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"Current Comments"

Journal Citation Studies. 24. Japanese Journals--What They Cite and What Cites Them

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Now that I may have alienated half the French and Soviet scientific communities,[1,2] (don't ask me which halves), let's consider the Japanese literature.

If I have allowed myself to be critical of our Soviet colleagues for persisting in publishing in Russian, what am I to say about the amount of scientific and technical material published in Japanese? Fortunately, a good part of the Japanese scientific output is published in English, and I believe it is growing.

In 1974, 79 (3.2%) of the 2443 journals covered by the *Science Citation Index®* (*SCI®*) were published in Japan. Of these, very few were published wholly in Japanese. Almost all of them--in English or Japanese--contained English summaries.

We cover the *Doklady* of the Soviet Academy of Sciences in the original Russian. But there is really no comparable multidisciplinary Japanese journal. The *Proceedings of the Japan Academy* is a small journal, published in English. However, much of the significant Japanese-language material is not available, like the Russian, in cover-to-cover translation. This means we must deal with journals like *Yakugaku Zasshi* (*Journal of the Pharmaceutical Society of Japan*), *Kogyo Kagaku Zasshi* (*Journal of the Chemical Society of Japan, Industrial Chemistry*) and *Nippon Kagaku Kaishi* (*Japanese Chemical Society Journal*) in the original.

Although ISI® 's chemical indexing staff can handle Japanese chemical reports, we long ago decided that the task of transcribing Japanese-language citations into roman was too formidable. Dealing with Japanese names alone is a bibliographer's nightmare. Long ago we tried to get the journals to help us, but they showed no interest.

As a consequence, we must ignore citations written in Japanese. Remarkably, in spite of this, the Japanese journals we do process contain the average number of references per article that one would expect. How many Japanese citations we omit, we don't know; but it must vary considerably from journal to journal. Therefore, to examine the data in Figures 1 and 2 realistically, you must keep these facts in mind.

The 79 journals in our study pub-

lished 10,930 articles, an average of 138 per journal per year. This was 2.7% of the 401,000 items we processed in 1974. And these articles produced 137,865 references, about 2.6% of the 5,230,000 we processed. This 2.6% is a key number in reviewing the data in the figures.

Figure 1 on page 6 is a list of the fifty journals most frequently *cited by* the Japanese journals. Figure 2 on page 7 is a list of the fifty journals that most frequently cited them. Each list shows for each journal the total citations it received or made, the number of citations made by or to the Japanese journals, the number of self-citations, and percentages that relate these three figures to each other. The last column in each list gives the journal's impact factor--the average number of 1974 citations of articles published by the journal in 1972 and 1973.[3]

As in so many other studies of this type--no matter what the disciplinary, geographic, chronological criteria determining the makeup of the group studied--the law of concentration seems to hold true.[4] Of the approximately 9600 publications cited by the Japanese group, less than 1%--the fifty journals listed in Figure 1--accounted for 42% of the total citations (47,234/112,478). Likewise, the Japanese journals were cited by 1576 different *SCI* journals, but the fifty journals in Figure 2 accounted for 43% of the total citations received by the Japanese journals (18,702/43,483).

If we expect a Japanese journal to perform as a truly international journal--an ideal rarely achieved by national journals and few multinational journals--the percentage in column D of Figure 1 will approximate the 2.6% mentioned above. That is the portion of all references contributed to the international pool by the 79 Japanese journals. Thus, in Figure 1 we find that Japanese references accounted for 5.2% of citations of the *Journal of the American Chemical Society*. The Japanese journals referred to *JACS*, therefore, more often than the average journal. This might not be true of the average chemical journal.

Similarly in Figure 2, column D shows the percentage of citations of the Japanese group by journals that cited it most. Since the 79 Japanese journals produced 2.7% of source items processed in 1974, the percentages in column D of Figure 2 should approximate 2.7%. Thus, in Figure 2 we see that *Bulletin of the Chemical Society of Japan* produced 12204 references in 1974, and that 1710 of them (14%) cited the Japanese group. There is perhaps nothing surprising there. We also see, however, that *JACS* did not, as it were, return the compliment of its high citation by the Japanese. Of its 51763 references in 1974, only 0.8% cited the 79 Japanese journals. About the only non-Japanese journal that cited Japanese resarch in expected proportion seems to be *Phytochemistry*. All the high citers on the list of Figure 2 are Japanese journals.

As noted above, we shouldn't forget the effect of omitted Japanese-language citations. For example, at first glance *Japan Analyst* seems to cite the Japanese literature in just about the right proportion, 2.9%. However, since we can usually expect a self-citing rate of from 20 to 40% in the case of such a well-established

Figure 1. Journals that were Cited by Japanese Journals.

A = total citations by all journals. B = total citations by Japanese journals. C = self-citations. D = B/A ('Japanese citations' in terms of total citations). E = C/A (self-citations in terms of total citations, the self-cited rate). F = C/B (self-citations in terms of 'Japanese citations'). G = Impact factor. The abbreviated titles of Japanese journals are italicized.

Journal	A	B	C	D	E	F	G
1. J. Amer. Chem. Soc	98995	5115	— —	5.2	— —	— —	4.38
2. J. Biol. Chem.	81354	3192	— —	3.9	— —	— —	5.84
3. *Bull. Chem. Soc. Japan*	7956	2375	1586	29.9	17.5	58.4	0.93
4. J. Chem. Physics	62040	1764	— —	2.8	— —	— —	2.91
5. Biochim. Biophys. Acta	51487	1720	— —	3.3	— —	— —	3.11
6. *Chem. Pharmaceut. Bull.*	3477	1617	1076	46.5	30.9	66.5	0.93
7. Analyt. Chemistry	18190	1515	— —	8.3	— —	— —	3.29
8. *J. Phys. Soc. Japan*	7607	1500	1239	19.7	16.3	82.6	1.13
9. *J. Biochemistry Japan*	4765	1361	874	28.6	18.3	64.2	1.71
10. Tetrahedron Letters	16478	1343	— —	8.2	— —	— —	1.77
11. J. Organic Chem.	20539	1308	— —	6.4	— —	— —	1.49
12. *Progr. Theoret. Phys.*	3860	1301	1271	33.7	32.9	97.7	1.41
13. Physical Review	40815	1281	— —	3.1	— —	— —	— —
14. J. Chem. Soc. (London)	14604	1209	— —	8.3	— —	— —	— —
15. *Agric. Biol. Chem.*	2522	1171	796	46.4	31.6	68.0	0.96
16. Nature	59206	1137	— —	1.9	— —	— —	3.63
17. Biochem. J.	31563	1071	— —	3.4	— —	— —	3.62
18. Phys. Rev. Letters	39229	937	— —	3.2	— —	— —	5.05
19. J. Chromatography	7928	930	— —	11.7	— —	— —	2.17
20. J. Appl. Physics	19277	921	— —	4.8	— —	— —	1.55
21. Biochemistry	27080	890	— —	3.3	— —	— —	4.71
22. Biochem. Biophys. Res. Comm.	23136	828	— —	3.6	— —	— —	3.73
23. Proc. Nat. Acad. Sci. USA	46916	779	— —	1.7	— —	— —	8.98
24. J. Phys. Chemistry	18086	749	— —	4.1	— —	— —	2.03
25. J. Bacteriology	18369	729	— —	4.0	— —	— —	2.72
26. Science	46488	679	— —	1.5	— —	— —	5.25
27. Arch. Biochem. Biophys.	15072	672	— —	4.5	— —	— —	2.95
28. Chem. Berichte	9569	577	— —	6.0	— —	— —	1.46
29. Tetrahedron	8903	574	— —	6.4	— —	— —	1.57
30. Surface Science	4600	552	— —	12.0	— —	— —	3.34
31. Chem. Comm.	8457	525	— —	6.2	— —	— —	— —
32. Analyt. Chim. Acta	— —	523	— —	— —	— —	— —	0.10
33. *J. Antibiotics Tokyo*	1161	479	339	41.3	29.2	70.8	2.04
34. *Japan. J. Appl. Phys.*	1847	475	400	25.7	21.7	84.2	0.66
35. Helv. Chim. Acta	7117	472	— —	6.6	— —	— —	1.64
36. J. Pharmacol. Exp. Ther.	13753	468	— —	3.4	— —	— —	3.57
37. Analyt. Biochem.	10206	457	— —	4.5	— —	— —	2.37
38. Phys. Rev. B.	16094	437	— —	2.7	— —	— —	2.86
39. Proc. Roy. Soc. London A	12211	410	— —	3.4	— —	— —	2.20
40. Proc. Soc. Exp. Biol. Med.	18167	390	— —	2.1	— —	— —	1.46
41. *J. Pharmaceut. Soc. Japan*	1301	388	5	29.8	0.4	1.3	0.35
42. J. Molecular Biol.	24209	387	— —	1.6	— —	— —	7.50
43. *Chemistry Letters*	718	385	145	53.6	20.2	37.7	0.86
44. Angew. Chem. Int. Ed.	10579	384	— —	3.6	— —	— —	4.10
45. J. Inorg. Nucl. Chem.	5761	384	— —	6.7	— —	— —	0.96
46. Amer. J. Physiol.	21519	380	— —	1.8	— —	— —	2.41
47. Acta Chem. Scand.	8627	373	— —	4.3	— —	— —	1.03
48. Inorganic Chem.	14310	373	— —	2.6	— —	— —	2.45
49. Liebigs Ann. Chemie	6171	361	— —	5.8	— —	— —	1.02
50. Physics Letters B	9958	359	— —	3.6	— —	— —	3.42

Figure 2. Journals that Cited Japanese Journals.

A = total citations of other journals. **B** = total citations from journals in the Japanese group. **C** = self-citations. **D** = B/A ('Japanese citations' in terms of total citations). **E** = C/A (self-citations in terms of total citations, the self-citing rate). **F** = C/B (self-citations in terms of 'Japanese citations'). **G** = Impact factor. The abbreviated titles of Japanese journals are italicized.

Journal	A	B	C	D	E	F	G
1. *Bull. Chem. Soc. Japan*	12204	1710	1386	14.0	11.4	81.1	0.93
2. *Chem. Pharmaceut. Bull.*	7163	1682	1076	23.5	15.0	64.0	0.93
3. *J. Biochemistry*	9204	1293	874	14.0	9.5	67.6	1.71
4. *Progr. Theoret. Phys.*	7107	1283	1271	18.1	17.9	99.1	1.41
5. *Agric. Biol. Chem.*	6194	1138	796	18.4	12.9	69.9	0.96
6. Biochim. Biophys. Acta.	53872	596	— —	1.1	— —	— —	3.11
7. *Chemistry Letters*	3502	469	145	13.4	4.1	30.9	0.86
8. *Jap. J. Appl. Phys.*	4816	459	400	9.5	8.3	87.1	0.66
9. *J. Antibiotics Tokyo*	2253	418	339	18.6	15.0	87.1	2.04
10. J. Organic Chem.	23962	395	— —	1.6	— —	— —	1.49
11. J. Amer. Chem. Soc.	51763	394	— —	0.8	— —	— —	4.38
12. Analyt. Chem.	27535	388	— —	1.4	— —	— —	3.29
13. *Japan Analyst*	12695	365	— —	2.9	— —	— —	0.07
14. J. Chem. Soc. Perkin	23011	343	— —	1.5	— —	— —	1.35
15. Tetrahedron Letters	12646	332	— —	2.6	— —	— —	1.77
16. *J. Synth. Org. Chem.*	3900	329	— —	8.4	— —	— —	0.17
17. J. Biol. Chemistry	36942	320	— —	0.9	— —	— —	5.84
18. *J. Ferment. Technol.*	1190	303	154	25.5	12.9	50.8	0.36
19. Physical Review B.	34284	299	— —	0.9	— —	— —	2.86
20. Uspekhi Khimii	14839	281	— —	1.9	— —	— —	1.08
21. J. Chem. Soc. Japan	4194	278	— —	6.6	— —	— —	0.20
22. *Plant and Cell Physiol.*	1852	274	212	14.8	11.4	77.4	1.16
23. *J. Pharmaceut. Soc. Japan*	2449	274	5	11.2	0.2	1.8	0.35
24. Phytochemistry	9347	269	— —	2.9	— —	— —	1.10
25. Tetrahedron	16259	269	— —	1.6	— —	— —	1.57
26. Biochem. Biophys. Res. Comm.	15832	244	— —	1.5	— —	— —	3.73
27. Biochemistry	25071	242	— —	1.0	— —	— —	4.71
28. J. Chem. Physics	43528	218	— —	0.5	— —	— —	2.91
29. J. Pharmaceut. Sci.	9986	217	— —	2.2	— —	— —	1.62
30. *Jap. J. Pharmacology*	2204	217	120	9.8	5.4	55.3	0.66
31. *Gann*	1552	212	136	13.7	8.8	64.2	1.00
32. J. Organometal. Chem.	27075	211	— —	0.8	— —	— —	2.38
33. *J. Phys. Earth*	— —	204	— —	— —	— —	— —	— —
34. *Bull. Jap. Soc. Mech. Eng.*	1623	201	195	12.4	12.0	97.0	0.35
35. *Bull. Jap. Soc. Sci. Fish.*	1456	198	— —	13.6	— —	— —	0.22
36. Physical Review D	18660	197	— —	1.1	— —	— —	2.72
37. FEBS Letters	17840	171	— —	1.0	— —	— —	3.05
38. *Tohoku J. Exp. Med.*	1807	166	124	9.2	6.9	74.7	0.46
39. Eur. J. Biochemistry	18447	163	— —	0.9	— —	— —	3.87
40. *Proc. Japan Acad.*	1530	163	108	10.7	7.1	66.3	0.35
41. *Polymer J. Japan*	1389	159	99	11.4	7.1	62.3	1.30
42. *J. Agr. Chem. Soc. Japan*	982	158	— —	16.1	— —	— —	0.29
43. J. Bacteriology	14219	156	— —	1.1	— —	— —	2.72
44. Arch. Biochem. Biophys.	12573	155	— —	1.2	— —	— —	2.95
45. *Jap. J. Exp. Med.*	1331	155	107	11.6	8.0	69.0	0.78
46. Nuclear Physics A	20623	155	— —	0.8	— —	— —	2.42
47. Inorganic Chem.	16965	152	— —	0.9	— —	— —	2.45
48. Biochem. J.	16318	145	— —	0.9	— —	— —	3.62
49. Cancer Research	14284	144	— —	1.0	— —	— —	3.39
50. J. Inorg. Nucl. Chem.	10465	143	— —	1.4	— —	— —	0.96

Figure 3. Articles from Journals Published in Japan that were Cited More than 150 Times during the Period 1961-1972.

1. 688 **Kubo R.** Statistical-mechanical theory of irreversible process. I. General theory of simple applications to magnetic and conduction problems. *J. Phys. Soc. Japan* 12:570-86, 1957.
2. 465 **Kondo J.** Resistance minimum in dilute magnetic alloys. *Progr. Theoret. Phys.* 32:37-49, 1964.
3. 464 **Kubo R & Tomita K.** A general theory of magnetic resonance absorption. *J. Phys. Soc. Japan* 9:888-919, 1954.
4. 440 **Tanabe Y & Sugano S.** On the absorption spectra of complex ions. I. *J. Phys. Soc. Japan* 9:753-66, 1954.
5. 415 **Okubo S.** Note on unitary symmetry in strong interactions. *Progr. Theoret. Phys.* 27:949-66, 1962.
6. 305 **Hakomori S.** A rapid permethylation of glycolipid, and polysaccharide catalyzed by methylsulfinyl carbamion in dimethyl sulfoxide. *J. Biochem. Tokyo* 55:205-08, 1964.
7. 301 **Ebashi S.** Calcium binding activity of vesicular relaxing factor. *J. Biochem. Tokyo* 50:236-44, 1961.
8. 290 **Tanabe Y & Sugano S.** On the absorption spectra of complex ions. II. *J. Phys. Soc. Japan* 9:766-79, 1954.
9. 232 **Akabori S, Ohno K & Narita K.** On the hydrazinolysis of proteins and peptides; a method for the characterization of carboxyl-terminal amino acids in proteins. *B. Chem. Soc. Japan* 25:214-18, 1952.
10. 225 **Anderson P W.** A mathematical model for the narrowing of spectral lines by exchange or motion. *J. Phys. Soc. Japan* 9:316-39, 1954.
11. 217 **Kasuya T.** The theory of metallic ferro- and antiferromagnetism on Zener's Model. *Progr. Theoret. Phys.* 16:45-57, 1956.
12. 206 **Sugano S & Tanabe Y.** Absorption spectra of Cr^{3+} in Al_2O_3. A. Theoretical studies of the absorption bands and lines. *J. Phys. Soc. Japan* 13:880-910, 1958.
13. 195 **Mori H.** Transport, corrective motion, and Brownian motion. *Progr. Theoret. Phys.* 33:423-55, 1965.
14. 182 **Sakata S.** On a composite model for the new particles. *Progr. Theoret. Phys.* 16:686-88, 1956.
15. 156 **Huijing F & Slater E C.** The use of oligomycin as an inhibitor of oxidative phosphorylation. *J. Biochem. Tokyo* 49:493-501, 1961.

journal, the omission of Japanese-language citations in our processing of *Japan Analyst* (*Bunseki Kagaku* or *Bunseki To Shiyaku*) has had a significant effect.

In considering the column D percentages in Figure 1, the omission is irrelevant. Of considerable interest in this list of journals highly cited by the Japanese group is their relatively high citation of the ACS journals, and biochemical journals particularly. Note also that 8% of all citations of *Analytical Chemistry* were from the Japanese group. This tells us something about their high interest and use of analytic methods. This may reflect the high interest in industrial development. In contrast, *Nature*, *Science*, and *Proceedings of the National Academy of Sciences USA* received less attention from Japanese

scientists, but this may be related to the preponderance of chemistry in Japanese research.

Whereas the *Journal of Biological Chemistry* was the eighth most cited by French journals, it is second on the list in Figure 1. Following it there is a leading Japanese chemical journal published in English.

Of the journals that cite the Japanese group most heavily, the top five are all Japanese. It is significant that on the remainder of this list, a very substantial number are occidental chemical and biochemical journals, beginning with *Biochimica Biophysica Acta, Tetrahedron Letters, Journal of Biological Chemistry*, and so on.

Like our study of French and Russian journals, this study of Japanese journals approaches, but by no means encompasses Japanese research publications. It doesn't take into account papers published by Japanese researchers working in Japan and elsewhere who publish in non-Japanese occidental journals. In subsequent studies we intend to extract from our files material on the basis of language and/or address to get a better grip on national publication and citation patterns.

As in previous studies of this type we've added a list of highly cited articles from the highly cited journals. Figure 3 is a list of fifteen articles from Japanese journals. They were the most frequently cited during the period 1961-1972. Nine were published in the fifties, and six in the first half of the sixties. The lack of any paper published after 1965 suggests to me that Japanese authors, especially life scientists, now prefer to publish their best work in international or other non-Japanese journals.

Four journals account for all the articles: *Bull. Chem. Soc. Japan* (1), *J. Biochemistry* (3), *J. Phys. Soc. Japan* (6), *Progr. Theoret. Phys.* (5). Not all the authors are Japanese, nor was all the work reported done in Japan. In a future study, covering the period 1961-1974, we hope to be able to select articles on the basis of institution and location, without regard to country of journal publication. I think we will then find the list of highly cited 'Japanese' articles will be considerably longer.

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