

ing every document in the collection themselves and, in that manner, found (if they found it) the document they needed. But reading manuscript after manuscript, even in those times when the amount of information (documents) was immeasurably smaller, was tiring and took a long time. That is why, even then, the first means (methods) appeared aimed at making the retrieval easier for the users. Undoubtedly, one of the first means (and possibly the first) was the creation of catalogs, which at first constituted a simple list of all the documents in a collection. The use of catalogs during a search frees users from the need to read the documents themselves; instead the required documents were retrieved using an existing list and again a natural language.

Humankind has accumulated at least four thousand years of experience in preparing catalogs. The insignificant amount of evidence accessible to study the catalogs of the ancient world provides us with only the most general idea of the ways of cataloging of that time. The most ancient of the preserved catalogs, a list of documents, was discovered on a Sumerian clay plate (approximately 2000 B.C.). More than 60 titles of compositions were written on both sides of this small plate, which was only a little larger than a matchbox in size. Since at that time compositions did not have headings, the first lines of the text were recorded. Of course, the first lines of the text did not always provide enough information for the user to determine whether he needed the document or not. However, the idea in this type of approach was extremely important, because it allowed one to review not the text itself, but its representative.

The next development in this direction was the use of headings. For example, headings were contained in the texts found on plates from the library of the Assyrian czar Ashurbanikal in Ninevia (7th century B.C.). In fact, the introduction of headings in manuscripts was in essence an attempt to lessen the amount of time needed to review the documents by way of a brief formulation (i.e., a compression) of the main subject of a written work. Retrieval by the use of headings, of course, also made use of a natural language. Although this was a faster method of retrieval compared to that which used the full texts of the manuscripts, it was not a convenient one, for in this case the reader anticipated a direct review of all documents comprising the library collection. This is exactly why headings began to be used predominantly as a description of documents in the catalogs. The first known indications of such use of headings belong to the catalog of the Alexandria library (3rd century B.C.). In that same catalog, the name of the author who had written the document was an element of the document's description.

As subsequent methods of retrieval were developed, the desire to review only a portion of the catalog, instead of the entire catalog, arose. One of the earlier methods of implementing this approach was to arrange descriptions of the documents in the catalog alphabetically, according to the names of the documents' authors. It should be noted that retrieval by the author's name anticipates that the user knows the "address" of the document, an assumption that was very

often far from reality. This is why such catalogs did not always (not for all users) reduce the size of the reviewed collection. However, as in the case of text "compression," collection "compression" was one of the most important directions for perfecting the methods of retrieval. The subsequent development of catalogs, which are even now one of the main forms of information retrieval in libraries, continued in these directions. Today, more than 30 different types of catalogs are being used in informational activity.

Within the framework of the described approaches, other (not catalog) forms facilitating the retrieval of information were being developed. For example, for the purpose of compressing the text, the use of headings led to the use of abstracts (which again found application in some types of catalogs) and then to the creation of special publications for the purpose of retrieval, specifically journals of abstracts. Obviously, even in such journals the retrieval was performed using a natural language.

Since ancient times, principally different methods of using a natural language in retrieval have also been known. Thus, thousands of years ago religious schools had people who were trained to know some parts of Talmud (Jewish religious law) by heart. Their obligations included (and this was their job) answering any question with regard to the contents of a book with a quote, which they did successfully throughout their lifetimes. Perhaps, these were the first people to professionally engage in the retrieval of information. Moreover, this was possibly the first method by which the retrieval was conducted—that is, not by the user directly, but by an intermediary.

Thus we have provided examples of information retrieval performed by humans. In each of the mentioned cases, the use of natural language for retrieval seems to be clear. But why is it clear? Why do we believe that people performed comparison and selection using a natural language? To answer this question, let's clarify our understanding of the language we will use within the framework of this book.

Because the societal nature of humans anticipates survival precisely within the framework of society and with the help of society, it becomes necessary for humans, in order to exist, to have tools or means through which to exchange information with society. The language of humans, which is usually understood to be a *system of symbols and rules* (explicit or implicit) designed for the purpose of exchanging information among people, is such a means. Through the help of a language, people can influence society for the purpose of obtaining a reaction that is in the person's interest. Also, through the help of a language, people can perceive the influence of society on them. In this manner, we can assert that every natural language was created in the course of many centuries of societal practice as a means for an individual to communicate with society. Moreover, it has become customary to consider these languages created by people as natural.

In determining a language, we wrote a "system of symbols and rules." We consciously call a language a system because this allows us to consider it as a