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SCIENCE AND LIBRARY CLASSIFICATION: TWO BRANCHES OF ONE DEVELOPMENT

The paper describes two approaches to science and library classification in the process of development. The first one is associated with science classification. The second one is characterized by a certain classification model in monastery and private libraries in the period of the late Middle Ages and in the early modern times, as well as by a specific development of systematic cataloguing in the XVIII — XX cen., and at present. Five fundamental changes to science and library classification are identified. **Key words:** science classification, library classification, systematic cataloguing, German libraries, history.

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НАУКОВА ТА БІБЛІОТЕЧНА КЛАСИФІКАЦІЯ: ДВІ ГІЛКИ ОДНОГО РОЗВИТКУ

Висвітлюються особливості підходів щодо класифікації в науці та бібліотеках протягом їх розвитку. Перша гілка пов'язана із розвитком науки. Друга — із застосуванням певних класифікацій у монастирських, приватних бібліотеках Середньовіччя та бібліотеках у період пізнього Середньовіччя й на початку Нового часу та специфічним розвитком систематичної каталогізації протягом XVIII — XX ст. і в сучасний період. Визначено п'ять базових засад фундаментальних змін наукової і бібліотечної класифікацій.

Ключові слова: класифікація науки, бібліотечна класифікація, систематична каталогізація, німецькі бібліотеки, історія.

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НАУЧНАЯ И БИБЛИОТЕЧНАЯ КЛАССИФИКАЦИЯ: ДВЕ ВЕТВИ ОДНОГО РАЗВИТИЯ

Освещаются особенности подходов к классификации в науке и в библиотеках в течение их развития. Первая ветвь связана с развитием науки. Вторая характеризуется применением классификации в монастырских, частных библиотеках Средних веков, в библиотеках в период Средних веков и в начале Нового времени, специфическим развитием систематической каталогизации в течение XVIII — XX вв. и в современное время. Определено пять базовых основ фундаментальных изменений научной и библиотечной классификации.

Ключевые слова: классификация науки, библиотечная классификация, систематическая каталогизация, немецкие библиотеки, история.

Introduction. A few months ago: Peter Rowert has an idea ...» ridiculous to organize my books according to colours, trying to construct an order (1). Indeed it is nice for a little private collection without scientific propose — maybe. As a fact librarians and library science scholars were possibly the first information specialists who developed theoretical approaches, practical tools and techniques for organizing and retrieving bibliographic documents and the bibliographic data about them also, above all more and more essential information about contents.

«It may not be too far fetches to say that the history of theoretical classification began with the division of knowledge into the knowledge of good and the knowledge of evil» (2). With these words the US-Librarian and Theologian Ernest Cushing Richardson (1860-1939) cites the text of 1 Moses 2,9 as the starting point of thinking and practicing classification in his basic work «classification» (written nearly one hundred years ago). Moreover, we must remind Antony Flew's (English philosopher 1923-2010) remarkable volume «An introduction of Western Philosophy. Ideas and Argument from Plato to Popper». Flew chooses the title «Classification as a Human activity» as the title of chapter XII, § 4 of his book and coins with this title nearly a Philosophical program (3).

Indeed a library is «a unique type of human organization» (4) and its classification, as a human activity in general, becomes a scientific activity in librarianship during the epochs of history. The need of organizing the contents of texts, books, libraries and so on requires thinking and competent working above all, not only an imitation of the changing number and structure of sciences and humanities.

Structuring and subject cataloguing was a permanent challenge in the history of libraries and very much related to the physical location of a book in shelves, stock-rooms, etc. Some important examples of this history of theory and practice of classifications within the libraries can be found in the following pages.

Beginning in early times the books in the great Byzantine respectively Arabic libraries were sorted by subject in shelves or rooms. Smaller libraries only grouped the books by the main categories (e.g. clerical and secular, liturgical and dogmatic works etc.) or other criteria (5)

1. Classified arrangement in monastery libraries of the Middle Ages

In the Middle Ages — at least in the beginning — monastic libraries became the important part in librarianship and the development of sciences vice versa. Really a monastery without books is like a fort without arms. Due to this the monks considered to set up a library as large as possible.

As an example: The library of the monastery St. Riquier has in the year 831 the following structure (i.e. five parts of classification):

Bible and Commentaries - Fathers of the Church - Grammar - History - Liturgy (6)

This reflection of librarianship continued with the mighty deed of a whole catalogue, consisting of a sequence of single catalogues of different libraries. Maybe the Benedictine monks of St. Emmeram in Regensburg especially abbot Albert (died 1358) started the distinguished attempt unique in the German librarianship of the 14 th century, to compile the complete registration of all books of all the Monasteries for monks in Regensburg («Freie Reichsstadt» and often residence of the emperor) in one single volume.

The subject order of the registration of literature in the medieval catalogues and projects followed older examples also. Most important is the «Biblionomia» by Richard de Fournival (died 1260) using academic aspects and therefore his library consisted of three sections: philosophy, medicine, jurisprudence (*scientiae lucrativae*) and theology (starting with the profane literature).

Richard's combination of famous «*septem artes liberales*» and aristotelic-scholastic classification of science with the three university faculties at the top is known since the 13th century as a common and conventional scheme, although it refers often to the shelving in medieval libraries.

2. Classified arrangement in private libraries of the Middle Ages

Besides monastic libraries there were some important private libraries also (7). One focus is the catalogue of the professor of medicine Amplonius Ratingk (1263/4-1435) who sorted his library according to 12 subjects, whereas the Nuremberg physician Hartmann Schedel (1440-1514) subdivided his catalogue into 22 subjects, in accordance to the Richard de Fournival system. In contrary to the medieval usage the *artes liberales* in a book collection were here at the start. Ratingk and Schedel also grouped the theological literature at the end of the classification scheme.

This scheme with its 22 topics displayed its own history. Three hundred years later it appeared again, as a product either of fortune or of decision, and was used by Ernst Gottfried Baldinger (1738-1804), professor of medicine at Marburg/Lahn. Due to his large collection the main topics were subdivided.

3. Classified arrangement in the late Middle Ages and at the beginning of modern times

From the beginning, librarians and readers use as their basis the consistent classified arrangement — with some local variations. The pattern was: Bible, Fathers of the Church, other theology, and profane literature. Within the subjects the arrangement was different. A real correlation between the

library classification and the academic classification of Isidor of Sevilla, Hrabanus Maurus or Vinzenz of Beauvais cannot be observed nor was the *Biblionomia* of Richard de Fournival adapted. It is a moot point whether this opus is cited in only one manuscript was publically known or only by its author. Shelving could also be seen as a tool of subject cataloguing and the fact that the order of the books is irrelevant to inventory as long as they are in the same place for audit.

Already in the middle ages the basics of the modern threefold cataloguing were set up: Shelf, Author/creator, subject. With timely changes the classification was used in accordance with the faculty departments. The Main categories from the middle ages like theology, law and medicine were kept untouched whereas arts was split into different disciplines some of which became new main categories. As a famous example may be given the system (created 1548-1549) of Conrad Gesner (Zürich, Bibliographer and physician):

- | | |
|----------------|------------------------|
| 1. Grammatica | 12. Divinatio et Magia |
| 2. Dialectica | 13. Artes literates |
| 3. Rhetorica | 14. Physica |
| 4. Poetica | 15. Metaphysica |
| 5. Arithmetica | 16. Ethica |
| 6. Geometrica | 17. Oeconomia |
| 7. Musica | 18. Politica |
| 8. Astronomica | 19. Juriprudentia |
| 9. Astrologia | 20. Medicina |
| 10. Historica | 21. Theologia |
| 11. Geographia | |

4. Systematic cataloguing in the 18th century

In the Renaissance time many libraries just needed the classified arrangement for browsing. Often catalogues existed but rather for inventory functions. Many of these catalogues registered location and subject at the same time. Without any dramatic changes but with slight modification they were used in this epoch for indexing as well.

Step by step the raw systematic catalogues changed to dignified ones best seen at the university library of Göttingen in the 18th century. Classification was not yet a common task but introduced at several libraries in different versions as, for example, the fine structured subject classification in Göttingen or as group marks in Milan — in contrast to individual marks of each book.

Two main aspects were relevant for the development of modern systematic cataloguing as it is still used today: the growing number of books (and scientific journals, starting in the 17 century) (8). In Libraries and

the famous change in the scientific and educational system, as to say the beginning of modern University in the era of Enlightenment.

The universal philosophy of science in this era (e.g. Leibniz) demanded (9): «Looking at a book collection should already give you an impression of the complete history of science and literature». Thus the libraries in the — often enormous — Baroque buildings represent glance and thinking of the era and — in this way — present the books excellently: This was the main aspect for the librarians much more than cataloguing work and success.

In some cases additional numbers of classes were adequate; elsewhere reorganization was done by classification. In 1694 Christoph Hendreich, a library worker at the elector's library at Cölln an der Spree (=Berlin), replaced the 6 main categories with 46 new ones — a nearly revolutionary act in the history of sciences and the history of classification.

Meanwhile at Göttingen's university library a voluminous systematic catalogue was set up using the book marks mentioned above. Here cataloguing was done in an exemplary way by Heyne and Reuß 1776-1790 and so Göttingen became a center of discussion — a «preceptor» — in the progress of German libraries. But already in this 18th century the modern arrangement by groups was alerted to the libraries in Southern Germany due to the reorganization of the Munich state library and/with the ideas of Martin Schrettinger (catalogue specialist at the library). And reviewing the content of classification: Until the end of this 18th century the dichotomy social vs. natural science and the separation in the classification scheme was not usual. Thus many practices of more than thousand years became practices with theoretical considerations, then they became theories on the way to a scientific organization and a science (at the university) (e.g. technology, agriculture, sports).

5. Systematic cataloguing in the 19th century

At the beginning of the 19th century nearly every library had to reorganize its book shelving and indexing system. This was made necessary either because of the recurring tightness in the classified arrangement and the full written catalogues, or because of the ongoing accretion of books due to secularization.

Some theoreticians in the 19th century accentuated that systematic cataloguing did not really matter as long as it only reproduced the arrangement of books. For these theoreticians, writing up a systematic catalogue had a minor significance in the daily work of librarian. The Classified arrangement — originating in the common medieval location of a (not too great) number of books — spread out to most German (academic) libraries in the course of time. The adaptation of the Göttingen archetype was wide, but seldom perfect. In detail it was not practicable and did not succeed completely.

There was also another trend that contrasted the Göttingen model of a centralistic library for common use, the more and more differentiating learned fields set up their own specific libraries and classification schemes in the middle of the 19th century. The classification was refined in this time, but cumulated also in the big catalogue systems of the 19th century — heredity of the time of Enlightenment. As examples may be seen Berlin, Darmstadt and Halle/Saale. As a rule, the subject catalogue of a scientific/academic library in the 19th and 20th century was a systematic register/index for the location of the books.

A great difference is obvious in this catalogue (for the first time!) between social and natural sciences. In social science, a detailed and specialized, nearly canonical Grouping is used. In contrast only a rough classification in small number existed in natural science, technology, agriculture and other upcoming fields of sciences. In the area of private libraries may be an example the structure of the medical collection of Franz Reisinger (1787-1855), sponsored to the Munich university library for the medical reading room (10):

- A. Anatomy
- B. Physiology
- C. Medicine (including Journals, Vocabularies, Collected Works, Pathology, Therapy and others)
- D. Chirurgical problems
- E. Birth
- F. Chemistry and Physics
- G. Natural History
- H. Varia, Lexica

In this context the meaning of alphabetic order is of special interest, but not really observed by historians of classification. Often the alphabetic order was integrated in the systematic index as an isolated application. These solutions were often found in subjects or part of subjects where a systematic was not theoretically approved in detail. Much more important is the fact that in accordance to the upcoming natural science, technology was nearly not mentioned in the library classification which was dominated by the social Sciences and the humanities.

An early exception represents the classification of the Princeton University Library (1901), a decimal system (without economics as special main group):

- | | |
|-------------------------------------|-----------------------------|
| 0. General | 5. Theology |
| 1. Historical sciences | 6. Philosophy and education |
| 2. Language and literature | 7. Sociology |
| 3. Modern languages and literatures | 8. Natural Sciences |
| 4. Arts | 9. Technology |

On the other side: Traditional is the section Philosophy, but «no term within the classification of sciences is thus multitasking and indefinite as the term Philosophy (...) A relation between philosophy and the other sciences is situated as an always renewed problem» (11).

6. Classification in the 20th century

After the First World War the time of traditional subject cataloguing with references to the location seemed to be over because no library was capable of regrouping their books on shelves to meet all requirements - without changing the signatures. Information management in a library was mainly considered a practical task and not alone a speculative portion of the theory of science.

Remarks to the DDC in an international context the Dewey Decimal Classification (DDC) as one of the most famous classification systems worldwide, composed in the end of the 19th century, came up. Generally, the decimal method, mentioned above, is a system of a number of possible schemes of ordering and also a very symbolic.

The ordering in ten chapters, themes, numbers etc. can you find often in history. Indeed Melvil Dewey is not the genius-founder of Decimal classification (against a number of authors!) for ordering and structuring separate schemes within a classification. Yet DDC was also considered to be too strongly based in (Anglo-) American thought of the 19th century particularly. Thus DDC creates a number of important negative solutions, e.g. in the main classes the «lost» of medicine and of physics as special schemes.

Nearly a catastrophe in the times of STM! And against an enormous tradition like Leibniz! Compare Bliss: This Classification gives space for 6 numbers «sciences» in a context of 26 classes. Therefore the result in short: DDC (and UDC of course!) are «flowers» of the past, of the first decades of century 20! As a fact the Decimal Classification within the tradition of Melvil Dewey is not a final work: See the number of newly — after the time of DDC-foundation - constructed decimal classifications in Eastern Asia during the last century and the Chinese Library Classification with 22 main classes (12). Nevertheless DDC is a very great (problem and) solution in its internationality and reception and an important example for a modern work of translation.

Remarks to the RVK

Another important example for modern classification manifests the Regensburg Network classification - the leading classification in academic (and other) libraries of Germany, Austria, Switzerland and South Tyrol (Regensburger Verbundklassifikation, RVK) (13). The University of Regensburg Library was founded in 1964 as a collection of books on

open-access shelves. It must be borne in mind that –during the 60' – Regensburg has been the exception in Germany for readers of academic libraries to be given direct access to the shelves. In a German academic library of that epoch the reader must use the catalogues to find what he wants.

Classmark consists in general of three principal elements: location number, classification number and author marks (formulated by Cutter and Sanborn). It was a totally new development: the commonly optimized and used classification for a network of libraries in Central Europe. The 34 individual schedules (in German of course, English and Italian partly) include economics,

Agriculture, forestry, horticulture and are kept to up-to-date by:

- On-going contact between specialist workers on libraries and universities and the secretary

- Updating the content according to developments in the sciences and humanities

- Updating the Online classification

- Newsletter (for additions and corrections; semi-annual), published by the secretary at Regensburg

- Rules for the assignment of shelfmarks; at the same time practical guide. It explains how to apply

Classification schedules and to build class numbers, and is a helpful source of advice for using the classification in general with a number of examples and explanations given in the text.

- Bibliography: a survey of works about the Regensburg classification scheme. (Newest edition 2014)

- Index to the classification scheme: What do users expect from indexes and how do they use them (14)?

Just the contrary: Private libraries construct classifications of own purposes traditionally. Here one example: Robert Lorenz (1916-1988, Nuremberg, physician) uses 63 parts for structuring his collection (15).

7. Present time

There are many proposals and aids for the work on/within classification: Parallel developments: Systematic shelving of large numbers of books and — at the same time — working on digital shelves; new information policy demands using of new information technology. International use of classifications demands a continuing discussion of prospects — above all the examination of terminology and description of content (16). Relationship between theory and application demands an exchange between semantic structures.

Terminology and the technical progress (multilingual indices, concordances), further compatibility, interoperability and cross-concordances

between different classification schemes (of different structure also) (17). Study of classification theories and systems could stimulate and enlighten the discussion in a period of turbulent changes - in the world of learning and in the organization of knowledge.

Five basics are fundamental for the interchange of classification and science (the five «F»):

- Fiction/Theory: what are the connections?
- Facts: What are the trends and developments?
- Functions: What are the aims for the two branches?
- Feeling/Emotional factor: Is very important for working together!
- Future: New themes and sciences demand some corrections or new possibilities in classification work and presentation (18).

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