to make decisions. *Prof. Carol Tenopir, University of Tennessee*



"knowledge" and "information"

Putting the three concepts ("data", "information", and "knowledge") as done here, gives the impression of a logical hierarchy: information is set together out of data and knowledge comes out from putting together information. This is a fairytale. *Prof Rafael Capurro, University of Applied Sciences, Stuttgart, Germany*



Enshrining the Hierarchy

OED 5 e. Contrasted with data: that which is obtained by the processing of data.

1970 A. Chandor et al. Dict. Computers 99 Data is sometimes contrasted with information, which is said to result from the processing of data.

1977 Ann. Internal Med. 86 640/2 This admixture of information and data is cemented by an experience accumulated over the years and a dash of intuition into a 'make-do' diagnosis.

2001 R. W. Cahn Coming of Materials Sci. xiii. 498 The process already has a name—datamining . . . This means 'the extraction of implicit, previously unknown and potentially useful information from data'.

2007 Information & Managem. 44 600/1 A common distinction within this domain is that data is raw numbers and facts, information is processed data.

We have lots of data on the new policy, but no information...

We have information about the policy, but no knowledge...



Defining "knowledge"

Collocations

knowledge economy *n.* *Econ. and Business* an economy in which growth is thought to be dependent on the effective acquisition, dissemination, and use of information, rather than the traditional means of production
knowledge management *n.* *Econ. and Business* the effective management of the sharing and retention of information in an organization; the use of management techniques to optimize) the acquisition, dissemination, and use of knowledge. **knowledge work** *n.* work which involves handling or using information. **knowledge worker** *n.* a person whose job involves handling or using information.

[Note:these are almost never translated with equivalent of "knowledge"]



A modest proposal

To avoid confusion with ordinary-lg uses of *data*, *information*, and *knowledge*, substitute new terms for technical notions:



A modest proposal



To avoid confusion with ordinary-lg uses of *data*, *information*, and *knowledge*, substitute new terms for technical notions:

"data" = "moe"

"information" → "curly"

"knowledge" → "larry"

Moe are facts that are the result of observation or measurement. Curly is meaningful moe. ... Larry is internalized or understood curly that can be used to make decisions.



Defining "knowledge"

Particularistic/individual senses

OED:

5a The fact of knowing a thing, state, etc., or (in general sense) a person; acquaintance; familiarity gained by experience. 1771 *His knowledge of human nature must be limited indeed.*

8. a. Acquaintance with a fact; perception, or certain information of, a fact or matter; state of being aware or informed; consciousness (of anything). The object is usually a proposition expressed or implied: e.g. the knowledge that a person is poor, knowledge of his poverty.

10. Acquaintance with a branch of learning, a language, or the like; theoretical or practical understanding of an art, science, industry, etc



Defining "knowledge"

Collective senses

13. The sum of what is known. *De Quincey, 1860 All knowledge may be commodiously distributed into science and erudition.*

Cf human knowledge vs ?human information

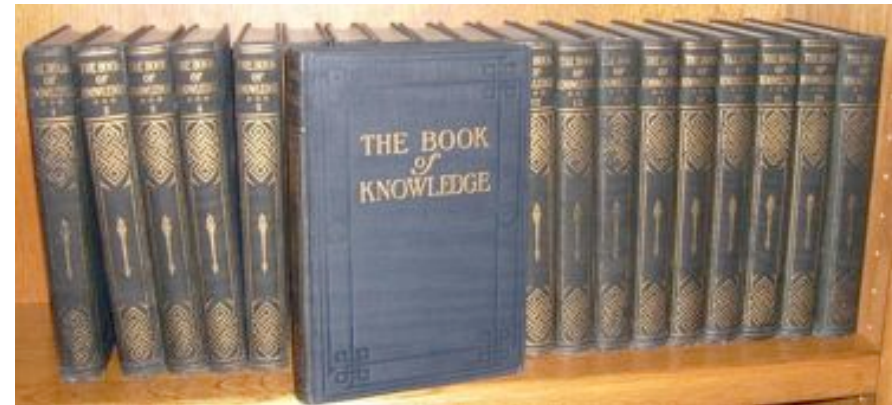
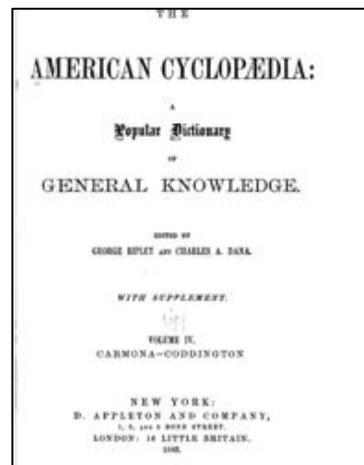
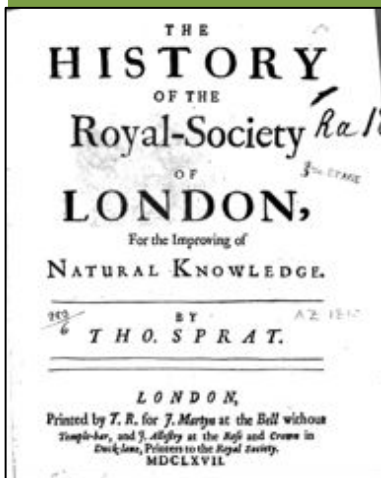


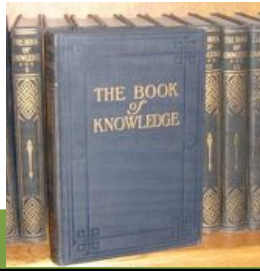
Collective knowledge: the missing arguments

Collective senses: knowledge as a three-place relation

I3. The sum of what is known [about X] [by Y]

Medical knowledge vs medical information: what is the difference?





Collective knowledge: the missing arguments

Collective senses: knowledge as a three-place relation

I3. The sum of what is known [about X] [by Y]

What qualifies a proposition as c-knowledge?

P is collectively significant (to everyone?)

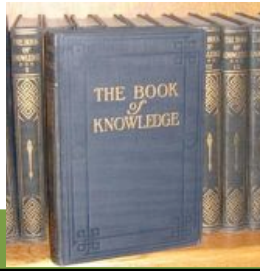
It's snowing in Chicago./It often snows in Chicago.

"We are out of paper towels"/Paper towel consumption is 50% higher in America than in Europe/Arthur Scott introduced the first paper towel in 1931.

GN was born in Manhattan./William Tell was born in Bürglen, Switzerland.



Collective knowledge: the missing arguments



Collective senses: knowledge as a three-place relation

I3. The sum of what is known [about X] [by Y]

What qualifies a proposition as c-knowledge?

P must be collectively accessible (to everyone?)

"The third-century Chinese had knowledge of porcelain"

In that medical knowledge doubles every 3.5 years or less, by 2029, **we** will know at least 256 times more than **we** know today. As a result, it is not impracticable nor improbable to expect that humankind will reach the point where **we'll** know how to substantially slow or perhaps even stop aging...



Quantifiable Knowledge

C-knowledge can (in theory) be quantified

In that medical knowledge doubles every 3.5 years or less, by 2029, we will know at least 256 times more than we know today.

Today it is recognized that medical knowledge doubles every 6–8 years, with new medical procedures emerging everyday...

Medical knowledge doubles every seven years.

...medical knowledge doubles itself every 17 years.

Medical knowledge doubles every two years, and with that kind of growth it is nice to know that Children's Hospital of Michigan offers plenty of research...

Medical Knowledge doubles every 19 years (22 months for AIDS literature) — Physician needs 2 million facts to practice...



What's the difference between e-Information and e-Knowledge?

...Thus the volume of new medical information doubles every 10 to 15 years and increases tenfold in 23 to 50 years.

Medical information doubles every 19 years. ... • Scientific information doubles every five years. • Biological information, doubles every five years. .

Medical Information Doubles every Four Years.

Medical information doubles every three years!

There are about 20000 - 30000 journals published in the discipline and the amount of medical information doubles every fifth year.



Information before "information"?



Shifting Conceptions of Knowledge, 1500-1800



The anthropology of knowledge

How do we characterize conceptions of "knowledge" historically?

Explicit descriptions & theories

Models/images of knowledge in

Forms of institutions & practices (curriculum)

Material embodiments (library, museum form of book)

Textual embodiments – encyclopedia, dictionary, compendium, bibliography

Metaphors & visualizations: field, tree, discipline, trésor, etc.



Shifting Conceptions of Knowledge, 1500-1800

Varieties of Renaissance knowledge:

scientiae/artes: "Ars sine scientia nihil est."

Private/public (alchemy, cf *métier*, "trade")

General/specialized

The "universal man" (*polymathia*, *pansophia*) "A man is able to learn many things and make himself universal in many excellent arts." Matteo Palmieri, 1528

Book-learning vs knowledge of things





The 15th-Century Curriculum

The *enkyklios paideia* ("circle of 'learning'"):

Trivium: grammar, logic, rhetoric

Quadrivium: arithmetic, astronomy, geometry, music

The three philosophies: ethics, metaphysics, "natural philosophy"

Higher faculties: theology, medicine, law





The 15th-Century Curriculum



Curriculum roughly uniform throughout Europe, enabled *peregrinatio academica*
"town and gown"





The 15th-Century Curriculum



3. TREE OF KNOWLEDGE, TITLE-PAGE OF R. LULL, ARBOR SCIENTIÆ (1515; rpt. 1635); COPY IN CAMBRIDGE UNIVERSITY LIBRARY (P^o.3.52)

System of knowledge is "closed"; built around classical sources and religious texts (courses organized around texts, not subjects)

Organization of knowledge is fixed and "natural"



Changing Frames of Knowledge

Within 200 years, something like the mod, system emerges.

Responses to influences that are:

Pragmatic/material

Philosophical/academic

Symbolic/political

(Not independent...)

But how can we tell that the system of knowledge has changed?



Breaking with the past



It would disgrace us, now that the wide spaces of the material globe, the lands and seas, have been broached and explored, if the limits of the intellectual globe should be should be set by the narrow discoveries of the ancients. Francis Bacon, *The Advancement of Learning*, 1605



Opening the World of Knowledge: Botany

Herbarum vivae eicones ("Living Pictures of Herbs") by Otto Brunfels, 1532. Matched Swiss & German plants to those known to Pliny and Discorides, ignoring differences, with residual *herbae nudae* ("naked plants")



Opening the world of knowledge



VALERIUS CORDUS
Medicus excellens.

VALERII CORDI SIMESIJ, Historiæ plantarum, liber I. qui est de herbis diuersis.

*Proxima quæ hominum castetate crescit,
Pulsibus æstrem cognitionem dedit.*

DE ROSELLA SIVE SALSIPORA, *Epica adyrtis*
Soli dicitur.] CAP. I.

ROSSELLA habet minima, septem uel octo numero, plura interdum, & interdum pauciora, longis et rubentibus pediculis in orbem per terram sparsa, leniter plerumque, quæ tantum spectant, concava & hirsuta, cæca rubentia capillo ut sita, coque in medio breuiori, in ambiguitate longiori: facillime etiam temporibus uentis minutissimas guttas et aspergines habentia: sapore acro, nitenti & glabra omnino sunt ex inferiore parte foliola, habentem tota minimi cochlearis figuram: è medio uero foliorum coliculus exit dodrante breuior, gracilis, rubescens, & sine ramulis, in summo paruos & pallidos flosculos sustinens, radice in habet pauca, breues, & capilli modo tenuissimas. Nascitur uliginosis & palustribus arenis. Habent folia, caules, & flosculi, acerbum, leniter acetosam & modicè acrimiam.



Valerius Cordus, *Historia plantarum* 1561 (1544), published posthumously by Conrad Gesner.

Records numerous plants not described by the ancients; emphasizes differences among similar plants.

By 1600, thousand of species are described, though in disorganized fashion.

Systems of description (not taxonomies) emerge. Plants bear four names (common, pharmacists' Latin, trad. Latin, Greek)



Drawing annotated by Gesner



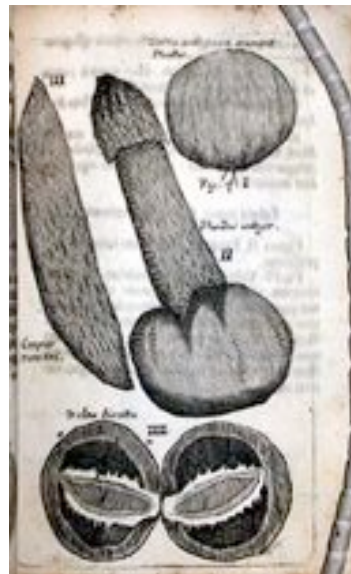
Opening the world of knowledge



John Ray, *Historia generalis plantarum*, 1686-
Classified 6100 plant species by seeds, seeds, fruit and leaves. Produced first modern definition of the species.

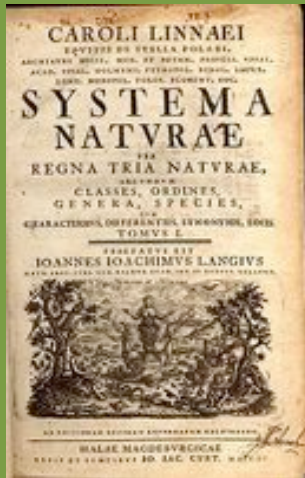
"... no surer criterion for determining species has occurred to me than the distinguishing features that perpetuate themselves in propagation from seed. Thus, no matter what variations occur in the individuals or the species, if they spring from the seed of one and the same plant, they are accidental variations and not such as to distinguish a species..."

"I reckon all Dogs to be of one Species, they mingling together in Generation, and the Breed of such Mixtures being prolifick"





The birth of "modern" classification



Systema naturae
1735 30

CAROLI LINNAEI				REGNUM ANIMALE												
I. QUADRUPEDIA		II. AVES		III. AMPHIBIA		IV. PISCES		V. INSECTA		VI. VERMES						
<p>CAROLI LIN</p> <p>I. QUADRUPEDIA. Corpus histurum. Pedes quatuor. Femina vivipara, lactifera.</p>						<p>II. AVES. Corpus plumosum. Alae duae. Pedes duo. Reprom ovisum. Femina ovipara.</p>										
ANTHROPO- MORPHIA. Eorum primus a- lii quatuor: vel nulli.	Homo. Natus in ipso.	Simia. Australis. Putterlicki. Digni.	Bradypus. Digni 3. vel 4. . . .	Ursus. Digni 5. Mamma 6. (Aid.) Colores lactei. Pelle crura pallida.	Leo. Digni 5. Mamma 4. testacea. Lapsa scabra.	Tigris. Digni 5. Mamma 4. umbilicis. Lapsa scabra.	Felis. Digni 5. Mamma 6. 5. 4. post 4. albam. Lapsa scabra.	Musfela. Digni 5. Mamma testacea 4. vituloga.	Didelphis. Digni 5. Mamma 8. latera lactifera albam.	ACCIPITRES. Eorum unum- decim.	Falco. Strix. Falco.	Parus. Corvus. Cuculus. Pica. Ceryle. Sitta. Upupa. Alcedo.	ACCIPITRES. Eorum unum- decim.	Strix. Falco. Parus. Corvus. Cuculus. Pica. Ceryle. Sitta. Upupa. Alcedo.	ACCIPITRES. Eorum unum- decim.	Strix. Falco. Parus. Corvus. Cuculus. Pica. Ceryle. Sitta. Upupa. Alcedo.

"I know no greater man on earth." Jean-Jacques Rousseau



The birth of "modern" classification



Frontispiece to
Linnaeus, *Hortus
Cliffortianus* 1737

Plants classified into 24 classes according to length and number of stamens; further classified into orders etc. Established binary system of naming



Plate 156: An illustration by Georg Dionysius Ehret for the *Hortus Cliffortianus* (1735–48) in which the Swedish plantman, Carl Linnaeus, first began to work out his 'methodus plantarum sexualis', grouping plants according to the number and arrangement of their stamens.



Organizing Knowledge Responses to Early Modern "Information Overload"



Pragmatic Forces: Perceptions of "Information Overload"



Antonfrancesco Doni, 1550: there are “so many books that we do not have time to read even the titles.”

“That horrible mass of books... keeps on growing, [until] the disorder will become nearly insurmountable.” Gottfried Leibniz, 1680



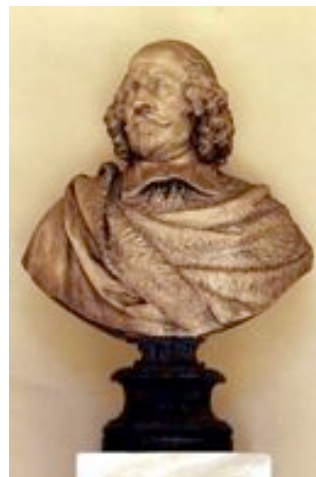
The Reorganization of Libraries



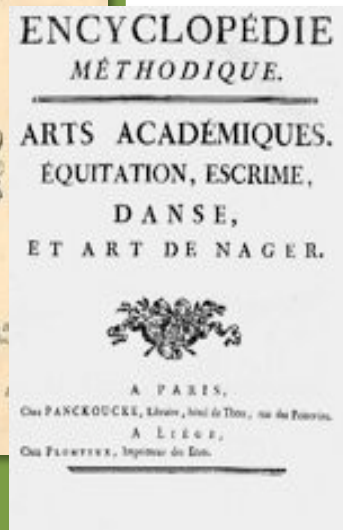
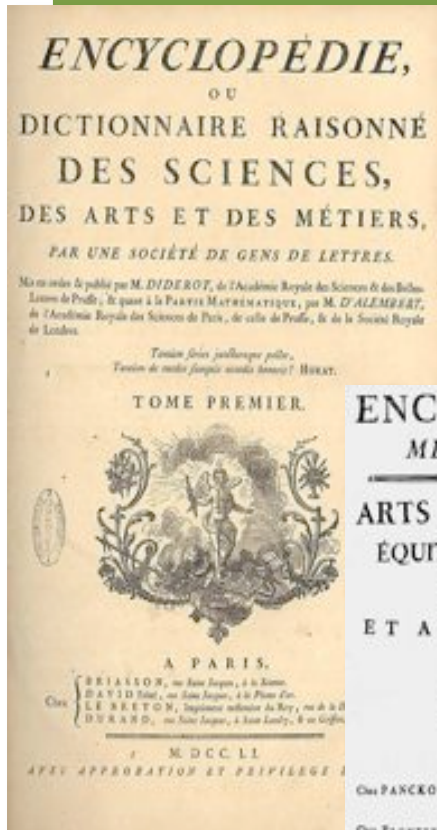
Gabriel Naudé proposes library organization scheme to “find books without labor, without trouble, and without confusion.” (1627)



Bibliothèque
Mazarine (1643)



Strategies for dealing with information overload



Compendia and reference books (*répertoires* or *trésors*)

As long as the centuries continue to unfold, the number of books will grow continually, and one can predict that a time will come when it will be almost as difficult to learn anything from books as from the direct study of the whole universe. It will be almost as convenient to search for some bit of truth concealed in nature as it will be to find it hidden away in an immense multitude of bound volumes.

—Denis Diderot, *Encyclopédie*, 1755



Creation of "reference" works

Compendia and reference books (*répertoires* or *trésors*)

"I esteem these Collections extreamly profitable and necessary, considering, the brevity of our life, and the multitude of things which we are now obliged to know, e're one can be reckoned amongst the number of learned men, do not permit us to do all of ourselves." Gabriel Naudé, 1661 [librarian to Mazarin]

The *Cyclopaedia* will "answer all the Purposes of a Library, except Parade and Incumbrance." Ephraim Chambers, 1728



Strategies for dealing with information overload



The most accomplished way of using books at present is twofold. Either, first, to serve them as men do Lords, learn their titles exactly and then brag of their acquaintance :—or, secondly, which is indeed the choicer, the profounder, and politer method, to get a thorough insight into the Index, by which the whole book is governed and turned, like fishes, by the tail... Thus men catch knowledge by throwing their wit on the posteriors of a book, as boys do sparrows by flinging salt upon the tail."

Jonathan Swift, "Tale of a Tub," 1704



Strategies for dealing with information overload

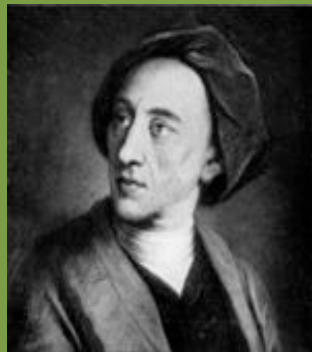


The most accomplished way of using books at present is twofold. Either, first, to serve them as men do Lords, learn their titles exactly and then brag of their acquaintance :—or, secondly, which is indeed the choicer, the profounder, and politer method, to get a thorough insight into the Index, by which the whole book is governed and turned, like fishes, by the tail. For to enter the palace of Learning at the great gate requires an expense of time and forms ; therefore men of much haste and little ceremony are content to get in by the back-door. ... Thus men catch knowledge by throwing their wit on the posteriors of a book, as boys do sparrows by flinging salt upon the tail."

Jonathan Swift, "Tale of a Tub," 1704

...How Index-learning turns no student pale,
Yet holds the eel of Science by the tail.

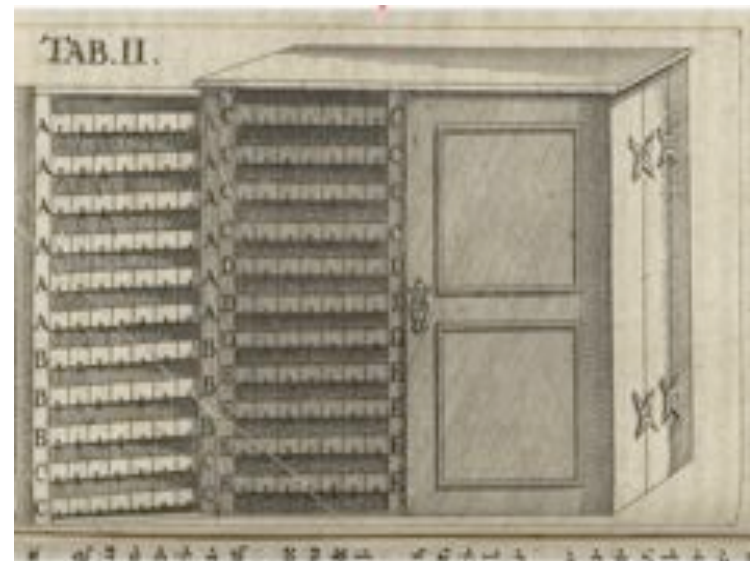
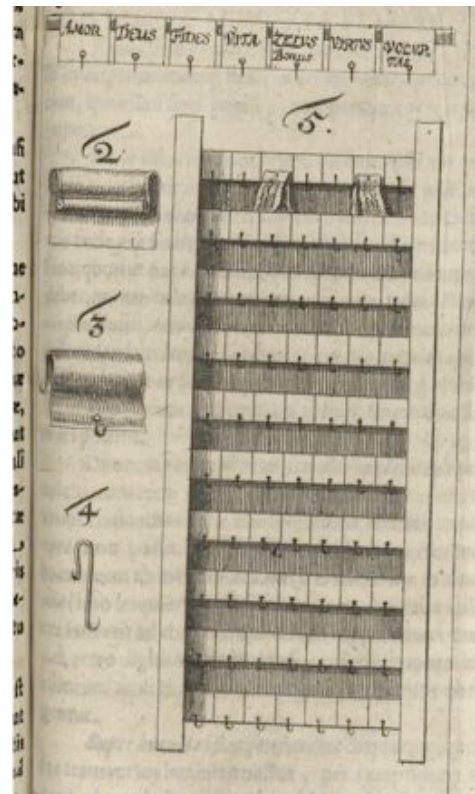
Pope, "The Dunciad," 1728





Strategies for Dealing with Information Overload

Note-taking system of Vincent Placcius, from *De arte excerpendi*, 1689





Forms and Frames of Knowledge



Presentation of the Pomeranian Kunstschränk to Duke Philip II of Pomerania-Stettin



Material Representations of Knowledge, 1

Knowledge and the role of the "trésor"

Libraries, anthologies, dictionaries, in a word "treasuries" [trésors], alongside of encyclopedic collections, delimit a vast territory on which are cast the signs required for knowledge, the expression of identities, and communication among the members of the group.

-Alain Rey, "Les trésors de la langue," 1986



Material Representations of Knowledge

Curriculum mirrored in form of library (bibliographies)





Material Representations of Knowledge



Curriculum mirrored in form of library (bibliographies)





Knowledge and the "Virtuosi"

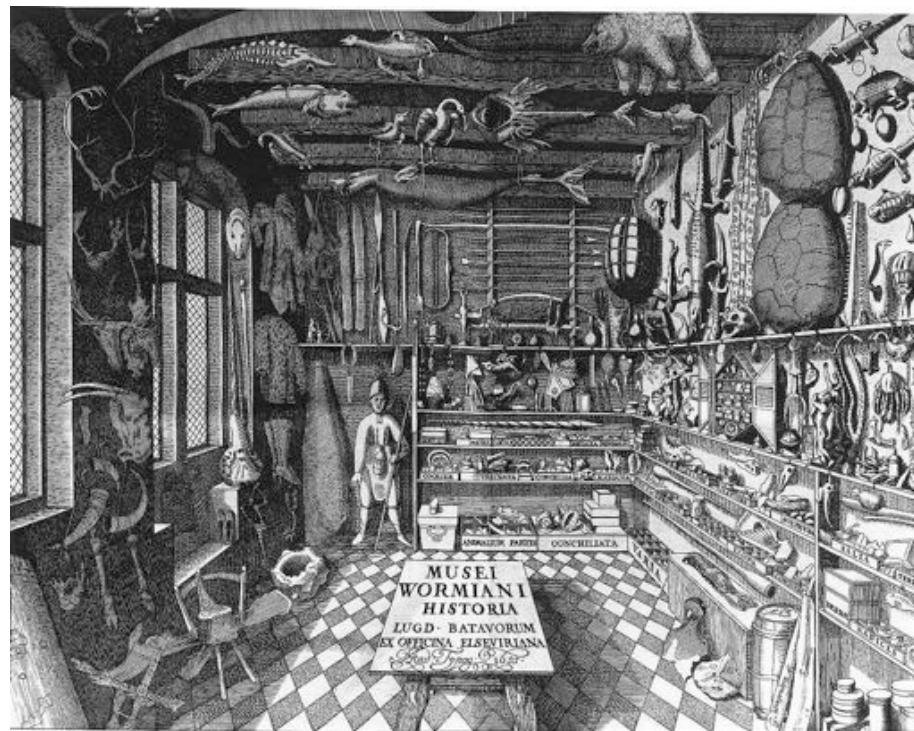


"He Trafficks to all places, and has his Correspondents in every part of the World; yet his Merchandizes serve not to promote our Luxury, nor encrease our Trade, and neither enrich the Nation, nor himself. A Box or two of Pebbles or Shells, and a dozen of Wasps, Spiders and Caterpillars are his Cargoe. He values a Camelion, or Salamander's Egg, above all the Sugars and Spices of the West and East-Indies... He visits Mines, Cole-pits, and Quarries frequently, but not for that sordid end that other Men usually do, viz, gain; but for the sake of the fossile Shells and Teeth that are sometimes found there." (Mary Astell, "Character of a Virtuoso," 1696)



Representations of Knowledge: The *Kunstkammer*

Organization of knowledge mirrored in form of *Kunstkammer*, cabinets of curiosities, *Wunderkammer*, etc.



Museum Wormianum, 1655



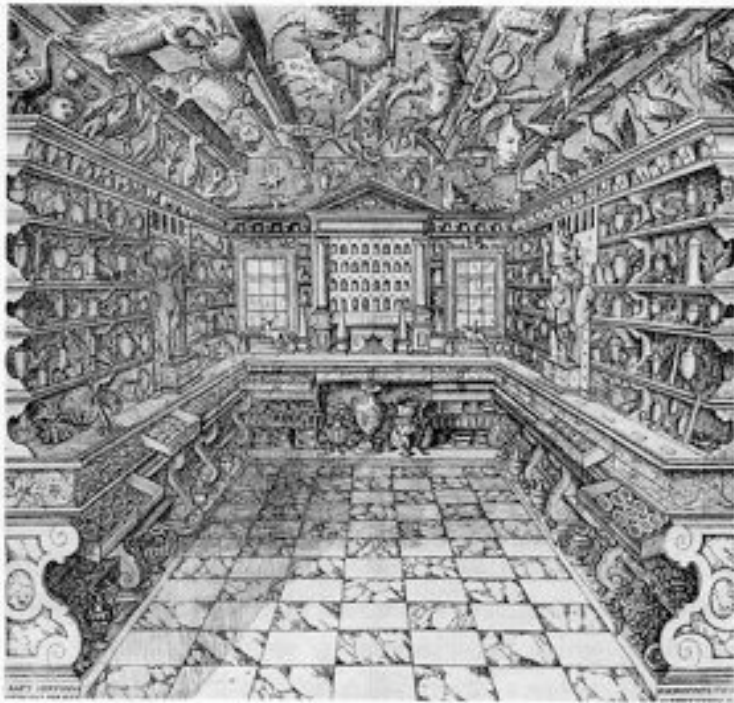
Representations of Knowledge: The Kunstkammer



Natural History Cabinet, Naples, 1599



Representations of Knowledge: The Kunstkammer



The Kunstkammer of Rudolph II was a carefully organized "museum" articulated through an understanding of the world... Its contents were organised to exhibit a world picture, with objects that symbolised all aspects of nature and art, as conceptualized by the occult philosophers... This organisation depended on the concept of resemblance, where the objects and their proximities suggested macrocosmic microcosmic links.

Eilean Hooper-Greenhill, *Museums and the Organisation of Knowledge*



Representations of Knowledge: The Studiolo



Studiolo of Francesco I
Florence (1570)



Kunstkammer, 1636



Representations of Knowledge: The Kunstschränk

The Kunstschränk (art cabinet or art shrine)





Representations of Knowledge: The Kunstschränk

The Kunstschränk

Presentation of the
Pomeranian Kunstschränk
to Duke Philip II of
Pomerania-Stettin, 1615)





From Cabinets to Museums

Kunstkammers first made available for public viewing in mid-17th. C (Kunstmuseum Basel, 1661)

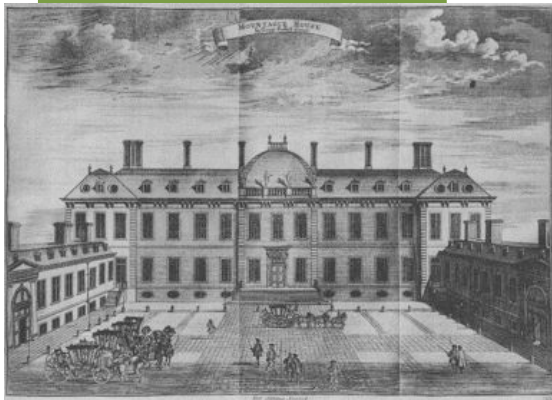
Public museums in 18th c:

British Museum, 1759, containing cabinet of curiosities assembled by Hans Sloan, ms collections, Royal Library. Later: collections of antiquities, etc.

Uffizi Gallery, Florence, 1765

Belvedere Palace, Vienna, 1781

Louvre Palace opened to public in 1793 with royal collections; augmented by Napoleon



Montague House, home of original British Museum in Bloomsbury



17th c. Galleries

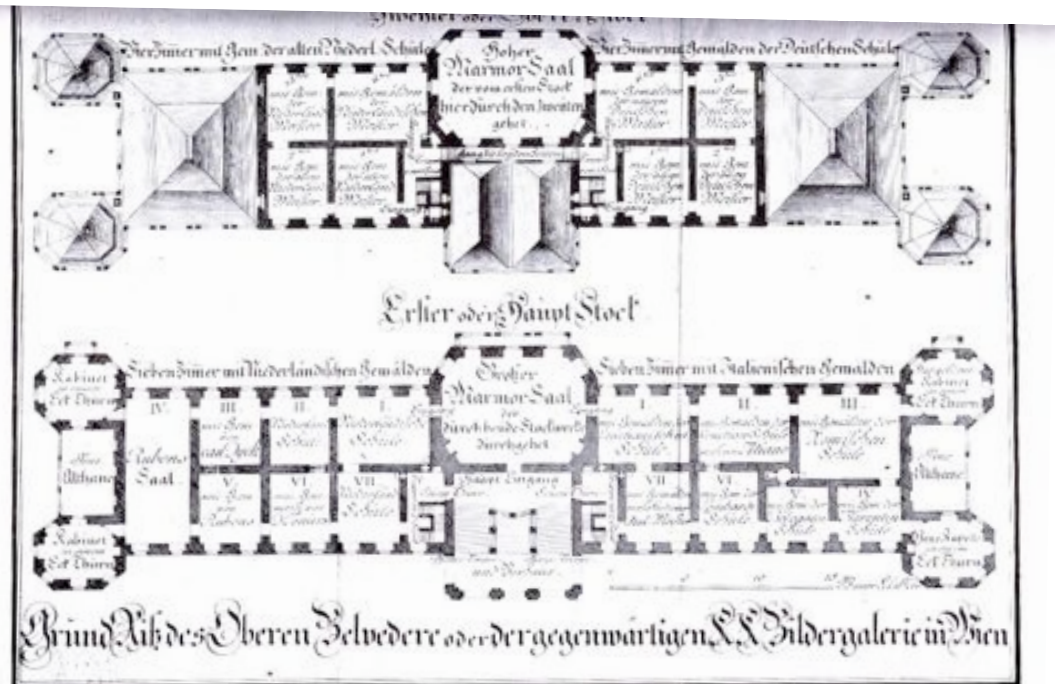


21. *The Imperial Gallery in Prague*, by Johann Betschneider, 1714. The paintings are arranged according to the visual and decorative effect.



18th c. Galleries

Painting Galleries,
Schloss
Belvedere,
Vienna, 1781



29 Histories of Art were created in many of the galleries of Europe. This plan of the paintings gallery in the Schloss Belvedere in 1778, shows how the works were grouped by country, and within that, by date, by (geographical) school, or by individual artist. This is in marked contrast to the forms of display shown in Plate 23.



Philosophical Issues: Reorganizations of Knowledge



The Classificatory Urge: Thematic Organization

c(9th c.): "Book of the Best Traditions"

1. Power
2. War
3. Nobility
4. Character
5. Learning and eloquence
6. Asceticism
7. Friendship
8. Prayer
9. Food
10. Women

فقالوا: "بايع." فقال: "إن أنا لم أفعل فمه؟"
فقالوا: "أذاً و الله الذي لا اله الا هو، نضرب عنقك!"
فقال: "أذا تقتلون عبد الله و اخا رسوله!"
فقال عمر: "أما عبد الله، فنعيم. أما اخو رسوله، فلا!"
و ابو بكر ساكت لا يتكلم. فقال له عمر: "ألا تأمر فيه بامرئ؟"
فقال: "ألا أكرهه على شيء ما كانت فاطمة الى جنبه."



The Classificatory Urge: Thematic Organization

Vincent de Beauvais, *Speculum triplex*,
1244, in 3 divisions:

Speculum naturale: God, angels & devils, man,
the creation, and natural history

Speculum doctinale: Grammar, logic, ethics,
medicine, crafts...

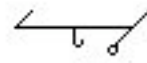
Speculum historiale: History of the world...






Wilkins' universal language

Explaining the symbol



The generic character  doth signify the genus of space. the acute angle on the left side doth denote the first difference, which is Time. The other affix signifies the ninth species under the differences, which is Everness. The Loop at the end of this affix denotes the word is to be used adverbially; so that the sense of it must be the same which we express by the phrase, For Ever and Ever.

John Wilkins "An Essay Towards a Real Character and a Philosophical Language' 1668

de, an element

deb, the first of the elements, fire

deba, a part of the element fire, a flame

"children would be able to learn this language without knowing it be artificial; afterwards, at school, they would discover it being an universal code and a secret encyclopaedia." Borges



Wilkins' universal language

... a certain Chinese encyclopaedia entitled 'Celestial Empire of benevolent Knowledge'. In its remote pages it is written that the animals are divided into: (a) belonging to the emperor, (b) embalmed, (c) tame, (d) sucking pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) et cetera, (m) having just broken the water pitcher, (n) that from a long way off look like flies.

...there is no classification of the Universe not being arbitrary and full of conjectures

Jorge Luis Borges



New Schemes of Organization: Philosophical Influences



Francis Bacon's scheme puts man at the center:

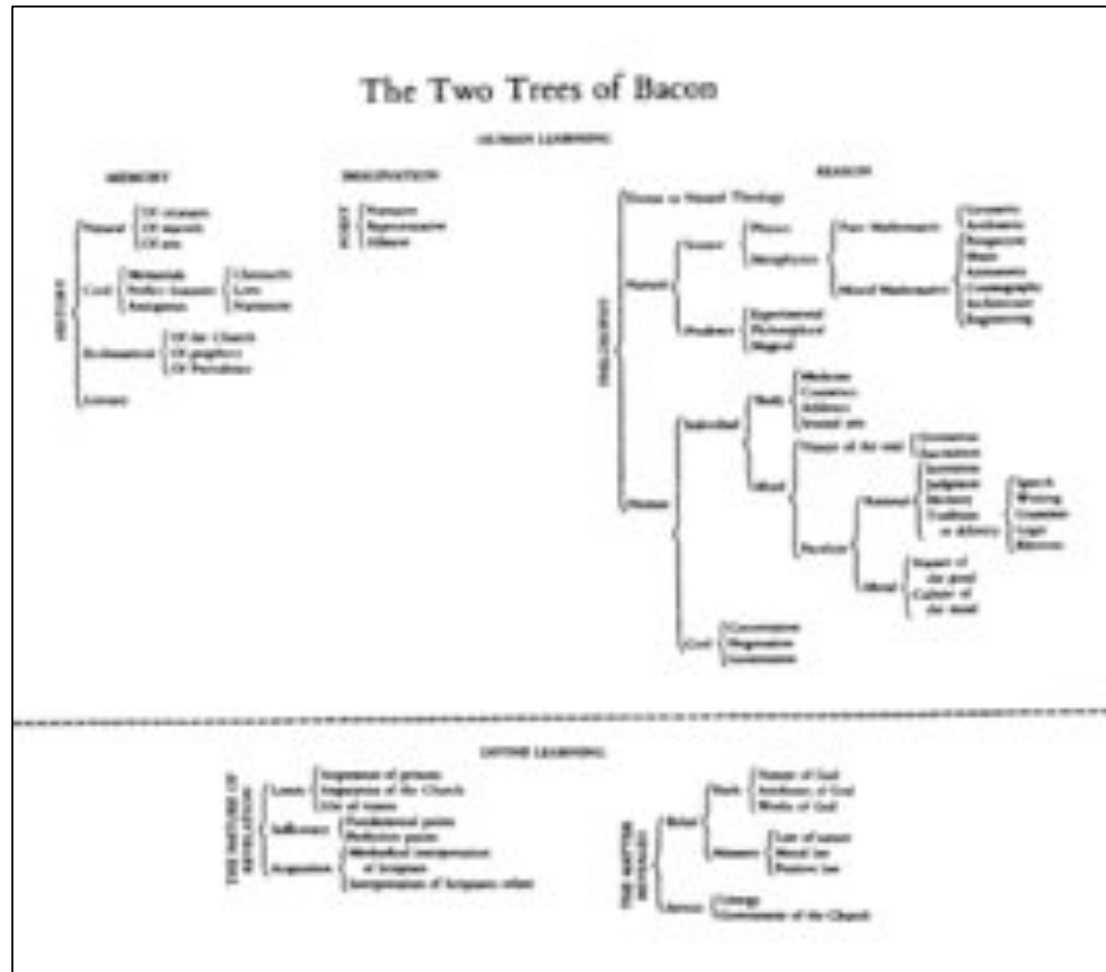
Nature (astronomy, meteorology, etc.).

Man (anatomy, powers, actions),

Man acting on nature (medicine, visual arts, arithmetic),,,

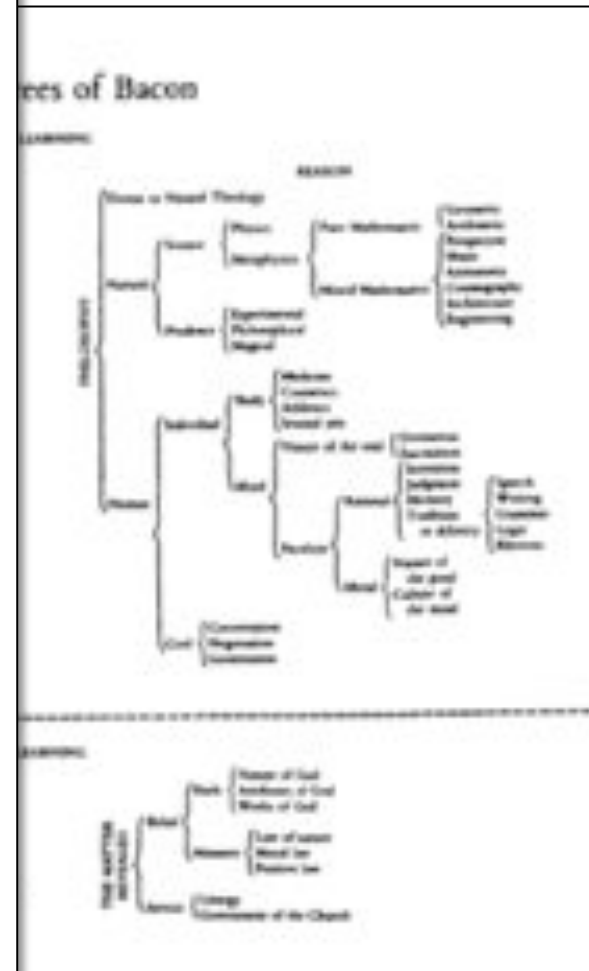


The Tree of Bacon



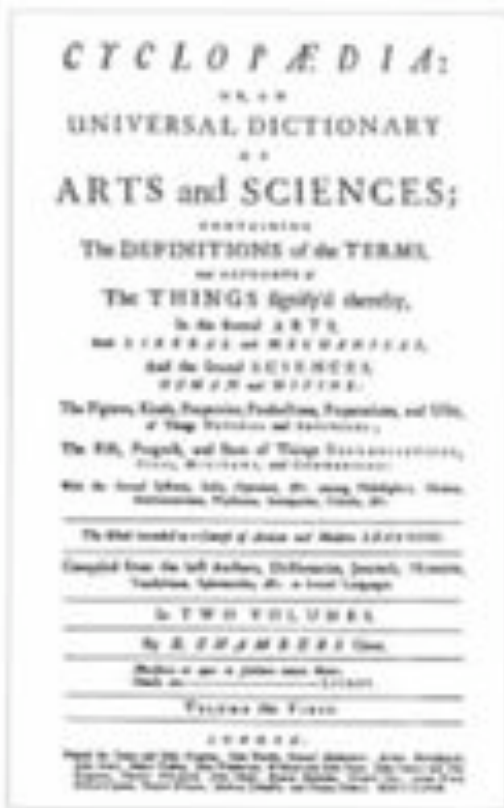


The Tree of Bacon





Chamber's Cyclopædia 1728



The Tree of Chambers



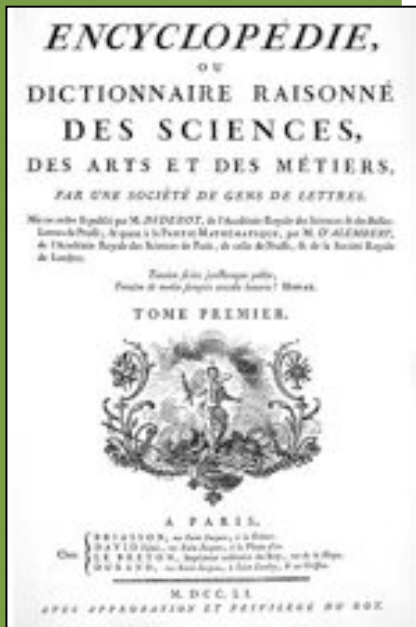


The Encyclopédie



First vol. appears in 1751; last in 1772;

ENCYCLOPEDIA, f.n. (philosophy). This word means the interrelation of all knowledge; it is made up of the Greek prefix *en*, in, and the nouns *kyklos*, circle, and *paideia*, instruction, science, knowledge. In truth, the aim of an encyclopedia is to collect all the knowledge scattered over the face of the earth, to present its general outlines and structure to the men with whom we live, and to transmit this to those who will come after us, so that the work of past centuries may be useful to the following centuries, that our children, by becoming more educated, may at the same time become more virtuous and happier, and that we may not die without having deserved well of the human race





The Enlightenment Plan



Jean d'Alembert

"The tree of human knowledge could be formed in several ways, either by relating different knowledge to the diverse faculties of our mind or by relating it to the things that it has as its object. The difficulty was greatest where it involved the most arbitrariness. But how could there not be arbitrariness? Nature presents us only with particular things, infinite in number and without firmly established divisions. Everything shades off into everything else by imperceptible nuances.



The "objectivity" of knowledge

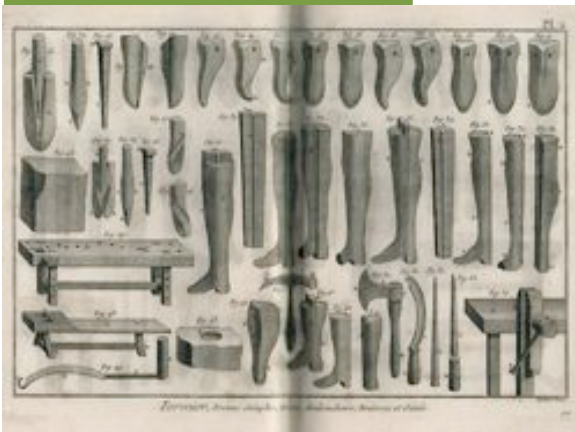


Jean d'Alembert

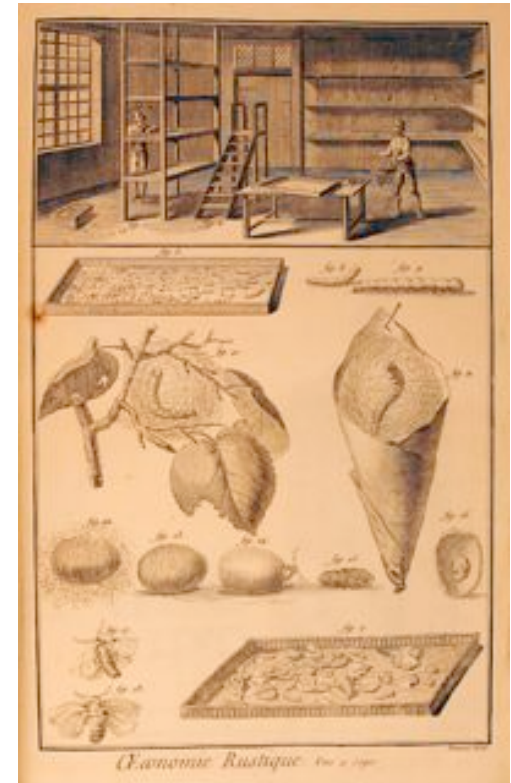
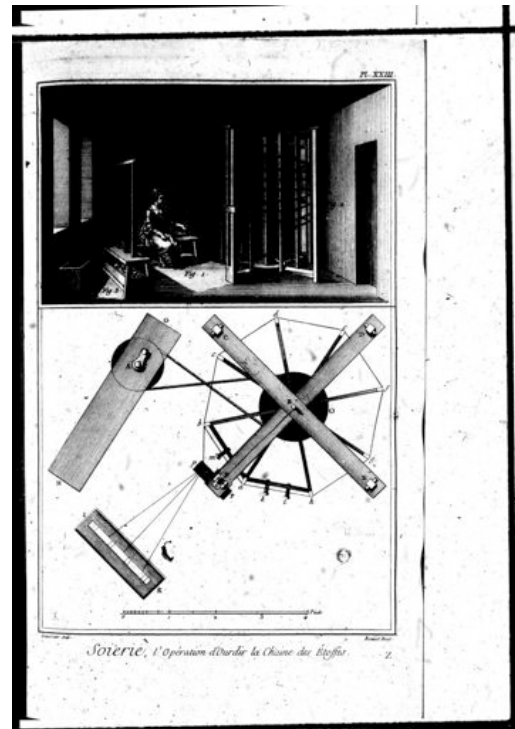
[T]he encyclopedic arrangement of our knowledge ... consists of collecting knowledge into the smallest area possible and of placing the philosopher at a vantage point, so to speak, high above this vast labyrinth, whence he can perceive the principle sciences and the arts simultaneously. From there he can see at a glance the objects of their speculations and the operations which can be made on these objects; he can discern the general branches of human knowledge, ...and sometimes he can even glimpse the secrets that relate them to one another. It is a kind of world map which is to show the principle countries, their position and their mutual dependence, the road that leads directly from one to the other.



"Sciences, Arts Libéraux, Arts Mécaniques"



Formier



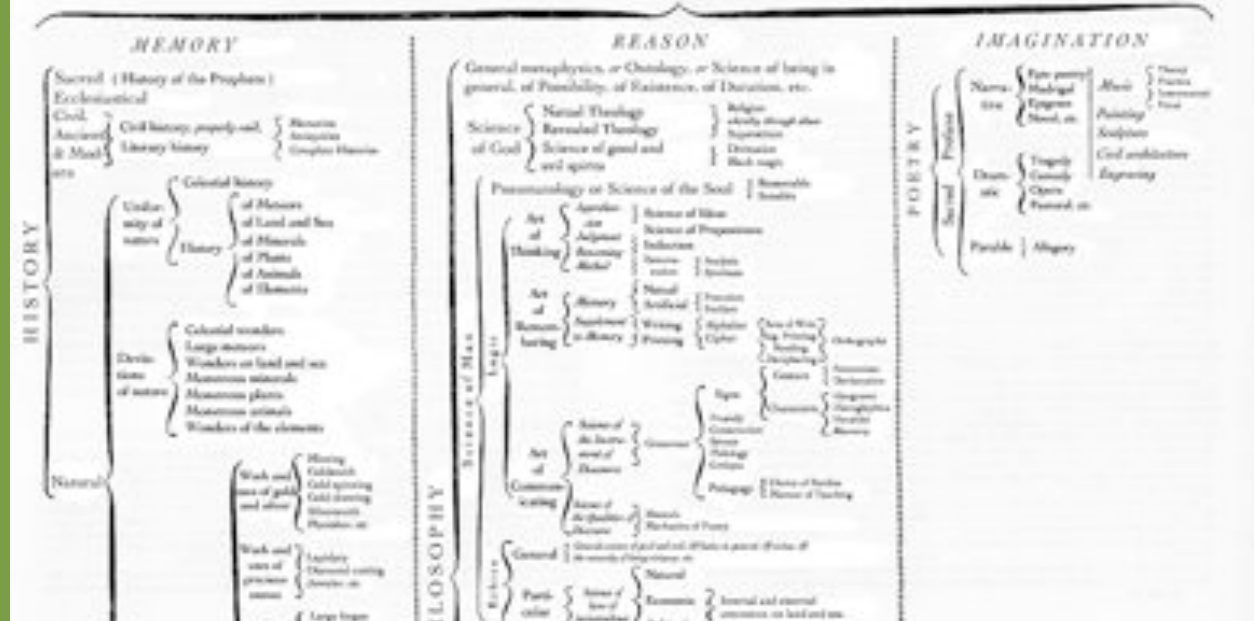
Economie Rustique (silk-making)



The Tree of Diderot & D'Alembert

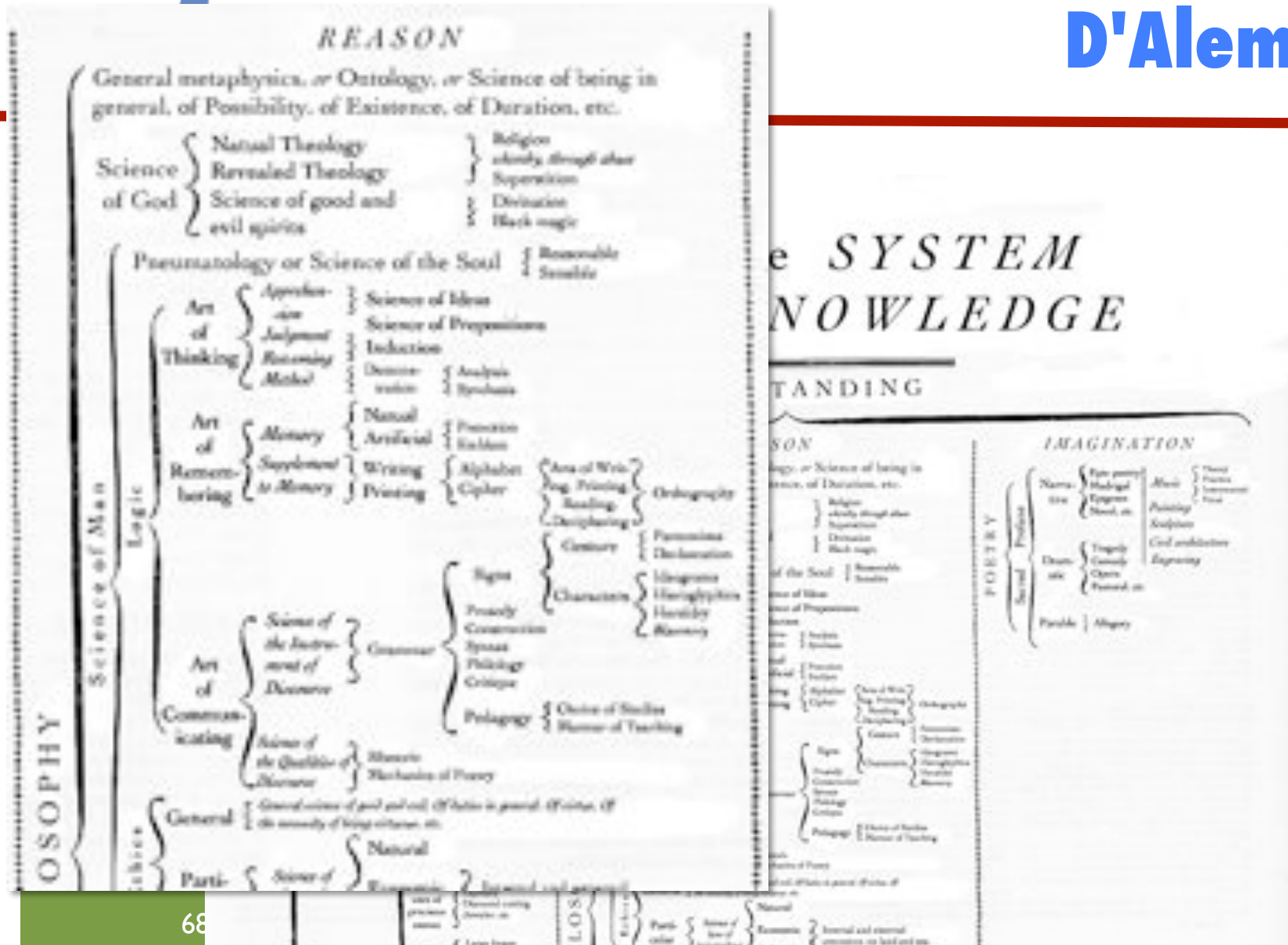
MAP of the *SYSTEM* of *HUMAN KNOWLEDGE*

UNDERSTANDING





The Tree of Diderot & D'Alembert



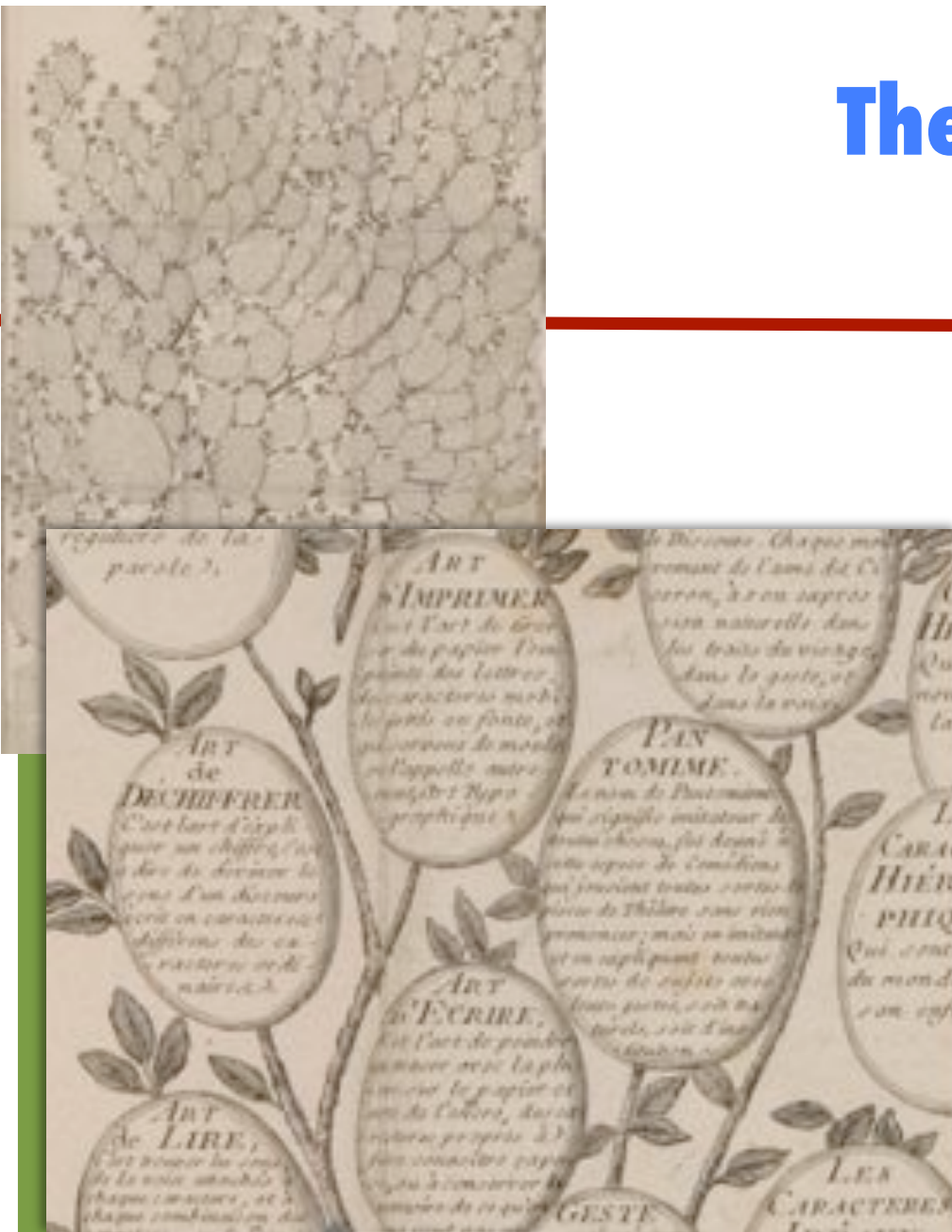
The Tree of Diderot & D'Alembert

ESSAI D'UNE DISTRIBUTION GÉNÉALOGIQUE
DES SCIENCES ET DES ARTS PRINCIPAUX.

Selon l'Explication détaillée du Système
des Connaissances Humaines dans le Discours
préliminaire des Editeurs de l'Encyclopédie
publiée par M. Diderot et M. d'Alembert,
À Paris en 1751

Reduit en cette forme pour
découvrir la connaissance
Humaine d'un coup d'oeil.

Par Chrétien Frederic Guillaume Roth,
À Weimar, 1769





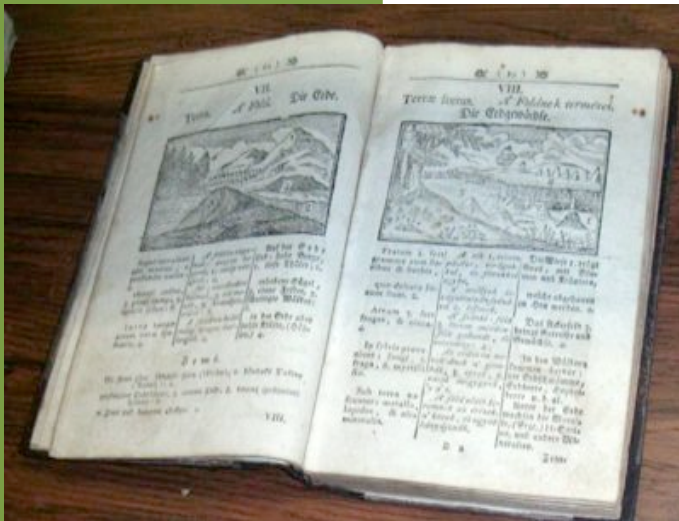
Organizing the Trésor



New Schemes of Organization: Didactic Objectives

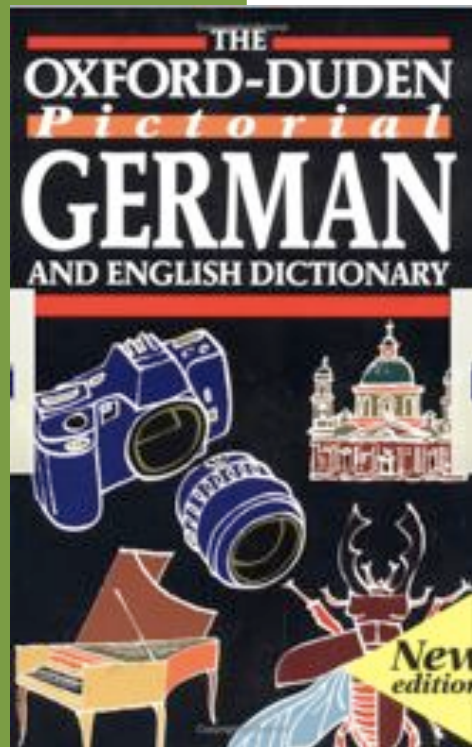
Comenius (Amos Komensky), *Orbis sensualium pictus*, 1658

1. Elements, firmament, fire, meteors
2. Waters, earths, stones, metals,
3. Trees, fruits, herbs, shrubs
4. Animals
5. Man and his body...
20. Providence, God and the angels,,





Comenius's Descendants





Comenius's Descendants

Peter Marc Roget: 1779-1869



P. M. Roget.

THESAURUS
OF
ENGLISH WORDS AND PHRASES,
CLASSIFIED AND ARRANGED
IN A
TO FACILITATE THE EXPRESSION OF IDEAS
AND USED IN
LITERARY COMPOSITION.

PETER MARK ROGET, M.D., F.R.S.

PROFESSOR OF THE ROYAL COLLEGE OF PHYSICIANS,
MEMBER OF THE SOCIETY OF THE HISTORY OF MEDICINE,
OF THE LITERARY AND PHILOSOPHICAL SOCIETY, ETC. OF BUCKINGHAM, STREETS, N.
BONN, GERMANY, NEW YORK, ALABAMA, TEXAS, AND CALIFORNIA.

EDITOR OF
THE "UNIVERSITY THESAURUS OF ENGLISH AND FRENCH VOCABULARY,"
ETC.

"It is impossible we should thoroughly understand the nature of the world, unless we
first properly consider and arrange the terms which it contains." — John Locke.

FOURTH EDITION, ENLARGED AND IMPROVED.



Comenius's Descendants



P. M. Roget.

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ETC.

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the property matter and arrange the human faculties." — "The Encyclopedia"

FOURTH EDITION, ENLARGED AND IMPROVED.

PLAN OF CLASSIFICATION.

Class.	Sec.	Sub.	Page
I. ABSTRACT RELATIONS	1.	EXISTENCE	1 to 8
	2.	RELATION	9—24
	3.	QUANTITY	25—57
	4.	ORDER	58—83
	5.	NUMBER	84—105
	6.	TIME	106—139
	7.	CHANGE	140—152
	8.	CAUSATION	153—179
II. SPACE	1.	GENERALLY	180—191
	2.	DIMENSIONS	192—239
	3.	FORM	240—263
	4.	MOTION	264—315
III. MATTER	1.	GENERALLY	316—320
	2.	INORGANIC	321—356
	3.	ORGANIC	357—449
IV. INTELLECT	1.	FORMATION OF IDEAS	450—515
	2.	COMMUNICATION OF IDEAS	516—599
V. VOLITION	1.	INDIVIDUAL	600—736
	2.	INTERSOCIAL	737—819
VI. AFFECTIONS	1.	GENERALLY	820—826
	2.	PERSONAL	827—887
	3.	SYMPATHETIC	888—921
	4.	MORAL	922—975
	5.	RELIGIOUS	976—1000



Revisiting Thematic Organization



S. T. Coleridge, *Encyclopedia Metropolitana*, 1817-35. Four Sections:

I. Pure Sciences, 2 vols., 1,813 pages, 16 plates, 28 treatises, includes grammar, law and theology;

II. Mixed and Applied Sciences, 6 vols., 5,391 pages, 437 plates, 42 treatises, including fine arts, useful arts, natural history and its application, the medical sciences;

III. History and Biography, 5 vols., 4,458 pages, 7 maps, containing biography (135 essays) chronologically arranged, interspersed with (210) chapters on history (to 1815), as the most philosophical, interesting and natural form.

IV. Miscellaneous and lexicographical, 13 vols., 10,338 pages, 105 plates, including geography, a dictionary of English and descriptive natural history.



The Emergence of Alphabetical Order

Practical advantages of alphabetical order:

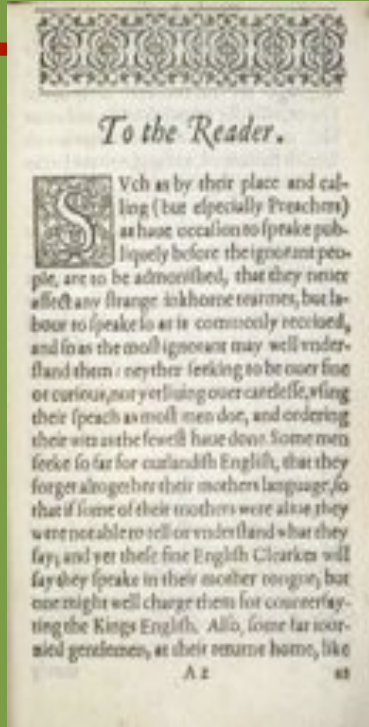
Facilitates access to particular entries (assuming a certain mode of reading)

Philosophically modest

"It might be more for the general interest of learning, to have the partitions thrown down, and the whole laid in common again, under one undistinguished name." Ephraim Chambers



The Emergence of Alphabetical Order



Advertisement to
Cawdrey's Table
Alphabeticall

If thou be desirous (gentle Reader) rightly and readily to vnderstand, and to profit by this Table, and such like, then thou must learne the Alphabet, to wit, the order of the Letters as they stand, perfecty without booke, and where euery Letter standeth: as (b) neere the beginning, (n) about the middest, and (t) toward the end. Nowe if the word, which thou art desirous to finde, begin with (a) then looke in the beginning of this Table, but if with (v) looke towards the end. Againe, if thy word beginne with (ca) looke in the beginning of the letter (c) but if with (cu) then looke toward the end of that letter. And so of all the rest. &c.

Rob't Cawdrey, *A table alphabeticall conteyning and teaching the true writing, and vnderstanding of hard vsuall English wordes, borrowed from the Hebrew, Greeke, Latine, or French, &c* 1604

But alphabetical order in use well before this...



The impulsion to structure



The Grand Larousse was everything to me; I would take down a volume at random, behind the desk, on the next-to-last shelf. A-bello, belloc-Ch, or Ci-D. . . (these associations of syllables had become proper names that denoted the sectors of universal knowledge: there was the Ci-D region, the Pr-Z region, with their flora and fauna, their cities, their great men and their battles). ... Men and beasts were there in person -- the engravings were their bodies, the text was their souls, their unique essences.

Jean-Paul Sartre, *Les Mots*



Material Representations of Knowledge 2



The "canonicity" of knowledge.

Canonicity: All elements of all subdomains are ordered with regard to "centrality" of membership (i.e., discursive space is metrical, not just topological)

What defines a "reference book"

words: *civet* > *panther* > *cat*

authors: Michael Crichton > John Updike > Herman Melville

news events: rescued cat > school budget vote > earthquake

Also: tourist attractions (travel guides), artists (national collections), etc.

Buf cf. world records: ??Most hot dogs eaten > largest waistline
> longest kiss



Canonicity, cont.

Canonicity permits "essentialist" abridgement:

"[M]en of good will have extracted the substance of a thousand volumes and passed it in its entirety into a single small duodecimo, a bit like skillful chemists who press out the essence of flowers to concentrate it in a phial while throwing the dregs away." L-S.Mercier, *L'An 2440*, 1771

Cf sense of "library" and "bibliothèque" to denote comprehensive publication series & catalogues

"If the lexicon of a language is indeed something like that of a circle, then... if one moves away from the center in concentric circles, the result should be a faithful image of the total lexicon." Henri Béjoint, *Tradition and Innovation in English Dictionaries*, 1992

i.e., In theory, every large dictionary contains every small dictionary



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E-L. Boulée, plan
for the
Bibliothèque du
Roi, 1785



The Spatialization of the Language



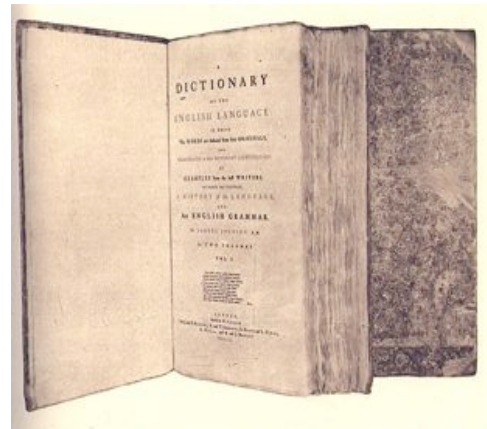
That vast aggregate of words and phrases which constitutes the Vocabulary of English-speaking men presents... the aspect of one of those nebulous masses familiar to the astronomer, in which a clear and unmistakable nucleus shades off on all sides, through zones of decreasing brightness, to a dim marginal film that seems to end nowhere, but to lose itself imperceptibly in the surrounding darkness....

James Murray, "General Explanation" to the OED



Symbolism of the dictionary's form

There is in [Johnson's *Dictionary*] a kind of architectural nobleness; it stands there like a great solid square-built edifice; you judge that a true builder did it." (Thos. Carlyle)





The Form of Collections, 1



Library of the
Escorial, 1543



E-L. Boulée, plan for the
Bibliothèque du Roi,
1785



Labrouste, Bibliothèque
Ste. Geneviève, 1851



The Form of Collections, 2: The classical version

Smirke,
British Museum
Reading
Room, 1851



Pelz/Casey Reading
Room, LOC, ca. 1898

Labrouste, Bibliothèque
Nationale 1868



Asplund, Stockholm City
Library, 1928



Circumscription of Knowledge: Modern Interpretations



D. Perrault, Bibliothèque Nationale de France, 1994

Pop

- • Adult contemporary music
- Adult oriented pop music
- Adult standards
- Afropop
- Arab pop
- Austropop
- Baroque pop
- Britpop
- Bastard pop
- Brazilian pop
- Bubblegum pop
- Chinese pop
- Contemporary Christian
- Country pop
- Dance-pop
- Disco
- Disco pops
- Dream pop
- Electropop/Technopop
- Eurobeat
- Euro disco
- Europop
- Experimental pop music
- French pop
- Greek Laiko pop
- Hind pop
- Hong Kong and Cant
- Hong Kong English p
- Hot Adult Contempor

Wikipedia: The logical end destructuring?

Ilma Julieta Urrutia Chang was Guatemala's national representative for the major beauty pageants in 1984.

The N battery is a type of battery. It has a battery. It has a diameter of 12 mm and a height of 30.2 mm. For a typical alkaline battery, the N size weighs 9 grams.

A System Requirements Specification (SRS) is a document where the requirements of a system that is planned to be developed are listed.

Protestants in Eritrea are about 91,232, which are 2% of the population.

Categories: 1926 births | 1991 deaths | African American musicians | American jazz bandleaders | American jazz composers | American jazz trumpeters | American songwriters | Avant-garde trumpeters | Bebop trumpeters | Cool jazz trumpeters | Deaths from stroke | Deaths from respiratory failure | People with sickle-cell disease | Grammy Award winners | Grammy Lifetime Achievement Award winners | Columbia Records artists | Capitol Records artists | Hard-bop trumpeters | Musicians from Illinois | Juilliard School of Music alumni | Miles Davis | Modal jazz trumpeters | People from Madison County, Illinois | People from St. Clair County, Illinois | Rock and Roll Hall of Fame inductees | St. Louis music | Third Stream trumpeters | Deaths from pneumonia | Burials at Woodlawn Cemetery (The Bronx) | Infectious disease deaths in California