

"Current comments"

More on Forecasting Nobel Prizes and the Most Cited Scientists of 1972!

Number 40

October 3, 1973

The following letter appeared in *Nature* recently.¹ It responds to some critics who object to my suggestion that citation analysis can be used to forecast the award of Nobel Prizes.²

Citation and Distinction

"Sir—I previously indicated¹ that frequency analyses of the *Science Citation Index*[®] could help forecast Nobel Prize winners. A number of people have pooh-pooed this simple technique. Consequently, it is of interest to note that all of this year's Nobel Prize winners again were among the list of most frequently cited authors. Two of them were anticipated in my article, in which I gave a list of the fifty most cited authors for 1967, using the 1967 *SCI*[®] as the data base. We have, since then, used the annual *SCIs* from the years 1961 through 1971 (except 1962 and 1963 which were not available then) to compile a list of most frequently cited authors. Out of more than 1.8 million authors cited, only 42,000 were cited at least thirty times in a single year during this nine-year period. However, less than 2,100 were cited more than 1,000 times. In this list will be found all of the Nobel Prize winners for 1972 and also winners for the preceding five-year period, with few exceptions. Thus, the Nobel Prize winners were members of an elite group consisting of the top 0.1% of all cited authors.

"If any of our readers can propose another algorithmic procedure for measuring scientific impact, let him come forward. In the

meantime, if scientific journalists, among others, want to know where the action was, is, and will be, they would do well to look into this method. We recently used a similar technique to determine the relative "impact" of journals.² In spite of the snide remarks of those³ who prefer the world of subjectivity, the latter study has caused a considerable amount of soul-searching among those seeking a rationale for thousands of infrequently cited journals.

Eugene Garfield

1. Garfield E. *Nature* 227:669, 1970.
2. Garfield E. *Science* 178:471, 1972.
3. Anonymous. *New Scientist* 56:464, 1972"

To reiterate, my letter emphasizes the usefulness of a simple, objective, algorithmic method in measurement of scientific *impact*. That citation analysis *is* useful in this regard, I and many others now accept as fact. Nobel Prizes also reflect scientific impact--surely there is no argument about that.

It is strange that some people should object to the observed correlation between the two. Our computers go about their citation counting much more swiftly than the Royal Swedish Academy goes about its subjective selections; it is unavoidable that the one will anticipate the other. I have never claimed what critics of the correlation impute to me—that the algorithm will, in advance, duplicate and thus predict the Academy's selections.

Since the letter was written, we have included the years 1962 and 1963 in our *ISI*[®] data base, and made some further counts. Following this essay is a list of the fifty authors most cited in 1967, as it appeared in the *Nature* article.² With the original list are two others: the fifty authors most cited in 1972, and the fifty authors most cited in the period 1961-72. More than one-fourth of the latter are Nobel Laureates. Sometime during the next year we hope to be able to refine these data even further to take into account the rankings of authors like Khorana and others who are frequently cited as co-authors.

REFERENCES

1. Garfield E. Citation and distinction. *Nature* 242:185, 1973.
2. ———. Citation indexing for studying science. *Nature* 227:669-71, 1970.

**Authors Most Cited
in 1967**

Times		Name
Rank	Cited	
1	2921	Lowry OH
2	1374	Chance B
3	1174	Landau LD
4	1150	Brown HC
5	1063	Pauling L
6	942	Gell-Mann M
7	940	Cotton FA
8	933	Pople JA
9	906	Bellamy LJ
10	904	Snedecor GW
11	893	Boyer PD
12	876	Baker BR
13	863	Kolthoff IM
14	842	Herzberg G
15	826	Fischer F
16	822	Seitz F
17	801	Djerassi C
18	754	Bergmeyer HU
19	750	Weber G
20	748	Reynolds ES
21	741	Mott NF
22	737	Eccles JC
23	729	Feigl F
24	727	Freud S
25	726	Pearse AGE
26	721	Eliel EL
27	717	Streitwieser A
28	712	Mulliken RS
29	711	Jacob F
30	710	Born M
31	706	Brachet J
32	702	Winstein S
33	687	Albert A
34	674	Luft JH
35	673	Deduve C
36	668	von Euler US
37	666	Fieser LF
38	661	Huisgen R
39	655	Novikoff AB
40	643	Goodwin TW
41	632	Barton DHR
42	631	Fisher RA
43	627	Bates DR
44	626	Flory PJ
45	626	Stahl E
46	619	Dewar MJS
47	618	Gilman H
48	618	Folch J
49	614	Dische Z
50	609	Glick D

**Authors Most Cited
in 1972**

Times		Name
Rank	Cited	
1	5925	Lowry OH
2	1501	Pople JA
3	1436	Landau LD
4	1307	Brown HC
5	1185	Snedecor GW
6	1210	Pauling L
7	1163	Herzberg G
8	1162	Chance B
9	1099	Cotton FA
10	1039	*Corey EJ
11	981	Dewar MJS
12	981	Reynolds ES
13	942	*Bray GA
14	925	Mott NF
15	914	*Olah GA
16	896	Folch J
17	880	Mulliken RS
18	878	*Davis BJ
19	873	*Fredrickson DS
20	812	Flory PJ
21	776	*Hoffmann R
22	775	*Woodward RB
23	767	Huisgen R
24	756	Eccles JC
25	746	Born M
26	742	Luft JH
27	727	Eliel EL
28	711	*Siegel S
29	691	*Anden NE
30	679	Pearse AGE
31	670	*Burton K
32	663	*Abragam A
33	652	Bellamy LJ
34	651	*Nesmeyanov AN
35	649	Albert A
36	637	Bjorken D
37	636	*Ginzburg VL
38	633	Fieser LF
39	631	*Miller JFA
40	618	*Carlsson A
41	618	Streitwieser A
42	614	*Clementi E
43	614	Kolthoff IM
44	613	*Slater JC
45	602	Freud S
46	598	*Spackman DH
47	592	*Chatt J
48	584	*Tanford C
49	582	*Hirschfelder JD
50	580	Weber G

**Authors Most Cited
1961-1972**

Times		Name
Rank	Cited	
1	35198	Lowry OH
2	13411	Chance B
3	12728	Brown HC
4	11870	Pauling L
5	11220	Landau LD
6	10503	Pople JA
7	10279	Snedecor GW
8	9865	Herzberg G
9	8923	Bellamy LJ
10	8688	Cotton FA
11	8094	Mulliken RS
12	8025	Gell-Mann M
13	7947	Eccles JC
14	7800	Kolthoff IM
15	7506	Flory PJ
16	7501	Pearse AGE
17	7493	*Selye H
18	7470	Djerassi C
19	7457	Mott NF
20	7266	Fieser LF
21	6919	Reynolds ES
22	6886	Albert A
23	6874	Folch J
24	6839	Born M
25	6762	Huisgen R
26	6671	Eliel EL
27	6617	Weber G
28	6612	Corey EJ
29	6607	Dewar MJS
30	6587	Luft JH
31	6558	Freud S
32	6528	*Fiske CH
33	6499	Winstein S
34	6420	Gilman H
35	6412	Dische Z
36	6381	*Moore S
37	6306	Fisher RA
38	6245	*Warburg O
39	6232	*Kuhn R
40	6210	*Novikoff AB
41	6196	*Kabat EA
42	6175	Jacob F
43	6165	Siegel S
44	6149	Boyer PD
45	6087	Barton DHR
46	6073	*Chandrasekhar S
47	5943	*Krebs HA
48	5936	*Brodie BB
49	5896	*Gomori G
50	5883	Streitwieser A

Asterisked names in the 1972 list are names that do not appear on the 1967 list. Asterisked names in the 1961-1972 list are names that do not appear on either of the other lists. The names of Nobel Laureates appear in bold type.