

Current Comments

Journal Citation Studies. 35. Veterinary Journals: What They Cite and Vice Versa

Number 13

March 29, 1982

There has been a persistent theme in the many journal studies we've published in *Current Contents*[®] (*CC*[®]) over the years. It is one thing to talk about the literature of a field. It is quite another to discuss the literature used by researchers in that field. Perhaps the classic example of this was the study of agricultural journals we performed some years ago.¹ We found that agricultural researchers frequently cite the same basic research journals used by other life scientists, in addition to journals in their field. While this is a general phenomenon, it varies in degree from field to field. Some literatures are relatively narrow, while others draw upon many diverse sources. In a recent study of the dentistry literature,² we found the field to be relatively self-contained. Incidentally, in that essay, I inadvertently failed to cite a relevant study of the dentistry literature³ which provided a list of classic papers.

This essay examines the literature of veterinary medicine. Again, we can make a distinction between the literature of the field and the literature of *interest* to researchers in veterinary science. In the case of veterinary research, the difference is less pronounced than in other fields. Before proceeding with our study, however, it's worthwhile to briefly review the roots of modern veterinary medicine.

Most ancient societies practiced veterinary medicine, some more compe-

tently than others. During the Vedic period in India (1800-1200 BC), for example, hundreds of veterinary hospitals were established, and careful reports were made on animal diseases. In ancient Egypt, on the other hand, the practice of veterinary medicine was riddled with superstition and magic. Although the ancient Greeks devoted much attention to the art of healing humans, they and their Roman heirs left little veterinary knowledge behind for later civilizations.⁴

The first "modern" school of veterinary medicine was established in 1761 at Lyon, France, by Claude Bourgelat. By 1825, there were 30 such schools in 12 countries. But in the US, it wasn't until 1854 that the first school to actually produce graduates, the Boston Veterinary Institute, was established.⁴ The American Veterinary Medical Association was formed in 1863, and established its journal in 1877.

The 76 core journals examined in this study are listed in Table 1, along with the year that each began publication. In 1981, we added the *Bulletin of Equine Research* to the core, but citation data for that journal are not included in this study. The oldest journal in the core is *Annales de Medecine Veterinaire*, established in 1849. As always in our journal studies, we will consider the veterinary journals covered in *Science Citation Index*[®] (*SCI*[®]) as if they comprised a single "Macro Veterinary Journal." In

Table 1: Veterinary core journals indexed by *Science Citation Index*[®], including the year that each began publication.

Acta Veterinaria Academiae Scientiarum Hungaricae—1951	Research in Veterinary Science—1960
Acta Veterinaria Scandinavica—1959	Revue de Medecine Veterinaire—1850
Acta Veterinaria Beograd—1951	Schweizer Archiv fur Tierheilkunde—1859
Advances in Veterinary Science & Comparative Medicine—1953	Southwestern Veterinarian—1948
American Journal of Veterinary Research—1940	Theriogenology—1974
Animal Blood Groups and Biochemical Genetics—1970	Tierarztliche Umschau—1946
Animal Production—1959	Tijdschrift voor Diergeneeskunde—1862
Animal Reproduction Science—1977	Tropical Animal Health and Production—1969
Annales de Medecine Veterinaire—1849	Veterinari Medicina—1928
Annales de Recherches Veterinaires—1970	Veterinary and Human Toxicology—1958
Archivio Veterinario Italiano—1950	Veterinary Clinics of North America—Large Animal Practice—1979
Arquivos da Escola de Veterinaria da Universidade Federal de Minas Gerias—1943	Veterinary Clinics of North America—Small Animal Practice—1979
Australian Veterinary Journal—1925	Veterinary Immunology and Immunopathology—1979
Australian Veterinary Practitioner—1971	Veterinary Medicine & Small Animal Clinician—1905
Avian Diseases—1957	Veterinary Microbiology—1976
Avian Pathology—1972	Veterinary Parasitology—1975
Berliner und Munchener Tierarztliche Wochenschrift—1888	Veterinary Pathology—1964
Biologizace A Chemizace Zivocisne Vyroby Veterinaria—1964	Veterinary Quarterly—1979
British Veterinary Journal—1875	Veterinary Record—1888
Canadian Journal of Comparative Medicine—1937	Veterinary Research Communications—1977
Canadian Veterinary Journal—1960	Vlaams Diergeneeskundig Tijdschrift—1932
Cornell Veterinarian—1911	Zeitschrift fur Tierphysiologie, Tierernahrung und Futtermittelkunde—1938
Deutsche Tierarztliche Wochenschrift—1893	Zeitschrift fur Versuchstierkunde—1961
Fortschritte der Veterinarmedizin—1958	Zentralblatt fur Veterinarmedizin Reihe A—1953
Indian Journal of Animal Sciences—1931	Zentralblatt fur Veterinarmedizin Reihe B—1963
Indian Veterinary Journal—1924	Zentralblatt fur Veterinarmedizin Reihe C—Anatomia, Histologia, Embryologia—1972
Irish Veterinary Journal—1980	Zuchthygiene—1966
Japanese Journal of Veterinary Science—1939	
Journal of Animal Science—1942	
Journal of Comparative Pathology—1888	
Journal of Equine Medicine and Surgery—1977	
Journal of Medical Primatology—1972	
Journal of Small Animal Practice—1960	
Journal of the American Animal Hospital Association—1965	
Journal of the American Veterinary Medical Association—1877	
Journal of Wildlife Diseases—1965	
Journal of Zoo Animal Medicine—1971	
Kleintier-Praxis—1956	
Laboratory Animal Science—1950	
Laboratory Animals—1967	
Magyar Allatorvosok Lapja—1946	
Modern Veterinary Practice—1920	
Monatshefte fur Veterinarmedizin—1946	
National Institute of Animal Health Quarterly—1961	
New Zealand Veterinary Journal—1952	
Nordisk Veterinaer Medicin—1949	
Philippine Journal of Veterinary Medicine—1962	
Praktische Tierarzt—1921	
Refuah Veterinarith—1943	

this way, we can determine what journals are frequently *cited* by the core veterinary journals, and what journals frequently *cite* the core. Data for this study are taken from the 1980 *Journal Citation Reports*[®] (*JCR*[™]) volume of *SCI*.

Of course, Table 1 does not include every veterinary journal published. But I can say with confidence that the list includes all of the significant journals in the field, and more. I have explained in previous essays how *ISI*[®] selects journals for coverage.⁵ We rely upon citation data to identify those journals that have significant impact. In the case of a newer journal, we rely upon the subjective judgments of our editorial advisory board, as well as recommendations from scientists working in the field. It is pertinent to point out that there are 20 additional relevant journals covered in *CC/Agriculture, Biology & Environ-*

mental Sciences that are not included in *SCI*. They are listed in Table 2. However, these journals are included in our online data base, *SCISEARCH*[®], and in our *Automatic Subject Citation Alert* (*ASCA*[®]) service. We just do not process the references they cite.

Together, the core veterinary journals published 6,346 articles in 1980. This represents about 1.8 percent of the 347,707 journal articles included in the *SCI* data base in 1980. *SCI* included 520,000 source items in 1980, but *JCR* eliminates such items as abstracts, editorials, short letters, etc. The journal articles involved included about 7,000,000 references in 1980. Of these, 97,218, or 1.4 percent, were references appearing in the core veterinary journals, an average of 15.3 references per article. This is somewhat lower than other categories in the life sciences. Biochemistry articles, for example, average 23.4 references.⁶

Articles published in *JCR* journals received more than 5,300,000 citations in 1980. Of these, nearly 44,000, or .8 percent, were citations to articles published in the veterinary core. The five most-cited veterinary journals accounted for 51 percent of those citations. These journals are: *Journal of Animal Science*, *American Journal of Veterinary Research*, *Veterinary Record*, *Journal of the American Veterinary Medical Association*, and *Research in Veterinary Science*. These same five journals published 25 percent of all papers in the veterinary core in 1980. This dramatically illustrates the concentration effect I've reported on many times before.⁷

Table 3 lists the journals most frequently cited by the veterinary core journals. They are ranked according to the number of citations received from core journals in 1980. The table shows how often each journal was cited by all journals, how often each journal was

Table 2: Veterinary journals not covered by *Science Citation Index*[®] but included in *Current Contents*[®]/*Agriculture, Biology & Environmental Sciences* and *ASCA*[®].

Acta Veterinaria Brno
 Archiv fur Experimentelle Veterinarmedizin
 Beitrage zur Tropischen Landwirtschaft und Veterinarmedizin
 Bulletin de l'Academie Veterinaire de France
 Bulletin of the Veterinary Institute in Pulawy
 Canine Practice
 Cheiron
 Equine Veterinary Journal
 Feline Practice
 International Journal of Zoonoses
 Japanese Journal of Veterinary Research
 Journal of the South African Veterinary Association
 Onderstepoort Journal of Veterinary Research
 Pesquisa Veterinaria Brasileira
 Proceedings of the Annual Convention of the American Association of Equine Practitioners
 Recueil de Medecine Veterinaire d'Alfort
 Revue d'Elevage et de Medecine Veterinaire des Pays Tropicaux
 Veterinary Radiology
 Veterinary Surgery
 Zwierzeta Laboratoryjne

cited by the veterinary core, self-citation data for each journal, impact factors, immediacy indexes, and the number of articles each journal published in 1980. The impact factor is a measure of how often the average article in a given journal is cited. The immediacy index reflects how quickly articles in a journal become cited.

The most-cited core veterinary journal is *Journal of Animal Science*. About 32 percent of its 6,801 citations were self-citations. While this is high for veterinary journals, it is understandable because of its key position in the field. Only two other core journals in Table 3 have a self-cited rate of 30 percent or more—*Avian Diseases* with 30 percent, and *Monatshfte fur Veterinarmedizin* with a hefty rate of 63 percent, by far the highest on the list. Whether self-citation is an indicator of provinciality or greater specialization can only be

Table 3: The 50 journals most-cited by veterinary core journals. An asterisk indicates a core member. A=total citations received from veterinary journals. B=total citations received from all journals. C=self-citations. D=percent of total citations which are veterinary citations (A/B). E=percent of total citations which are self-citations (self-cited rate, C/B). F=percent of veterinary citations which are self-citations (C/A). G=impact factor. H=immediacy index. I=1980 source items.

	A	B	C	D	E	F	G	H	I
*J. Anim. Sci.	3555	6801	2152	52.3	31.6	60.5	1.123	.215	339
*Vet. Rec.	3219	4077	725	79.0	17.8	22.5	1.216	.616	320
*J. Amer. Vet. Med. Assn.	3158	3925	495	80.5	12.6	15.7	.903	.198	348
*Amer. J. Vet. Res.	3017	4300	895	70.2	20.8	29.7	1.014	.256	438
*Aust. Vet. J.	1249	1614	378	77.4	23.4	30.3	1.586	.274	113
J. Dairy Sci.	1099	5118	—	21.5	—	—	1.075	.187	246
*Res. Vet. Sci.	1089	1766	212	61.7	12.0	19.5	1.003	.280	164
*Avian Dis.	852	1192	361	71.5	30.3	42.4	1.122	.211	114
*Brit. Vet. J.	729	1050	85	69.4	8.1	11.7	.774	.195	87
Nature	715	92,968	—	.8	—	—	6.496	1.613	1502
*J. Comp. Pathol.	711	1084	112	65.6	10.3	15.8	1.008	.476	63
J. Reprod. Fert.	710	5542	—	12.8	—	—	1.899	.405	227
Infec. Immunity	585	9864	—	5.9	—	—	2.667	.333	627
*Deut. Tierarztl. Wochenschr.	577	690	105	83.6	15.2	18.2	.478	.105	124
*Cornell Vet.	563	785	18	71.7	2.3	3.2	.815	.108	37
*Monatsh. Veterinarmed.	559	621	393	90.0	63.3	70.3	.279	.078	219
Poultry Sci.	543	4591	—	11.8	—	—	.907	.201	417
Proc. Soc. Exp. Biol. Med.	541	15,414	—	3.5	—	—	1.350	.144	277
*Berl. Mun. Tierarztl. Wochenschr.	530	644	124	82.3	19.3	23.4	.629	.264	106
*Can. J. Comp. Med.	529	750	75	70.5	10.0	14.2	.927	.460	63
*J. Small Anim. Pract.	519	579	77	89.6	13.3	14.8	.461	.186	59
*Anim. Prod.	514	1127	225	45.6	20.0	43.8	1.000	.250	96
J. Agr. Sci.	506	2461	—	20.6	—	—	.848	.222	180
J. Parasitol.	485	3057	—	15.9	—	—	.665	.196	153
J. Immunol.	472	33,817	—	1.4	—	—	6.417	.976	908
Science	457	62,929	—	.7	—	—	5.708	1.533	1023
J. Nutr.	442	6815	—	6.5	—	—	1.622	.349	298
J. Nat. Cancer Inst.	430	15,085	—	2.9	—	—	3.028	.302	368
J. Infec. Dis.	399	8567	—	4.7	—	—	2.942	.535	226
J. Biol. Chem.	395	113,670	—	.3	—	—	5.712	.926	1942
Endocrinology	390	24,675	—	1.6	—	—	4.704	.662	610
*N.Z. Vet. J.	389	468	124	83.1	26.5	31.9	.681	.404	47
*Vet. Med. Small Anim. Clin.	385	437	31	88.1	7.1	8.1	.170	.076	250
*Acta Vet. Scand.	384	614	111	62.5	18.1	28.9	.696	.431	58
Amer. J. Physiol.	380	26,953	—	1.4	—	—	2.785	.446	876
*Lab. Anim. Sci.	377	881	160	42.8	18.2	42.4	.524	.089	135
*Zbl. Veterinarmed. Reihe B Lancet	371	473	77	75.7	16.3	21.5	.456	.165	91
	349	51,436	—	.7	—	—	8.695	3.287	595
*Nord. Vet. Med.	344	478	69	72.0	11.4	20.1	.524	.089	135
*Theriogenology	339	464	119	71.8	25.6	35.1	1.189	.217	92
Brit. J. Nutr.	330	2600	—	12.7	—	—	1.487	.294	102
*Vet. Pathol.	330	499	67	66.1	13.4	20.3	.658	.217	92
Arch. Exp. Veterinarmed.	318	414	—	74.6	—	—	.229	.056	108
*Can. Vet. J.	315	386	63	81.6	16.3	20.0	.596	.122	74
*Tijdschr. Diergeneesk.	313	399	70	78.4	17.5	22.4	.286	.066	91
J. Endocrinol.	310	7708	—	4.0	—	—	2.616	.376	237
*Tierarztl. Umsch.	304	328	63	91.2	19.2	21.1	.325	.088	102
N. Engl. J. Med.	302	45,790	—	.7	—	—	14.211	2.600	360
*J. Amer. Anim. Hosp. Ass.	300	322	56	93.2	17.4	18.7	.377	.019	104
J. Exp. Med.	298	31,020	—	1.0	—	—	10.657	1.463	313

determined by a careful analysis of the data for each journal.

Journal of Animal Science received 3,555 citations from the veterinary core, more than any other journal. Only *Veterinary Record*, *Journal of the American Veterinary Medical Association*, and *American Journal of Veterinary Research* also received more than 3,000 citations from the veterinary core. *Journal of Animal Science* also ranks highest among core journals in the number of citations it received from outside of the core—3,246, or about 48 percent of its total. The core journal receiving the greatest percentage of its citations from outside the core is *Laboratory Animal Science* with about 57 percent. The figure for *Animal Production* is 54 percent. As Table 3 shows, it's not unusual for veterinary journals to receive more than 70 percent of their citations from other veterinary journals.

The non-veterinary core journal that received the most citations from the veterinary core is *Journal of Dairy Science*. The 1,099 veterinary citations that journal received represent more than 20 percent of its citations from all journals. Other non-veterinary journals that were frequently cited by the core are *Nature*, *Journal of Reproduction and Fertility*, and *Infection and Immunity*.

The core journal with the highest impact factor, 1.59, is the *Australian Veterinary Journal*. *Veterinary Record* had an impact of 1.22 while *Journal of Animal Science* and *Avian Diseases* each had an impact factor of 1.12. The average impact for all *SCI* journals was 1.22 in 1980. We have recently begun to consider whether our impact criteria actually correspond to the peak period for citations in certain fields. In some fields, for example, higher 1980 impact factors might be obtained by using 1977-1978 as the base years, instead of the customary 1978-1979. In our study of the dentistry literature,² we briefly mentioned the ef-

fect of recalculating impact for certain journals. If we apply the new formula to selected veterinary journals, we find that the impact for *Journal of Animal Science* increases to 1.44. *Avian Diseases* would also increase, to 1.23. But *Australian Veterinary Journal* would decrease slightly to 1.46. How to best calculate impact for different fields⁸ is a subject for future essays.

Interestingly, the core veterinary journal with the highest immediacy did not receive enough citations from the core to make the list in Table 3. That journal, *Annales de Medecine Veterinaire*, had an immediacy of .617. *Veterinary Record* had an immediacy of .616. The third highest immediacy in the veterinary core belongs to *Journal of Comparative Pathology*, .476. These numbers are relatively low compared, for example, to *Nature* or other journals. While the pace of research in this field is relatively slow compared to the hottest areas of basic research, such as molecular biology, it's worth noting, for example, that no journal in the dental core had an immediacy as high as .4.²

Table 3 shows that animal research workers do draw upon a large number of multidisciplinary and non-veterinary journals. In fact, 22 out of the top 50 journals cited by this field are non-core journals, including such highly cited journals as *Nature*, *Proceedings of the Society for Experimental Biology and Medicine*, *Science*, *Journal of Biological Chemistry*, *Lancet*, and *New England Journal of Medicine*. The non-veterinary journals in Table 3 received 28 percent of the citations to the 50 journals most-cited by veterinary journals (the sum of column A). In our dentistry study, by comparison, we found that among the 50 journals most-cited by the dentistry core, non-core journals received 16 percent of the citations.

Table 4 lists the journals that most frequently cited the veterinary core.

Table 4: The 50 journals which most frequently cited veterinary core journals. An asterisk indicates a core member. A=total citations to veterinary core journals. B=total citations to all journals. C=self-citations. D=percent of total citations which are veterinary citations (A/B). E=percent of total citations which are self-citations (self-citing rate, C/B). F=percent of veterinary citations which are self-citations (C/A). G=impact factor. H=immediacy index. I=1980 source items.

	A	B	C	D	E	F	G	H	I
*J. Anim. Sci.	2528	7445	2152	34.0	28.9	85.1	1.123	.215	339
*Amer. J. Vet. Res.	2506	8289	895	30.2	10.8	35.7	1.014	.256	428
*Vet. Rec.	1699	3616	725	47.0	20.0	42.7	1.216	.616	320
*J. Amer. Vet. Med. Assn.	1634	4921	495	33.2	10.1	30.3	.903	.198	348
*J. Amer. Anim. Hosp. Ass.	1029	3107	56	33.1	1.8	5.4	.377	.019	104
*Monatsh. Veterinarmed.	990	3393	393	29.2	11.6	39.7	.279	.078	219
*Aust. Vet. J.	959	2146	378	44.7	17.6	39.4	1.586	.274	113
*Res. Vet. Sci.	740	2552	212	29.0	8.3	28.6	1.003	.280	164
J. Dairy Sci.	725	6690	—	10.8	—	—	1.075	.187	246
*Berl. Mun. Tierarztl. Wochenschr.	715	1898	124	37.7	6.5	17.3	.629	.264	106
*Vet. Parasitol.	637	1883	55	33.8	2.9	8.6	.789	.131	61
*Can. Vet. J.	633	1547	63	40.9	4.1	10.0	.596	.122	74
*Theriogenology	633	1894	119	33.4	6.3	18.8	1.189	.217	92
*Avian Dis.	631	1536	361	41.1	23.5	57.2	1.122	.211	114
*Indian J. Anim. Sci.	581	2635	181	22.0	6.9	31.2	.108	.056	305
*Zbl. Veterinarmed. Reihe B	567	1523	77	37.2	5.1	13.6	.456	.165	91
*Deut. Tierarztl. Wochenschr.	550	1964	105	28.0	5.3	19.1	.478	.105	124
*Vet. Med. Small Anim. Clin.	548	1389	31	39.5	2.2	9.7	.170	.076	250
*Ann. Med. Vet.	534	1240	129	43.1	10.4	24.2	1.226	.617	41
*Prakt. Tierarzt	526	1618	41	32.5	2.5	7.8	.198	.074	148
*Vet. Pathol.	489	1827	67	26.8	3.7	13.7	.658	.217	92
*Tierarztl. Umsch.	453	1164	63	38.9	5.4	13.0	.325	.088	102
*Brit. Vet. J.	447	1223	85	36.5	7.0	19.0	.774	.195	87
*Anim. Prod.	445	1356	225	32.8	16.6	50.6	1.000	.250	96
*Magy. Allatorv. Lapja	442	2045	13	21.6	.6	2.9	.081	.000	186
*Jpn. J. Vet. Sci.	417	1251	65	33.3	5.2	15.6	.541	.133	75
*Schweiz. Arch. Tierheilkd.	416	1096	71	38.0	6.5	17.1	.573	.032	62
*Can. J. Comp. Med.	406	1183	75	34.3	6.3	18.5	.927	.460	63
*J. Comp. Pathol.	393	1184	112	33.2	9.5	28.5	1.008	.476	63
*J. Small Anim. Pract.	390	824	77	47.3	9.3	19.7	.461	.186	59
*Avian Pathol.	373	929	118	40.2	12.7	31.6	1.369	.361	61
*J. Wildlife Dis.	356	1353	138	26.3	10.2	38.8	.484	.019	105
*Zbl. Veterinarmed. Reihe A	340	1781	51	19.1	2.9	15.0	.367	.138	109
*Nord. Vet. Med.	337	1131	69	29.8	6.1	20.5	.346	.091	66
*N.Z. Vet. J.	333	695	124	47.9	17.8	37.2	.681	.404	47
Can. J. Anim. Sci.	323	1698	—	19.0	—	—	.630	.075	93
*Rev. Med. Vet.	309	770	39	40.1	5.1	12.6	.124	.056	72
*Lab. Anim. Sci.	308	1717	160	17.9	9.3	51.9	.524	.089	135
*Advan. Vet. Sci. Comp. Med.	301	1441	3	20.9	.2	1.0	1.286	.111	9
*Kleintier-Prax.	299	809	17	37.0	2.1	5.7	.135	.107	56
*Acta Vet. Scand.	294	1062	111	27.7	10.5	37.8	.696	.431	58
*Cornell Vet.	277	714	18	38.8	2.5	6.5	.815	.108	37
J. Reprod. Fert.	274	4894	—	5.6	—	—	1.899	.405	277
*Tijdschr. Diergeneesk.	274	797	70	34.4	8.8	25.5	.286	.066	91
*Vet. Med.	257	1472	8	17.5	.5	3.1	.326	.024	83
J. Agr. Sci.	256	3234	—	7.9	—	—	.848	.222	180
Poultry Sci.	251	6046	—	4.1	—	—	.907	.201	417
Advan. Food Res.	245	1614	—	15.2	—	—	1.273	.000	4
*Vet. Quart.	238	714	5	33.3	.7	2.1	.833	.194	31
*Mod. Vet. Pract.	232	738	12	31.4	1.6	5.2	.161	.055	165

Journal of Animal Science again tops the list, giving more than 2,500 citations to the veterinary core. Of the first 42

journals in the table, 41 are veterinary journals, and 40 of them are core journals. Among non-veterinary journals

Table 5: The most-cited papers from the veterinary core journals. The number of papers receiving 50 or more citations from each journal is shown in parentheses.

Total Citations 1961-80	Bibliographic Data
75(1)	Andrews E D, Hartley W J & Grant A B. Selenium-responsive diseases of animals in New Zealand. <i>N. Z. Vet. J.</i> 16:3-17, 1968.
208(6)	Blaxter K L, Wainman F W & Wilson R S. The regulation of food intake by sheep. <i>Anim. Prod.</i> 3:51-61, 1961.
50(1)	Blom E & Birch-Andersen A. The ultrastructure of the bull sperm. 2. The sperm head. <i>Nord. Vet. Med.</i> 17:193-212, 1965.
168(31)	Chubb R C & Churchill A E. Precipitating antibodies associated with Marek's disease. <i>Vet. Rec.</i> 83:4-7, 1968.
112(12)	Cornelius C E, Bishop J, Switzer J & Rhode E A. Serum and tissue transaminase activities in domestic animals. <i>Cornell Vet.</i> 49:116-26, 1959.
68(10)	Cotchin E. Mammary neoplasms of the bitch. <i>J. Comp. Pathol.</i> 68:1-22, 1958.
50(1)	Crabo B. Studies on the composition of epididymal content in bulls and boars. <i>Acta Vet. Scand.</i> 6(Suppl. 5):9-94, 1965.
50(1)	Lieber C S & DeCardi L M. An experimental model of alcohol feeding and liver injury in the baboon. <i>J. Med. Primatol.</i> 3:153-63, 1974.
56(1)	Malmquist W A, Nyirado M B A & Brown C G D. East coast fever: cultivation in vitro of bovine spleen cell lines infected and transformed by <i>Theileria parva</i> . <i>Trop. Anim. Health Prod.</i> 2:139-45, 1970.
71(2)	Mebus C A, Kono M, Underdahl N R & Twiehaus M J. Cell culture propagation of neonatal calf diarrhea (scours) virus. <i>Can. Vet. J.</i> 12(3):69-72, 1971.
98(1)	Mebus C A, Stair E L, Underdahl N R & Twiehaus M J. Pathology of neonatal calf diarrhea induced by a Reo-like virus. <i>Vet. Pathol.</i> 8:490-505, 1971.
74(5)	Mengeling W L, Gutekunst D E, Fernellus A L & Pirtle E C. Demonstration of an antigenic relationship between hog cholera and bovine viral diarrhea viruses by immunofluorescence. <i>Can. J. Comp. Med. Vet. Sci.</i> 27:162-4, 1963.
53(1)	Neumann F, Richter K D & Gunzel P. Wirkungen von Antiandrogenen. <i>Zbl. Veterinarmed. Reihe A</i> 12:171-88, 1965.
185(12)	Okazaki W, Purchase H G & Burmester B R. Protection against Marek's disease by vaccination with a herpesvirus of turkeys. <i>Avian Dis.</i> 14:413-29, 1970.
111(12)	Purchase H G & Biggs P M. Characterization of five isolates of Marek's disease. <i>Res. Vet. Sci.</i> 8:440-9, 1967.
132(8)	Radford H M, Watson R H & Wood G F. A crayon and associated harness for the detection of mating under field conditions. <i>Aust. Vet. J.</i> 36:57-66, 1960.
139(36)	Reisinger R C, Heddleston K L & Manthei C A. A myxovirus (SF-4) associated with shipping fever of cattle. <i>J. Amer. Vet. Med. Assn.</i> 135:147-52, 1959.
63(1)	Ressang A A, Mastenbroek N, Quak J, van Griensven L J L D, Calafat J, Hilgers J, Hageman P C, Soussi T & Swen S. Studies on bovine leukemia. 1. Establishment of type C virus producing cell lines. <i>Zbl. Veterinarmed. Reihe B</i> 21:602-17, 1974.
82(3)	Rommel M, Heydorn A O & Gruber F. Beiträge zum Lebenszyklus der Sarkosporidien. 1. Die Sporozyste von <i>S. tenella</i> in den Fäzes der Katze. <i>Bert. Mun. Tierarztl. Wochenschr.</i> 85:101-5, 1972.
153(7)	Sevolan M. Avian lymphomatosis. <i>Vet. Med. Small Anim. Clin.</i> 57:500-1, 1962.
143(6)	Sigurdsson B. Rida, a chronic encephalitis of sheep. <i>Brit. Vet. J.</i> 110:341-54, 1954.
164(55)	Van Soest P J. Development of a comprehensive system of feed analyses and its application to forages. <i>J. Anim. Sci.</i> 26:119-28, 1967.
63(1)	Topel D G, Bicknell E J, Preston K S, Christian L L & Matsushima C Y. Porcine stress syndrome. <i>Mod. Vet. Pract.</i> 49(5):40-1, 1968.
218(37)	Witter R L, Nazerian K, Purchase H G & Burgoyne G H. Isolation from turkeys of a cell-associated herpesvirus antigenically related to Marek's disease virus. <i>Amer. J. Vet. Res.</i> 31:525-38, 1970.

Table 6: Partial list of papers in the 1981 *ISI/BIOMED*TM research front entitled "Immune-response and Marek's disease virus."

- Calnek B W, Shek W R & Schat K A.** Latent infections with Marek's disease virus and turkey herpesvirus. *J. Nat. Cancer Inst.* 66:585-90, 1981.
- Coleman R M & Schlerman L W.** Independence of chicken major histocompatibility antigens and tumor-associated antigen on the surface of herpesvirus-induced lymphoma cells. *Infect. Immunity* 29:1067-72, 1980.
- Confer A W & Addlinger H K.** Cell-mediated immunity in Marek's disease: cytotoxic responses in resistant and susceptible chickens and relation to disease. *Amer. J. Vet. Res.* 41:307-12, 1980.
- Elmubarak A K, Sharma J M, Witter R L, Nazerian K & Sanger V L.** Induction of lymphomas and tumor antigen by Marek's disease virus in turkeys. *Avian Dis.* 25:911-26, 1981.
- Ikuta K, Kitamoto N, Saito C & Kato S.** Demonstration of heterophile antibody in chicken antiserum against Marek's disease tumor-derived cell line, MSB-1. *Biken J.* 23:57-60, 1980.
- Ikuta K, Kitamoto N, Shoji H, Kato S & Nalki M.** Expression of Forssman antigen of avian lymphoblastoid cell lines transformed by Marek's disease virus or avian leukosis virus. *J. Gen. Virol.* 52:145-51, 1981.
- Ikuta K, Kitamoto N, Shoji H, Kato S & Nalki M.** Hanganutziu and Deicher type heterophile antigen expressed on the cell-surface of Marek's disease lymphoma-derived cell lines. *Biken J.* 24:23-37, 1981.
- Kitamoto N, Ikuta K, Kato S & Hirai K.** Persistence of genomes of both herpesvirus of turkeys and Marek's disease virus in a chicken T-lymphoblastoid cell line. *Biken J.* 23:1-8, 1980.
- Kitamoto N, Ikuta K, Kato S & Wataki K.** Demonstration of cells with Marek's disease tumor-associated surface antigen in chicks infected with herpesvirus of turkey, 01 strain. *Biken J.* 22:137-42, 1979.
- Schat K A & Murthy K K.** In vitro cytotoxicity against Marek's disease lymphoblastoid cell lines after enzymatic removal of Marek's disease tumor-associated surface antigen. *J. Virol.* 34(1):130-5, 1980.
- Sharma J M.** Fractionation of Marek's disease virus-induced lymphoma by velocity sedimentation and association of infectivity with cellular fractions with and without tumor antigen expression. *Amer. J. Vet. Res.* 42:483-6, 1981.
- Stephens E A, Witter R L, Nazerian K & Sharma J M.** Development and characterization of a Marek's disease transplantable tumor in inbred line T_2 chickens homozygous at the major (B) histocompatibility locus. *Avian Dis.* 24:358-74, 1980.

only *Journal of Dairy Science* frequently cited the core. Whereas Table 3 shows that veterinary journals frequently cite the literature in agricultural and basic biomedical journals, Table 4 shows that the core journals receive citations largely from themselves. In other words, veterinary journals cite other fields much more than other fields cite veterinary journals.

In Table 5, we have listed the most-cited paper from each veterinary core journal. We've included only those journals with papers cited more than 50 times from 1961 to 1980. The most-cited paper on the list, by R.L. Witter and colleagues, describes the isolation of a type of herpesvirus called HVT, which

infects turkeys. Veterinarians are interested in this virus because when it is injected into chickens, it seems to protect against the harmful effects of another herpesvirus called MDHV. MDHV is thought to cause Marek's disease, which is highly contagious among chickens. Symptoms include the formation of tumors in various organs. Four papers listed in Table 5 discuss various aspects of Marek's disease. The 1981 *ISI/BIOMED*TM⁹ system included three research fronts on Marek's disease.

These selections are intended to show some of the more interesting papers published in a wide variety of journals. Clearly, had we intended to list the most-cited articles for the field, the list

would be dominated by articles from a few of the most-cited journals. Furthermore, many of the most important articles published by or used by veterinary researchers are published in non-veterinary journals. As an illustration of this point, we have included in Table 6 the key current papers in one of the

research fronts for Marek's disease, entitled "Immune-response and Marek's disease virus."

* * * * *

My thanks to Thomas Di Julia and Dorothy Silver for their help in the preparation of this essay.

©1987 ISI

REFERENCES

1. **Garfield E.** Journal citation studies. 20. Agriculture journals and the agricultural literature. *Essays of an information scientist*. Philadelphia: ISI Press, 1977. Vol. 2. p. 272-8.
2., Journal citation studies. 34. The literature of dental science vs. the literature used by dental researchers. *Current Contents* (3):5-11, 18 January 1982.
3. **Brunette D M, Simon M J & Reimers M A.** Citation records of papers published in the Journal of Periodontology and the Journal of Periodontal Research. *J. Period. Res.* 13:487-97, 1978.
4. **Smithcors J F.** Chiron, Apsyrus & Carlo Ruini: veterinary medicine from mythology to the nuclear age. *Mod. Vet. Pract.* 59:433-6, 1978.
5. **Garfield E.** How do we select journals for *Current Contents*? *Essays of an information scientist*. Philadelphia: ISI Press, 1981. Vol. 4. p. 309-12.
6., Trends in biochemical literature. *Trends Biochem. Sci.* 4:N290-5, 1979.
7., Citation analysis as a tool in journal evaluation. *Science* 178:471-9, 1972.
8. **Taylor R.** Is the impact factor a meaningful index for the ranking of scientific research journals? *Can. Field-Natur.* 95:236-40, 1981.
9. **Institute for Scientific Information.** *Index to research fronts in ISI/BIOMED 1981™*. Philadelphia: ISI, 1981. 205 p.