Mirosław Górny, Jan Andrzej Nikisch

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MUZEUM HISTORII POLSKI

Mirosław Górny, Jan Andrzej Nikisch

UNION CATALOGUES IN THE DIGITAL AGE

Introduction

Any decision connected with carrying out any undertaking must be preceded by thorough research and analysis of its usefulness and profitability, which it seems is obvious.

A considerable part of union catalogues, however, especially those created a few dozen years ago, was created without conducting such research. They were rather an outcome of a belief that the concept of a union catalogue was a way of solving some of the problems of librarianship at that time. Subsequent catalogues most often came into being as an imitation of previous solutions and as the outcome of a profound conviction that they were a very useful library tool.

In this day and age, when libraries operate in an utterly, technologically different world, the question is whether there is any justification for the existence of union catalogues. If so, what functions should they perform and in what ways should they be configured?

Union catalogues and their functions in the past

1. Informative functions for readers

This function is undoubtedly the oldest and at the same time the most important for the user. It allows the user to familiarize themselves with the literature that has been published on a certain subject and the library it can be found in. It was for these very purposes that the first European union catalogues were created.

In France, a union catalogue was published in book format (altogether 22 volumes were issued) from 1895 to 1935. In 1936, it was placed, already in printed format in the library of the Sorbonne[1]. In 1952, on the initiative of the

[1] V. A. Ambarcumjan, *Svodnye katalogi za rubezom*, "Bibliotekovedenie i bibliografija za rubezom", 2(1959), p. 148.

Ministry of Education, the Bibliotheque Nationale de France began the creation of a union catalogue of foreign books (catalogue collectif) which had been in libraries since January 1952. In 1954, the catalogue had approximately 150 thousand catalogue cards and cooperated with 270 libraries. In 1955, the number of catalogue cards exceeded 200 thousand records and the number of affiliated libraries reached 400[2].

At the same time, regional catalogues were created in the libraries of 16 universities, which were the equivalents to the union catalogues on a regional level. Those catalogues performed the function of union catalogues for the so called "region academique" and they incorporated all the contemporary foreign books stored in the region libraries. Copies of the regional catalogue cards were sent then to the Bibliotheque Nationale, where they were incorporated into the union catalogue. In 1953, a catalogue of foreign periodicals started to be created, which was also situated at the Bibliotheque Nationale. In the 50's it included records of 20 thousand titles and cooperated with about 1700 libraries. In 1956, a catalogue of foreign periodicals was printed (among them Slavic ones written with Cyrillic), which could be found in university libraries in France[3].

In the Netherlands, the work on the union catalogue (Nederlandische Centrale Catalogus) was commenced in the Royal Library in The Hague in 1922. In 1941, the union catalogue of periodical publications started to come into being (Centrale Catalogus van Periodiken)[4]. In 1958, the union catalogue comprised 2 million catalogue cards and cooperated with over 50 libraries. The periodical catalogue in 1959 had 100 thousand catalogue cards and was supplemented by 180 libraries. The library of the Polytechnic in Delft kept a union catalogue of technical literature, which at the end of the 50's consisted of 170 thousand records of works collected in 65 technical libraries[5].

In Sweden since 1958, the Royal Library has been running a union catalogue for Swedish books. Moreover, the Bibliographic Institute at the Royal library publishes a union catalogue of foreign books found in the collections of about 100 Swedish libraries[6]. In Oslo, the university library, performing the

[2] V. A. Ambartsumjan, *Bibliotechnoe delo vo Frantsii*, "Bibliotekovedenie i bibliografijia za rubezhom", 2(1959), p. 7–53.

[3] L. T. Juchhoff, H. Więckowska, *Organizacja bibliotekarstwa francuskiego*, "Przegląd Biblioteczny" 1958, p. 15–26.

[4] R. Uchhoff, *Cooperation on the Continent*, "Library Trends" 3(1958), p. 375.

[5] V. A. Ambartsumjan, *Svodnye katalogi...*, *op. cit.*, p. 18–23.

[6] I. Ju. Bargova, *Obsluzhivanie chitatelej v nauchnych bibliotekach Shvecii*, "Bibliotekovedenie i bibliografija za rubezhom", 2(1959), p. 95–109.

function of the national library of Norway, is running a union catalogue of medical publications (1300 titles of periodicals collected in 98 libraries)[7].

In Italy, in 1952, following the example of the Library of Congress, work was begun at the National Library on the union catalogue (Catalogo Unico), including collections of around 100 libraries[8].

In Canada, in 1950, a union catalogue in the National Bibliography Center of the National Library started to be created. By 1954, the catalogue had 2,853,000 cards and cooperated with 76 libraries[9].

In Romania, in 1957, the Central National Library organized a union catalogue of foreign books (Ctalog colectiv). In 1960, it had 125 thousand catalogue cards and covered collections of 114 libraries. Moreover, work was led on the union catalogue of postwar Romanian publications and old prints[10].

In Japan, in the 50's, work on the union catalogue of foreign books in the Parliamentary Library was begun[11].

The above mentioned catalogues, constituted a kind of list of books found, most often in university libraries, nationwide. Because of the character of the scholarship at that time, the academic community was not very demanding as far as the speed of information access was concerned. It was enough for the scholars to obtain updated and printed registers of works stored in individual libraries once a year. In fact, nobody, apart from the scholars, used the union catalogues.

Libraries were orientated towards building huge and stable collections, the value of which grew as the time passed. Therefore, the creation of the union catalogue did not pose a big organizational problem. In fact, it was only a matter of adding new catalogue records.

Catalogues in the Anglo-Saxon countries were of a slightly different character from the very beginning, the informative function being of prime importance for librarians, with the main aim of coordinating the acquisition of collections.

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[7] T. S. Junaeva, *Biblioteki Norvegii*, "Bibliotekovedenie i bibliografija za rubezhom", 8(1961), p. 66–83.

[8] V. A. Ambartsumjan, *Biblioteki Italii*, "Bibliotekovedenie i bibliografija za rubezhom", 5(1960), p. 89–115.

[9] V. M. Os'kina, *Nekotorye svedenije ob organizatsii bibliotechnogo obsluzhivania v Kanade*, "Bibliotekovedenie i bibliografija za rubezhom", 10(1962), p. 69–83.

[10] V. A. Ambartsumjan, *Nekotorye voprosy sovremennogo sostojanija bibliotechnogo dela v Rumynskoj Narodnoj Respublike*, "Bibliotekovedenie i bibliografija za rubezhom", 8(1961), p. 5–31.

[11] V. N. Orlov, *Biblioteki Japonii*, "Bibliotekovedenie i bibliografija za rubezhom", 8(1961), p. 32–65.

2. Information for coordination purposes in collection acquisition

In the United Kingdom, between 1929-36, nine regional library systems were created and the span of their activity covered the whole of England and Wales. Each of the systems had the union catalogue situated in the central regional library. Union catalogues facilitated interlibrary loans and cooperation in acquiring collections. University libraries were not, however, part of regional systems[12].

In the USA, between 1931 and 1943, about 20 regional library systems came into being (some of them were of non-formal character) and operated similarly to the British system, namely, they were also equipped with union catalogues[13]. In the mid 50's, American libraries already had 117 union catalogues but were mostly minor ones – containing from a few dozen thousand to few hundred thousand catalogue cards. Their main task was to coordinate the purchase of library materials[14]. Here the cooperation in collections however, has a regional character, which usually encompasses groups of several or several dozen libraries. This is why in this instance, union catalogues are so numerous and fairly small.

In the Federal Republic of Germany, in the 50's, six library regions were created, each with a union catalogue: Cologne, Frankfurt, Munich, Stuttgart, Göttingen and Hamburg[15]. In 1947, at the library of the University of Göttingen, the Union Catalogue of Foreign Periodicals came into existence. Apart from card catalogues, printed catalogues were also established.

These printed catalogues were not, in the main, readily made available to readers and other catalogues, therefore, those which were to serve interlibrary loans, were created.

3. The Interlibrary Loans Service

In the USA, huge bibliographical centers have been set up for this purpose (like the one created in 1956, the Northeastern Pennsylvania Center serving libraries of 13 universities and colleges, mainly in interlibrary loans)[16]. In the mid

[12] J. Clement Harrison, *Library Cooperation in Great Britain*, "Library Trends", 3(1958), p. 355.

[13] S. B. Smith, *College and University Library Cooperation*, "The Library Quarterly", 2(1946), p. 122–139.

[14] W. H. Carlson, *Mobilization of Existing Library Resources*, "Library Trends", 3(1958), p. 272.

[15] G. von Busse, *West German Library Developments Since 1945, with special emphasis on the rebuilding of research libraries,* Washington, Library of Congress, 1962, p. 45.

[16] J. Orne, *Storage and deposit libraries*, "College and Research Libraries", 6(1960), p. 449.

50's, the catalogues of bibliographical centers already had several dozen million catalogue cards. The central catalogue of the Library of Congress in 1955 contained records of 8.5 million books (13.5 million catalogue cards) found in about 1000 libraries of the USA and Canada[17].

In Switzerland, the National Library in Bern has been running a union catalogue (Schweizerischer Gesamtkatalog) since 1928, including foreign books and periodicals, as well as Swiss publications issued after 1900 found in Swiss libraries. In 1939 about 180 libraries cooperated with it (mostly public ones) and in the 50's already 350 libraries cooperated with the catalogue and 711 with the catalogue of periodicals. Between 1959 and 1960, around 40 thousand queries were directed annually to these catalogues[18].

Union catalogues created by the libraries of the German Democratic Republic served mainly interlibrary loans. The country was divided into 5 library regions, each of which had its own union catalogue (Halle, Jena, Rostock, Dresden and Leipzig). In 1960, there were 11 union catalogues in the German Democratic Republic and they were supplemented by the Bibliographic Information Office at the German National Library in Berlin. In addition, there was the Central Catalogue of Foreign Literature, including publications issued after 1939, placed in 16 university libraries of the German Democratic Republic and the Central Catalogue of Foreign Periodicals published after 1939[19].

Union catalogues, greatly facilitated the system of interlibrary loans. In the Federal Republic of Germany, it was estimated that their creation allowed to shorten the waiting time for a book from three weeks to 10 days.

4. Shared cataloging systems

Librarianship in the Anglo-Saxon countries developed at the end of the 60's and the beginning of the 70's a certain form of cooperation in cataloging called shared cataloging systems "The first major online shared cataloging system was OCLC (then the Ohio College Library Center, now the OCLC Online Computer Library Center, Inc.), established in 1967. Others quickly followed, such as the Research Libraries Information Network (RLIN) and the Western Library Network (WLN) in the United States; Birmingham Libraries Cooperative Mechanisation Project (BLCMP) and the Consortium of Univer-

[17] W. H. Carlson..., *op. cit.*, p. 272.

[18] T. S. Stupnikova, *Biblioteki Shvejtsarii*, "Bibliotekovedenie i bibliografija za rubezhom", 9(1962), 3–51. See also P. Uchhoff, *op. cit...*, p. 372.

[19] T. S. Stupnikova, *Koordinatsja roboty i sotrudnichestva nauchnych bibliotek Germanskoj Demokraticheskoj Respubliki*, "Bibliotekovedenie i bibliografija za rubezhom", 28(1969), p. 45–68.

sity Research Libraries (CURL) in the United Kingdom; and the Project on Integrated Catalogue Automation (PICA) in the Netherlands"[20]. In all those systems, the union catalogue plays the major role. All the affiliated libraries send their bibliographic records to the catalogue and can download the ones necessary to their local catalogue from the union source.

Union catalogues in the Internet era

Are the previously mentioned functions of union catalogues still up-to-date? It seems that as long as libraries have printed resources, the answer is – yes. There may be doubts in one case though. The readers, who look for literature on a given subject, can make use of many data bases as well as book catalogues. They can also search through local catalogues easily. The role of minor catalogues therefore, has significantly diminished in this respect.

At the same time, another question arises – is a minor catalogue needed to perform the above mentioned functions? The answer is very important, especially in those countries that modernize their librarianship following the example of America. One can thus be under the impression that sometimes here the goals are confused with the means. The union catalogue is only a means, not a goal in itself. Unfortunately, quite often it is viewed as the main aim. In the Anglo-Saxon countries, it came into being many years ago and the fact that it has been used there up to this day is often the result of tradition and habit. On the other hand, it is advantegous to make use of the already existing union catalogues (established before the Internet era), because the cost and time of their creation is not taken into account.

We bring this point up because, in recent years, very serious changes have taken place as far as the technological environment in which libraries operate is concerned. The most significant change in this case, was making the library catalogues available through the Internet. This naturally resulted in library catalogues becoming available from any place and at any time.

Can the functions performed so far by union catalogues be performed by local ones available through the Internet? Undoubtedly, yes. The basic issue here is the profit and loss account that may reveal which solution is the most profitable in given conditions.

[20] Christine L. Borgman, *From acting locally to thinking globally: a brief history of library automation*, "Library Quarterly", 3(1997), p. 220.

Functions performed so far by traditional union catalogues, may be performed today within the frame of three types of organizational and technological structures.

A. a union catalogue based physically on one base (due to technical reasons mirror copies can exist),
B. a virtual union catalogue which is a special software making a certain number of local catalogues searchable with just one query,
C. a group of local catalogues (simple solution based on searching of existing catalogues without any software or hardware structure added).

The above-mentioned structures are characterized by defined effectiveness measured according to the following performance indicators:

- cost of building and maintaining a union catalogue
- time in building a union catalogue
- access time to the data kept in the union catalogue

The value of the above-mentioned parameters depends on the characteristics of the above-mentioned structures. For example, it is not possible to shorten the access time because of the properties of the described structure. Because we touch upon the organizational and technological structure, it is probable that in the future, technological advances will make it possible to improve the value of properties mentioned.

On the other hand, the functioning of all of the mentioned structure types is conditioned by:

- the number of bases composing the union catalogue;
- the degree of data homogeneity in the bases;
- the degree to which information is shared between the union catalogue base and the local catalogue base.

Structure **A** always uses only one data base, and is very convenient for the user. It is usually characterized by a fairly short searching time, has a uniform user interface and is very easy to maintain data cohesion.

Its disadvantage is the high cost of building (requires high-powered equipment) and maintenance (usually requires additional staff). It also takes a long time to build such a catalogue. Another disadvantage is the huge labour input on the part of affiliated libraries (frequent data updating in the central base).

Structure **B** is cheap to build and maintain. The time of realization of such a venture is usually very short and it does not require additional activities on the part of affiliated libraries, apart from certain unification operations at the beginning. Its disadvantage is a long search time and difficulty in maintaining data cohesion.

Structure **C** does not require any expenditure on building and maintenance, in fact, it exists already everywhere around the world. It can be used virtually on the spot and it does not require any additional activities on the part of affiliated libraries. Its disadvantage is a very long search time and extreme difficulties in obtaining data cohesion.

Unfortunately in the librarianship literature available there are no results of serious research on the basis of which one could make a reliable assessment and choice of a solution appropriate to the given conditions.

We know for example, that searching in one base takes less time than in a defined number of data bases, but we do not know for sure from what number of bases this difference is significant.

It is also known that the costs of building and maintenance of a virtual catalogue (type B), are significantly lower than those of building and maintenance of traditional catalogue (type A).

Apart from that, in practice, the users of catalogue B do not usually have to search all the bases. Catalogue **C** is a similar case. According to the distribution rights, we can assume that about 80% of queries are realized by about 20% of bases. We do not know, however, what the proportions are with the instance of each query. They depend on many factors. Common sense and rudimentary knowledge, however, would direct anyone looking for a book on molecular biology, to a library of a prestigious university rather than to a local college. Experienced librarians know well the localization of collections in the country and abroad, and probably manage to find appropriate data quicker than we think. They simply engage their own strategy of searching available sources of metadata.

Opponents will surely point out the problem of data cohesion, which is, indeed, a fact. In types **B** and **C** this problem is very difficult to solve. In reality, it is possible only to a certain degree. In virtual catalogues it can influence the search results – i.e., lower the integrity and increase redundancy of the obtained results. This is related to the structural heterogeneity (when records differ in respect to which fields are present); semantic heterogeneity (here: the use one field for different types of content); syntactic heterogeneity (when there are different rules for entering data into a field)[21].

Are these problems really so serious that they can justify implementing a much more expensive solution? In practice, data cohesion in libraries using the MARC format is very high, much higher than we think. Discrepancies usually apply to minor issues – especially for the reader.

[21] O. Husby, *Real and virtual union catalogues*, http://*www.caslin.cz:7777/caslin99* (June 2002).

Obviously, in union catalogues authority files are standardized, unified thesauri are introduced etc. All these elements, certainly enhance the effectiveness of searching, but are also implemented with reference to individual local catalogues and do not necessarily have to be associated with a union catalogue. Besides, despite the lack of data cohesion, it is still possible to obtain a very high integrity of search results, provided that the search time is adequately prolonged.

Unfortunately, in this case too, nobody has credible research results as to what extent the work on standardizing bibliographical records enhances search effectiveness. Such results would be very useful, as the cost of trying to maintain cohesion is very high. If however, the improvement of data search effectiveness obtained in this way is relatively small, it is advisable to lower the level of cohesion. In this way, the cost of maintaining the base should also be reduced.

It is very probable that indirect solutions are the most favourable. Instead of one central base in the country, there can function several bases specializing in certain branches. This is still an expensive solution, although in the case of existing generically based central special libraries, it could simply amount to extending their local catalogues. It is obvious that those libraries surely have most of the literature on a given branch nationwide. Besides, the number of actively cooperating libraries would be not big – several, or a dozen or so.

The second indirect solution is a virtual catalogue. It is a cheap, and when managed by a skilful librarian, very effective solution. There are many indications that it will slowly come to prevail.

There is another group of indirect solutions, namely, solutions in which there is a central data base, but part of the bibliographical data is available in the local catalogues. For example, in the central base there is a bibliographical record, but data concerning the possibilities of a loan are in the local base only. In this situation, affiliated libraries do not need to constantly update data in the central base.

In the Israeli ULI catalogue (contains over 5 million bibliographic records) records are abbreviated, and contain links to the full records in the catalogues of the holdings institutions. The holding library is indicated by a location code in the 'Details' field. Clicking on the highlighted link connects to the full record if the holding library's catalog is accessible via WWW. ULI allows for searching of logical bases, or pre-defined subsets, of the full databases (ULIUNI to search universities only, ULIMAP to search maps only, etc.)[22].

[22] ULI – The Israel Union Catalog http://*libnet.ac.il/~libnet/uli/uliinfo.htm* (June 2002).

The type C solution is used out of necessity in places, where there are only local catalogues. In the times of the fast developing Internet, such a solution should not, however, be disregarded. The appearance of a Semantic Web can make this solution a very attractive one.

In the end, we would like to point out one idea of creating a union catalogue, connected with using the power of search engines. At present, library catalogues can, by the means of the WWW, make available only search results. Therefore, the content of those catalogues is not indexed by search engines. But making the catalogue content available to the instruments indexing Internet resources would result in a very efficient (much more efficient than currently functioning union catalogues) and free of charge union catalogue, in comparison to libraries. It does not make a big difference for a search engine like Google, to index another i.e., several million pages, because they constitute only a small fraction of the whole resource indexed by it (about 10 billion pages).

Such a solution, obviously, requires the library to place each catalogue record on a separate WWW page. It seems neither very expensive (several hundred thousand text pages should not require a bigger server than that of a regular PC), nor technically complicated. Long existing converters such as MARC – XML can be used here. This is fairly simple, because the MARC format has a very unambiguous structure. Part of the minor data can obviously be excluded from indexing and can appear just on a page. It is necessary to apply XML language because we have to determine the semantic meanings of individual record elements. This, however, is the direction in which the present day Internet is heading for.

Maybe, in the near future, we will not have to log into library union catalogues, but simply write in the search engine dialogue box the surname with the index "author" (or an appropriate subject password with the index "only those information sources of which this is the main subject") and restrict search results to one city. In a few moments, we will receive bibliographic records of books we are interested in, localized in libraries of the city we want to borrow them from – unless of course we obtain access to their content on the spot.

other, the titles of the periodicals in which they have been published. Apparently, a relatively small number of core journals secures, provided Bradford pattern is used, access to a sizeable number of texts important in a given field of science. Nowadays, when scientific periodicals are extremely expensive, the implementation of the law would allow head librarians responsible for gathering material from just one domain, to stock purchased material in a most favourable and beneficial way.

Małgorzata Praczyk-Jędrzejczak: Functional Requirements for Bibliographic Records (FRBR) – a new model of processing library holdings

The article begins with a general description of the development of cataloguing rules, standards, norms, and procedures adopted here in this country and abroad. The main part of the paper presents a new model of processing of library collection material, the so-called FRBR model. The model has been designed by the IFLA and aims at restructuring catalogue databases to reflect the conceptual structure of information services and at defining such a model of bibliographical records that would enable assessment of data in relation to basic user functions and which would enable defining a basic functional level of bibliographic records (metadata for information objects). Terminology and crucial issues linked with FRBR are discussed. The article includes examples of a standard search as well as of the one that uses FRBR principles and examines the issues associated with the conversion of a set of bibliographic records to conform to FRBR requirements. The author also presents an example of a conversion of records in MARC 21 format to the FRBR model.

Aleksandra Wiśniewska: Austrian National Library – a practical portrait

The article aims at presenting the National Library of Austria in Vienna (Österreichische Nationalbibliothek – ÖNB) which, with its over 6-million collection, is ranked among the biggest libraries in the world. The author outlines the profile and main tasks of the library as well as briefly presents special collection holdings, including the papyrus collection, manuscripts and autographs, Austrian Literary Archive, old and rare books, maps and atlases, globes, music collection, collection of portraits, digital image archive and the so-called *Fideikommissbibliothek (*fidei committee library*)*, grey literature (fugitive literature), posters, book plates and, finally, works in and on Esperanto. The so-called "Polonica" i.e., material in Polish and referring to Poland, held in the ÖNB, is separately discussed. The practical part of the article covers online services provided by the ÖNB, incl. catalogues and databases, and provides practical tips in having library material for personal inspection on the premises of the library. Cultural activity of the library, exhibitions, events for children, the Literary and the Music Salon initiatives, are presented as well as other ways employed by the library to attract sponsors and to implement additional fund raising schemes. Organizational chart and a list of useful addresses concludes the paper.

Mirosław Górny, J. Nikisch: Union catalogues in the Digital Age

The article presents the creation of union catalogues in the USA and Europe. Their task was to perform four functions: information on literature, shared cataloging, support for interlibrary loans and the acquisition coordination of collections. In the Internet era, these tasks have still remained current (apart from the informative function for the reader). But the building of union catalogues in the shape of the 70's (based on one base), ceases to be justified at present. The authors indicate the growing importance of virtual catalogues and constantly growing effectiveness of searching local catalogues.