Lucyna Anna Bielicka; Janusz Paciejewski; Eugeniusz Scibor
Institute of Scientific,
Technical and Economic Information, Warsaw

Classification and Indexing Languages in Poland (1974–1986). Pt. II

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Continuation of article in 1nt.Classif.87-1, p.23-28. The first three chapters covered: General problems of indexing languages (ILs), Structure of indexing languages, and Indexing and information retrieval. In chapters 4-7 the following topics are treated: Classification systems (development, UDC, faceted classifications, subject-field classifications); Subject heading languages (positional grammar, subject-heading and subject-headings, methodology of creating alphabetical subject catalogues, alphabetical subject indexes to classified catalogues); Descriptor languages (general studies and the grammar of descriptor languages, formalized descriptions of thesauri, linguistic analysis of the vocabulary contained in thesauri, semantic relationships in thesauri, roles, methodology of building up thesauri, information on descriptor languages used in Poland); Other indexing languages (ILs for factographic systems, semantic code).

4. Classification Systems

The evolution of ILs (and particularly of classification systems) against the background of various factors which determine their creation and development is presented in the study *"Development of classification systems against the background of development of literature as well as of library and documentation activities"* which is an adaptation of *Eugeniusz Scibor's* PhD thesis (83). The author's aim was to reveal the regularities that govern the development of ILs and their rise.

This study on the basis of an analysis determining the creation of ILs, including systems of documentary classification, deals with the following aspects: a) Further background, i.e. the general level of civilization and culture development, in particular the level of development of science and technology; b) Closer background (conditioned by further background) which consists of the development and character of literature as well as of the methods of collecting, processing, making accessible, dissemination and using documents. The influence of the development of science and literature as well as of the library and documentation activities on the development of classification systems is shown; this development is presented under a chronological aspect. Four periods of the developments of documentary classification systems have been distinguished. Main conclusions: investigated in time, classification and indexing systems form a continuous developmental line; the classification of sciences to a rather small extent influenced documentary classification; the basic factor influencing the development of ILs is the development of literature and of the methods of its application.

In connection with the Dewey Decimal Classification Centenary, celebrated in 1976, *Eugeniusz Scibor* published an article on the activities concerning the development and maintenance of the UDC which is widely used in Poland. This article entitled *"Perspectives of reformed UDC construction as a modern international indexing language"* (79), presented (i.a.) the project of UDC reform that had been elaborated by FID/CCC/D (Subcommittee for Drastic Development of UDC).

An effort to make the use of UDC more efficient is described in the article by *A. Gorol, W.Mlodozeniec, T. Zokowska: "An attempt to standardize the way of classifying documents according to UDC through UDC number assignment to descriptors appearing in a thesaurus"* (40).

Olgierd Ungurian's book *"The utilization of the theory of Ranganathan's faceted classification for the categorization of Polish scientific and technical onomastics (for the needs of information retrieval)"*, (95), the article *"The general structure of an information language. Some proposal of a framework of a lexical set"* (92), and *"Semantic categories of the dimensions "subject of document""* (91) are devoted to the theoretical and methodological aspects of the organization of the vocabulary of ILs with particular attention to its multi-dimensional (faceted) structure. The thesis does not deal with a universal classification of the Polish scientific and technical onomastics, but only treats, in the examples of terminology relating to motor transport and information science, the vocabulary (lexical set) destined for the needs of information processing and for the construction of the dictionaries of ILs (lists of lexical units used in ILs). Analytico-systematizing measures undertaken by the author within the limits shown above have led him to elaborate his own conception concerning the categorization of the vocabulary of ILs based on Ranganathan's theoretical output.

In the articles *"Polish Subject-field Classification - an indexing language for SINTO[1] "* (81) and *"New version of the Polish Subject-field Classification"* (79) *Eugeniusz Scibor* in his capacity as the main originator of the Polish Subject-field Classification (PSC) discusses the functions and structure of this classification system. The description of PSC is made against the background of the development of various subject-field classifications (i.e. broad ordering systems) as well as of the conception of ILs for the Polish national information system.

The pamphlet by *Eleonora Jabrzemska* and *Eugeniusz Scibor, "Principles of elaboration and use of branch subject-field classifications"* presents the principles relating to the construction and use of subject-field classifications (i.e. ordering systems the scope of which is limited to only one branch of science and technology) that should be compatible with the PSC mentioned above.

5. Subject-Heading Languages

Problems connected with a subject-heading language are discussed in *Jadwiga Sadowska's PhD thesis "Subject subheadings in the system of the subject-heading language"* (68) as well as in three articles by the same author: *"Positional grammar in the subject-heading language"* (65), *"Subject and subject-heading in the theory and practice of an alphabetical subject catalogue"* (69) and *"Specific and language-ethnical subject subheadings in the subject-heading language"* (67). The thesis consists of two parts, the first

dealing with general problems of semantics and the syntax of subject subheadings, while the second is devoted to the analysis of about 12,000 subject headings. The analysis is based on the comparison of lexical meanings (senses) and real words which have the same form as subject subheadings. The author indicates the existence of unequivocal subject subheadings (used in one real sense, irrespective of the number of lexical meanings) as well as of lexically equivocal and functionally equivocal subject subheadings. The author also shows the hierarchical and hierachical-thematical dependences between subject subheadings, the inequality of the extension of their semantic fields and the influence of positional grammar on the informative possibilities of the subject-heading language. The author assumes that the analysis of the subject subheadings which she has carried out will contribute to the obtainment of the more univocal character of the subject-heading language through the elimination of synonymic and equivocal elements at the lexical and syntactic level.

Jadwiga Cwiekowa's manual, *"Alphabetical subject arrangement of literature"* (35) is devoted to the theoretical and methodological aspects of the subject-heading language used in library alphabetical subject catalogues.

In *"Alphabetical subject indexes to systematic catalogues", Jadwiga Sadowska* (66) presents the alphabetical subject index to a systematic (classified) catalogue as a variant of the alphabetical subject index to classification tables which can be considered as a factor to speed up the circulation of information. The author looks at the main problem connected with the creation of an alphabetical subject index, i.e. how and to what extent the index reflects the structure and contents of the systematic catalogue. The interdependence between the alphabetical subject catalogue and the alphabetical subject index is also shown.

6. Descriptor Languages

Jozef Robowski in his PhD thesis *"Descriptor languages. Comparative analysis with other indexing languages"* (63) discusses the role of an indexing language in an information retrieval system and presents the historical outline of the development of descriptor languages. The comparative analysis of descriptor languages with other ILs (hierarchical classifications, UDC, faceted classifications, subject headings) is made from the viewpoint of their application in the Polish national computer-based information system. He advocates the parallel application of UDC and descriptor languages in this system.

In *"Grammar of a descriptor language against a background of grammars of other indexing languages"*, a collective work, (41) the grammar of a descriptor language is compared with grammars of non-descriptor ILs (subject-heading languages, UDC, faceted classification, Semantic Code of ASM-WRU). Elements of the grammar of the Polish language are analysed from the view-point of their use in descriptor languages. The main types of the grammar of descriptor languages are discussed on the basis of the formal definition of grammar (which has been introduced for the needs of the study) and of its classification.

Lucyna Anna Bielicka in *"Grammatical rules in descriptor languages"* (10) gives definitions of fundamental concepts connected with the grammar of descriptor languages. She discusses various grammatical devices used in descriptor languages, namely: simple co-ordination of descriptors (co-ordinate indexing), hierarchical indexing, Farradane's relational indexing and faceted indexing. Types of syntagmatic relationships which can be distinguished when using the above-mentioned device are indicated. Finally, she formulates general recommendations for the System of Scientific, Technical and Organizational Information (Polish acronym SINTO), relating to the use of the grammar of descriptor languages.

In the article *"Problem of giving the definition of the concept thesaurus", Hanna Popowska* (58) considers the derivation of the term "thesaurus" and its formal definition.

Tadeusz Radecki in *"Formal description of a thesaurus and its application to information retrieval systems"* (62) considers a thesaurus as a relational system where T is a set of terms representing concepts of such domains of knowledge which are reflected in a set of documents D of the examined information system whereas P_1, P_2, ... P_n are semantic relations defined in a set T. The theory of fuzzy sets, elaborated by L.A.Zadeh, was used in the description of the thesaurus as well as when exemplifying a strategy of information retrieval. The use of fuzzy sets theory to the description of an information retrieval system based on a thesaurus makes it possible to take into consideration the fact that the degrees of importance of individual terms in the search patterns of documents and information requests are of continuum type and that semantic relations generally have no sharp membership boundaries. It is possible, by using simple operations of fuzzy sets theory, to find documents with the desired degrees of relevance to information requests from the users of a given information system.

In *"Logical reconstruction of descriptors" Jerzy Kopania* (46) examines the following problems: descriptors versus names, relations of informative equivalence, relation of preference, principle of abstraction through the representation and generation of descriptors.

Joanna Tomasik-Beck in her three studies *"The linguistic analysis of the terms from technical thesauri"* (85), *"Ambiguity and homonymy in technical terminology"* (88), and *"Syntactic and semantic analysis of multiword terms used in Polish Thesauri"* (86) analyses one-word and multi-word technical terms. The set of one-word terms is divided into semantic categories and then - within each category - into subcategories according to the formative that has motivated the derivative. In the analysis of multi-word terms, particular attention was paid to the relationship between the designated and designating parts of the term. The causes of gaining independence by various lexical-semantic variants have been analysed. Two kinds of homonymy are distinguished: homonymy in the strict sense and formative homonymy.

In the article *"Grammatical number as a semantic distinguishing feature", Janusz Paciejewski* (54) isolates some factors which in practice influence the use of the singular or plural form of substantives and - in consequence - of descriptors. The author recommends the use of the plural as the reflection of the trends of the language towards generalizations.

Hanna Popowska's PhD thesis *"Semantic relation of the hierarchical type in descriptor languages (based on the material of Polish thesauri)"* (59) was written in Russian. The author presents the results of a comparative analysis of hierarchies as paradigmatic relationships occurring in thesauri. The results - based on the investigation of the

contents of more than 60 thesauri (including 12 Polish ones which were analysed in detail) - have enabled the author to present both a typology of hierarchical relationships (occurring within thesauri) and a methodology of estimating the extension of hierarchy in a descriptor language.

The following three articles by *Wieslawa Ogorkiewicz* and *Barbara Wereszczynska-Cisl* deal exclusively with descriptor languages: *"The experimental thesaurus of technology of fruits and vegetables"* (99), *"Specification of associative relationships in an experimental thesaurus and their influence on the efficiency of information retrieval"* (98) and *"An influence of detailed specification of relationships on the effectiveness of food technology information searching"* (100).

"Standardization in the construction of thesauri" by *Kazimierz Leski* (48) discusses some more important rules (recommended or compulsory) concerning the construction of thesauri.

"Principles for establishment of multilingual thesauri" (89) and *"Problems of equivalent terms in multilingual thesauri"* by *Joanna Tomasik-Beck* present - on the basis of selected examples -principles for the establishment of multilingual thesauri. The author stresses that the most important problem - when establishing multilingual thesauri - lies in fixing the equivalents of lexical units in different languages.

Lucyna Bielicka and *Joanna Tomasik-Beck (*"Descriptor languages for SINTO"*)* (14) present principles for the establishment of thesauri and general principles of indexing. Both groups of principles mentioned above are recommended for use within the Polish National System of Scientific, Technical and Organizational Information (SINTO).

A list of Polish thesauri (already built up or under elaboration) is given in the article by *Eleonora Jabrzemska* *"Information about the state of activities concerning the establishment of thesauri for SINTO"* (43).

The aim of the *"Thesaurus of Common Topics" (TCT)*, which has been elaborated at IINTE, is to provide teams dealing with the establishment of branch thesauri with some ready-made sets of interdisciplinary lexical units. The TCT is described i.a. in the article by *leonora Jabrzemska* *"Thesaurus of Common Topics. Origin, structure, application"* (44).

Olgierd Adrian Wojtasiewicz and *Barbara Sosinska* in *"On the construction of a macrothesaurus for the social sciences"* (101) consider the methods of establishing the macrothesaurus and the scope of the concept "social sciences" in the light of selected science classification systems and against the background of various definitions of this group of branches of science. After the characterization of the most important features of social sciences (such as the differentiation of research methods, the interdisciplinary character of many research problems, the ambiguity of terminology) some principles concerning the choice of an indexing language for the information system in the area of social sciences are given.

Z,Latyszojc and *S.Pajak's* article *"Problems connected with the application and utilization of a descriptor language in patent information"* (49) deals with experience resulting from the application of a descriptor language (apart from the International Patent Classification) to the indexing of branch patents at the Institute of Ferrous Metallurgy in Gliwice. They have ascertained that the two ILs mentioned above (i.e. a descriptor language and IPC) are complementary and that the synchronous use of both is therefore advisable.

The following publications deal with the establishment and use of descriptor languages in various branch(specialized) information systems:

Dariusz Kuzminski: "Polish Medical Thesaurus. Collecting and lexicographical processing of keywords" (47);

Krystyna Garbacz-Lapuchowa: "Optimal collection of descriptors in the thesaurus of agricultural machinery" (39);

Elzbieta Artowicz: "Assumptions of the information retrieval language for the AWION system" (5) and *"Methodics for analytic and synthetic elaboration of documents put into automatized information systems (exemplified by the AWION system)"* (2) (the AWION system operation in the field of science of science);

Mikolaj Poletylo: "Establishment and use of a thesaurus for the needs of the TV film library (experience and conclusions" (56);

Grazyna Przepiorkowska and *Elzbieta Obrebska: "Thesaurus for the Light Industry. Structure and elaboration"* (60).

7. Other Indexing Languages

Two publications by *Lucyna Anna Bielicka* entitled *"Indexing languages of the type object-attribute for simple factographic systems"* (7, 8) have the character of state-of-the-art reports prepared mainly on the basis of Soviet literature. In these reports it is stated that in simple factographic (data) systems ILs of the type object-attribute are used. The structure of the vocabularies of these languages is discussed together with their types of grammar. Particular attention is paid to the features which distinguish this type of language from other types of ILs. Examples of object-attribute languages used in Polish and foreign factographic systems are given.

In the article *"Facet formula versus frame"*, *Dariusz Dziuba* (38) estimates the practical use of two methods of designing ILs (especially for factographic systems); these are: the facet approach and the method of so-called frames (semantic patterns). Frames and facets as forms of the representation of information, have many features in common.

Zbigniew Madrzycki in *"Problems connected with the construction of an indexing language for factographic systems of scientific, technical, and economic information"* (51) considers the object (object in general, object as such), its elements, features (peculiarities, parameters, attributes) of an object and of its value. In the author's opinion an indexing language for factographic systems should have a faceted structure.

Bozenna Bojar's and *Olgierd Adrian Wojtasiewicz's* study *"Semantic code for the SINTO system"* (17) contains the draft of a semantic code destined for the description of the document contents and of the extralinguistic reality in any natural or indexing language. The semantic code refers to some appropriately selected fundamental semantic units which are considered as primitives (primitive concepts). The interpretation of primitives differs from the colloquial usage of particular terms and even from their professional usage. The following semantic categories are isolated: primary objects, secondary objects, operations upon objects, operations upon operations and characteristics (features, distinctive traits) relating to operations as well as to objects. The proposed semantic code is characterized by

a considerable productiveness; its syntactic rules as well as its semantic interpretation facilitate the description of concepts that - at a given moment - have no equivalents (counterparts) in the empirical world or did not have them in the past.

1   SINTO — Polish acronym of the name "System of Scientific, Technical and Organizational Information" (the implemental Polish national information system)

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