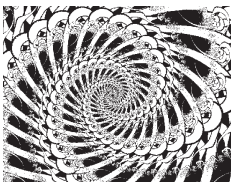

CROATIAN JOURNALS AT THE END OF THE 20 CENTURY
A bibliometric evaluation[1]

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There are in Croatia 241 journals appearing at least twice a year. They make for about 2/3 of those periodic publications whose contents are recorded in the *Croatian Bibliography. Series B, contributions in journals and proceedings*. Their scientific communicability (sci.comm.) was evaluated by four indicators: peer review, language, timeliness/regularity, and foreign authorship; journals from the natural and applied-technical sciences (NT) faired considerably better than those from the social sciences and humanities (SH). This dichotomy was also apparent in the 1990 to 1995 comparison. Although there were no dramatic changes, the sci. comm. did improve, and more so for the NT-journals. New SH-journals more frequently appeared and ceased. Hence, the criteria for decision making in science policy must not be identical for all types of journals. The results of the sci. comm. evaluation by our method is congruent with the coverage of Croatian journals in the international secondary information services. This flow into the "capillary" system of scientific information exchange leads to a reasonable "visibility" of Croatian journals via the *ISI*-journals.

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INTRODUCTION

Publishing of journals at the end of the 20 century is shadowed (or maybe flood-lit?) by the accelerated application of the information technology. Subiah Arunachalam's paper is indicative in that respect (Arunachalam, 1998). The Ninth Conference of the International Federation of Science Editors at

which Professor Arunachalam delivered his lecture was titled "Science Communication for the Next Millennium". The paper strikes a pessimistic note for the countries "not sufficiently developed". At which development level is Croatia now? Are we to be concerned about our scientific journals? Irrespective of what is going to happen in the technological sense, there is a lasting basic problem of communication between the "mainstream" and the "peripheral" science. Communication means an exchange of information in both directions, but the "mainstreaming" is so strong that only more or less stationary whirls form along its banks. There are in the world, as it is well known, several thousand journals from the "front-line" of the relevant science, followed by tens of thousands of journals from the peripheral scientific communities. Various secondary science information services provide for the good visibility of the first ones, while the others continuously strive to enter the mainstream from their local whirls, or – remain witness to a very questionable, localized science, which is a contradiction in itself, science being a worldwide, self-regulatory, cognitive process.

Assuming journals to be those periodic publications which appear at least twice a year, there are in Croatia some two hundred scientific and technical journals, amounting to about 2/3 of those whose contents are being continuously recorded by the *Croatian Bibliography. Series B, contributions in journals and proceedings* (CROBIB/b). Having in mind the need to participate in the worldwide scientific communication by our journals too, and taking into account the fast application of the information technology, the question arises: which of them should be helped in getting into the process of world science at the beginning of the 20 century (or, for that matter – the third millennium)?

In this paper we are trying to approach the answer to the latter question within two frameworks.

The first one is of a practical nature and imposed by the local usage of the term "internationally recognized" domestic journals (Ministarstvo/Pravilnik, 1997). It certainly has to be scrutinized because it is being used in financial decision making concerning the journals, as well as within the mechanism of scientists' promotion. A few examples from science studies literature will suffice to show that this problem is not only local or of recent origin.

Thus, even as early as 1986 Yongyuth Yuthavong said in a commentary of the state of science in Thailand (Yuthavong, 1986): "In Thailand, like in many other non-English speaking developing countries, there are difficulties in compiling bibliometric indicators of scientific activity, since very few local journals are covered by the international indexing and abstracting services, and the local services are weak to the point of being non-existent. Only two out of some 200 journals on sci-

ence and technology from Thailand are included in the *Science Citation Index* source list." The author mentions also that the scientists in developing countries are always heavily pressed by the local authorities to produce evidence on the impact and utilization of their research.

Somewhat later, (Luukkonen, 1989) voiced from the Finnish Academy of Sciences in a paper titled "Publish in a visible journal or perish?": "A second set of reasons relates to social factors which result in an imperfect communication among the scientific communities and effect the fairness with which recognition is apportioned to authors...Countries differ in their size and the organization of their research efforts, and subsequently in their patterns of scientific communication. This, we may assume, places small countries in a disadvantageous position compared to the bigger ones..."

In his frequently quoted paper Gaillard concludes: "All these recent findings substantiate the thesis that the bibliometric indicators, especially the *SCI,* do not accurately assess the scientific output from the periphery, especially from the DCs and that local science far from being synonym of poor science (is) at least as important as international science in the context of a developing country, and should be taken into account." (Gaillard, 1992)

The other, (most) general framework of our research of the Croatian journals may be characterized after the paper by Yuko Fujigaki as socio-gnoseologic (Fujigaki, 1998): "....the aggregation of publications in scientific journals is defined as the unity of the autopoiesis system, and scientific papers as the components of that system. Publishing is defined as operation of the system. Using the definition and demonstrating the process by which the operation creates the structure, we can show how the daily activities of scientists (micro-activity) create a macro-structure. Focusing on the system's operation (publishing) clarifies the essence of science..."

Our method of evaluating scientific communicability of domestic journals was published in 1992 (Maricic et. al. 1992). Using the same method we have evaluated the Croatian journals which continued to appear, or publishing of which began later on, till 1996, so we are now able to compare the state of affairs in the publishing of scientific and technical journals in Croatia between the present (1995-1996) and the earlier period (1990 -1991), but also to observe the characteristics of the new journals.

THE METHOD

Indicators

Our method of evaluating journals' scientific communicability is based *exclusively* upon the information contained within the journals. It is thus the most objective approach, since the

editorial boards do not participate in any way, nor do the evaluators by any kind of subjective judgment. Even when methods for evaluating scientific achievements are most objective, the question remains as to how relevant they are regarding the set aims, here – the scientific communicability. The dilemma stems from the principle of indeterminacy (Narin, 1978), i.e. there is an inverse relationship between objectivity of a given method and its relevance to the evaluation of scientific achievements. The greater the objectivity, the smaller the relevance, and *vice versa.*

The details can be found in our paper of 1992, so here we shall only enumerate briefly the indicators used in the present survey.

1. Peer review

It was understood that the papers were subjected to refereeing prior to publication only if there was a statement to that effect (usually in the "Instructions to the authors"). If there was no such statement, we checked whether there were two dates accompanying the papers – i.e. "received" and "accepted". In such cases the papers were considered to have been refereed.

Discussions about the value of the refereeing procedure continue in the literature, but an evergrowing number of journals still stick to the peer review, the same being with Croatian journals. However, these discussions extend now to a new dimension due to the appearance of the fully electronic journals (van Raan, 1997). Although there are specific difficulties in performing the peer review within peripheral scientific communities (Petrak et. al., 1990), journals declaring peer review do instigate precisely the scientific communicability, thus promoting the "scientific behaviour" of their authors. Even the switch to the fully electronic publishing did not dispose of the peer review. On the contrary, in some cases it re-appears as a democratic practice of publishing also the reviewers' opinions, and the commentaries of the readers (van Raan, 1997). Besides, electronic journals frequently indicate whether the papers will be subject to peer review or not, and to which kind of manuscripts it will be applied.

2. Language

Obviously, there is a greater chance for our scientific messages to be received in the world if (a) the papers, (b) the abstracts, or at least (c) the content pages are published in one of the world languages. As a rule, this is a precondition for an appearance at the world scientific scene. It is essential in strengthening the scientific communicability within the mechanism of attaining "public knowledge" (Ziman, 1968), i.e. within the world scientific community, by effectively diminishing the language barriers.

3. Timeliness and regularity

An on-time and regular publishing is not a quality observed only with scientifically orientated journals, but it is a necessary (though not sufficient) condition for the scientific communicability evaluation. The argument to include this indicator is justified thoroughly in our earlier research (Sorokin et al., 1990). Namely, the dynamics of science development is secured by a prompt reporting on the current research. Only in some cases, predominately in humanities, journal timeliness may not be essential for its scientific communicability. On the whole, timeliness and regularity in publishing indicate a vital scientific community with a better scientific communicability. This is frequently an important pre-requisite for a journal to be referred by secondary scientific information services worldwide.

4. The authorships from abroad

Authors with a foreign working address were taken to indicate directly the reverse direction in scientific communicability of the journal – from the world towards Croatia. Apart from foreign authors living and working abroad, there may be also Croatian authors who are abroad for good, or temporarily. We did not differentiate between these three possibilities. Whatever the case may be the fact remains that scientific results obtained abroad are being presented in Croatian journals.

The scoring. The score attribution to each journal in the evaluation process according to the first four indicators was identical to the procedure applied in our earlier work (Maričić et al., 1992), so that the total scores could vary from 0 to 16 (except for the value of 1).

Comparisons. In order to get insight into the practical meaning of scientific communicability as evaluated by our method, especially for the journals appearing in 1990 and onwards, i.e. those already taken up in our earlier research (Maričić et al., 1992), we recorded the secondary information sources whenever it was indicated in the journal. Our data base contains all the secondary services recorded as given in each journal. However, in this research, we are only interested whether the journal is or is not reviewed in any secondary information service. Namely, the number of such services per each journal cannot be taken to be directly related to the degree of its scientific communicability, since it is most probably a result of the varied subject content, and consequently the journal may be of interest to multiple secondary services.

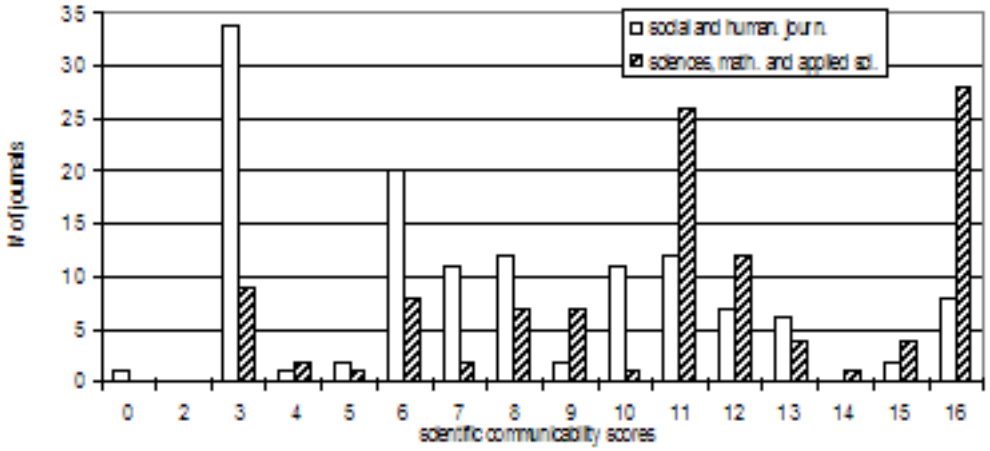
The comparison of scientific communicability as evaluated by scores 0-16 for journals included in the present study and those from the previous one is only of a statistical nature. Namely, in the former study we took into account all the is-

sues of a given volume, while now we have examined only one issue per volume. The comparison is, however, valid for the following reasons. Three out of the four indicators used are independent of the number of issues published per year. The fourth (authorship from abroad) may depend on the number of issues, so that journals who have very rarely authors with foreign working addresses may be at a disadvantage if only one issue per year is examined.

THE RESULTS

The frequencies of *all* the journals according to their scientific communicability scores are presented in Figure 1. The only distinction made is between those from the social sciences and the humanities (SH) on the one hand, and, on the other those from the (natural) sciences with mathematics and the applied sciences (technical), (NT). Figure 1 comprises the evaluation data for all the journals that have been processed by CROBIB.b in 1995 and onwards: (i) journals covering the period 1990-1995, including those already evaluated (Maričić et al. 1992), as well as those (ii) not evaluated before although they were appearing in the given period, and those (iii) whose publication began after 1990.

FIGURE 1
Frequency distribution of journals by their scientific communicability scores



The dichotomy between the journals belonging to the two basic spheres of the scientific discourse can be noted in Figure 1: the *smaller* the scientific communicability of the SH journals, the *more numerous* they are, while with the NT journals it is reverse – there are *more* of them the *greater* their scientific communicability.

The results were further arranged by the scientific communicability scores into the following groups: 0-4, 5-7, 8-13 and 14-16 scores, and the values which differentiate between these groups are presented in Table 1.

SH				NT		
score-total	journal freq.	average group-score	score-groups	score-total	journal freq.	average group-score
(1)	(2)	(3)		(1)	(2)	(3)
103	36	2,86	0-4	35	12	2,92
207	33	6,27	5-7	67	11	6,09
518	50	10,36	8-13	600	56	10,71
158	10	15,80	14-16	522	33	15,82
986	129	*7,64*	0-16	1224	112	*10,93*

TABLE 1
Scientific communicability data for score goupings

There are three columns for each set of data, SH and NT. In the first column (1) are the score-totals for journals within a given score-grouping, i.e. the results obtained by summing-up the multiplication products between the number of journals of a particular score value they were given, and that score value. The average score value (i.e. per journal) for a given score-grouping (3) is obtained by dividing (1) with the number of journals in the given score-grouping (2).

Our division into score-groupings (Table 1) was not firmly set in advance. However, now, *a posteriori* it is evident that both SH and NT journals are divided further, according to their score-totals (see columns (1) for SH and NT in Table 1) into at least two segments: one of the lesser scientific communicability (scores 0-7), and the other, of the better (scores 8-16). SH- and NT-journals cannot be distinguished by the average score values ((3) in Table 1) because the frequency distribution within each of the four segments are similar. However, taking average score values for *all* journals, the scientific communicability of journals from the (natural) sciences with mathematics and the applied sciences is 1.43 times higher than the corresponding value for the social sciences and humanities journals (assuming the linearity of the scoring scale).

Because of the obvious dichotomy between the SH- and NT-journals, the results will be further discussed separately. In table 2 the temporal dimension is introduced. This is done by comparing the distribution of the journals (SH and NT) according to their scientific communicability, as evaluated before (1990/91) and now (1995/6).

TABLE 2
Comparison of 1990 and 1995 data for score groups

SH							NT					
1990			1995			score-groups	1990			1995		
(1)	(2)	(3)	(1)	(2)	(3)		(1)	(2)	(3)	(1)	(2)	(3)
73	26	2,81	54	19	2,81	0-4	14	5	2,80	16	6	2,67
130	21	6,19	144	23	6,26	5-7	66	11	6,00	36	6	6,00
189	19	9,95	254	24	10,58	8-13	390	38	10,26	410	38	10,79
96	6	16,00	95	6	15,83	14-16	389	25	15,56	458	29	15,79
488	72	*6,78*	547	72	*7,60*	0-16	859	79	*10,87*	920	79	*11,65*
			64%	42%		8-16				94%	85%	

Columns (1), (2), (3) – as in Table 1.

From Table 2/(2) (the row for 0-16) one can see that of all 129 SH-journals included in the present study, 72 (55.8%) of them were identical in both periods, so that they can be compared. Of 112 NT-journals 79 (70,5%) are comparable. Hence, about 2/3 of all 241 journals in this study have been continuously published during the past 5-6 years. (See for details about the publishing changes 1990-3, with the journal titles, in (Sorokin, 1994).) Again, the more persistent journals are from the (natural) sciences with mathematics and the applied sciences. Let us see if there was any change in scientific communicability within the comparable '90 vs. '95 set of journals. Judged by the average score values for all journals (see columns (3) row 0-16) both SH- and NT-journals show some improvement in scientific communicability. A better distribution in this respect is observed with the NT-journals (see columns (2)).

Table 3 comprises the data for journals which could not have been evaluated earlier, because they firstly appeared after 1990. (For brevity we shall refer to them as *new,* while those in Table 3 for the year 1995 will be called *persistent*.)

TABLE 3
Data for post-1990 (new) journals

SH			score-groups	NT		
(1)	(2)	(3)		(1)	(2)	(3)
46	16	2,88	0-4	16	5	3,20
39	6	6,50	5-7	18	3	6,00
198	19	10,42	8-13	144	13	11,08
32	2	16,00	14-16	16	1	16,00
315	43	7,33	0-16	194	22	8,82
73%	49%		8-16	83%	64%	

Columns (1), (2), (3), as in the preceding tables.

Comparing the data from Tables 3 and 2 one can see that there are twice as many new SH-journals (43) than NT-journals (22)/Table 3, while as regards the persistent ones (Table 2) there are slightly less SHs (72) than NTs (79).

To compare the scientific communicability of the persistent set of journals (Table 2/1995) and the new one (Table 3) we turn to the data expressed in percentages (the lower, shaded row, 8-16 in Tables 2 and 3). This was obtained by combining figures for the two higher score groupings, i.e. for 8-16 (shaded in Tables 2 and 3), and their percentages calculated in reference to the totals, 0-16 row in both tables (2 and 3).

The scientific communicability dichotomy (SH vs. NT) is much less expressed for the new than for the persistent journals. The score-totals for the new ones is 73%:82% (Table3), whereas for the persistent ones it is 64%:94% (Table 2). The results are similar if one observes the two groups through journals *frequency* data (columns (1) in Tables 2 and 3). Apparen-

tly, it takes time for the journals to re-settle into the better ones or the worse.

The average score values of the new journals (7.33 and 8.82, the row 0-16 in Table 3) are lower than those for the persistent journals (7.60 and 11.65 in the 0-16 row of Table 2/1995), the NT-values being more suggestive in this respect.

The distribution of journals along scientific communicability scores, which claim to be covered by secondary information services, are compiled in Figure 2 (DHs) and Figure 3 (NTs), for both the new and the persistent ones.

FIGURE 2
Frequencies of SH-journals covered by secondary information services

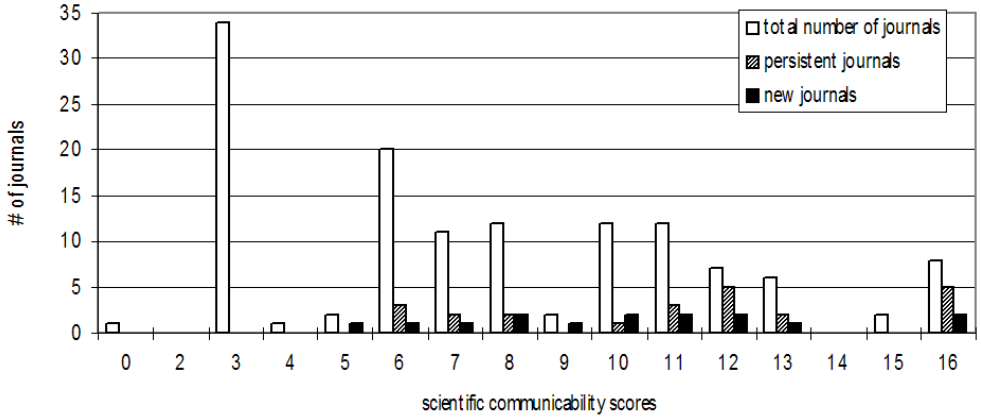
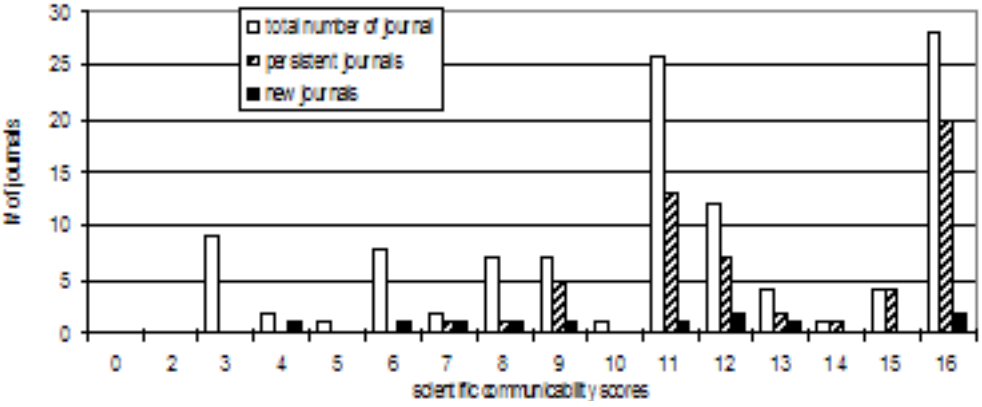


FIGURE 3
Frequencies of NT-journals covered by secondary information services



REFLECTION

We shall begin from the general, and then move towards the special. According to (Fujigaki, 1998), the analysis of publishing, i.e. the operation of the journal system, enables one to understand how the (micro-) operation creates the (macro) structure. This approach is based on the dynamic comprehension of the very process of science, and particularly of the communication activity, hence primarily the system of scientific journals. Every single editorial office is embedded in its own part of the system, acting as allowed by its closer or wider sur-

rounding (professional society, university, financing body etc.) but without any direct interaction with other journals. The unintentional macro-structuring as a result of a deliberate micro-activity of the editorial boards may become visible only through the analysis of the whole population of journals, as it was accomplished here for a socio-political entity (Croatia).

We have already established (Maričić et al., 1992) the dichotomy with respect to the two main spheres of scientific discourse – the social sciences and the humanities on one hand, and the (natural) sciences (with mathematics) and their applications (technical) on the other (SH and NT in Tables 1 and 2). It is obvious that the "primary process of scientific production" differs in these two spheres, so that the criteria for decision making in science policy must not be identical for all journals.

Further distinction within each of the two spheres of journal publishing was also established, namely into those with a worse scientific communicability and others which are much better in that respect (Tables 1 and 2). A concrete sociological analysis of smaller journal groups according to their subjects is required in order to understand the actual factors at play. Eventually, one may hope to describe the "macro-structuring" process and whether it differs between the SH- and NT-journals population.

The main dichotomy was also observed along the time-dimension (Table 2). Although there were no dramatic changes, scientific communicability did improve, and more so for the NT-journals. Besides, 71% of all NT-journals were being published without any interruption, while the same applies to only 56% of the SH's. Altogether about 2/3 of all 241 journals was appearing continuously in this five year period. In other words, irrespective of what kind of the journals' corpus structuring is observed, rather inertial sociological circumstances are at play. Similarly, in an earlier research (Sorokin et. al., 1990) which encompassed about 50 years, it was observed that journals from the social sciences and humanities more frequently appear, but also disappear.

Now we come to discussing the *specific,* i. e. the role of the domestic journals within the organization of the scientific endeavour in Croatia. We shall therefore reflect upon the evaluation of journals in the mechanism of their co-financing according to the Ministry of Science and Technology's act (Ministarstvo..., 1997). The latter relies heavily on the selection of journals for the processing in the *Institute for Scientific Information* (*ISI* – Philadelphia). If a domestic journal is among those included in the *ISI*'s *Current Contents* (*CC*), or if it is chosen by the Ministry to be "of equal quality", it obviously gains advantage

over the others. In the Introduction, we quoted a few papers from the world literature which, if not directly rejecting such an approach, do cast serious doubt upon its validity – see for instance (Gaillard, 1992). We have already compared our first results from this study with the Ministry's list of journals "of equal quality" (Maričić et. al., 1997). We shall not proceed here with this comparison of the actual journal titles, but it has to be emphasized that the problem lurks from the domestic journals themselves, too. For instance, though not dealing with the problem in extenso, it is directly mentioned under a very indicative title of the paper "To be here – To publish there", in (Prica, 1994): "...because this "dialogue effort" has recently also been receiving encouragement in the form of conditioning of existential survival of the domestic scholar through publication of internationally recognized papers." (In a footnote the author mentions "the propositions for the evaluation of status of domestic scholars" in a special, December 1994 issue of the Ministry's gazette *Most*.)

It is an ultimate simplification, as implied by the quoted Ministry's act, to accept that the "scientific dialogue" (with the world) is only possible through the channel of scientific communication established by the *ISI* (although it was not initially meant to be used for that purpose). We have shown before that the incorporation of a journal into the *ISI*'s selection does not automatically mean its better "visibility" (by citations) (Zmaic et al., 1989). A growing number of the secondary sources of scientific information (various data bases) is much more important for the "science periphery". Therefore we paid attention to establishing how many of our journals could be found in such secondary sources. The data in Figures 2 and 3 are based exclusively on the information given by individual journals. To check through the actual data bases themselves if, and to what extent the content of our journals is being presented, requires a special study, such as has been performed for instance for one journal (Jokić, 1998). Although this overview of ours is of a statistical nature, the results appear to be sufficiently indicative of the secondary information services coverage of Croatian journals.

It takes some years for a journal to be accepted by a secondary information service. That is why the data for the persistent journals in Figures 2 and 3 are of a greater value. Those journals have been regularly published since our last evaluation (1990). We shall not discuss the data for the new ones.

It seems quite certain that *persisent* journals whose scientific communicability is evaluated by scores 5 or less were not included in any secondary information source. From all those with a greater scientific communicability, the NT ones are much

more frequently within the secondary services than the SH ones, this dichotomy between the two main science spheres being thus confirmed anew. On the one hand it is safe to take that the journals of low or no scientific communicability from both spheres (SH and NT) are excluded from the secondary presentations worldwide, on the other it is equally safe to expect that 2/3 of the more scientifically communicable NT-journals (scores 11, or higher) will be there.

On the whole it seems that the coverage of Croatian journals by the secondary science-information services is not bad.

We thus arrive to an important conclusion: the evaluation of journals' scientific communicability by our method – without any resort to the *ISI* publications – is congruent with the choice(s) of Croatian journals for the international secondary information services. In other words, although this year (1998) there are eight Croatian NT- (two with scores of 12 and 14, and others of 16) and two SH-journals (one with 12, the other with 16 scores) within the *ISI*'s selection, many more Croatian journals enter the "capillary" system of scientific information exchange. This, after all, explains their citability by the ISI-journals (Zmaic et al., 1989 and Maričić, 1997).

This was now also confirmed through a few checks[2] for the most scientifically communicable Croatian journals. From the NT-group, 17 with the highest score of 16 were "unearthed" by searching the *SCISEARCH* base, i.e. those titles were cited by the *ISI*-journals in spite of the fact they were not chosen for regular processing by the *ISI*. In the further search for the 4 SH-journals (all with the score 16) only one of them was not cited at all. These results confirm that the Croatian journals which were evaluated by our method in 1995/6 as scientifically most communicable – do enter the "citation world".

Without elaborating the results with respect to any of the subject areas, it has to be concluded in general that a substantial number of Croatian journals are superfluous with regard to the indigenous science development, because they are of low scientific communicability.

On another occasion, at another time, an anonymous author (Anonymus, 1789) said in a German medical journal: "... This really is a decade of journals and their number ought to be diminished rather than increased, because there may be already too much news..." It was in the age of the French Revolution, and within 125 years from the appearance of the first scientific journals. In India, the first periodic scientific publication (*Asiatick Researches*) appeared in 1788 (Sen and Lakshmi, 1992). In Croatia it was (in 12 installments) *Arkiv za povjestnicu jugoslavensku,* 1851-75. Among the more persistent ones are *Lijecnicki vjesnik* i *Šumarski list* 1877, and in 1886 *Glasnik Hrvatskoga naravoslovnog družtva.* Thus, the Croatian journals had come out of age, too, after more than a century. The ano-

nymous German author may have been concerned with the flood of texts to process because at that time he could only make use of the classical writing method of ink-and-paper, and printing on paper. Nowadays, although the information technology provides for handling two to three orders of magnitude larger "heaps" of articles, their quality is in the forefront (again), especially in the peripheral scientific communities.

Finally, what is the status of Croatian journals with regard to Garfield's "rule" (Garfield, 1991), that for a journal to be taken as truly scientific it must publish yearly at least 100 papers? Though, Garfield does mention that even in the journal selection for *Science Citation Index* 1989 there are about 1500 titles (from some 7000 altogether) which had published less than 100 papers per year. In the Croatian journals only a few tens of papers are being published yearly. In 1996, there was only one from those ten Croatian journals chosen by *ISI* which published 121 papers. The rest of them had 13 to 55 papers. Those which are not in the regular *ISI* selection, but were discovered in the citation indexes, had between 11 and 83 papers.

There is absolutely no doubt that the articles published in non-*ISI* journals (from peripheral scientific communities) are being cited in the *ISI*'s publications. These are not exceptional cases. N. Bayers and H. Small estimated in 1996 (according to Van Hooydonk and Milis-Proost, 1997) that between 50 and 70% of all citations (depending on the particular *ISI* index) are to non-*ISI* journals. On a large scale, and for medical journals from a scientifically highly developed country – Germany – this has just been fully confirmed, by "unearthing" over 300 non-*ISI* journal titles, with "constructed impact factors" ranging up to 5 (Stegmann, 1999).

Our method enables the evaluation of indigenous journals without evaluating them via citation indexes of the Institute for scientific information from Philadelphia. However, this does not mean that the use of the latter would not be in place. On the contrary, the journals can be disentangled by our method into those not satisfying the minimal requirement for scientific communicability, and into those which are very good in that respect. Using the citation rates of domestic journals obtained from the *ISI* data base(s), one could separate further those journals which have entered the mainstream of the world science. It could be done already, as mentioned (Stegmann, 1999), but at considerable cost. It would be much simpler and cheaper if an annual citation index of non-ISI journals appeared (Maricic, 1998).

Irrespective of the direct and indirect connectivity of Croatian journals with the main stream of the world science, it is up to the editorial boards to switch over stepwise to electron-

ic publishing of their journals. The exploitation of the Internet in this respect is at the lowest level in Croatia (Krčmar, 1997). Besides, one has to bear in mind that the electronic publishing mode does not mean only a formal, technical, change, but an absolutely new, modular way of scientific communication with countless interactive links, thus influencing the very essence of science (Kircz, 1998).

NOTES

[1] The results were partially presented by a poster within the (international) 31st Assembly of the Croatian Librarians' Society – Library Users in the 21 Century – A Challenge for the Librarians' Profession, Zadar, 7-10 October 1998. (the book "radni materijali", pp. 107-108).

[2] We are grateful to Dr. Johannes Stegmann (Medizinische Bibliothek, Uniklinik Benjamin Franklin, Freie Universitaet Berlin) and Dr. Maja Jokić (Nacionalna i sveučilišna knjižnica u Zagrebu) for the serchings by which a number of Croatian journal titles were found in the *ISI*'s citation indexes. We thank the referees for several of their remarks, which were considered in the final stage of manuscript preparation.

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* We thank Dr Johannes Stegmann for kindly supplying the exact quotation in German (and Dr Armin Hetzer, Universitaet Bremen, Deutchland, for its translation into Croatian):
The title of the journal is:
Neues Medicinisches Wochenblatt fuer Aerzte, Wundaerzte, Apotheker, und Freunde der Naturwissenschaft.

The full title page is:
Neues Medicinisches Wochenblatt fuer Aerzte, Wundaerzte, Apotheker, und Freunde der Naturwissenschaft, unter Aufsicht der medicinischen Fakultaet zu Giessen
Giessen und Frankfurt am Mayn, 1789
Erster Jahrgang, Zweites Quartal, Nro. XIV.
Sonnabend, den 4. April, 1789.
The text in question is on page 211. The first part below is the title of the reviewed work. The text is obviously taken from that work. The author is the (unknown) reviewer. For completeness some additional sentences from page 212, too:
Medicinische praktische Bibliothek fuer Aerzte und Wundaerzte, von D. Carl Georg Theodor Kortum und Joh. Christoph Schaeffer, Aerzten zu Dortmund 1ter Band, 1tes Stueck. Muenster und Hamm 1789
Voellig wahr ists', was die Verf. dieser Bibliothek, zween beruehmte Aerzte in Dortmund, in der Vorrede sagen, dass es "in dem itzigen Zeitraume an guten Journalen ueber alle Faecher der A.W. nicht fehle". Es ist wirklich itzt das Jahrzend der Journale, und man sollte eher die Zahl derselben vermindern, als vermehren, da es doch wohl auch der Zeitschriften zu viele geben kann. Ein Esprit des Journaux würde daher sehr dienlich seyn; denn fuer viele Gelehrte, die die mehrsten Magazine, Journale, Bibliotheken lesen, ists' mitunter ekelhaft, in einer Zeitschrift wieder eine andere ausgezogen zu finden.
Freilich hat jede Ihr Gutes, allein dies Waizenkorn ist oft so tiefunter Schutt vergraben, daß es kaum der Muehe lohnt es hervorzusuchen.

Hrvatski časopisi na kraju XX. stoljeća. Bibliometrijsko vrednovanje

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Najmanje dvaput godišnje u Hrvatskoj izlazi 241 časopis. To je oko 2/3 periodičkih publikacija čije sadržaje bilježi *Hrvatska bibliografija. Niz B, prilozi u časopisima i zbornicima*. Njihovu smo znanstvenu komunikabilnost (zn. kom.) vrednovali četirima pokazateljima: recenzijom, jezikom, redovitošću i inozemnim autorstvom. Časopisi prirodnih i primijenjenih znanosti (NT) su u tom pogledu znatno bolji od onih iz društvenih i humanističkih znanosti (SH). Ta se dihotomija očituje za razdoblje 1990. do 1995.: iako nije bilo dramatičnih promjena, zn. kom. se poboljšala, i to više u NT-časopisa; češće se pojavljuju novi SH-časopisi, a i češće nestaju. Zbog te dihotomije kriteriji pri odlučivanju u politici znanosti ne bi smjeli biti

jedinstveni za sve vrste časopise. Rezultati vrednovanja zn. kom. našom metodom slažu se s pokrivenošću hrvatskih časopisa u međunarodnim sekundarnim informacijskim službama. Taj ulazak u "kapilarni" sustav razmjene znanstvenih informacija dovodi i do zamjetljive "vidljivosti" hrvatskih časopisa, iako u pravilu nisu u obradi Instituta za znanstvene informacije iz Philadelphije.

Kroatische Fachszeitschriften am Ende des 20. Jahrhunderts. Bibliometrische Auswertung

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In Kroatien erscheinen mindestens zweimal jährlich 241 verschiedene Fachzeitschriften. Dies sind etwa zwei Drittel aller Periodika, deren Inhalt von *Hrvatska bibliografija. Niz B, prilozi u časopisima i zbornicima* (*Kroatische Bibliographie. Reihe B, Beiträge in Zeitschriften und Sammelschriften*) erfasst wird. Ihr wissenschaftlich-kommunikativer Charakter wurde anhand von vier Faktoren bewertet: Besprechungscharakter, Sprache, Regelmäßigkeit und Herkunft des Verfassers (Ausland). Zeitschriften aus dem Bereich der Natur- und der angewandten Wissenschaften (NT) weisen in dieser Hinsicht eine weitaus bessere Qualität auf als gesellschaftswissenschaftliche und humanistische Publikationen (SH). Dieser Unterschied offenbart sich ganz besonders im Zeitraum von 1990 bis 1995: obwohl es keinerlei dramatische Veränderungen gab, verbesserte sich der wissenschaftlich-kommunikative Charakter, zumal in NT-Publikationen; des öfteren erschienen neue SH-Zeitschriften, die jedoch nicht selten auch bald wieder verschwanden. Wegen dieser Dichotomie sollte man bei kulturpolitischen Entschlüssen keine einheitlichen, d.h. für alle Arten von Publikationen gleichermaßen geltenden Kriterien anwenden. Die Ergebnisse zur Auswertung des wissenschaftlich-kommunikativen Charakters nach der hiesigen Methode stimmt überein mit Angaben, die in internationalen sekundären Informationsdiensten über kroatische Publikationen vorliegen. Dieser Anschluss an das "Kapillarsystem" des internationalen wissenschaftlichen Informationsaustauschs hat eine spürbare "Sichtbarkeit" (Präsenz) kroatischer Zeitschriften zur Folge, obwohl sie in der Regel nicht vom Institut für wissenschaftliche Informationen aus Philadelphia erfasst werden.