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GUEST EDITORIAL

Use of *Journal Citation Reports* and *Journal Performance Indicators* in Measuring Short and Long Term Journal Impact

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The impact factor has become the subject of widespread controversy. It has gradually developed to mean both journal and author impact. The emphasis on impact factors obscures the main purpose of bibliographic databases created at the Institute for Scientific Information. I will here show how two of these databases, *Journal Citation Reports* and the *Journal Performance Indicators*, can be used to study scientific journals and the articles they publish, as well as the evolution of scientific fields.

Key words: *bibliometrics; citation analysis; impact factor; journal article; library science; medical informatics; medical literature analysis and retrieval system*

I first mentioned the idea of an impact factor in 1955 (1). At that time it did not occur to me that impact would one day become the subject of widespread controversy. Like nuclear energy, the impact factor has become a mixed blessing. It has been used constructively to select the best journals for Current Contents® and the Science Citation Index®, and for library collections. However, it has been misused in many situations, especially in the evaluation of individual researchers.

In the early 1960s, Irving H. Sher and I created the journal impact factor to help select journals for the Science Citation Index (SCI®). It was obvious that a core group of highly cited large journals needed to be covered in the SCI. However, we also recognized that certain small journals would not be selected if we depended solely on citation counts (2). We needed a simple method for comparing journals regardless of their size. So we created the journal impact factor.

However, the term "impact factor" has gradually evolved, especially in Europe, to mean both journal and author impact. This ambiguity often causes problems. It is one thing to use impact factors to compare journals and quite another to use them to compare individual authors. Journal impact factors generally involve relatively large populations of articles and citations. Individual authors, on average, produce much smaller numbers of articles.

Everything said in this article has been stated repeatedly over the past 30 years. A recent tutorial appeared in the *Canadian Medical Association Journal* (3), and the abundance of recent bibliography on the impact factor (4-14) reflect general interest in this issue.

A journal's impact factor is based on two elements: (a) the numerator, which is the number of citations in the current year to any items published in a journal in the previous 2 years, and (b) the denominator, which is the number of substantive articles (source items) published in the same two years. The impact factor could just have been based solely on the previous year's articles. This would give even greater emphasis to current research. Alternatively, a less current impact factor would be based on three or more previous years.

Journal Citation Reports

All citation studies can be normalized to take into account such time variables as half life as well as discipline or citation density. The citation density (references cited per source article) is significantly lower for mathematics than the life sciences. The half-life (number of cited years that cover 50% of the current year's citations) would be longer in physiology than in molecular biology. The impact factors currently reported each year by the Institute for Scientific Information (ISI) in *Journal Citation Reports® (JCR)* may not provide a complete enough picture for slower moving fields with longer half-lives. However, annual *JCR* data can be cumulated. Regardless, when journals are studied within disciplines, the *rankings* based on 1-, 7- or 15-year impact factors do not differ significantly, as I reported for 200 journals in *The Scientist* (15,16). When journals were studied across fields, the ranking for physiology journals improved significantly as the number of years increased, but the rankings within the group did not change significantly.

The emphasis that is placed on journal impact factors obscures the main purpose of the *Journal Citation Reports*. The classification of journals is a good example of how traditional classification is very subjective. However, examination of journal-to-journal matrices demonstrates the emergence of new fields. Back in 1973, I demonstrated (17) the emergence of applied virology using journal-to-journal citation matrices of pathology journals.

For each of the thousands of journals in *JCR*, there are two basic printouts – cited and citing journals. *JCR* is an associative system so we find out what a journal is really about by determining the journal and subject matter it cites. This is in contrast to what a journal calls itself, which is often anachronistic – historically correct but obsolete.

Analysis of the journals that authors of another journal cite tells us a great deal about the underlying content of its material. In the case of the *Journal of Experimental Medicine*, I found in a 1972 study that its main focus was on virology (18).

Consider then a title like the *Review of Scientific Instruments* (*RSI*). The Tables 1-6 present typical *JCR* data for this interdisciplinary journal. What does the title "*Review of Scientific Instruments*" really mean? The *JCR citing journal report* for *RSI* demonstrates that in 1998, *RSI* almost exclusively cited physics journals (Fig. 1). Most life scientists would not consider this a particularly relevant journal. However, certain members of a biomedical research team who use these types of scientific instruments might.

Now, in contrast, consider the *JCR cited journal report* for *RSI*. In 1998, other than RSI itself, the journal that cited it most was the *Journal of Synchrotron Radiation* (Fig. 2), a fair distance semantically from "scientific" instruments.

Hansen and Henrikson (19) reported "good agreement between the journal impact factor and the overall [cumulative] citation frequency of papers on clinical physiology and nuclear medicine." However, clinical editors, especially of foreign language journals, are not pleased with impact evaluations since the international research and clinical literature is dominated by the English language. Local clinical journals are by definition less relevant for most researchers, and cited less frequently. They are of great interest to drug firms for marketing reasons.

The *Journal Citation Reports* tacitly imply that editorial items in such diverse journals, such as the *Science*, *Nature*, *JAMA*, *CMAJ*, *BMJ*, and *Lancet*, can be neatly categorized. Such journals publish large numbers of items that are neither traditional substantive research nor review articles. These items (e.g., letters, news stories, and editorials) are not included in *JCR*'s calculation of impact. Yet we all know that they are cited, especially in the most recent year. However, the JCR numerator includes citations to all items published in these journals. The assignment of article codes is based on human judg-

Table 1. The *Review of Scientific Instruments* – data from the *Journal Citation Reports 1998*

Instruments	Number
Total cites	10,548
Impact factor	1.177
Immediacy factor	0.206
Articles	810
Cited half-life	6.5
Citing half-life	7.7

Table 2. The *Review of Scientific Instruments* – calculation of the impact factor[a]

In year	Number of	
	cites to articles	articles
1997	809	830
1996	1,121	810
1997+1996	1,930	1,640

[a]Calculation: Cites to recent articles (1,930)/No. of recent articles (1,640) =1.177. Source: *ISI Journal Citation Reports, 1998.*

Table 3. The *Review of Scientific Instruments* – calculation of the immediacy index[a]

Parameter	Number
Cites in 1998 to articles published in 1998	167
Articles published in 1998	810
Immediacy index[a]	0.206[a]

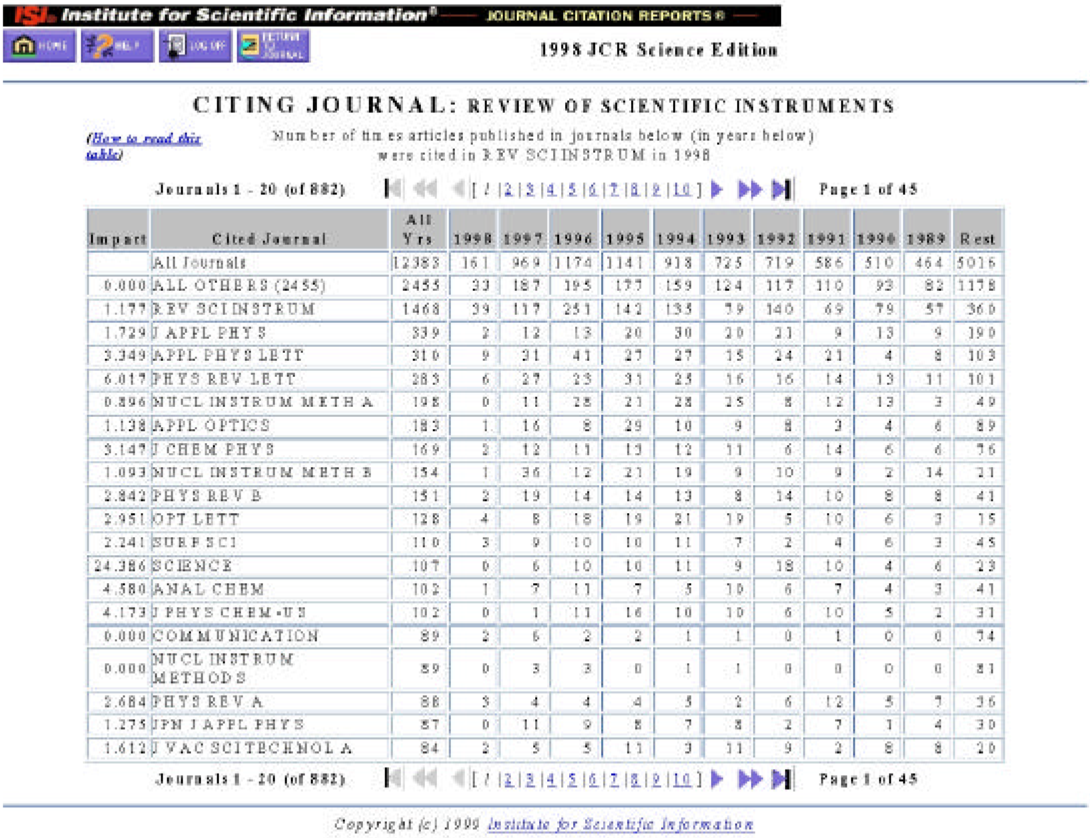
[a]Calculation: Cites to current articles/No. of current articles. Source: *ISI Journal Citation Reports, 1998.*

Table 4. *The Review of Scientific Instruments* (RSI) – definition and calculation of the cited half-life[a]

1. Definitions
   Cited half-life is the age range of 50% of the journal's cited articles.
   The half-life integer is the number of years from the current year to the years < or = 50% is cumulated.
2. Calculation
   Step A: subtract the % reached just before 50% from 50%;
   Step B: subtract the % reached just before 50% from the % in the next column to the right;
   Step C: divide the result A by result B and truncate to the nearest tenth.
3. Cited half-life for RSI = 6.5.
   Breakdown of the citations to the journal by cumulative percent of 1998 cites to articles published in the following years:

1998	1997	1996	1995	1994	1993	1992	1991	1990	1989
1.58	9.25	19.88	32.76	40.28	45.56	55.00	59.20	63.28	68.68

[a]Source: *ISI Journal Citation Reports, 1998.*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1998 JCR Science Edition

CITING JOURNAL: REVIEW OF SCIENTIFIC INSTRUMENTS

(How to read this table)

Number of times articles published in journals below (in years below) were cited in REV SCI INSTRUM in 1998

Journals 1 - 20 (of 882) [1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10] Page 1 of 45

Impact	Cited Journal	All Yrs	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	Rest
	All Journals	12383	161	969	1174	1141	918	725	719	586	510	464	5016
0.000	ALL OTHERS (2455)	2455	33	187	195	177	159	124	117	110	93	82	1178
1.177	REV SCI INSTRUM	1468	39	117	251	142	135	79	140	69	79	57	360
1.729	J APPL PHYS	339	2	12	13	20	30	20	21	9	13	9	190
3.349	APPL PHYS LETT	310	9	31	41	27	27	15	24	21	4	8	103
6.017	PHYS REV LETT	283	6	27	23	31	25	16	16	14	13	11	101
0.896	NUCL INSTRUM METH A	198	0	11	28	21	28	25	8	12	13	3	49
1.138	APPL OPTICS	183	1	16	8	29	10	9	8	3	4	6	89
3.147	J CHEM PHYS	169	2	12	11	13	12	11	6	14	6	6	76
1.093	NUCL INSTRUM METH B	154	1	36	12	21	19	9	10	9	2	14	21
2.842	PHYS REV B	151	2	19	14	14	13	8	14	10	8	8	41
2.951	OPT LETT	128	4	8	18	19	21	19	5	10	6	3	15
2.241	SURF SCI	110	3	9	10	10	11	7	2	4	6	3	45
24.386	SCIENCE	107	0	6	10	10	11	9	18	10	4	6	23
4.580	ANAL CHEM	102	1	7	11	7	5	10	6	7	4	3	41
4.173	J PHYS CHEM-US	102	0	1	11	16	10	10	6	10	5	2	31
0.000	COMMUNICATION	89	2	6	2	2	1	1	0	1	0	0	74
0.000	NUCL INSTRUM METHODS	89	0	3	3	0	1	1	0	0	0	0	81
2.684	PHYS REV A	88	3	4	4	4	5	2	6	12	5	7	36
1.275	JPN J APPL PHYS	87	0	11	9	8	7	8	2	7	1	4	30
1.612	J VAC SCI TECHNOL A	84	2	5	5	11	3	11	9	2	8	8	20

Journals 1 - 20 (of 882) [1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10] Page 1 of 45

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Figure 1. The *Review of Scientific Instruments* – citing journal data from the *Journal Citation Reports*, 1998.

Table 5. *The Review of Scientific Instruments* (RSI) – definition and calculation of the citing half-life[a]

1. Definitions

   Citing half-life is the age range of 50% of the journal's cited articles.

   The half-life integer is the number of years from the current year to the years < or = 50% is cumulated.

2. Calculation

   Step A: subtract the % reached just before 50% from 50%;

   Step B: subtract the % reached just before 50% from the % in the next column to the right;

   Step C: divide the result A by result B and truncate to the nearest tenth.

3. Cited half-life for RSI = 7.7

   Breakdown of the citations from the journal by cumulative percent of 1998 cites to articles published in the following years:

1998	1997	1996	1995	1994	1993	1992	1991	1990	1989
1.30	9.13	18.61	27.82	35.23	41.09	46.89	51.63	55.75	59.49

[a]Source: *ISI Journal Citation Reports, 1998.*

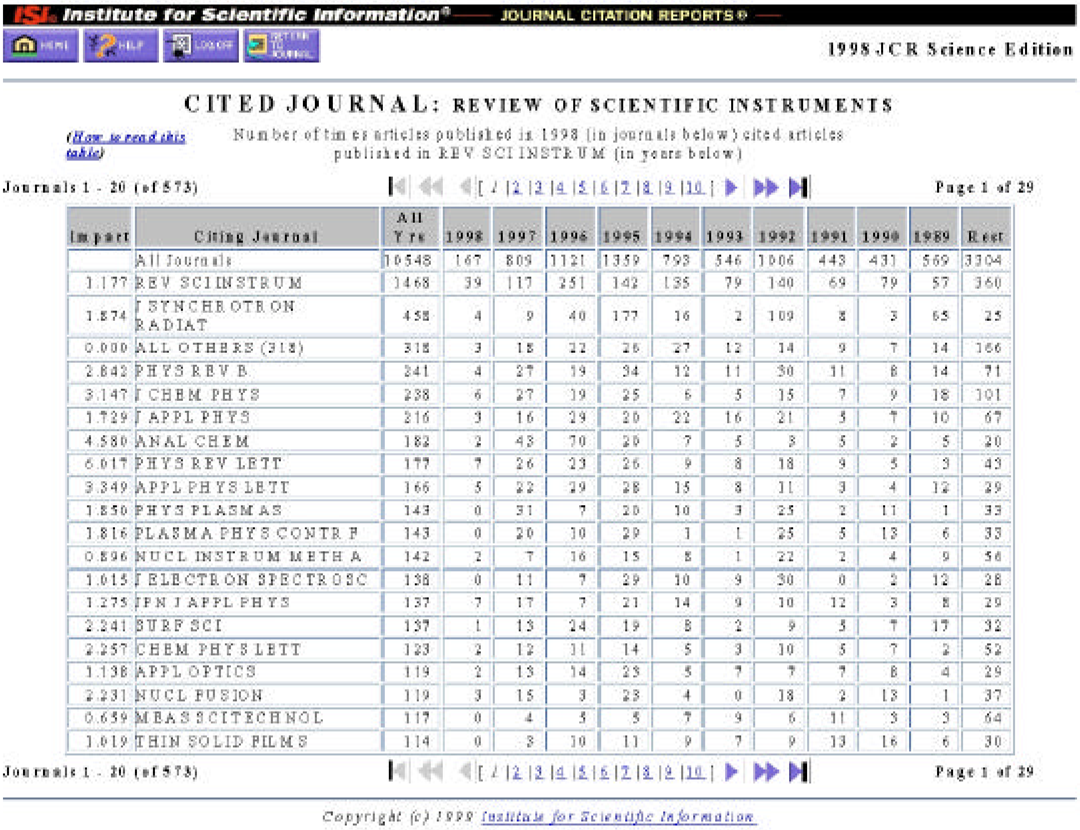
ment. A news story might be perceived as a substantive article, and a research letter might not be. Furthermore, no effort is made to differentiate clinical versus laboratory studies or, for that matter, practice-based versus research material.

There is a widespread but mistaken belief that the size of the scientific community that a journal serves affects the journal's impact factor. While the larger journals receive more citations, they must be shared by the equally larger number of published articles. Many articles in large fields are not well cited, whereas articles in small fields may have unusual impact. Therefore, the key determinants in impact are not the number of authors or articles in the field, but rather the mean number of citations per article (density) and the half-life or immediacy

Table 6. The *Review of Scientific Instruments* – the source data[a]

Articles	No. of articles (A)	No. of referenced items (R)	Ratio (R/A)
Non-reviewed	802	11,316	14.1
Reviewed	8	1,065	133.1
Combined	810	12,381	15.3

[a]Source: *ISI Journal Citation Reports, 1998.*



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CITED JOURNAL: REVIEW OF SCIENTIFIC INSTRUMENTS

(How to read this table) Number of times articles published in 1998 (in journals below) cited articles published in REV SCI INSTRUM (in years below)

Journals 1 - 20 (of 573) Page 1 of 29

Impact	Citing Journal	All Yrs	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	Rest
	All Journals	10548	167	809	1121	1359	793	546	1006	443	431	569	3304
1.177	REV SCI INSTRUM	1468	39	117	251	142	135	79	140	69	79	57	360
1.874	J SYNCHROTRON RADIAT	458	4	9	40	177	16	2	109	8	3	65	25
0.000	ALL OTHERS (318)	318	3	18	22	26	27	12	14	9	7	14	166
2.842	PHYS REV B	241	4	27	19	34	12	11	30	11	8	14	71
3.147	J CHEM PHYS	238	6	27	19	25	6	5	15	7	9	18	101
1.729	J APPL PHYS	216	3	16	29	20	22	16	21	5	7	10	67
4.580	ANAL CHEM	182	2	43	70	20	7	5	3	5	2	5	20
6.017	PHYS REV LETT	177	7	26	23	26	9	8	18	9	5	3	43
3.349	APPL PHYS LETT	166	5	22	29	28	15	8	11	3	4	12	29
1.850	PHYS PLASMAS	143	0	31	7	20	10	3	25	2	11	1	33
1.816	PLASMA PHYS CONTR F	143	0	20	10	29	1	1	25	5	13	6	33
0.896	NUCL INSTRUM METH A	142	2	7	16	15	8	1	22	2	4	9	56
1.015	J ELECTRON SPECTROSC	138	0	11	7	29	10	9	30	0	2	12	28
1.275	JPN J APPL PHYS	137	7	17	7	21	14	9	10	12	3	8	29
2.241	SURF SCI	137	1	13	24	19	8	2	9	5	7	17	32
2.257	CHEM PHYS LETT	123	2	12	11	14	5	3	10	5	7	2	52
1.138	APPL OPTICS	119	2	13	14	23	5	7	7	7	8	4	29
2.231	NUCL FUSION	119	3	15	3	23	4	0	18	2	13	1	37
0.659	MEAS SCI TECHNOL	117	0	4	5	5	7	9	6	11	3	3	64
1.019	THIN SOLID FILMS	114	0	3	10	11	9	7	9	13	16	6	30

Journals 1 - 20 (of 573) Page 1 of 29

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Figure 2. The *Review of Scientific Instruments* – citing journal data from the *Journal Citation Reports*, 1998.

of citations. This distinction was explained many years ago in an essay on the "Garfield's constant" (20).

The size of a field, however, will determine the number of "super-cited" papers. Some are theoretical while some will be methodology papers. Thousands of methodology papers do not achieve citation distinction. In fact, citations to the super-cited papers rarely affect the short-term impact factors reported in *JCR*. They do have a significant effect when one calculates long-term impact factors.

Table 7. The *Review of Scientific Instruments* – citation impact (cited items only) in one year periods[a]

Year	Cited impact	No. of citations	No. of cited papers
1981	13.27	4,712	355
1982	11.47	3,798	331
1983	10.15	2,792	275
1984	10.11	3,439	340
1985	10.37	4,768	460
1986	10.49	5,793	552
1987	9.89	3,847	389
1988	9.63	4,729	491
1989	10.48	6,844	653
1990	7.75	5,364	692
1991	8.66	3,523	407
1992	6.89	7,374	1,071
1993	6.18	3,141	508
1994	5.57	2,911	523
1995	4.72	4,225	895
1996	3.26	1,755	538
1997	2.33	976	418
1998	1.36	162	119

[a]Source: *ISI Journal Performance Indicators, 1998.*

Table 8. The *Review of Scientific Instruments* – percentage cited papers in one year periods[a]

Year	% Cited	No. of cited papers	No. of total papers
1981	87.42	355	406
1982	83.35	331	397
1983	87.00	275	316
1984	82.70	340	411
1985	84.86	460	542
1986	85.57	552	645
1987	87.59	389	444
1988	85.97	491	571
1989	86.71	653	753
1990	85.85	692	806
1991	83.04	407	490
1992	83.67	1,071	1,280
1993	81.66	508	622
1994	77.36	523	676
1995	75.20	895	1,190
1996	67.84	538	793
1997	50.11	418	834
1998	13.71	119	868

[a]Source: *ISI Journal Performance Indicators, 1998.*

Table 9. The *Cell* – percentage cited papers in one year periods[a]

Year	% Cited	No. of cited papers	Total No. of papers
1981	100.00	393	393
1982	100.00	410	410
1983	100.00	424	424
1984	100.00	381	381
1985	100.00	424	424
1986	100.00	434	434
1987	99.75	431	432
1988	100.00	423	423
1989	100.00	489	489
1990	100.00	488	488
1991	100.00	479	479
1992	99.06	433	437
1993	100.00	480	480
1994	100.00	433	433
1995	99.78	491	492
1996	99.76	448	449
1997	100.00	449	449
1998	75.89	312	411

[a]Source: *ISI Journal Performance Indicators, 1998.*

Some analysts censor out such papers since their inclusion may distort the data inordinately.

The time required to review manuscripts may also affect impact. If reviewing and publication are delayed, and references to articles are no longer current, they will not be included in the *JCR* impact calculation. Even the appearance of articles on the same subject in the same issue of a journal may have an effect. Opthof (21) recently showed how journal impact performance varies from issue to issue.

For greater precision, it is preferable to conduct item-by-item journal audits so that any differences in impact for different types of editorial material can be taken into account (22). As stated earlier, for a small number of journals a bias may be introduced by including in the numerator citations to items that are not part of the denominator of source articles. However, most journals publish primarily substantive research or review articles. Therefore, statistical discrepancies are significant only in rare cases. The *JCR* data have come under some criticism for this reason among others (23).

Table 10. The *Journal of Biological Chemistry* – percentage cited papers in one year periods[a]

Year	% Cited	No. of cited papers	Total No. of papers
1981	99.50	2,209	2,220
1982	99.83	2,376	2,380
1983	99.91	2,387	2,389
1984	99.79	2,380	2,385
1985	99.79	2,466	2,471
1986	99.77	2,632	2,638
1987	99.74	2,690	2,697
1988	99.90	2,978	2,981
1989	99.78	3,285	3,292
1990	99.88	3,331	3,335
1991	99.81	3,675	3,682
1992	99.72	3,971	3,982
1993	99.84	3,910	3,916
1994	99.77	4,836	4,847
1995	99.53	4,507	4,528
1996	98.79	4,890	4,950
1997	94.82	4,412	4,653
1998	43.03	2,185	5,078

[a]Source: *ISI Journal Performance Indicators, 1998.*

Journal Performance Indicators

Most editorial discrepancies are eliminated altogether in another database called the *ISI Journal Performance Indicators (JPI)* (http://www.isinet.com/products/rsg/jperfind.html). This annual compilation now covers citations from 1981 to 1999. Since the *JPI* database links each source item directly to its citations, the impact calculations are more precise. Using *JPI* one can also obtain cumulative impact measures for longer periods. For example, the cumulated impact for *CMAJ* articles published in 1981 is 9.04 (derived by dividing the number of articles published in *CMAJ* that year [224] into the number of citations to *CMAJ* between 1981 and 1998 [2024]). Using *JPI* data, I was able to calculate 7- and 15-year impact factors for the 200 high- impact journals mentioned earlier (15,16).

If we take again the example of the *Review of Scientific Instruments*, JPI data tell us that in 1981 the *Review of Scientific Instruments* published 406 papers but only 355 were ever cited. About 20% have never been cited at all. I think this may say something about the archival nature of many instrumental articles.

And if the degree of citedness were to be stricter, and we classified as uncited all those articles that were cited only once or twice, or involved one or two self citations, that would give us a better idea of how much of this material is really used. By conducting an article-by-article audit of the journal, that type of frequency distribution would be very revealing (Tables 7 and 8). For 1981, 87% of the articles from the *Review of Scientific Instruments* were cited, whereas 13% were never cited at all. By contrast, consider journals like the *Cell* or *Journal of Biological Chemistry* (Tables 9 and 10). In a comparable 5-year period, over 90% of *Cell* papers were cited and 84% of *JBC* papers were cited. And one would get comparable figures for *Science* and *Nature* (Tables 11 and 12).

Impact Factor as a Tool for Scientists and Librarians

In addition to helping libraries decide which journals to purchase, journal impact factors are also used by authors to decide where to submit their articles. As a general rule, the journals with high impact factors are among the most prestigious today. The perception of prestige is a murky subject. Some would equate prestige with high impact. However, some librarians argue that the numerator in the impact factor calculation is in itself even more relevant. Bensman (4) stated that this 2-year citation count is a better guide to journal significance and cost-effectiveness than is the impact factor.

Journal impact can also be useful in comparing expected and actual citation frequency. Thus, when *ISI* prepares a "Personal Citation Report" it provides data on the expected citation impact not only for a particular journal but also for a particular year, because impacts change from year to year. For historical comparisons, a 1955 article cited 250 times might be considered a "citation classic", whereas the threshold for a 1975 article might be 400 and a 1995 article 1,000. These are somewhat arbitrary thresholds. When we solicited author commentaries on *Citation Classics* we often chose the most-cited papers for a given journal, which might be the only journal in its field.

In the case of the *Review of Scientific Instruments*, let us look at it from that end of the spectrum. One could ask how many of the thousands of papers published in this journal were cited ten or more times over the 20-year period? An even smaller number achieve a threshold of citation to warrant the designation *Citation Classic*.

Here are the titles of the three most cited papers in this journal for the past 30 years:

1. Pierce DT, Celotta RJ, Wang GC, Unertl WN, Galejs A, Kuyatt CE, Mielczarek SR. GaAs spin polarized electron source (1980), cited 246 times;

2. Stamatovic A, Schulz GJ. Characteristics of trochoidal electron monochromator (1970), cited 217 times; and

3. Stern E, Heald SM. X-Ray filter assembly for fluorescence measurements of X-ray absorption fine structure (1979), cited 206 times.

While no physics lab would be without the *Review of Scientific Instruments*, it is clear that its impact does not match physics on the leading edge of research. It is a repository for descriptions of reports on custom instruments that will never be used or needed again. Those articles are important for C.V.s but do they justify space in expensive printed journals?

The use of journal impact factors instead of actual article citation counts for evaluating authors is probably the most controversial issue. Granting and other policy agencies often wish to bypass the work involved in obtaining actual citation counts for individual articles and authors. Arguably, recently published articles may not have had enough time to be cited, so it is tempting to use the impact factor as a surrogate, virtual count. Presumably the journal's impact and the mere acceptance of the paper for publication is an implied indicator of prestige and expected subsequent citation. Typically, when the author's bibliography is examined, a journal's impact factor is substituted for the actual citation count. Thus, use of the impact factor to weight the influence of a paper amounts to a prediction.

While it is true that the average paper is not cited for two or three years, a significant percentage are cited quite rapidly. Indeed, there is a myth in citation analysis that recent papers cannot be evaluated. But many papers achieve rapid impact. Indeed, their citation frequency in the first six to eighteen months indicate they are putative *Citation Classics*. This pattern of immediacy has enabled ISI to identify "hot papers" in its bimonthly publication *Science Watch*.® However, full confirmation of high impact is generally obtained two years later. By the time *The Scientist* (http://www.the-scientist.com) interviews authors of such "hot papers", the field has usually moved on to another key phase of development. A series of such hot papers may be a predictor for Nobel Class recognition.

Of the many conflicting opinions about impact factors (4-14), I believe that Hoeffel (24) expressed the situation succinctly.

Impact factor is not a perfect tool to measure the quality of articles but there is nothing better and it has the advantage of already being in existence and is, therefore, a good technique for scientific evaluation. Experience has shown that in each specialty the best journals are those in which it is most difficult to have an article accepted, and these are the journals that have a high impact factor. These journals existed long before the impact factor was devised. The use of impact factor as a measure of

Table 11. The *Nature* – percentage cited papers in one year periods[a]

Year	% Cited	No. of cited papers	Total No. of papers
1981	97.37	1,339	1,375
1982	98.23	1,338	1,362
1983	99.12	1,257	1,268
1984	99.32	1,184	1,192
1985	99.06	1,165	1,176
1986	99.13	1,155	1,165
1987	98.50	1,192	1,210
1988	99.26	1,090	1,098
1989	99.32	1,035	1,042
1990	99.72	1,124	1,127
1991	98.78	980	992
1992	99.22	1,035	1,043
1993	99.28	983	990
1994	96.54	895	927
1995	97.34	920	945
1996	99.08	877	885
1997	96.25	901	936
1998	67.73	651	961

[a]Source: *ISI Journal Performance Indicators, 1998.*

Table 12. The *Science* – percentage cited papers in one year periods[a]

Year	% Cited	No. of cited papers	Total No. of papers
1981	95.72	1,031	1,077
1982	96.75	956	988
1983	98.65	954	967
1984	98.43	884	898
1985	98.06	815	831
1986	97.75	785	803
1987	97.90	796	813
1988	98.71	848	859
1989	98.30	815	829
1990	98.58	843	855
1991	99.42	872	877
1992	97.68	972	995
1993	96.73	979	1,012
1994	93.81	972	1,036
1995	97.15	1,025	1,055
1996	94.24	1,032	1,095
1997	90.89	949	1,044
1998	61.38	655	1,067

[a]Source: *ISI Journal Performance Indicators, 1998.*

quality is widespread because it fits well with the opinion we have in each field of the best journals in our specialty.

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