

HISTORIOGRAPHY OF SCIENTIFIC COMMUNICATIONS IN THE FIELD OF MEMORY AND BLOOD-BRAIN BARRIER

D. Tomov, P. Mileva

The Library and Information Service, Medical University of Varna

ABSTRACT

A scientometric study after author's own methods (Tomov, 1986 and 1998) of the publication output in the field of memory and blood-brain barrier in MEDLINE on CD-ROM (EBSCO Publ., USA) data base for 1965-2000 was carried out. On this interdisciplinary topic, a total of 126 articles in seven languages, mainly in English, had been published in a total of 93 journals from 21 countries. In 37 review articles there were 5289 references (at an average of 143 references per paper). Authors' institutions belonged to 18 mono- and 7 interdisciplinary thematic profiles while the journals could be assigned to 17 mono- and 8 interdisciplinary profiles. Some 39 journals from 12 countries containing 57 articles belonged to the generalized profile of neurosciences. The authors from the USA had published 37 papers in 30 American journals but 16 ones in 10 journals from 5 countries. As a whole, 67 papers had been published in domestic journals but 59 ones in foreign journals. Eight articles by authors from 6 countries had been published in 7 "international" journals from 5 countries. The computerized historiography of science could be successfully applied for scientometric purposes and for perfection of science policy and management at any levels in small countries like Bulgaria.

Key words: memory, blood-brain barrier, institutionalization, internationalization, computerized historiography, *MEDLINE* on CD-ROM

INTRODUCTION

Recently, there is a rising interest in the dynamics of science internationalization (3,4,10,11) and institutionalization (2,9). Memory research in animal and man has been carried out already in the 80ies of the XIX. century (8). The processes of memorizing and forgetting under normal and pathological conditions and various influences on learning and memory of factors from the external and internal environment of the organism are intensively studied in many countries of the world. The rapid advances of a series of experimental disciplines enrich our knowledge and understanding of the role and importance of different structural and functional barrier systems and especially of the blood-brain barrier (5). In 2000, the Nobel Prize in medicine and physiology has been awarded for basic psychophysiological research in the field of memory. The number of publications in this hot topic rapidly increases during the last decade (6-8).

The objectives of the present communication are the following: i) to analyze the publication output in the field of memory and blood-brain barrier, ii) to outline some of its most essential patterns, and iii) to help creating the preconditions

for incorporation of the Bulgarian scientific community to the world achievements.

MATERIAL AND METHODS

The publication output in the field of memory and blood-brain barrier was analyzed in the *MEDLINE* on CD-ROM data base (EBSCO Publ., USA) for the period from January, 1965 till April, 2000. Own original methods for scientometric analysis of international scientific communications in interdisciplinary fields were applied (1,2). The following bibliometric parameters were assessed: number and kind of publications in single years; institutional and national affiliation of the authors (during the period from 1988 till 2000 only) as well as thematic profile and national belonging of the journals. The present treatise describes a small extract from the numerous data obtained that directly deal with the structure and dynamics of authors' and their institutes' publication activity from a historical perspective.

RESULTS AND DISCUSSION

The total number of articles devoted immediately to this interdisciplinary topic during the aforementioned period and reflected in *MEDLINE* on CD-ROM is 126. The total number of journals containing these articles is 31. They have been published in 21 countries from all over the world.

Address for correspondence:

D. Tomov, *The Library and Information Service, Medical University of Varna, 55 Marin Drinov St, BG-9002 Varna, BULGARIA*

E-mail: library@asclp.muvar.acad.bg

Country distribution according to the number of journals and relevant articles in them is shown on Fig. 1.

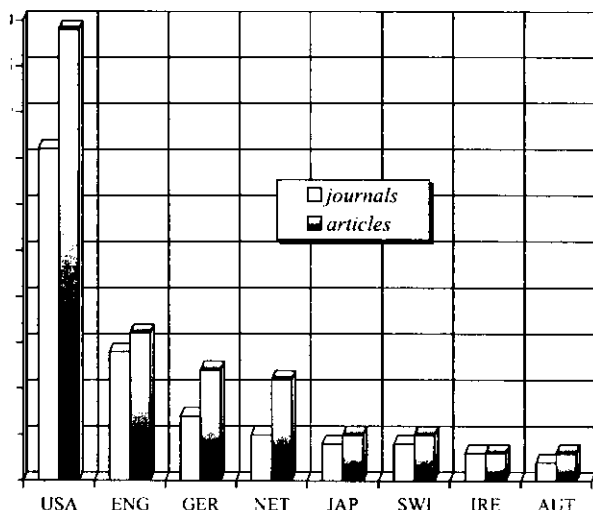


Fig. 1. Country distribution according to the number of journals and articles in them

The majority of papers are in English although there are articles in 6 other languages. The annual dynamics of the number of publications is demonstrated on Fig. 2.

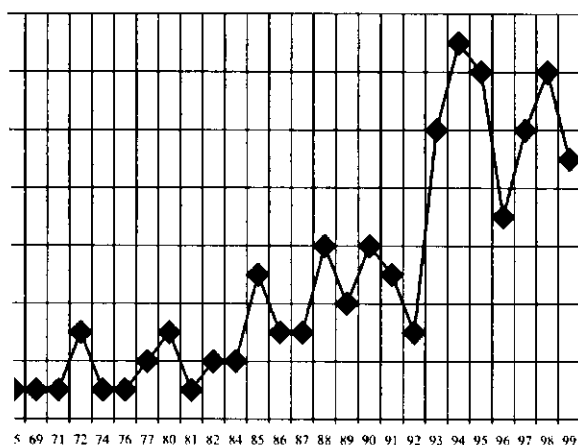


Fig. 2. Annual dynamics of the publications

The rapid increasing of the number of co-authors of the original articles in the last decade stresses, indeed. On the other hand, the number of co-authors of review articles remains much smaller. In our opinion, one reason for enlargement of collaboration in the course of accomplishing and frequent publishing the own investigations consists in the necessity of creating effective interdisciplinary teams. Indirect proof of the presence of researchers from different specialties is provided by the unique examination of the degree of non-coincidence between the denominations of scientific units and institutions, respectively, on the one hand, and the titles of the journals containing the corresponding articles and reflecting relatively objectively the thematic belonging of the publications themselves. In case available at our disposal the reprints of all the original papers

we could much more comprehensively analyze the interdisciplinary collaboration patterns within these authors' collectives. Unfortunately, this data base like almost all contemporary data bases provides only one author's address of the corresponding article. This non-coincidence has been established in 34 out of a total of 94 papers (or in 36,2 per cent of the cases) during the period from 1988 till 2000.

A particular interest represent the interactions between neurosciences and pharmacology: the pharmacologists have published 6 articles in neurological journals and one article in a chemical journal, while neuroscientists have published two articles in pharmacological and miscellaneous journals each as well as one article in a gerontological, allergological, and dental journal each. The gerontologists have published two articles in pharmacological journals and one article in a neurological journal.

In a total of 37 review articles there are 5289 references or at an average of 143 references per article. There are three review articles containing 691, 542, and 469 references, respectively.

Authors' institutions belong to 18 mono- and 7 interdisciplinary thematic profiles, while the journals belong to 17 mono- and 8 interdisciplinary profiles. To the generalized profile of "neurosciences" belong 39 journals from 12 countries containing 57 articles. This country distribution is presented on Fig. 3.

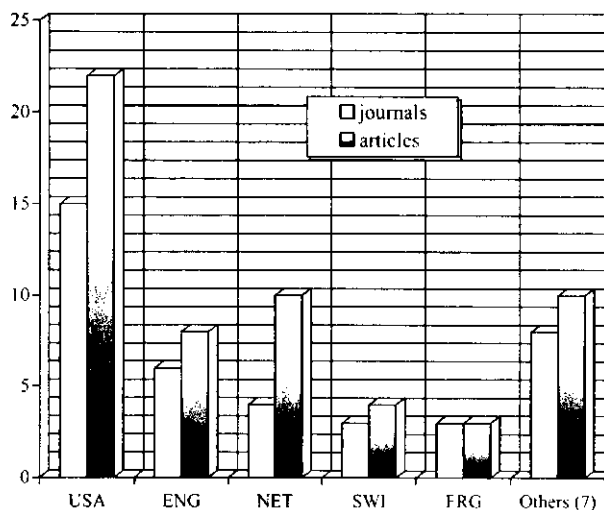


Fig. 3. Country distribution according to the number of journals and articles in neuroscience

The publication in foreign journals by the authors from the developing and developed countries as well represents an essential aspect of internationalization of modern science. The authors from Israel, Sweden, Japan, France, Germany and the Netherlands are particularly active in this respect (Fig. 4). The authors from the USA have published 37 papers in American journals and 16 papers in 10 journals from 5 countries. As a whole, 67 papers have been published in domestic journals but 59 papers in foreign ones. The authors from 10 countries, Bulgaria inclusive, have published their papers in foreign journals only, while the authors from

other 9 countries have published their papers in their own national journals only.

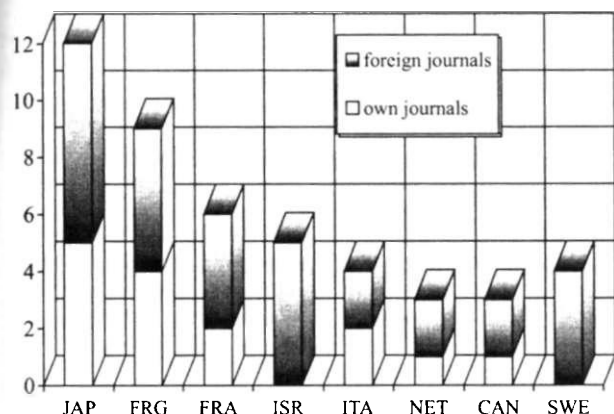


Fig. 4. Country distribution according to the number of articles in domestic and foreign journals

There exists a specific orientation of the leading countries towards a concrete thematic specialization of their authors' institutions relatively actively involved in this topic. Fig. 5 displays the distribution of the number of countries and of the articles by their authors working in institutions belonging to five primary thematic profiles.

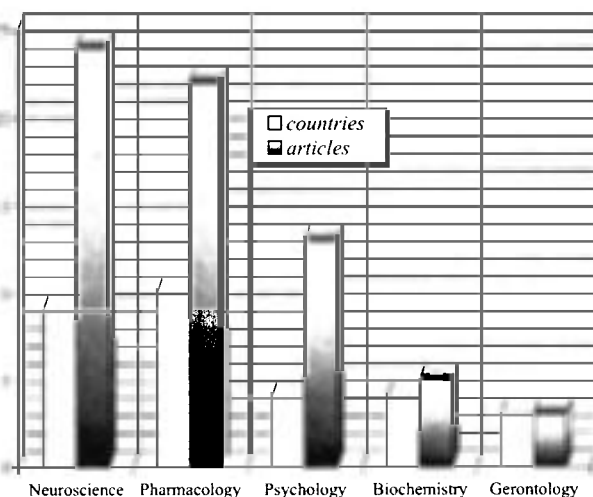


Fig. 5. Countries and articles by authors from the main thematic-profile institutions

In a total of 7 "international" journals from 5 countries, Uruguay inclusive, 8 articles have been published by authors from 6 countries. German investigators are most active in this respect. They present with one article in two German journals each and with one paper in a Swiss journal. Although this sample is very small it allows to outline the so-called "core" journals. The following titles belong to

this group: "Psychopharmacology" (Germany) with 5 articles; "Brain Research" (the Netherlands) and "Pharmacology, Biochemistry and Behavior" (USA) with 4 articles each. Besides there are 3 journals (two from the USA and one from the Netherlands) with 3 articles each.

CONCLUSION

We would like to emphasize the considerable opportunities of the computerized historiography of science for scientometric purposes and to point out the role of this methodology for revealing the origin and subsequent dynamic development of a given broader or narrower interdisciplinary research field of rising socio-medical importance. The complex examinations of the three significant components of contemporary scientific communications, i. e., of the permanently improving institutionalization and internationalization of the interdisciplinarily oriented paradigm could undoubtedly contribute to the perfection of university education and thus of science policy and management at any levels in small countries like Bulgaria. The experience in research planning and organization gained by the leading European and American institutions should be more actively used by science managers in our country, too.

REFERENCES

1. Томов, Д. *Социол. прегл.*, 1986, № 7, 67-72.
2. Томов, Д. Дисертация за степен "доктор". София, Център по наукознание и история на науката-БАН, 1998.
3. De Lange, C., W. Glanzel. *Scientometrics*, **40**, 1997, 593-604.
4. Glanzel, W., C. De Lange. *Scientometrics*, **40**, 1997, 605-626.
5. Томов, Д. *Scr. Sci. Med. (Varna)*, **30**, 1997, Suppl. 1, p. 26.
6. Томов, Д., O. Persson. *Eur. J. Neurosci.*, **10**, 1998, Suppl 10, p. 152 (Abstracts).
7. Томов, Д., O. Persson. *Scr. Sci. Med. (Varna)*, **31**, 1999, 159-166.
8. Томов, Д., S. Gerasimova. In: *Collaboration in Science and in Technology. Proceedings of the Second Berlin Workshop on Scientometrics and Informetrics*. Berlin, 1-3.IX.2000. F. Havemann, R. Wagner-Dobler and H. Kretschmer, eds. Berlin, Gesellschaft für Wissenschaftsforschung, 2001 (in press).
9. Wilpert, B. *Z. Psychol.*, **207**, 1999, 419-439.
10. Zitt, M., A. Sigogneau, F. Lavelle, R. Barre. *Res. Policy*, **28**, 1999, 545-562.
11. Zitt, M., E. Bassecoulard, Y. Okubo. *Scientometrics*, **47**, 2000, 627-657.