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Inorganica Chimica Acta

The portrait of a journal as reflected in its publications, references and citations: *Inorganica Chimica Acta*, 1990–1994

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Abstract

Scientometric techniques have been used to help sketch a portrait of the journal *Inorganica Chimica Acta* during the period 1990–1994. An attempt is made not only to reveal some of the so far hidden features of the journal but also to give some hints on how to improve its visibility and prestige in the future.

1. Introduction

According to *Webster's New World Dictionary* a **portrait** is "3. a description, dramatic portrayal, etc. of a person." What 'etc.' might mean in this case is open to discussion, but there is no apparent reason to exclude any literary (cf. "*The Portrait of the Artist as a Young Dog*") or numerary forms (e.g., a clinical report) portraying the characteristic features of somebody, or even something. Scientific journals have been reported to exhibit particular analogies to human populations [1]. It is even claimed that the demography of journals "reveals a more complicated and colourful picture than that of humans." It seems thus justified to believe that there is a huge variety of ways to portray a scientific journal; different pictures take shape from the editor's fatherly memories, from the publisher's definitely positive advertising leaflet, or from the critical evaluation in other scholarly journals. I would hesitate to consider any of these views more objective, let alone more relevant, than the others; I would rather regard them as images of the same object in different mirrors.

A peculiar aspect of portraying a journal is through the mirror of the science literature itself. Statistics on publications, references, citations and other bibliographical items — whether called scientometrics, bibliometrics or by any other name — has lately become a standard basis of classifying, mapping and assessing journals. A milestone paper on this topic was published almost 25 years ago [2]; skepticism regarding the reliability of such a kind of mirror is almost of the same age [3]. When compared with conclusions drawn from other, more 'conservative' methods, results of scientometric analyses usually fall into one of two categories. Either they coincide — in this case scientometrics is generally considered superfluous and, therefore, discarded — or they contradict — in this case scientometrics is generally considered irrelevant and, therefore, discarded. Nevertheless, there is still a devoted group (including the author), who believe that some non-trivial and yet relevant conclusions might sometimes be drawn from such statistical reasoning, and that the mirror of scientometrics is worth a glance even if not for a privileged but just for a different view.

In the present study, scientometric techniques have been used to help sketch a portrait of the journal *Inorganica Chimica Acta* during the 1990–1994 period. The main data source of the analysis was the *Scientometric Indicators Datafiles* of the ISSRU (Budapest, Hungary) [4] derived from the *Science Citation Index* database of the Institute for Scientific Information (ISI, Philadelphia, PA, USA).

2. Analysis of publications

A total number of 2355 papers published in Volumes 167 (1990) through 227 (1994) of *Inorganica Chimica Acta* and categorized by *Science Citation Index* into the document types of *Articles* (1942 items), *Letters* (216 items), *Notes* (189 items) and *Reviews* (8 items) were taken into account. These types are usually regarded in our Datafiles as *relevant* (*citable*) *items*, while all others (such as biographical items, editorials, corrections) are discarded.

2.1. Where do the publications come from?

Countries of origin can be assigned to papers according to the corporate addresses indicated in the by-line of the papers or given as a footnote. It must be noted that the *Science Citation Index* has a policy of omitting certain addresses (e.g.

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those preceded by the phrase 'on leave from'), but the number of losses from such omissions is statistically negligible. All addresses of all contributing authors are recorded in the database; in our statistics each contributing country is counted exactly once. What counts is, thus, the number of papers to which (any number of) authors from the given country contributed.

A total of 69 countries contributed to *Inorganica Chimica Acta* in the period under study. 10 of them appeared only once; the most productive one, the USA, was present with 635 publications. In Fig. 1, the number of publications from the countries of the world is given in the form of a proportional map, i.e. a map, where the relative position of the countries is attempted to remember their 'natural' (geographical) order, whereas their area represents the number of papers published in *Inorganica Chimica Acta*.

To facilitate the assessment of their relative proportions, countries publishing at least 10 papers during the period under study are ranked in Table 1 by their Specific Activity Index. This indicator is the ratio of the country's share in papers published in *Inorganica Chimica Acta* to the country's share in world total chemistry publications. Countries with an indicator value above one are, in this sense, overrepresented in the journal, while those below one are underrepresented. It seems that the slight underrepresentation of the USA can be balanced only by the overrepresentation of a considerable number of smaller countries, whose relative order is, nevertheless, remarkable. Although five years is too short a period to observe any significant time trends, an attempt has also been made to compare the participation of different countries in the first half (Vols. 167–196) and the second half (Vols. 197–227) of the period. The Mean Annual Percentage Change of the publication share of the countries is also given in Table 1. It is rather reassuring that the shares of all the scientific superpowers (USA, UK, Germany, France, Japan) are definitely growing, while the 'big losers' are the less developed countries (India, Egypt, P.R. China), whose scientific impact acknowledgedly does not always keep up with their ambitions.

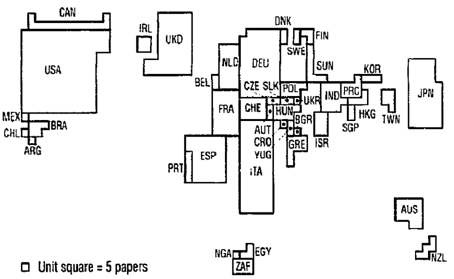

Fig. 1. Proportional map of countries by the number of publications in *Inorganica Chimica Acta* (for an explanation of the country codes see the Appendix).

Table 1
Countries ranked by Specific Activity Index

Rank	Country	Specific activity index	Mean annual % change
1	Hong Kong	4.4	−5
2	New Zealand	4.4	−10
3	Greece	3.8	−14
4	Ireland	3.5	−17
5	Italy	3.4	0
6	South Africa	3.1	−6
7	Portugal	3.0	+15
8	Australia	2.4	+9
9	Brazil	2.4	+21
10	Netherlands	2.0	−17
11	Spain	1.9	+7
12	Israel	1.9	−10
13	Switzerland	1.6	+14
14	Hungary	1.6	0
15	Finland	1.3	+21
16	UK	1.3	+4
17	Germany	1.1	+10
18	Taiwan	1.0	−16
19	USA	0.9	+5
20	Canada	0.8	+27
21	P.R. China	0.8	−32
22	France	0.8	+1
23	Poland	0.8	−10
24	Egypt	0.7	−19
25	Japan	0.7	+3
26	India	0.6	−56
27	South Korea	0.5	+71
28	Belgium	0.5	+3
29	Russia [a]	– [a]	−52

[a] Only aggregate data for the former Soviet Union were available in total chemistry.

2.2. *International coauthorship patterns*

It is a commonplace habit nowadays to speak about the ever increasing internationality of scientific research (see, e.g. [5]). It is no surprise, therefore, that among the 69 countries contributing to *Inorganica Chimica Acta* during the period 1990–1994, there were only 7 (Iran, Iraq, Jordan, Senegambia, Sri Lanka, Turkey, Uganda — with a total of 10 papers) without any international coauthorship in the journal. Another global statistic: 19% of all papers published in

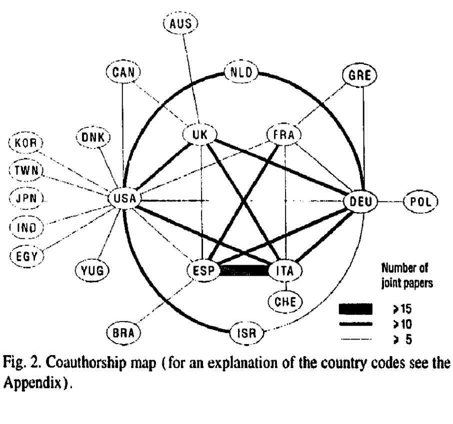

Fig. 2. Coauthorship map (for an explanation of the country codes see the Appendix).

Inorganica Chimica Acta had corporate addresses from more than one country, i.e. were internationally coauthored.

Maybe even more interesting than the mere extent of internationality, is the structure of international cooperation. Fig. 2 presents graphically the main coauthorship links between the contributing countries.

The basic structure of the graph is rather similar to that observed in other coauthorship studies (see, e.g. [5]). The USA and the major European countries form an almost complete core subgraph (the lack of significant collaboration between UK and France is somewhat unexpected); the 'double bondage' of Canada to the USA and UK is symptomatic, the same (and even in a greater strength) for the Netherlands is not unexpected either.

3. Analysis of references

A typical *Inorganica Chimica Acta* paper had about 20–25 items in its list of references (the distribution of references

Table 2
Most cited journal and non-journal items

Journal items Paper	Times cited
Walker, N., Stuart, D.: An empirical method for correcting diffractometer data for absorption effects, *Acta Crystallogr. A.*, Vol. 39, pp. 158–166 (1983) [Univ. London, Queen Mary Coll., Dept. Chem., London E1 4NS, UK]	152
North, A.C.T., Phillips, D.C., Mathew, F.S.: A semi-empirical method of absorption correction, *Acta Crystallogr. A.*, Vol. 24, p. 351 (1968) [Univ. Oxford, Dept. Zool., Lab. Molec. Biophys., Oxford, UK]	94
Cromer, D.T., Mann, J.B.: X-ray scattering factors computed from numerical Hartree-Fock wave functions, *Acta Crystallogr. A.*, Vol. 24, p. 321 (1968) [Univ. Calif., Los Alamos, Sci. Lab., Los Alamos, NM 87544, USA]	69
Nardelli, M.: PARST. A system of FORTRAN routines for calculating molecular structure parameters from results of crystal structure analyses, *Comput. Chem.*, Vol. 7, pp. 95–98 (1983) [Univ. Parma, CNR, Ctr. Studio Strutturist. Diffrattometr., Ist. Chim. Gen. Inorgan., I-43100 Parma, Italy]	60
Cromer, D.T., Liberman, D.: Relativistic calculation of anomalous scattering factors for X-rays, *J. Chem. Phys.*, Vol. 53, p. 1891 (1970) [Univ. Calif., Los Alamos, Sci. Lab., Los Alamos, NM 87544, USA]	54
Geary, W.J.: Use of conductivity measurements in organic solvents for characterization of coordination-compounds, *Coord. Chem. Rev.*, Vol. 7, p. 81 (1971) [Sheffield Polytech., Dept. Chem., Sheffield, Yorks, UK]	54
Stewart, R.F., Davidson, E.R., Simpson, W.T.: Coherent X-ray scattering for hydrogen atom in hydrogen molecule, *J. Chem. Phys.*, Vol. 42, p. 3175 (1965) [Univ. Washington, Chem. Dept., Seattle, WA, USA]	40
Shannon, R.D.: Revised effective ionic-radii and systematic studies of interatomic distances in halides and calcogenes, *Acta Crystallogr. A*, Vol. 32, pp. 751–767 (1976) [Dupont Co. Centr. Res. Dept., Wilmington, DE 19898, USA]	37
Hathaway, B.J., Billing, D.E.: Electronic properties and stereochemistry of mononuclear complexes of copper(II) ion, *Coord. Chem. Rev.*, Vol. 5, p. 143 (1970) [Univ. Essex, Chem. Dept. Colchester, Essex, UK]	34
Ibers, J.A., Hamilton, W.C.: Dispersion corrections + crystal structure requirements, *Acta Crystallogr.*, Vol. 17, p. 781 (1964) [Northwestern Univ., Dept. Chem., Evanston, IL, USA]	27
Bino, A., Cotton, F.A., Fanwick, P.E.: Preparation of tetraammonium octakis(isothiocyanato)dimolybdenum(II) and structural characterization of two crystalline hydrates, *Inorg. Chem.*, Vol. 18, pp. 3558–3562 (1979) [Texas A&M Univ., Dept. Chem., College Station, TX 77843, USA]	25
Juris, A., Balzani, V., Barigelletti, F., Campagna, S., Belser, P., Vonzelewsky, A.: Ru(II) polypyridine complexes. Photophysics, photochemistry, electrochemistry and chemiluminescence, *Coord. Chem. Rev.*, Vol. 84, pp. 85–277 (1988) [Univ. Bologna, Dipartimento Chim. G. Ciamician, I-40126 Bologna, Italy]	25
Tolman, C.A.: Steric effects of phosphorus ligands in organometallic chemistry and homogenous catalysis, *Chem. Rev.*, Vol. 77, pp. 313–348 (1977) [Dupont Co., Wilmington, DE 19898, USA]	24
Lehmann, M.S., Larsen, F.K.: Method for location of peaks in step-scan-measured Bragg-reflections, *Acta Crystallogr. A.*, Vol. 30, pp. 580–584 (1974) [Inst. Laue Langevin, BP 156, 38042 Grenoble, France]	21
Gilmore, C.J.: MITHRIL. An integrated direct-methods computer program, *J. Appl. Crystallogr.*, Vol. 17, pp. 42–46 (1984) [Univ. Glasgow, Dept. Chem., Glasgow G12 8QQ, Scotland]	20
Sigel, H., Martin, R.B.: Coordinating properties of the amide bond. Stability and structure of metal-ion complexes of peptide and related ligands, *Chem. Rev.*, Vol. 82, pp. 385–426 (1982) [Univ. Basel, Inst. Inorgan. Chem., CH-4056 Basel, Switzerland]	20
Ugozzoli, F.: ABSORB. A computer program for correcting observed structure factors from absorption effects in crystal-structure analysis, *Comput. Chem.*, Vol. 11, pp. 109–120 (1987) [Univ. Parma, CNR Ist. Strutturist. Chim., Viale Sci, I-43100 Parma, Italy]	20

Non-journal items **Author**: *Title*	Times cited
Sheldrick G.M.: *SHELX Program* (1976; 1984)	507
– *Int. Tables of X-Ray Crystallogr., Vol. 4* (1974)	424
Nakamoto K.: *Infrared Raman Spectroscopy* (1978; 1986)	104
Lever A.B.P.: *Inorganic Electronic Spectroscopy* (1968; 1984)	87
Pauling L.: *The Nature of the Chemical Bond* (1960)	38
Motherwell W.D.S.: *PLUTO Program* (1974)	38

had a modus of 20, a median of 22, and a mean of 25). Thus, in the period under study about 63 000 references were made to about 45 000 items. Almost 90% of the referenced items were journal articles, but a few non-journal items attracted a significantly higher number of references than any journal article. The list of journal and non-journal items most cited in *Inorganica Chimica Acta* during the 1990–1994 period is given in Table 2. In the case of non-journal items, references to different editions of the same work were totalled.

The age distribution of the references is shown in Fig. 3. The maximum (modus) of the distribution is at 3 years, the median ('reference half-life') at 8 years. This latter value indicates that *Inorganica Chimica Acta* papers largely rely upon more 'mature' literature, but the value is far from unusual in this field. Another indicator characteristic to the age of the references is the *Price index*: the percentage share of references not older than five years. The Price index of *Inorganica Chimica Acta* is 36% — again, far from the 80% of the hottest particle physics or molecular biology journals, but fits to its own subject field.

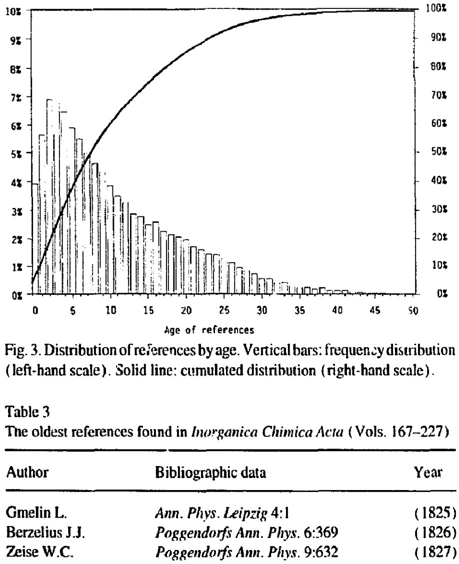

Fig. 3. Distribution of references by age. Vertical bars: frequency distribution (left-hand scale). Solid line: cumulated distribution (right-hand scale).

Table 3
The oldest references found in *Inorganica Chimica Acta* (Vols. 167–227)

Author	Bibliographic data	Year
Gmelin L.	*Ann. Phys. Leipzig* 4:1	(1825)
Berzelius J.J.	*Poggendorfs Ann. Phys.* 6:369	(1826)
Zeise W.C.	*Poggendorfs Ann. Phys.* 9:632	(1827)
Biot J.	*C.R. Hebd. Acad. Sci.* 1:459	(1835)
Marignac C.	*Ann. Chim.* 25:362	(1862)
Marignac C	*C.R. Hebd. Acad. Sci.* 55:888	(1862)
Schiff H.	*Liebigs Ann. Chem.* 131:118	(1864)
Kolbe	*Liebigs Ann. Chem.* 147:71	(1868)
Kekule A.	*Chem. Ber.* 2:332	(1869)
Volhard J.	*J. Prakt. Chem.* 9:217	(1874)
Bombieri G.	*J. Chem. Soc.* :73	(1875)
Mills E.J.	*Proc. Roy. Soc. London* 26:504	(1877)
Bouty M.E.	*J. Phys.* 8:241	(1879)
Doebner O.	*Chem. Ber.* 16:1664	(1883)
Wittenberg M.	*Chem. Ber.* 16:500	(1883)
Kruss G.	*Liebigs Ann. Chem.* 225:29	(1884)
Gibb W.	*J. Am. Chem. Soc.* 7:313	(1885)
Claisen L.	*Chem. Ber.* 20:252	(1887)
Wolff L.	*Chem. Ber.* 20:425	(1887)
Blau F.	*Ber. Dtsch. Chem. Ges.* 27:1077	(1888)

Some of the references found in *Inorganica Chimica Acta* Vols. 167–227 are worth attention just because of their extreme age. References to papers more than a century old are collected in Table 3 in the order of their age.

It is worth noting that these 'citation Methuselahs' were mentioned not in some particular historical studies but in 14 research articles.

4. Analysis of citations

The indicator of primary significance in the citation analysis of journals is the *impact factor*. Introduced and regularly reported in the *Journal Citation Reports* [6], the impact factor "is basically the ratio between citations and citable items. Thus, the 1990 impact factor of journal *X* would be calculated by dividing the number of all the *Science Citation Index* source journals' 1990 citations of articles journal *X* published in 1988 and 1989 by the total number of source items it published in 1988 and 1989." Although several objections have been raised as to the reliability of the impact factor and many amendments have been proposed, its easy availability (for a large set of journals and a long time period) and the fact that it correlates basically well with the general value judgement of the scientific community, made the impact factor uniquely popular and widely used.

Year-by-year changes in the impact factor of established journals are usually small, longer range trends are easy to follow. There might be, however, disturbing facts that make the tracking of impact factors difficult or even impossible.

Table 4
Impact factor values and relative positions of *Inorganica Chimica Acta*, 1975–1994

Year	Impact factor	Relative position
1975	1.603	n/a
1976	n/a	n/a
1977	2.110	n/a
1978	2.243	n/a
1979	n/a	n/a
1980	2.628	n/a
1981	2.172	5/19
1982	1.751	7/19
1983	1.500	13/30
1984	1.486	13/28
1985	1.534	11/28
1986	1.245	14/26
1987	1.376	9/27
1988	1.230	11/27
1989	1.107	15/32
1990	1.196	13/29
1991	1.159	11/30
1992	1.372	11/30
1993	1.343	15/31
1994	1.204	15/32

After certain 'demographic events' in the life of a journal (split, merger, title change, etc.), it may take several years for the journal to regain a stable impact factor value. In the case of *Inorganica Chimica Acta*, the emergence and later merger of the *Articles*, *Letters* and *Bioinorganic Chemistry* series made it impossible to find a continuous series of impact factor values for the 80s in the *Journal Citation Reports* volumes. From the detailed publication and citation values one can, however, reconstruct the impact factor values of a fictious 'unified' *Inorganica Chimica Acta* for all years (wherever any data were available at all). They are given in Table 4.

Variation of the impact factor may reflect not only changes in the journal but also some global alteration in the *Science Citation Index* database. Such global changes influence more or less equally all journals, therefore, the relative position of a journal among its 'peers' may usefully supplement the absolute numbers. The relative positions given in Table 4 are the position of *Inorganica Chimica Acta* (the existing or a fictious 'unified' one) in an impact factor based ranking of the journals classified into the subject field Inorganic Chemistry in the given *Journal Citation Reports* volume over the total number of journals classified into this category. 15/32 is, thus, read as 15th among 32 Inorganic Chemistry journals. Both indicators of Table 4 suggest that after a nadir in the late 80s, a consolidation may follow in the 90s to stabilize *Inorganica Chimica Acta*'s position in the midfield of Inorganic Chemistry journals.

Table 5
Inorganica Chimica Acta papers receiving the highest number of 'impactful' citations in the 1990–1994 period

Paper	Citations
Colton, R., Traeger, J.C.: The Application of Electrospray Mass-Spectrometry to Ionic Inorganic and Organometallic Systems, 1992, Vol. 201, pp. 153–155 [La Trobe Univ., Dept. Chem., Bundoora, Vic. 3083, Australia]	24
Reedijk, J.: The Relevance of Hydrogen Bonding in the Mechanism of Action of Platinum Antitumor Compounds, 1992, Vol. 200, pp. 873–881 [Leiden Univ., Gorlaeus Labs., Dept. Chem., POB 9502, 2300 RA Leiden, Netherlands]	20
Blasse, G., Brixner, L.H.: The Intensity of Vibronic Transitions in the Emission Spectrum of the Trivalent Gadolinium Ion, 1990, Vol. 167, pp. 25–31 [State Univ. Utrecht, Debye Res. Inst., POB 80000, 3508 TA Utrecht, Netherlands; Dupont Co., Dept. Cent. Res. & Dev., Exptl. Stn., POB 80356, Wilmington, DE 19880, USA]	14
Denti, G., Campagna, S., Sabatino, L., Serroni, S., Ciano, M., Balzani, V.: A Heptanuclear Ruthenium(II) Polypyridine Complex — Synthesis, Absorption Spectrum, Luminescence, Electrochemical Behavior, 1990, Vol. 176, pp. 175–178 [Univ. Pisa, Ist. Chim. Agr., I-56124 Pisa, Italy; Universita Messina, Dipto. Chim. Inorgan. and Struttura Molec., I-98166 Messina, Italy; Univ. Calabria, Dipto. Chim., I-87036 Rende, Italy; Univ. Bologna, Dipto. Chim. G. Ciamician, I-40126 Bologna, Italy; CNR, Ist. FRAE, I-40126 Bologna, Italy]	14
Miller, S.E., House, D.A.: The Hydrolysis Products of cis-Dichlorodiamineplatinum(II). 3. Hydrolysis Kinetics at Physiological pH, 1990, Vol. 173, pp. 53–60 [Univ. Canterbury, Dept. Chem., Christchurch 1, New Zealand]	14
Bertini, I., Capozzi, F., Luchinat, C., Piccioli, M., Oliver, M.V.: NMR Is a Unique and Necessary Step in the Investigation of Iron Sulfur Proteins – The HIPIP from R-Gelatinosus as an Example, 1992, Vol. 200, pp. 483–491 [Univ. Florence, Dept. Chem., Via G. Capponi 7, I-50121 Florence, Italy; Univ. Bologna, Inst. Agr. Chem., I-40127 Bologna, Italy]	14
Banci, L., Bertini, I., Briganti, F., Scozzafava, A., Oliver, M.V., Luchinat, C.: H-1 Noe Studies of Oxidized High-Potential Iron Sulfur Protein-II from Ectothiorhodospira Halophila, 1991, Vol. 180, pp. 171–175 [Univ. Florence, Dept. Chem., Via Gino Capponi 7, I-50121 Florence, Italy; Univ. Bologna, Inst. Agr. Chem., I-40126 Bologna, Italy]	13
Guillou, O., Kahn, O., Oushoorn, R.L.: One-Dimensional and Two-Dimensional Rare-Earth Copper Molecular Materials, 1992, Vol. 200, pp. 119–131 [Lab. Chim. Inorgan., CNRS, URA 420, F-91405 Orsay, France, Univ. Paris 11, Phys. Solide Lab., CNRS, URA 002, F-91405 Orsay, France]	13
Block, E., Kang, H., Oforiokai, G., Zubieta, J.: The Crystal and Molecular Structure of a Tetranuclear Copper Thiolate Cluster, $(Cu(SC_6H_3\text{-}2,6\ (SiMe_3)_2))_4$, 1990, Vol. 167, pp. 147–148 [SUNY Albany, Dept. Chem., Albany, NY 12222, USA]	12
Drew, M.G.B., Nicholson, D.G., Sylte, I., Vasudevan, A.: Stereochemical Activity of Lone Pairs — The Crystal and Molecular Structure of a Complex of 18-Crown-6 (1,4,7,10,13,16-Hexaoxacyclooctadecane) with Bismuth(III) Chloride, 1990, Vol. 171, pp. 11–15 [Univ. Reading, Dept. Chem., Reading RG6 2AD, Berks, UK; Univ. Trondheim, Dept. Chem., AVH, N-7055 Dragvoll, Norway]	12
Fedin, V.P., Sokolov, M.N., Mironov, Y.V., Kolesov, B.A., Tkachev, S.V., Fedorov, V.Y.: Triangular Thiocomplexes of Molybdenum — Reactions with Halogens, Hydrohalogen Acids and Phosphines, 1990, Vol. 167, pp. 39–45 [Novosibirsk Inorgan. Chem. Inst., Prospekt Lavrentyeva 3, Novosibirsk 630090, USSR]	12
Rogers, R.D., Bond, A.H.: Crown-Ether Complexes of Lead(II) Nitrate – Crystal Structures of the 12-Crown-4, 15-Crown-5, Benzo-15-Crown-5 and 18-Crown-6 Complexes, 1992, Vol. 192, pp. 163–171 [No. Illinois Univ., Dept. Chem., De Kalb, IL 60115, USA]	12
Inorganica Chimica Acta papers receiving the highest total number of citations during the 1990–1994 period	
Halpern, J.: Activation of carbon–hydrogen bonds by metal complexes. Mechanistic, kinetic and thermodynamic considerations, Vol. 100, pp. 41–48 (1985) [Univ. Chicago, Dept. Chem., Chicago, IL 60637, USA]	73
Kontoghiorges, G.J., Sheppard, L.: Simple synthesis of the potent iron chelators 1-alkyl-3-hydroxy-2-methyl-pyrid-4-ones Vol. 136, pp. L11–L12 (1987) [Royal Free Hosp., Sch. Med. Dept. Haematol., London NW3 2QG, UK]	57
McDonald, J.W., Friesen, G.D., Rosenhein, L.D., Newton, W.E.: Syntheses and characterization of ammonium and tetraalkylammonium thiomolybdates and thiotungstates, Vol. 72, pp. 205–210 (1983) [Charles F. Kattering Res. Lab., 150 E.S. Coll. St. Yellow Springs, OH 45387, USA]	54

4.1. *The 'receivers' of impact factor*

By the definition given above, citations received in the two years after the publication of a paper are what count in determining the impact factor. In what follows, such citations will be called 'impactful' citations, not as if they would be by any means more valuable than citations received in the year of publication or three or more years later (in fact, in some sense, these can be considered even more meritorious), but merely in the technical sense as these are the citations that factually determine the impact factor of the journal. Since our present study covers the years 1990–1994 (both as far as publications and citations are concerned), our 'impactful citation' database consists of *Inorganica Chimica Acta* papers published in 1990–1991 and cited in 1992, 1991–1992 papers cited in 1993, and 1992–1993 papers cited in 1994. In this database, 1325 papers received a total of 3629 citations; 30% of the papers remained uncited within two years after publication — this is a surprisingly low value given the fact that more than 60% of the journal literature remains uncited forever. On the other hand, there were in *Inorganica Chimica Acta* no outstandingly highly cited papers, either. The 12 papers receiving 12 or more 'impactful' citations are given in Table 5.

Although it does not relate to the impact factor directly, the data in Table 5 inevitably raise the question: which *Inorganica Chimica Acta* papers were the most cited in the 1990–1994 period irrespective of their publication date? The answer is given in Table 5(a).

The country distribution of *Inorganica Chimica Acta* papers by the number of 'impactful' citations received in the period under study is represented in the form of a proportional map in Fig. 4. Comparing this map with that in Fig. 1, the similarities and differences between publication *activity* and citation *attractivity* can be judged.

A more direct measure of relative citation impact of a country is the *Relative Citation Rate*. This indicator gauges the *actual* number of citations received by each paper to the *expected* number of citations, i.e. to the average citation rate of the publishing issue of the journal (in effect, to the impact factor). To put it very simply, countries with *Relative Citation Rate* values higher then 1 contribute to the impact factor above par, while those with *Relative Citation Rate* < 1 contribute under par. Countries publishing at least 10 papers in the 1990–1994 period are ranked by their *Relative Citation Rate* values in Table 6. The result is somewhat surprising and makes one wonder whether the difference is in the standards of the submitted manuscripts or in a kind of 'permselectivity' of the refereeing system.

Table 6
Countries ranked by Relative Citation Rate

Rank	Country	*RCR*
1	Russia	1.61
2	Greece	1.49
3	Netherlands	1.46
4	Italy	1.12
5	Israel	1.09
6	Australia	1.09
7	Switzerland	1.06
8	Germany	1.05
9	Portugal	1.04
10	France	1.03
11	New Zealand	1.02
12	Brazil	1.01
13	Spain	1.01
14	South Korea	1.00
15	Hong Kong	0.99
16	USA	0.99
17	Japan	0.92
18	Canada	0.90
19	P.R. China	0.89
20	UK	0.88
21	Hungary	0.84
22	Egypt	0.82
23	Taiwan	0.78
24	India	0.76
25	Poland	0.74
26	Finland	0.73
27	South Africa	0.72
28	Belgium	0.64
29	Ireland	0.58

4.2. *Where are the 'impactful' citations coming from?*

5204 references in 3917 papers published in 291 journals contributed to the 1990–1994 impact factors of *Inorganica*

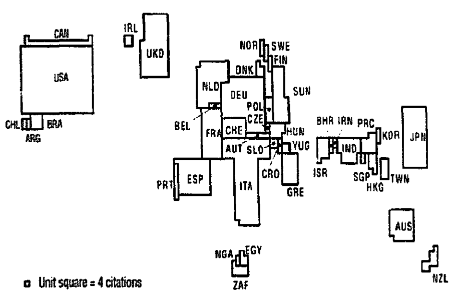

Fig. 4. Proportional map by the number of citations to *Inorganica Chimica Acta* papers (for an explanation of the country codes see the Appendix).

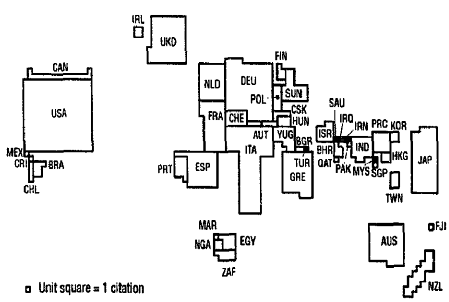

Fig. 5. Proportional map by the number of publications citing *Inorganica Chimica Acta* papers (for an explanation of the country codes see the Appendix).

Table 7
Journals with the highest contribution to *Inorganica Chimica Acta*'s impact factor in the period 1990–1994

Journal	No. of papers citing *Inorganica Chimica Acta*	No. of references to *Inorganica Chimica Acta*
Inorganica Chimica Acta	653	943
Inorganic Chemistry	573	713
Journal of the Chemical Society — Dalton Transactions	299	387
Polyhedron	252	332
Journal of Organometallic Chemistry	189	340
Journal of the American Chemical Society	150	183
Organometallics	138	147
Journal of the Chemical Society — Chemical Communications	86	93
Coordination Chemistry Reviews	81	247
Acta Crystallographica Section C — Crystal Structure Communications	68	75
Journal of Coordination Chemistry	63	74
Transition Metal Chemistry	61	92

Chimica Acta. About 50% of the citations came from 5 journals; 12 journals (see Table 7) are responsible for the 70% of the 'impactful' citations received by *Inorganica Chimica Acta* during the period under study. Detailed annual journal-to-journal citation data can be found in the *Journal Citation Reports* volumes [6] of the *Science Citation Index*.

No information whatsoever can be found in the *Journal Citation Reports* on the national origin of the citations yielding the impact factor. Just like in the case of source publications, papers citing *Inorganica Chimica Acta* have also been assigned to countries according to the corporate address of their authors. The resulting proportional map is given in Fig. 5.

Table 8
Countries ranked by citing/cited ratio

Rank	Country	Citing/cited ratio
1	Canada	1.55
2	P.R. China	1.50
3	Belgium	1.46
4	India	1.31
5	Hungary	1.26
6	Finland	1.25
7	Greece	1.19
8	Portugal	1.16
9	Poland	1.15
10	Switzerland	1.14
11	Brazil	1.11
12	USA	1.11
13	South Korea	1.06
14	UK	1.05
15	Italy	1.03
16	South Africa	1.02
17	Spain	1.01
18	Egypt	0.97
19	Germany	0.92
20	Russia	0.91
21	Japan	0.89
22	Australia	0.89
23	New Zealand	0.82
24	France	0.75
25	Ireland	0.72
26	Hong Kong	0.62
27	Taiwan	0.62
28	Netherlands	0.59
29	Israel	0.49

A particular balance can be drawn by comparing the percentage share of a country in citations as *citing* country (see Fig. 5) with its percentage share in citations as *cited* country (see Fig. 4). The ratio of these two percentages (the citing/cited ratio) is given in Table 8. The indicator and the ranking from it cannot be readily interpreted. As a first approximation, it can be said that countries at the top of the list use *Inorganica Chimica Acta* mainly as an information source rather than an effective publication channel, while those at the end of the list just to the contrary. Scientists from the former group of countries may be encouraged in the future to contribute to the journal, while those in the latter group may be encouraged to subscribe to it.

5. Conclusions

What are the main features of the portrait of *Inorganica Chimica Acta* seen in the mirror of scientometrics? In the author's opinion, the picture shows a fairly balanced, 'golden mean' journal of its subject field, free from any extremities. The major geographical areas and even the single countries are more or less proportionally represented; the home country (Italy) is somewhat overrepresented but not superabundant. The age distribution of references indicates a kind of sedateness: flamingly hot topics typically do not appear in the journal. This might be one reason for the particular citation characteristics of the journal: only a laudably low fraction of the papers remains uncited, but there are only a very few really highly cited papers ('citation classics') as well.

The tendencies in the 1990–1994 period are generally reassuring: the national distribution of publications is fundamentally stable and evolves in a healthy direction, the impact factor appears to have passed through its nadir and even a few relatively higher cited paper have also been published in the second half of the period.

Scientometrics is primarily of a descriptive nature; its predictive aspects are still far from being exploited. We can only hope that this scientometric portrait not only reveals some so far hidden features of the journal but also gives some hints on how to improve its visibility and prestige in the future.

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Appendix A

Country codes and full country names (explanation for Figs. 1, 2, 4 and 5)

ARG	Argentina	ISR	Israel
AUS	Australia	ITA	Italy
AUT	Austria	JPN	Japan
BEL	Belgium	KOR	South Korea
BGR	Bulgaria	MAR	Morocco
BHR	Bahrein	MEX	Mexico
BRA	Brazil	MYS	Malaysia
CAN	Canada	NGA	Nigeria
CHE	Switzerland	NLD	Netherlands
CHL	Chile	NOR	Norway
CRI	Costa Rica	NZL	New Zealand
CRO	Croatia	PAK	Pakistan
CSK	Czechoslovakia	POL	Poland
CZE	Czech Republic	PRC	P.R. China
DEU	Germany	PRT	Portugal
DNK	Denmark	QAT	Qatar
EGY	Egypt	SAU	Saudi Arabia
ESP	Spain	SGP	Singapore
FIN	Finland	SLK	Slovakia
FJI	Fiji	SLO	Slovenia
FRA	France	SUN	USSR
GRE	Greece	SWE	Sweden
HGK	Hong Kong	TWN	Taiwan
HUN	Hungary	UKD	UK
IND	India	UKR	Ukraine
IRL	Ireland	USA	USA
IRN	Iran	YUG	Yugoslavia
IRQ	Iraq	ZAF	South Africa

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