International Perspectives on the History of Information Science and Technology

Pioneers of Information Science in Europe: The Œuvre of Norbert Henrichs

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Abstract

This article discusses the works and influence of Norbert Henrichs (born 1935), a pioneer of Information Science in Europe. In the context of philosophy documentation, Henrichs developed in the 1960s a dictionary-independent method of indexing: the Text-Word Method. This method works exclusively with the term material of the documents to be indexed. It starts by using a variant of syntactic indexing, viz. the formation of thematic chains. Documents indexed via the Text-Word Method form the basis for relatively ballast-free information retrieval, but also for studies in the history of ideas. Henrichs was a leading contributor to the formulation and realization of the German Information & Documentation (I&D) program (1974 – 1977). This widely noted political program planned for the world's entire scientific and technical literature to be made available in 20 specialized information centers. Henrichs served as scientific executive director of the central German infrastructure provision within the I&D program, the "Society for Information and Documentation" (GID), from 1980 to 1985. Over the course of the 1980s, the I&D program broke down—mainly due to a lack of financing. At the Heinrich-Heine-University in Düsseldorf, Henrichs successfully developed a curriculum for information science, which—typically for Germany in the 1980s and 1990s—had no strong ties to either library science or computer science.

Introduction

Norbert Henrichs (born 1935) is known as a pioneer of information science in Europe (Schröder, 2000; Stock, 2000). He was significantly involved in the institutionalization of information science and information practice ("documentation") as well as in the establishment of information science as an academic discipline in Germany. Apart from a commemorative publication on the occasion of his 65th birthday (Schröder, 2000), little has been written in Germany about Henrichs' work. However, it must be noted that hardly any studies are available on the history of German information science in the first place. In many countries (including the United States), Henrichs' work has thus been more or less overlooked due to the unavailability of any scholarly literature on Henrichs and his contributions to information science. While Henrichs' work is mainly focused on Germany, we believe that his "Text-Word Method" as a means of indexing, his experiences with (failed) government-run information policy, and his construction of an information science curriculum beyond LIS (library & information science) and CIS (computer & information science) are of interest to the global community of information science.

In this paper, we regard the œuvre of Henrichs as a case study for the development of foundational ideas of documentation (Text-Word Method, early informetrics), the role of government and information policy (Henrichs as CEO of the GID), and the development of information science studies in Germany. To our knowledge, this study is the first attempt to describe, analyze and evaluate the life's work of Norbert Henrichs and his position in the history of information science.

Methods

Our building block for the history of information science builds on three methods of research:

- Oral History
- Literature Review
- Review of Archival Material.

Oral History

In preparing the background on an information scientist (who is still alive), an obvious first step is to interview him in his capacity as a contemporary witness. The corresponding historical research method here is Oral History. As Paul B. Thompson (2000, p. 23) writes, "Oral history is a history built around people." The history of information science is a part of the histo-

ry of science. Oral History can also be used in the historiography of science, as an "elite interview" (de Chadarevian, 1997, p. 52). "Elite interviews can be very useful in eliciting otherwise unrecorded information and new perspectives" (de Chadarevian, 1997, p. 53). How is Oral History implemented? To put it simply, oral history collects personal memories and personal commentaries of historical significance through recorded interviews (Ritchie, 2003). There are four components of oral history interviews:

- the interviewee,
- a well-prepared interviewer,
- a visual or aural recording of the interview,
- a transcript, summary, or index of the interview's recordings (Ritchie, 2003).

For Donald A. Ritchie (2003), the main aspect with regard to oral history is the recording of the interview. An interview becomes oral history only when it has been recorded and processed in some way and when it has been made available in an archive, library, or other repository, or reproduced in a publication.

The historiography of information science can draw upon a store of experiences involving oral history. In the Medical Library Association's "Oral History Program", personal interviews were conducted with selected representatives of medical libraries (McKenzie & Pifalo, 1998). The Chemical Heritage Foundation and the Eugene Garfield Foundation have supported the idea of interviewing pioneers of chemical information systems. Robert V. Williams interviewed, among others, Eugene Garfield (Garfield & Williams, 1997) and Claire K. Schultz (Schultz & Williams, 1997). "Collecting oral history should be part of the apprenticeship of every historian", Michael Buckland (1999, p. 5) writes, but there are problems that must be acknowledged: "The whole process is highly accidental: who survived, what they knew, what they recalled, what they imagined, what they chose to relate, how they choose to express it, and of course whether anybody bothered to record them" (Buckland, 1999, p. 5). Diane McKenzie and Victoria Pifalo emphasize the role of the interviewee's memory, which—perhaps when recalling exact dates—can be flawed. "Accuracy of dates and other facts in interviews is an issue for some oral historians. Because oral history is a memoir, the responses reflect one per-

son's personal bias" (McKenzie & Pifalo, 1998, part I, p. 168).

We conducted our oral history interview with Norbert Henrichs on April 12, 2012 in Düsseldorf. WGS posed the questions while KH took the minutes. The camera was operated by Lisa Beutelspacher. We addressed three groups of topics: 1) philosophy documentation, Text-Word Method and informetric methods of topic analysis, 2) the history of the I&D program and of the "Society for Information and Documentation" and 3) the development of information science curricula in Germany. Anneliese Volkmar made a transcript of the spoken text. We edited the video into three sections, in correspondence with the topics, and made them available on DVD, stored (together with the transcript) in the archive of the Heinrich-Heine-University's Department of Information Science. The total amount of video is about 200 minutes.

Literature Review and Unpublished Primary Sources

In addition to the interview with Norbert Henrichs, we drew upon his published writings. We had the advantage that one of us (KH) is currently editing a selection of Henrichs' work (2012). The Department of Information Science at the Heinrich-Heine University Düsseldorf has an archive containing unpublished material (including letters, files, microfilm) from the approximate time period between the years 1967 and 2000. They are source material for the history of information science in Germany in so far as Norbert Henrichs participated in it. This archive has also been incorporated into our work.

Results

Text-Word Method

In 1967, Henrichs started a project of philosophy documentation at the University of Düsseldorf, Germany. In cooperation with *Siemens*, he developed a new method and new tools for the intellectual indexing and electronic retrieval of philosophical articles. Since neither classification systems nor thesauri are regarded as adequate indexing tools in the humanities, Henrichs developed a text-oriented knowledge organization method that works without any lexicon. His Text-Word Method (Stock, 2000; Stock & Stock, in prep., Ch. M.1) is

a kind of syntactical indexing allowing for very precise retrieval results. The project of philosophy documentation (Diemer, 1967; Henrichs, 1967; 1969; 1970a; 1970b) led to cooperation with worldwide partners:

- University of Louvain, Belgium (Wenin & Jucquois-Delpierre, 1971; Wenin, 1973)
- Research and Documentation Center of Austrian Philosophy, Graz, Austria (Gombocz, Haller, & Henrichs, 1986)
- Philosophy Documentation Center, Bowling Green State University, Bowling Green, OH, U.S.A. ("The Philosopher's Index") (Lineback, 1978; Lineback, 1979).

In the case of knowledge organization systems, Henrichs sees a danger of the "ideologies that have established themselves being further consolidated" (Ecker, Lang, Henrichs, & Wersig, 1974, p. 234). Hence, he regards neither thesauri nor classification systems as viable options (at least for philosophy documentation) (Henrichs, 1970a, pp. 136-137). Full-text storage and the automatic indexing that builds on this approach are problematic as well, since the sole occurrence of a word does not mean that the text properly discusses the concept it represents (Henrichs, 1969, p. 123). Henrichs exclusively concentrates on the text in philosophy documentation. One criterion for the selection of a word or a name is the consideration whether a later user of the system will be able to use the text thus retrieved, whether the passage in the text is so rich that it can be used as a "search entry" to the document for further processing (Henrichs, 1970b). The Text-Word Method only uses term material that—apart from grammatical standardization—factually occurs in the document. This also means that the terms are adopted in their respective language of origin and not translated (Henrichs & Rabanus, 1969, p. 3). This confronts the users with serious problems, because they would have to summarize their search terms in all languages that might have been used to discuss the topic and then perform a comprehensive search. In a research project (not performed by Henrichs, however) for the "Graz School" (Stock & Stock, 1990), the Text-Word Method was enhanced with a translation relation, enabling the user to search both in the text's original language and in the "unified language" (Stock, 1989). In the interview, Henrichs stressed

that the Text-Word Method does not provide documentary representations of individual topics, but always of thematic groupings. This is resolved via syntactic indexing using thematic chains. Each chain receives a numerical value that is attached to the search entries. The Philosophy Department of the University of Düsseldorf ran a database with records of articles which were published in philosophical journals. For complete journals, the Department published bibliographies in the form of printed books. Figure 1 depicts some typical indexing entries of the Text-Word Method. They are part of a bibliography of the philosophical journal "Mind" (Iljon, 1980). The third entry (by Sully) contains the name topic "Wundt, Wilhelm Max" in a total of twelve chains (2-3, 10-12, 14-20). For instance, the index n° 2 links *Wundt* with *Germany* and *Psychology, physiological*.

The printed bibliographies and the online version of the database take into account the thematic chains when researching. Calling up the index of the so-called "historical relations" (which are predominantly name topics) for *Wundt, Wilhelm Max* (Figure 2), we see all topics that are discussed in "Mind" alongside Wundt. Our sample chain *Wundt, Wilhelm Max—Germany* refers to entry n° 00003, the article by Sully from Figure 1.

In Dialog retrieval, the thematic chains served to refine the search. Henrichs' philosophy information system worked with both the Boolean AND operator (acting independently of thematic chains) and the SAME operator, which does take the chains into account. While the AND operator erroneously gives out the Sully article after a search for *Wundt, Wilhelm Max AND Herbart, Johann Friedrich*, this same document is—correctly—not found in a search for *Wundt, Wilhelm Max SAME Herbart, Johann Friedrich*. Since *Wundt* and *Herbart* have different index numbers, they both occur in the text but at completely different points and never together.

In the oral history interview, Henrichs suggested using the thematic chains in social tagging. Especially laymen's "unclean" tags could thus be used to gain advantages in precision when dealing with folksonomies. To do so, interfaces would have to be created that offer taggers several fields—each for a thematic group.

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============================================================================================================
B  00001          (0100) MIND-OLD SERIES                                        BAND:1      JAHRGANG:1876
============================================================================================================


00001
VERFASSER         EDITOR
TITEL U. SEITE    PREFATORY WORDS.1-6
SACHWOERTER       PHILOSOPHY (1)/ PSYCHOLOGY (1)


00002
VERFASSER         SPENCER,HERBERT
TITEL U. SEITE    THE COMPARATIVE PSYCHOLOGY OF MAN.7-20
SACHWOERTER       PSYCHOLOGY,COMPARATIVE (1-11)/ EVOLUTION,MENTAL (2-11)/ MASS,MENTAL (3-9)/ MASS,FHYSICAL
                  (4-5)/ RACE (5-8,10)/ INTELLIGENCE (6,9)/ COMPLEXITY (7,9)/ EMOTION (8-10)/
                  SEX,COMPARISON (9-10)/ CIVILISATION (10)/ CONDITION,SOCIAL (11)


00003
VERFASSER         SULLY,JAMES
TITEL U. SEITE    PHYSIOLOGICAL PSYCHOLOGY IN GERMANY.20-43
HIST. BEZUEGE     GERMANY (1-2,4,7)/ WUNDT,WILHELM MAX (2-3,10-12,14-20)/ HERBART,JOHANN FRIEDRICH (5)/
                  MUELLER,JOHANNES PETER (7-8,10,16)/ FECHNER,GUSTAV THEODOR (5-10,12)
SACHWOERTER       PSYCHOLOGY,PHYSIOLOGICAL (1-2,6-7,9-10,14-19,21)/ SENSATION (3,6,10,13)/
                  METHOD,METAPHYSICAL (4-5)/ PHYSIOLOGY (6-7,16,20)/ SPACE-PERCEPTION (9)/ PERCEPTION
                  (10,13-19)/ NERVOUS-SYSTEM (11,13,17)/ THRESHOLD (12)/ STIMULUS (13)/ VORSTELLUNG (14)/
                  EXPRESSION-OF-EMOTION (15)/ NERVE,SFECIFIC-ENERGY (16-17)/ QUALITY-OF-FEELING (17)/
                  ATTENTION (18-20,22)/ APPERCEPTION (19)/ TIME,PHYSIOLOGICAL (20)/ IMPRESSION (21)/
                  VOLITION (22)


00004
VERFASSER         VENN,JOHN
TITEL U. SEITE    CONSISTENCY AND REAL INFERENCE.43-52
HIST. BEZUEGE     HAMILTON,SIR WILLIAM ROWAN (4)/ MANSEL,HENRY LONGUEVILLE (4)/ MILL,JOHN STUART (10,14)
SACHLOERTER       LOGIC (1-2,5-8,12,14-16)/ SYSTEM-OF-LOGIC (2-3,7,16)/ CONCEPTUALIST-DOCTRINE (3-4,7-9)/
                  CONCEPT (5-6)/ JUDGEMENT (6,12)/ CONSISTENCY (7)/ LOGIC,FORMAL (8)/ LOGIC,MATERIAL (9)/
                  SYLLOGISM-DOCTRINE (9-12)/ INFERENCE (11-12)/ FACT (12)/ INDUCTION (14-15)/ BELIEF (15)/
                  PREMISS,PSYCHOLOGICAL (16)
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Figure 1. Bibliographical Entry of the Philosophical Documentation:

The First Entries of the Bibliography of *Mind (Old Series)*.

Source: Iljon, 1980, p. 3.

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            WUNDT,WILHELM MAX
COCO3       APPERCEPTION
OC261
00267
CC287
00343
OC383
C0063       ASSOCIATION
00261
00343
C0162       ASSOCIATION-TIME
OOC03       ATTENTION
00096       BAIN,ALEXANDER
00170
00358
OOC85       BRIDGMAN,LALRA DEWEY
OOC96       CALCULUS,HEDONICAL
00134       CLIFFORD,WILLIAM KINGDON
00274       DELBOEUF,JOSEPH REMY LECPOLD
00085       DREAM
OOC85       EMOTION
CC329       EMPFINDUNG
OOC85       EQUILIBRIUM
OOC63       EXPERIENCE,MOTOR
00229       EXPERIMENT-PROTOCOL
OCCC3       EXPRESSION-OF-EMOTION
OOC85       EXPRESSION,FACIAL
CCCC3       FECHNER,GUSTAV THEODOR
OOC85
C0170       FEELING
00003       GERMANY
OOC63       HELMHOLTZ,HERMANN LUDWIG FERDINAND VON
00274
00303
OOC63       HERBART,JOHANN FRIEDRICH
00325       HYSLOP,J.H.K.
OC102       INDIFFERENCE,FUNCTIONAL
C0274       INFERENCE,UNCONSCIOUS
00303
00303       INNERVATION-SENSATION
OCC74       INNERVATION,CENTRAL
00303       INNERVATION,MUSCULAR
00325
OO274       INTELLECTUALIST-THEORY
00343       INTERPRETATION,PSYCHOPHYSICAL
00280       LABORATORY,PSYCHOLOGICAL
00085       LANGUAGE
COC25       LAW,LOGARITHMIC
00280       LEIPZIG
CC1C2       LEWES,GEORGE HENRY
OOC35       LIEBER,FRANCIS
OC253       LOCALISATION
OOC63       LOTZE,RUDOLF HERMANN
OOC96       MEASURE
OO3C3       MILL,JOHN STUART
OOC63       MOVEMENT,OCULAR
OC108
OOCC3       MUELLER,JOHANNES PETER
00343       MUENSTERBERG,HUGO
OC358
00393
COC85       MUSCLE-SENSE
00102       NERVE
OGCC3       NERVE,SPECIFIC-ENERGY
OOC03       NERVOUS-SYSTEM
CC003       PERCEPTION
OOC74       PERCEPTION,MUSCULAR
CCC63       PERCEPTION,VISUAL
OOC03       PHYSIOLOGY
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Figure 2. Index of Historical References (Authors, Schools of Thought, Periods, etc.). Entry of *Wundt, Wilhelm Max* in the Bibliography of *Mind (Old Series)*. Source: Iljon, 1980, p. 97.
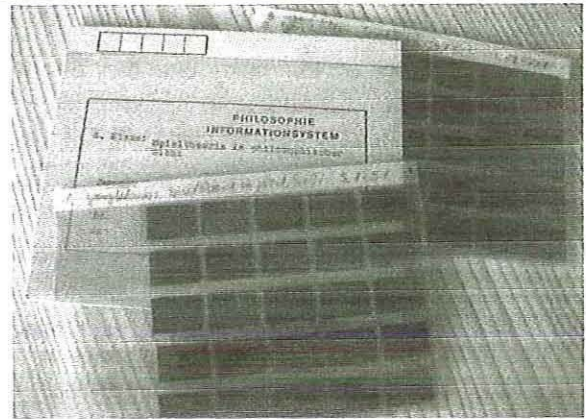
Figure 3. Microform Version of Full Texts in the Philosophy Information System by Henrichs. Microfiche of the First 50 Pages of a Book by Georg Klaus. Photograph: *W. G. Stock.*

Since full-text storage in the facsimile format was not possible in the 1960s and 70s, Henrichs relied on microfilm to make the original documents available. Here too, he found a strong business partner—in addition to Siemens—in the *3M Company* (Henrichs, 1973). All journals that were indexed for philosophy documentation (as well as some books) were microfilmed and could then be accessed and printed article by article (see Figure 3).

According to Henrichs, using the Text-Word Method allows us to draw upon the index term material as an empirical basis for studies in the history of ideas. Because there is no pre-defined lexicon, the index terms represent the articles' original terminology. Thus it is possible to calculate the importance as well as the development of (philosophical) words. In the 1970s, Henrichs created some early forms of informetrics.

The documentary use "can be complemented by another option, viz. in connection with heuristic procedures that can be applied to the database's contents in order to search them for various aspects. Some examples for this are studies in terms of the history of ideas" (Henrichs, 1975, p. 351). Here the framework of the documentary unit is dissolved, and the available text words are summarized according to other viewpoints. We could think, for instance, of a time series of the occurrence of all text words that are featured in the same syntactic chain as some original word (Henrichs, 1975, pp. 352-353), or of the thematic development of a journal, or of the life's work of a scientist, or of a school, etc.

The procedures used are informetric, and they describe a precisely defined document set.

An advantage here is that no dictionaries are used (Henrichs, 1980). Only in this way can the terminological basis of the documents be preserved. If a thesaurus were used, for example, the history of ideas would be seen through the lens of this thesaurus—which could lead to bias. Using the Text-Word Method, the "change in concepts in databases" (Henrichs, 1992, p. 183) is described on a solid empirical basis.

Kathrin Knautz (2008) drew upon Henrichs' idea of evaluating connections between terms informetrically. She uses the thematic chains to create semantic networks that span any desired document sets. The result is a "statistical thesaurus" (Stock, 2000, p. 32) that expresses, for each respective document set, both the terms and the syntactical relations between the terms. When applied to folksonomy-based information services (such as del.icio.us), the statistical thesaurus makes it possible to create so-called "tag clusters"—as opposed to the purely alphabetically ranked tag clouds—that represent a semantic network of the tags of all documents in a hit list (Knautz, Soubusta, & Stock, 2010).

Organization of Information Practice in Germany: The "Information & Documentation Program"

In 1957, the Soviet Union's success in the Space Race (Sputnik) unnerved the West. A huge part of their advantage was due to their superior scientific communication. This showed how important it was to have a clear coordination of scientific projects as well as good communication among research institutions (Henrichs, n.d. a). Not only did the Sputnik shock strongly influence the expansion of documentation in the U.S., it also made German officials realize the importance of information. In 1962, the Bundesrechnungshof (German Federal Court of Audit) submitted its "Study of Scientific Documentation in the Federal Republic of Germany" to the Bundestag. In this document the Court demanded increased public efforts to improve the information system in the Republic. Heinz Lechmann (1964; 1967), then the director of the Federal Research Ministry's department of documentation, published two important contributions to the formation of a national

policy in the area of Information and Documentation (I&D). In these so-called "Lechmann Theses", he mainly described the role of the government in subsidizing the creation of an I&D infrastructure. The goals and designated measures for structuring I&D mentioned therein, alongside the Federal Court of Audit's 1962 recommendations, formed the basis for the first national I&D development plan in the Federal Republic of Germany (Broschard, 2001, p. 23). Henrichs played an essential role in planning the I&D Program.

Scope	Information Centre	Sponsors
1. Medicine	DIMDI, Cologne*	Government
2. Agriculture	ZADI, Bonn	Government
3. Chemistry	FIZ Chemie, West Berlin	Federal and State Government, Scientific Societies
4. Energy, Physics	FIZ Karlsruhe*	Federal and State Government, Scientific Societies
5. Materials	FIZ Werkstoffe, West Berlin	Industry, Government
6. Earth Sciences	GEOFIZ, Hannover	Government
7. Transport	—	—
8. Building	IRB, Stuttgart	Government
9. Consumer Goods	—	—
10. Economics	—	—
11. Law	JURIS, Bonn*	Government
12. Education	—	—
13. Social Sciences	IZSozialwiss, Bonn	Scientific Society, Government
14. Humanities	—	—
15. International Relations	—	—
16. Engineering	FIZ Technik, Frankfurt*	Industry, Government
17. Patents	—	—
18. Current Research	—	—
19. Environment	UMPLIS, West Berlin	Government
20. Standards	DITR, West Berlin	Industry, Government

* = host operators

Figure 4. Structural objectives of the I&D Program: Planned information systems (first column) and realized services in 1986 (second column). Source: Abbel, 1986.

The German federal government's program for developing information and documentation (I&D Program 1974-1977) caused a stir in the world. It explained that the Republic was responsible for planning, implementing and financing the area of information and documentation. A large centralistic system was envisioned, at the top of which would be the Federal Ministry for Research and Technology (Bundesministerium für Wirtschaft und Technologie BMFT). The basic idea was to unify the approximately 650 German documentation centers into 20 information centers (see Figure 4). A specialist information center (Fachinformationszentrum; FIZ) would collect, index and provide to untrained users, information on each of the 16 subject

areas. Additionally, there would be four information centers for patents, current research, environment and technological standards that fit no particular subject area (Lohner & Henrichs, 1980).

A core element of the I&D program was the establishment of the Society for Information and Documentation (Gesellschaft für Information und Dokumentation GID) as an infrastructure facility for the FIZ (Federal Minister for Research and Technology, 1976). The GID was founded in 1978 by merging the following six pre-existing facilities whose tasks were related to information infrastructure (Wissenschaftsrat, 1984, pp. 13-15):

1. Institute for Documentation (Institut für Dokumentationswesen IDW): The IDW was founded in 1962 and coordinated funding for documentation by distributing grants.

2. Central Department for Mechanical Documentation (Zentralstelle für Maschinelle Dokumentation ZMD): The ZMD was founded in 1964 and was a German data center that provided technological services.

3. Study Group for System Research (Studiengruppe für Systemforschung e.V. SfS): The SfS was founded in 1959, and its research area of information and documentation was transferred to the GID. This area was responsible for planning and developing information systems, as well as to study the organization and profitability of information and documentation centers.

4. Department of Non-Numerics (Abteilung Nichtnumerik) at the GMD (Society for Mathematics and Data Processing): The Department of Non-Numer-ics was founded in 1974 and was responsible for formal groundwork as well as the further processing of information science methods and data processing in the social sciences and the humanities.

5. Teaching Institute for Documentation (Lehrinstitut für Dokumentation LID) at the German Society for Documentation (Deutsche Gesellschaft für Dokumentation DGD), financed via the IDW: training of information professionals.

6. Documentation Center for Information Science (Dokumentationszentrum für Informationswissenschaften ZDOK) at the DGD: the ZDOK collected information science literature, including literature pertaining to I&D.

7. The GID's main tasks lay in research and development in the various areas of I&D, teaching, consulting and technological support for the specialist information centers, sponsoring projects and operating a central information service (Abbel, 1986; Thomas, 2002). There were also international I&D projects: the GID's predecessor institutions established branches in Washington, D.C. (in 1970) as well as in Tokyo (in 1977), whose original task was to acquire rare foreign-language literature. These branches were used to make contact with local institutions and to exchange information with them. They observed international development in the I&D sphere and reported on them in situation analyses (Wissenschaftsrat, 1984, p. 37).

The I&D program was never implemented as planned, however. Only a few of the planned FIZs were actually founded anew, other institutions adopting their tasks instead. Still other FIZs were never realized. There were several reasons for this. On the one hand, financing proved problematic. According to Henrichs' statements in the interview, the program's overall costs had been gravely underestimated. The plans had foreseen grants of 442.3 million German Marks (DM) for the entire I&D program, of which 41 million DM would go to the GID. These grants were insufficient by far, however. The GID alone had 300 employees on its payroll, with a yearly budget of 25 million DM. Additionally, the mid-1970s saw an economic recession following the oil crisis, which meant that even less money was available to expand the I&D sphere.

A fundamental problem in implementing the I&D program was the question whether information and documentation ought to be left to the government or to the markets. Commercial information providers such as publishers and booksellers criticized the program, fearing that they would be superseded by the new, publicly financed information services. Another area of uncertainty was whether the federal states or the federal government should be responsible for I&D.

In the 1980s, there was a paradigm shift toward the market economy. In the subsequent specialist information program, from 1985 to 1988, the government played only a small role (Czermak, 1986). Instead, information was to be produced and distributed by private providers in the sense of a social market economy.

Areas in which the market did not produce specialist information of public interest, however, should be subsidized. In addition to this, the government itself should produce information if, in so doing, it fulfilled certain information duties (Broschard, 2001, p. 32). The general intention, however, was to only support areas that were profitable, and the resulting FIZs were largely left to their own devices: Their only option for receiving federal support was to apply for project grants.

The GID, too, was unable to assume the function it had been created to fulfill. The infrastructure it was supposed to create had become largely unnecessary due to the lack of newly created FIZs. There was no environment for the GID to provide with services. Because the Federal Ministry for Research and Technology (BMFT) gave out financial support only for projects, the GID's role was reduced while the costs it incurred were disproportionately high. The GID was dependent upon the government and the states, since both were partners in financing it.

The GID itself also had many internal organizational difficulties, which led to numerous tasks not being performed satisfactorily. In the interview, Henrichs states that the conflation of six institutions into the GID had been a crucial mistake from the beginning. Most of the directors and employees of these institutions had opposed their incorporation into the GID. They had had wholly different histories and backgrounds, in some cases still adhering to fixed schedules established in the 50s and 60s, and were thus extremely resistant to structural change. The GID was unable to recruit a scientific executive in the crucial years after its establishment, from 1978 to 1980. In this period the individual sections had worked out their work programs and isolated themselves from each other (Wissenschaftsrat, 1984, p. 68). The budget was planned shortly after the GID's foundation and the institutions' former directors managed to fill the newly created posts. When, in 1980, Henrichs assumed his post as scientific executive of the GID for five years, all important positions had been taken, and the personnel was firmly entrenched—even though several proved incompetent, none could be replaced as practically all had signed long-term contracts. Henrichs attempted to mediate and keep the internal peace, but he was unable to mitigate the differences and rivalries among the individual departments. For these reasons the institutions that made up the GID never became a unit. In addition, Henrichs never had enough authority in his role as executive to perform the necessary changes to the GID's structure. Instead, all important decisions had to be discussed with the board of directors. The BMFT also constantly intervened in the GID's program without notifying Henrichs. Lastly, there were three employee representatives who each had a say in matters, which further restricted the GID's flexibility.

The death blow was dealt as early as 1984, when a commission of the science council (Wissenschaftsrat) recommended that government and states cease funding the GID as it had failed to perform its tasks adequately. In a statement by the science council (Wissenschaftsrat, 1984, pp. 72-84) it was suggested that the GID be reorganized. The GID's board of directors decided to fuse with the Society for Mathematics and Data Processing (Gesellschaft für Mathematik und Datenverarbeitung GMD) instead, as future development was deemed to point in the direction of technology. In 1985, Henrichs agreed with the decision to dissolve the GID and declined to renew his position as executive, foreseeing the end of the GID. Subsequently, the GID was dissolved step by step and partly fused with the GMD.

Since the late 1980s, information in Germany has come to be seen as a "normal" product distributed on markets and mainly financed by private enterprise. There is no more need for a government-financed think tank for information science. The GID ceased operations in 1987. Philosophy documentation, which failed to survive on "normal" markets, was also shut down in Germany.

Information Science as a Subject of Study in Higher Education

The origin of information science in Düsseldorf lay in philosophy documentation. The latter contributed to the creation of Düsseldorf's philosophical library, which at the time was one of West Germany's best. Since 1967, Henrichs had worked on a documentation project that was meant to optimize the provision of philosophical literature to students. Because library catalogs did not

take journals into consideration, a large register was created for all philosophical journals. To do so, a database with a Boolean retrieval system was created—among the first worldwide. This proved to be an incentive for many groups, home and abroad, to travel to Düsseldorf in order to see how the system worked and how it was used. Among these visitors was, for example, Gerald Salton (who failed to see much of value in intellectual indexing, however).

Documentation was completely outside the scope of the Philosophical Faculty's teaching concept. In spite of this, students, too, were to be provided the opportunity of acquainting themselves with the workings of philosophy documentation. This resulted in several seminars that gave students an insight into the subject matter. The first courses that could properly be called information science were held by Henrichs around the turn of the decade, in 1969-1970. It quickly became apparent that they were not sufficient by far and needed to be systematized. The Philosophical Faculty allowed Henrichs to develop a curriculum unrelated to his regular teaching duties, a curriculum that became ever more expansive.

By 1974, Henrichs' project had reached the ministry and he was given the opportunity to work out a curriculum for information science as a minor subject. This was an opportunity for him to be of use to the Faculty. Until then, scholars in the humanities had only been able to study their respective subjects via a teaching degree. When it became possible to study subjects such as philosophy, German and history as graduate degrees, it was feared that graduates would prove unable to gain employment in the economy. Information processing and the theoretical background of information science gave these graduates something to fall back on with regard to entering the job market. Since graduate students needed a minor subject anyway, it made sense to offer them information science. Furthermore, the idea of an information society sprang up in the 1970s, and the required technology was developing at breakneck speed, making information science ever more interesting as a minor subject. Henrichs could not count on a lot of financial support, but the faculty had noticed his work and acceded to his plans.

As the university realized, in the early 1970s, that it needed data collection, other faculties became aware of

Henrichs' work as well. Since students pursuing teaching degrees at the Mathematical-Scientific Faculty would be studying philosophy anyway, there was already good contact between the faculties. For this reason information science was first offered to these mathematical-scientific students under the name of "Applied Philosophy." It was subsequently offered to students of the Philosophical Faculty, too. Student turnout was low at the beginning, but it increased over time. At the beginning of the 2000s, there were more than 1,000 students of information science at the Heinrich-Heine-University of Düsseldorf.

Throughout the 1970s, information science was respected and tolerated at the faculty. It was only accredited as a subject in its own right in 1989, however, as the ministry refused for a long time to grant the statute that had been developed since the mid-1970s. Until that time, students had to enroll in philosophy and were only able to study information science on the quiet. For a long time, too, there was no option of gaining a doctorate.

In many countries, information science is combined with either library science (as *Library and Information Science*; LIS) or with computer science (as *Computer and Information Science*; CIS). This was not the case in West Germany. LIS was not an option, as universities did not teach Library Science. Furthermore, the "modern" documentalists differentiated themselves from the "fusty" librarians. To become a librarian, Germans had to pass additional training courses after completing a degree (in any subject). In many other countries, on the other hand, Information Science developed as a branch of Library Science, managing not only books but knowledge in general. Neither could Information Science be combined with Computer Science in Germany. While Henrichs needed informatics for data processing and organizing information, it has only ever been a useful tool, never an actual subject of study. For this reason, Information Science has not moved toward Computer Science in its early days. Informatics was only of marginal interest to Henrichs, although he had to come to grips with it as a matter of necessity. Like Henrichs, all other early information scientists in Germany originally came from the humanities or documentation. This has changed, as we can see in Düsseldorf today: the current course *Information Science & Language*

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Technology comprises the sub-disciplines Computational Linguistics and Computer Science. In the arena of research, on the other hand, Düsseldorf's Department of Information Science today is quite interested in topics that relate to Library Science.

For Henrichs, Information Science is the science of knowledge organization, with a clear focus on applicability. Henrichs, who started in philosophy, here refers to the philosophical context. Philosophy is a hermeneutical science that studies man's knowledge and man's nature as a being capable of knowledge. These processes of understanding have been of particular interest to Henrichs. The curriculum worked out by Henrichs thus focused particularly on the process of information transmission. The following will describe the curriculum from the year 1994 (Henrichs, n.d. b):

1. Introduction to Information Science with the Object of Information Science, Communication, Information and Documentation, with the Goal of Information Transmission, and with the Practice of Modern, Organized Information Systems.

2. Methodology of Specialist Documentation: Methods of Information Transmission via Procedures of Knowledge Representation and Knowledge Organization Systems (Documentation Languages such as Classifications or Thesauri, Procedures of Text and Data Indexing) and via Information Retrieval. Methods of Information Management via Data Structures, the Creation of Memories and Access Modes.

3. Information Technology with Data Processing (DP) Technologies, Telematics (Network Technologies), Communication Technologies and Repro-Technologies (Copy/Print/Fax/Microfilm Technologies).

4. Information Psychology with the Establishment of Information Needs, Information Awareness and Information Behavior (Acceptance of Information Systems, Acceptance Barriers, Reception Behavior).

5. Information Management with Organization-Related Communication and Information Management, Planning, Implementing and Managing Organizational Information Systems and Processes, and Information Resources Management (Setting Up and Operating In-House IS, Acquiring External Information).

6. Information Economics with the Profitability of Information Facilities and Information Systems, the Development of the Information Market (the Structure of the Information Economy, Product Policy, Pricing and Information Marketing).

7. Information Law with Basic Information Rights (Grounded in Constitutional Law), Protective Rights (Data Protection Law, Copyright Law, Competition Law and Liability Law) and DP Law.

8. Information Policy with Supply of Information via Government or Free Information Economy, and with National and International Promotional Programs.

9. Information and Society with Informatization as the Industrialization of the Mind, the Effects of Informatization on Social Macro- and Micro-Areas, the Humanization of Dealing with Information Technologies and the Ethics of the Information Society.

Discussion

Text-Word Method

The Text-Word Method was developed by Henrichs in the context of philosophy documentation and foregoes the use of any knowledge organization systems such as thesauri or classification systems. Instead, a concrete document is indexed via its own vocabulary. The resulting data material is not only suitable for the purposes of information retrieval, but also serves as an empirical basis for analyses in the context of history of ideas. Philosophy documentation is an elaborate, and thus cost-intensive, effort. With the end of the I&D program, governmental subsidy of philosophy documentation was shut down in Germany. The Text-Word Method thus lost its "classical" area of application. Current developments, such as (the very imprecise) folksonomies or tag clouds (or the more precise tag clusters) could profit from the experiences of the Text-Word Method, however.

Governmental Information Policy?

The dissolution of the GID and the resulting loss of a central infrastructure facility in the area of specialist information in Germany are still lamented today (Broschard, 2001, p. 40). There were follow-up programs

for specialist information policy up until the 1990s, but they never resulted in an institution like the GID. The Program for Information and Documentation was impressive in the conceptual stage, but could never be translated into practice. Nevertheless, each of the subject areas supported by the I&D program has profited from it one way or another. Some of the planed FIZs have survived to this very day.

Subsequent to the I&D program's failure, the development and transmission of specialist information was regarded first and foremost as a task for the markets. In his writings from the 1980s and 1990s, Henrichs criticizes this market paradigm. According to Henrichs, in many cases it is simply implausible to argue that one should pay money for information. Of course there exists a capitalist market for information, but there are further aspects that must be considered beyond markets, e.g. information in education. In several essays Henrichs formulates his vision of an information society, of information ethics and of information anthropology (Henrichs, 2012).

Information Science as an Academic Discipline

Without Henrichs' endeavors and his missionary zeal, the subject of Information Science would never have been created in Düsseldorf. Henrichs did all he possibly could have done to establish Information Science in Düsseldorf and to safeguard its continued existence. Thus from 1980 to 1985 he continued to teach at the Heinrich-Heine-University once a week even after being granted leave to serve as scientific executive of the GID. Since Henrichs was the only scholar at the Philosophical Faculty in Düsseldorf who worked on Information Science, there was nobody who could have replaced him. It was important to Henrichs not to leave the university before his subject had been established as a major. Since 2004, there are a bachelor degree major and a master degree major at the university of Düsseldorf called *Information Science and Language Technology*, additionally a bachelor minor in *Information Science* and PhD studies in *Information Science*, established by his successor (who had previously studied under Henrichs).

Outlook

In this article only a few topics of the Œuvre of Norbert Henrichs could be considered. Further aspects should be analyzed in order to obtain a complete picture of one of the European pioneers of Information Science. In the interview, Henrichs said of Germany's early information scientists: "They accomplished no more, but on the other hand maybe no less, than to push a badly built cart with bumpy wheels along a marshy meadow until they reached the edge of the asphalt road."

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