## """""""current comments"

Citation Analysis of Pathology Journals Reveals Need for a Journal of Applied Virology!

January 17, 1973

In 1971, I spoke to the American Phytopathological Association on the subject of information retrieval.<sup>1</sup> To "define" phytopathology, I provided data from ISI®'s *Journal Citation Index (JCI)*, which I have mentioned previously.<sup>2</sup> Briefly: the *JCI* displays subject relationships between journals in science and technology by showing how often they have cited and been cited by other journals.<sup>3</sup> Cluster analysis of this type is now of considerable interest to information scientists.

The JCI showed that of all the journals cited by the journal Phytopathology, the second most frequently cited (excluding self-citation) was Virology. None of the phytopathologists present were able to guess that fact. A relationship between the two journals was corroborated by a list of journals from among the 2000 or so covered by the Science Citation Index<sup>®</sup> (SCI<sup>®</sup>) that had cited Phytopathology in 1969. On that list, Virology ranked seventh. (See figures 1 and 2).

I have wondered whether a similar relationship between pathology and virology would hold true for journals devoted to human pathology.

The SCI covers about 20 pathology journals. Of these, the following con-

tained the most references in 1969:

Title	Estimated no. of references in 1969
Acta path. microb.	scand. 6940
Virchows Archiv	5584
Pathologie Biologie	4308
J. Pathology	4044
Amer. J. Pathol.	3716

It is surprising to learn that, with one puzzling exception, pathology journals do not cite virology journals with any significant frequency at all. For example, Figure 3 shows that Virology ranks only 24th among journals cited by Acta path. microb. scand.

The puzzling case of Pathologie Biologie is strikingly different. The list of journals it cites most frequently is shown in Figure 4. As with Phytopathology, among the three journals it cites most frequently, is again Virology. But Pathologie Biologie evidences little if any interest in plant diseases. It seems devoted exclusively to animal pathology. Moreover, Pathologie Biologie is the only one of the leading animal pathology journals that shows this interest in virology.

Taking the same 20 pathology journals covered by the SCI as cited rather

	No. of	1		No. of	
Rank	citations	Title	Rank	citations	Title
1.	3288	Phytopathology (self- citation)	1.	3288	Phytopathology (self- citation)
2.	476	Plant Dis. Reporter	2.	1164	Annu. Rev. Phyto-
3.	320	Virology			pathol.
4.	240	Canad. J. Bot.	3.	184	Trans. Brit. Mycol.
5.	204	Plant Physiol.			Soc.
6.	188	Amer. J. Bot.	4.	168	Canad, J. Bot.
7.	184	Nature	5.	120	Mycologia
8.	164	Ann. Appl. Biol.	6.	112	Mycopathol. Mycol.
9.	164	Annu. Rev. Phyto-			Appl.
		pathol.	7.	76	Virology
10.	148	Phytopathol. Zschr.	8.	72	Ann, Appl. Biol.
11.	144	J. Agric. Res.	9.	68.	Botan. Rev.
12.	120	Science	10.	60	Canad. J. Microbiol.
13.	88	J. Bacteriol.	11.	56	Canad. J. Plant Sci.
14.	88	J. Biol. Chem.	12.	56	Hilgardia
15.	80	Mycologia	13.	56	Theoret. Appl.
16.	76	Agronomy J.			Genetics
17.	76	J. Gen. Microbiol.	14.	48	Amer. Potato J.
18.	72	Trans. Brit. Mycol.	15.	48	Crop Sci.
		Soc.	16.	48	J. Econ. Entomol.
19.	68	Annu. Rev. Plant	17.	40	Science
		Physiol.	18.	36	J. Bacteriol.
20.	60	Austr. J. Biol. Sci.	19.	36	J. Gen. Microbiol.
21.	60	J. Econ. Entomol.	20.	32	J. Stored Prod. Res.
22.	60	Soil Sci.	21.	28	C.R. Acad. Sci. D
23.	56	Crop Sci.	22.	28	IIRB
24.	56	J. Agric. Food Chem.	23.	28	J. Nematol.
25.	52	Ann. Phytopathol. Soc.	24.	28	Nat. Cancer Inst. Monogr.
			25.	28	Radiation Res.
	4788	All Other			
		(731 other titles)		044	All Other
1	1320	Total		2.4.1	(99 other titles)
	-			6852	Total
Figure 1	List of	journals cited by	Figure 2	l. List of j	ournals that cited
Phyt	opatholo	gy.	Phyte	opatholog	у

	Times	;	
Rank	Cited	Title	
1.	416	Acta path. microb.	
		scand. (self-citation)	
2.	240	Nature	
3.	148	J. Exp. Med.	
4.	116	J. Nat. Cancer Inst.	
5.	108	Ann. N.Y. Acad Sci.	
6.	104	Arch. Pathol.	
7.	104	J. Bacteriol.	
8.	96	Amer. J. Pathol.	
9.	96	Ann. Human Genetics	
10.	96	Proc. Soc. Exp. Biol.	
		Med.	
11.	80	Ann. Eugenics	
12.	80	J. Histochem. Cyto-	
		chem.	
13.	80	Lancet	
14.	76	Biochem. J.	
15.	76	J. Biol. Chem.	
16.	72	Circulation	
17.	72	J. Med. Microbiol.	
18.	68	Amer. J. Human	
		Genetics	
19.	64	C.R. Acad. Sci.	
20.	64	Lab. Invest.	
21.	60	Acta genet. med.	
		gemell.	
22.	60	J. Immunol.	
23.	56.	J. Cell Biol.	
24.	52	Virology	
25.	48	Cancer Res.	
	4408	All Other (601 other titles)	
	6940	Total	
Figure Ac	e 3. List ta Path.	of journals cited by Microb. Scand.	F

Figure 3. L	list of journ	als cited by
Acta Pa	th. Microb.	Scand.

Rank	Time: Cited	s Title
1	170	Nature
1.	1/2	I Restorial
2.	134	J. Dacterioi.
J. 1	124	V Irology
т. 5	116	J. Biol Cham
5. 6	116	J. Diol. Chem.
7	02	Cancer Res
8	76	Ann NV Acad Sci
9. 9	72	Riochem Bionhys
).	12	Acta
10.	72	Proc. Soc. Exp. Biol. Med.
11.	64	Biochem. Biophys. Res.
12.	60	Ann. Inst. Pasteur
13.	60	Lancet
14.	60	New Engl. J. Med.
15.	60	Science
16.	56	J. Virology
17.	52	Biochem. J.
18.	52	J. Exp. Med.
19.	52	Presse Med.
20.	44	Arch. Biochem.
		Biophys.
21.	44	Pathol. Biol.
22.	40	Canad. J. Microbiol.
23.	36	Biokhimiya
24.	36	Endocrinology
25.	36	Proc. Nat. Acad. Sci. US
	2464	All Other (400 other titles)
	4308	Total
Figure 4 Patho	4. List o ol. Biol.	f journals cited by

than citing journals, we find a similar situation. The five most cited pathology journals are:

	Estimated Times
Title	Cited
Amer. J. Pathol.	5592
Arch. Pathol.	4432
Naunyn-Schmiedeber	gs Arch.
exp. Pathol. Pharm	iakol. 3044
J. Clin. Pathol.	2576
Brit. J. Exp. Pathol.	2420

Only the Brit. J. Exp. Pathol. is cited significantly by virology journals; the other four are not. As with Pathologie Biologie, Brit. J. Exp. Pathol. evidences little interest in plant disease, being devoted to "causation, diagnosis, and cure of disease in man."

It is apparent that while the study of virology has had its impact in plant disease studies and in molecular biology and biochemistry, it does not yet seem to have a direct impact on the literature of human pathology, as far as citation practice can reveal it. Indeed the impact on cancer research is far more evident. Does this possibly indicate that the field of "applied virology" is yet to be developed? If this conclusion is valid, it is easier to understand why an article such as ter Meulen and Koprowski's recent report on viral factors in multiple sclerosis<sup>4</sup> appeared in a general medical journal rather than in one of the specialty virology journals. Indeed, if there exists a literature of applied virology, then it is probably scattered through the general medical literature.

- 1. Garfield, E. Most frequently cited phytopathology journals. *Phytopathol. News* 6(3):4, 1972.
- ------ ISI's Journal Citation Index data base, a multi-media tool. Current Contents No. 16, 19 April 1972, p. 5-8.
- 3. ----- Citation analysis as a tool in journal evaluation. Science 178:471-479, 1972.
- 4. ter Meulen, V., Koprowski, H. et al. Fusion of cultured multiple-sclerosis brain cells with indicator cells: presence of nucleocapsids and virions and isolation of parainfluenzatype virus. *Lancet* (1972)II:1-5, 1 July 1972.