2. évfolyam • 1. szám • 1992. január

# IMPAKT

TÉNYEK A TUDOMÁNYOS ALAPKUTATÁSRÓL

*Szilárd:* Csak a tényeket írom le – nem azért, hogy bárki is elolvassa,csakis a Jóisten számára.
*Bethe:* Nem gondolod, hogy a Jóisten ismeri a tényeket?
*Szilárd:* Lehet, hogy ismeri, de a tényeknek nem *ezt* a változatát.

[*Leo Szilard, His version of the Facts. S.R. Weart & Gertrud Weiss Szilard* (Eds), MIT Press, Cambridge, MA, 1978, p.149.]



## A tartalomból:



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## Research, a Long-Term Investment in People

The mark of a healthy scientific research effort is that it will generate a few answers to the questions originally addressed, but it will also give rise to new, interesting questions that need answering. In some sense that is the fascination of science. It is the endless frontier, to use the words of Vannever Bush whose efforts led to Public Law 507 of the 81st Congress that established the National Science Foundation in 1950.

"Basic research leads to new knowledge", Bush wrote in *Science, The Endless Frontier*. "It provides scientific capital. It creates the fund from which practical applications of knowledge must be drawn." The federal government has grown to become the premier financier of scientific research in this country; with the exception of one or two notable private foundations, government agencies are responsible for the bulk of the research effort in institutions of higher learning. Financiers, whether they be public or private, all seek one thing, that is, a return on their investment. Thus, it is not surprising that the public's legislative representatives want to see tangible results in return for their support of research. Politicians want to show their constituents the results of the dollars they have spent.

There are a number of fundamental problems that scientists have in acceding to requests for "progress reports". First, the results of much scientific research are generally not perceived to be directly or immediately "useful" for the public. Scientific research must often pass through a technological transformation before its public usefulness evolves. For example, even though plasma fusion processes have been known for decades, no practical use has been developed; there is a reasonable chance that the so-called cold fusion processes may be destined for the same fate. In general, the public seems to want to know what it is getting for its investment quicker than most research projects can be completed, and elected representatives often want-or need-at least preliminary results even earlier in order to justify continued supportive votes. The situation is akin to the mind-set of those who get into the stock market for a short-term gain as compared to those who go into it for the long run. It takes time for new scientific discoveries to mature and for their usefulness to emerge. Occasionally, the leap from science to technology occurs very rapidly, but this is neither usual nor predictable.

Over the years some of the public's representatives have, perhaps, learned that science is not technology and that the results of science research can be a long way from practical applications. Unfortunately, the turnover of policy makers is such that lesson must be learned and retaught continually.

Perhaps the tension between scientists and those who finance science could be lessened if the focus of discussion could be shifted to the other product of academic science research, i.e., trained people. Some would argue that the students who become involved in research projects are the most important outcome of those projects. Indeed, from this point of view there are no "failed projects" if the students involved have acquired the manipulative and cognitive skills expected of good scientists. If the students have been taught how to recognize problems, to plan experiments designed to solve those problems, to collect the appropriate data at an accepted level of precision, and to draw conclusions therefrom, then research projects will have been successful irrespective of the details of the formal "results." We might eliminate a great deal of misunderstanding if research support were viewed as the support of an important national resource that is essential in a technologically oriented society – people trained as scientists.

*Editorial, Journal of Chemical Education, 68(8) (1991) 625*

## Mezítláb a parkban

Ez a kis írás Neil Simon színdarabjának (és az abból Charles Boyer, Jane Fonda, Robert Redford és Gene Sachs szereplésével forgatott kitűnő filmjének) címét csak olcsó utalásként veszi igénybe. Amire céloz, az a Magyarországon is divatba jött tudományos és/vagy innovációs parkok témája. Az analogizálás – bizonyos mértékben – anyagi helyzetünkre is utal. Az alábbiakban a *The Scientist*-ben (Vol. 5., No. 18., September 16, 1991) közzétett, és e kérdéssel kapcsolatos anyagból mutatunk be néhány válogatott szemelvényt.

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Conceived about a half-century ago to link academia with the private sector, research parks have mushroomed in recent years.

*

With 115 of them in the United States and 307 worldwide, research parks are home to a growing number of scientists.

Almost 190.000 Americans work in research parks.

*

At first glance, most parks look and act alike. Located near a university, they typically consist of a series of low-rise buildings set amid trees and grass

*

All seek to attract high-tech research and development companies and government labs that would benefit from proximity to a research university.

*

The parks host industrial scientists and other workers, as well as university researchers from natural science and occasionally social science disciplines. The main attraction to private industry is the university, particularly access to its faculty and educated work force, libraries, and special instrumentation facilities. For university scientists, the draw is the added vigor of aligning their work with a company's profit motive.

*

A well-managed research park, knows what its clients want and how to satisfy those needs.

*

If the mix of companies does not connect with the capabilities and strengths of the university, then the value of the research park to the scientist is no different than the value of a university owning a hotel or any other piece of property.

*

If a university lacks some level of capability in science, it's not a great idea to create a research park.

*

No research park is going to create a capability in a university where one doesn't already exist.

*

A strong research base and a commitment to industry aren't enough. A university-based research park must also have a good business address.

*

It is the faculty startups and other business in the state that will ultimately make the park productive.

*

A lot of the parks are suffering from overplanning. You can push growth to some extent, but a lot of it has to happen naturally.

*

Proliferation of research parks conceals uneven success pattern.

*

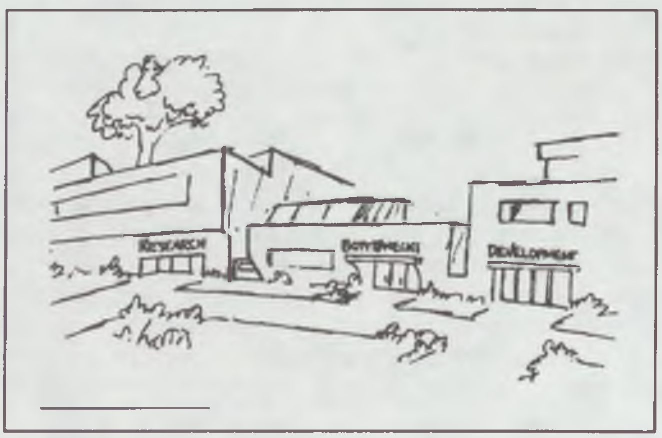
While their supporters tout the virtues of the university – industry efforts, critics are quick to note why many of them fail.

*

There is a strong temptation to believe that research parks are a cure for what ails the country's economy.

*

There's a certain sexiness to a research park: "You can see it and touch it."



# Scientometric Datafiles. A Comprehensive Set of Indicators on 2649 Journals and 96 Countries in All Major Science Fields and Subfields, 1981-1985. 5. Engineering

The compilation published under the above title [1], is a more detailed than ever collection of scientometric indicators. As main data source, the tapes of the *Science Citation Index* (*SCI*) database of the Institute for Scientific Information (ISI, Philadelphia, PA, USA) have been used.

The present compilation is a continuation of those published in earlier issues of this journal [2-5]. All the definitions and explanations can be find there.

In the table below, summary data of engineering, publication counts as well as average and outstanding citation rates of all subfields, and main scientometric indicators of all countries publishing at least 50 papers in the 1981-1985 period are presented.

*Schubert András, Glänzel Wolfgang, Braun Tibor, MTAK*


[1] *Scientometrics*, 16(1-6) (1989) 3-478
[2] *Impakt*, 1(1) (1991) 2-3
[3] *Impakt*, 1(2) (1991) 2-3
[4] *Impakt*, 1(3) (1991) 3
[5] *Impakt*, 1(4) (1991) 3


| Major field | Publication count | Citation rate per paper average | Citation rate per paper outstanding |
|---|---|---|---|
| ENGINEERING | 197424 | 1.44 | 4.79 |

| Subfield | Publication count | Citation rate per paper average | Citation rate per paper outstanding |
|---|---|---|---|
| AEROSPACE ENGNG & TECHNOL | 4381 | 0.58 | 2.04 |
| CERAMIC MATERIALS | 2759 | 1.52 | 4.64 |
| CHEMICAL ENGINEERING | 20461 | 1.47 | 5.11 |
| CIVIL ENGINEERING | 6384 | 0.90 | 2.30 |
| COMPUTER APPL & CYBERNETICS | 18266 | 1.58 | 4.94 |
| CONSTRUCTION & BLDG TECHNOL | 1530 | 0.80 | 2.20 |
| ELECTRICAL & ELECTRONIC ENGNG | 40204 | 1.75 | 5.27 |
| ENERGY & FUELS | 7833 | 1.19 | 4.82 |
| FOOD SCIENCE & TECHNOLOGY | 17853 | 1.71 | 4.47 |
| MATERIALS SCIENCE | 16867 | 1.43 | 4.79 |
| MECHANICAL ENGINEERING | 7822 | 0.71 | 2.09 |
| MEDICAL LABORATORY TECHNOL | 2309 | 1.61 | 5.24 |
| METALLURGY & MINING | 22539 | 1.39 | 4.96 |
| NUCLEAR SCIENCE & TECHNOLOGY | 25638 | 1.45 | 4.69 |
| PAPER & PULP TECHNOLOGY | 3630 | 0.67 | 2.29 |
| PHOTOGRAPHIC TECHNOLOGY | 1425 | 0.64 | 1.97 |
| TELECOMMUNICATION | 7903 | 1.34 | 4.27 |
| WATER RESOURCES | 8786 | 1.38 | 4.19 |

| Country | Publication count | Publication % | Citation count | Citation % | Citation rate obs | Citation rate exp | Citation rate rel |
|---|---|---|---|---|---|---|---|
| USA | 77544 | 39.28 | 127935 | 45.11 | 1.65 | 1.51 | 1.09 |
| Japan | 18337 | 9.29 | 27567 | 9.72 | 1.50 | 1.54 | 0.98 |
| UK | 14608 | 7.40 | 23671 | 8.35 | 1.62 | 1.52 | 1.07 |
| USSR | 12880 | 6.52 | 6119 | 2.16 | 0.48 | 0.56 | 0.84 |
| Germany FR | 12474 | 6.32 | 18531 | 6.53 | 1.49 | 1.35 | 1.10 |
| Canada | 8727 | 4.42 | 11932 | 4.21 | 1.37 | 1.42 | 0.96 |
| France | 6457 | 3.27 | 11433 | 4.03 | 1.77 | 1.72 | 1.03 |
| India | 6275 | 3.18 | 5536 | 1.95 | 0.88 | 1.44 | 0.61 |
| Australia | 3476 | 1.76 | 5543 | 1.95 | 1.59 | 1.60 | 0.99 |
| Italy | 3327 | 1.69 | 4366 | 1.54 | 1.31 | 1.64 | 0.80 |
| Poland | 2895 | 1.47 | 2543 | 0.90 | 0.88 | 1.28 | 0.68 |
| Netherlands | 2860 | 1.45 | 5500 | 1.94 | 1.92 | 1.80 | 1.07 |
| German DR | 2279 | 1.15 | 2254 | 0.79 | 0.99 | 0.93 | 1.06 |
| Switzerland | 2094 | 1.06 | 3747 | 1.32 | 1.79 | 1.51 | 1.19 |
| Israel | 2049 | 1.04 | 2712 | 0.96 | 1.32 | 1.60 | 0.83 |
| Sweden | 1998 | 1.01 | 3462 | 1.22 | 1.73 | 1.47 | 1.18 |
| Czechoslovakia | 1355 | 0.69 | 1337 | 0.47 | 0.99 | 1.23 | 0.80 |
| Belgium | 1251 | 0.63 | 1880 | 0.66 | 1.50 | 1.71 | 0.88 |
| Spain | 1166 | 0.59 | 1332 | 0.47 | 1.14 | 1.61 | 0.71 |
| Austria | 1093 | 0.55 | 1419 | 0.50 | 1.30 | 1.35 | 0.96 |
| PR China | 988 | 0.50 | 599 | 0.21 | 0.61 | 1.42 | 0.43 |
| South African R | 965 | 0.49 | 1116 | 0.39 | 1.16 | 1.28 | 0.91 |
| Egypt | 918 | 0.46 | 498 | 0.18 | 0.54 | 1.19 | 0.45 |
| Finland | 903 | 0.46 | 1216 | 0.43 | 1.35 | 1.41 | 0.95 |
| Denmark | 815 | 0.41 | 2305 | 0.81 | 2.83 | 1.75 | 1.62 |
| Hungary | 789 | 0.40 | 989 | 0.35 | 1.25 | 1.59 | 0.79 |
| Greece | 710 | 0.36 | 628 | 0.22 | 0.88 | 1.34 | 0.66 |
| Brazil | 585 | 0.30 | 641 | 0.23 | 1.10 | 1.68 | 0.65 |
| New Zealand | 585 | 0.30 | 683 | 0.24 | 1.17 | 1.42 | 0.82 |
| Yugoslavia | 548 | 0.28 | 432 | 0.15 | 0.79 | 1.51 | 0.52 |
| Taiwan | 523 | 0.26 | 473 | 0.17 | 0.90 | 1.62 | 0.56 |
| Norway | 499 | 0.25 | 699 | 0.25 | 1.40 | 1.55 | 0.90 |
| Argentina | 476 | 0.24 | 501 | 0.18 | 1.05 | 1.64 | 0.64 |
| Nigeria | 418 | 0.21 | 195 | 0.07 | 0.47 | 1.30 | 0.36 |
| Bulgaria | 398 | 0.20 | 324 | 0.11 | 0.81 | 1.52 | 0.53 |
| South Korea | 388 | 0.20 | 447 | 0.16 | 1.15 | 1.77 | 0.65 |
| Saudi Arabia | 364 | 0.18 | 144 | 0.05 | 0.40 | 1.08 | 0.37 |
| Romania | 338 | 0.17 | 307 | 0.11 | 0.91 | 1.52 | 0.60 |
| Turkey | 284 | 0.14 | 187 | 0.07 | 0.66 | 1.35 | 0.49 |
| Mexico | 236 | 0.12 | 173 | 0.06 | 0.73 | 1.51 | 0.49 |
| Ireland | 222 | 0.11 | 381 | 0.13 | 1.72 | 1.74 | 0.99 |
| Iraq | 208 | 0.11 | 109 | 0.04 | 0.52 | 1.28 | 0.41 |
| Hong Kong | 194 | 0.10 | 127 | 0.04 | 0.65 | 1.29 | 0.51 |
| Singapore | 184 | 0.09 | 74 | 0.03 | 0.40 | 1.44 | 0.28 |
| Portugal | 165 | 0.08 | 244 | 0.09 | 1.48 | 1.66 | 0.89 |
| Venezuela | 139 | 0.07 | 165 | 0.06 | 1.19 | 1.81 | 0.65 |
| Pakistan | 131 | 0.07 | 144 | 0.05 | 1.10 | 1.35 | 0.81 |
| Thailand | 125 | 0.06 | 100 | 0.04 | 0.80 | 1.34 | 0.60 |
| Kuwait | 117 | 0.06 | 62 | 0.02 | 0.53 | 1.08 | 0.49 |
| Malaysia | 108 | 0.05 | 92 | 0.03 | 0.85 | 1.36 | 0.63 |
| Chile | 99 | 0.05 | 75 | 0.03 | 0.76 | 1.76 | 0.43 |
| Iran | 83 | 0.04 | 51 | 0.02 | 0.61 | 1.30 | 0.47 |
| Jordan | 51 | 0.03 | 45 | 0.02 | 0.88 | 1.31 | 0.67 |
| + 67 countries | 723 | 0.37 | 539 | 0.19 | | | |

## Útkeresés a francia kutatás értékeléséhez

Az *Impakt* előző számában (1. évfolyam, 4. szám, 9. old., 1991 december), a *Nature* nyomán beszámoltunk a francia – nem katonai – kutatási költségvetés örvendetes növekedéséről. (1992-ben: 51.1 milliárd frank). Annak ellenőrzésére, hogy e pénzek felhasználása milyen kézzelfogható eredményekhez vezet, 11 francia minisztérium és kutatási szervezet 1990-ben létrehozta az *Observatoire des Science et des Techniques*-t (a tudomány és technológia megfigyelőállomását), amelynek feladata mennyiségi adatok segítségével rendszeres időközönként a francia K & F eredmények bemutatása. Az OST első beszámolója, a *Science & Technologie, Indicateurs 1992* (286 oldalon), 1991 októberében látott napvilágot. (A kötet az MTA Könyvtárában megtekinthető. Megtisztelő és jóleső tény, hogy a kötet 24 táblázata és grafikonja az MTAK Informatikai igazgatóságán kidolgozott tudománymetriai adatokra épül.)

Ezzel párhuzamosan a francia Nemzeti Oktatási Minisztérium egy érdekes nemzetközi közvéleménykutatást kezdeményezett, amelynek magyar vonatkozásáról az alábbi levél tájékoztat (címzett az MTA elnöke).

Tisztelt Uram!

Jelenleg széleskörű vizsgálatot folytatunk a francia egyetemeken folyó kutatások minőségéről. Különböző mennyiségi és minőségi jellemzők felhasználásával kívánunk felépíteni egy adatbázist. Arra törekszünk, hogy az értékelés során valamennyi lehetséges oldaláról közelítsük a kérdést.

Mellékelten megküldök önnek egy egyszerű kérdőívet. Megköszönném, hogyha felelne azokra a kérdésekre, amelyekre tud. Tisztában vagyok azzal, hogy kérésem külön terhet jelent bokros teendői mellett. Válaszával azonban segítene feltárni a kiemelkedő szakterületeket, azonosítani azokat amelyek gyengék és támogatásra szorulnak. Célunk mind a kutatás feltételeinek, mind a graduális képzés minőségének javítása. Mindkettő szempont elsőbbséget élvez a francia kormány szemében.

Vincent COURTILLOT
kutatási és továbbképzési igazgató
Nemzeti Oktatási Minisztérium

1. Soroljon fel olyan francia tudósokat a szakterületéről, akiket elsőosztályú kutatónak tart. (Név, szakterület, egyetem)

2. Ismer-e közvetlenül vagy közvetve eqyéb szakterületen dolgozó kiemelkedő francia kutatót, vagy francia intézetben dolgozó személyt? (Név, szakterület, egyetem)

3. Ismer-e olyan francia kutatócsoportokat, amelyek világszínvonalon dolgoznak? (Név, szakterület, egyetem)

4. Véleménye szerint a fent megadott tudósok jelentősen hozzájárultak-e a tudomány fejlődéséhez
a/ általában
b/ saját szakterületükön
a hozzájárulás néhány szavas leírása:
Csoport, illetve a csoportvezető neve:

5. Ismer-e olyan ígéretes fiatal francia kutatót, aki jelenleg valamely francia egyetemen vagy külföldön dolgozik? (Név, szakterület, egyetem)

Az, hogy egy ilyen széleskörű "peer review"-típusú értékelési kísérlet érdekes, az vitathatatlan. Mint azonban a tudományban minden értékelést; ezt is kétkedő fennhangok kísérik. Az itt következő beszámolót nemrég közölte a *Nature*.

## Friends for France

**The French government is trying out random (as distinct from anonymous) peer review.**

The French ministry of education has hit on a novel way of assessing the quality of those who teach at French universities. In the past few week, several people outside France have been sent letters by the ministry's director of research and graduate studies asking for the names of those French scientists whom the respondents consider to be "first-class scientists", of research groups "that would compare favourably" with others elsewhere and of people who have made "any contribution to science on a broad scale". Many recipients of the questionnaire have been nonplussed by it, not least because answers cannot be obtained simply by checking boxes.

There will, of course, be general sympathy for the ministry's ambitions. The French university system is growing quickly, as is the usual difficulty of telling who is good and who less good. It also makes sense that administrations should seek advice on such questions from outside their own parishes. (The German Max-Planck Gesellschaft has had great success with including scientists from overseas on its advisory councils.) But a general enquiry of the kind now put out is unlikely to provide the ministry of education with more than trouble.

Some recipients of the circular will not answer, some will take endless quasi-judicial trouble and other will sing the praises of their chums. And what would happen if some French academics should set about soliciting responses of the third kind?

*Nature, 352 (18 July) (1991) 176*

## France's peers overseas

SIR – Your amusing, but pessimistic, view [*Nature*, *352 (1991) 176*] of the outcome of our international inquiry into the reputations of the professors employed in the French university system is incomplete.

Your readers should know of the full scope of our attempt to establish a clear, acceptable and (we hope) accurate evaluation system for French university research and graduate studies. We have a scientific advisory council of 25 members, half of them from outside France, including several Nobel and Fields laureates, and chaired by Jean Marie Lehn. The council reviews ministry policy every six months, publishes its opinions and formulates recommendations on longer-term scientific policy.

Thirty groups, each of approximately 15 experts, review all proposals for contract money, advise on the right to award master's or doctoral degrees and evaluate candidates for the newly established *prime d'encadrement doctoral et de recbercbe*. (These are awards of an annual bonus of FF 30 000 for four years to those who have been particularly successful in teaching and directing doctoral students and in producing and publishing innovative research.) The expert committees are similar in several respects to those established a few years ago to evaluate British science and to rank all British university departments. In addition, hundreds of French and foreign experts contribute evaluations of particular projects by mail.

Seven scientific directors and their staff use all this material to prepare the minister's decisions. The results are discussed with the universities. The principal outcome is a four-year contract between the ministry and each university, committing the state to a minimum level of funding. All evaluations and grants are made public.

The creation of this system has undoubtedly been eased because of the high priority given by the French Government to education and research. One obvious result is that the funds available to universities for research and doctoral studies have risen by more than 30 per cent over the past three years, reaching FF 2900 million in 1992. (The global budget, including the salaries of professors and other staff, is in excess of FF 11 000 million.)

Our further attempt to provide experts with quantitative and external qualitative data must be judged against that background. We are now attempting to use citation indices and have also launched the worldwide inquiry campaign mentioned in your leading article. We do not intend to use the responses directly in making decisions about the funding or promotion of individuals. We want to assemble the answers by department, university and discipline so as to form an opinion of the reputation that costly state-financed scientific research projects have earned abroad. We want to see ourselves as others see us.

Everybody knows that there is no perfect method of evaluating, even in broad terms, the quality of continuing research. Even if the many hundreds of responses to our letter include some along the lines that you predicted, the great majority have been independent straightforward opinions of the reputation of French science in particular fields, and as such have been useful and useable. We shall make a synthesis available as soon as possible.

I should like to take this opportunity to thank the hundreds of scientists outside France who have taken the time and trouble to provide us with serious and unprejudiced responses.

*V. Courtillot, Nature, 353 (31 Oct 1991) 786*

## What's wrong with French literature?

French scientific journals are of such "questionable quality" that few researchers outside France either read them or are willing to contribute to them. Scientists, publishers, students and government officials meeting in February 1991 at a colloquium organised by the research ministry agreed that poor quality produces a downward spiral of falling circulation and a further loss of contributions from respected scientists.

Most of the 1500 French journals are published by small research units and groups of specialists, and have an average print run of 1000. Only 10 per cent are published by the big research institutes.

The most recent survey showed that of 1460 journals published in France during 1984, only 150 were of an international standard. Mathematics journals had the highest standing internationally, with nearly a third of contributions coming from abroad.

Those at the meeting agreed that the way to pull French journals up to international standards is to attract articles from foreign contributors and to include foreign specialists on editorial boards. Synopses in English would widen their readership. French scientists also need to adopt a higher profile in international circles. A recent study by INSERM, the national institute of health and medical research, revealed that French specialists are under-represented on the editorial boards of medical reviews in relation to the strength of French biomedical research.

French scientists and engineers are not good at background reading. Their failure to make the most of the scientific literature seems to begin early in their academic careers. A survey presented at the meeting showed that half of undergraduate and graduate students think lecture notes and photocopies are enough to pass their course examinations. In the six months preceding the survey, 40 per cent of them had spent £18 or less on textbooks.

The problem of poor reading habits is compounded by a lack of science textbooks. The survey showed that France produces only 6300 new science books a year, compared with more than 9000 in Britain. University teachers, the survey revealed, have begun to recommend books in English.

One way of tackling the reluctance to read might be the introduction of a hitherto unknown entity in France – the campus bookshop. There are just five campus bookshops in the whole France.

*New Scientist, (16 Feb 1991) 17*

# Néhány szempont természettudományi kutatócsoportok publikációs tevékenységének értékeléséhez

**A jelen közlemény néhány olyan szempontot, illetve tudománymetriai mutatószámot ismertet tézisszerűen, amelyek – természetesen a helyi körülmények szerint módosítva – alkalmasak arra, hogy kutatócsoportok tudományos publikációs tevékenységének eredményességét objektív módszerekkel segítsék megítélni.**

1. *Az értékelendő szervezeti egység:* – *tudományos csoport*, vagyis az a szervezeti egység, amely szakmailag, személyileg és anyagilag is környezetétől elkülönített vagy elkülöníthető.

2. *Az értékelés tárgyai:* – a *Science Citation Indexben* (SCI) feldolgozott folyóiratok cikkei (article), összefoglaló (review), note és letter típusú közleményei.

3. *Az értékeléssel átfogott időtartam:* – általában három-öt év. (Célszerű a három-, illetve ötéves időszakra vonatkozó átlagos mutatószámokat használni)

4. *Az értékelés feltételei:*

*a.* az értékelendő csoport szakmai tevékenysége hozzárendelhető legyen a SCI-ben megadott szakterületek, illetve a Braun, Glänzel, Schubert adatforrás [1] által használt szakterületi besorolás valamelyikéhez,

*b.* az értékelendő csoport bibliográfiája legalább három-öt évre visszamenően rendelkezésre álljon (első közelítésben elegendő a csoport státuszban lévő szerzőinek neve).

5. *Az értékelés mutatószámai:*

*a. Relatív Publikációs Eredményesség* ($P_p$) (rövid időtávra szóló mennyiségi- és hatás-mutatószám):

$$P_p = P_S \times n \times \underline{f} = ECR/\underline{h} \times n \times \underline{f} = \underline{f}/\underline{h} \times \Sigma_{i=1}^{n} h_i$$

ahol:

| | |
|---|---|
| $P_S$ = | Publikációs stratégia (az értékelendő cikkeket megjelentető folyóiratok színvonala a terület átlagához viszonyítva) |
| n: | az illető kutatócsoport cikkeinek száma |
| $\underline{f}$: | az értékelendő cikkekre vonatkozó átlagos kooperációs hányad (lásd a 6. pontot) |
| ECR: | Expected Citation Rate (azon folyóiratok ötéves idézettségi átlaga[1] (ha tetszik hatástényezője, azaz: idézetek száma osztva a cikkek számával), amelyekben az illető csoport cikkei megjelentek.) |
| $\underline{h}$: | a megfelelő tudományterülethez rendelt folyóiratok (cikkeinek) idézettségi átlaga |
| $h_i$: | a csoport i-edik publikációja, amely a $h_i$ átlagos idézettségű folyóiratban jelent meg. |

Különböző létszámú kutatócsoportok összehasonlítására a $P_p/k$ mutatószám alkalmazandó, ahol k a kutatók száma.

*b. Relatív Szakterületi Eredményesség* ($P_w$) (hosszabb időtávra szóló mennyiségi- és hatás-mutatószám):

$$P_w = R_w \times n \times \underline{f} = I/n \times \underline{h} \times n \times \underline{f} = OCR/\underline{h} \times n \times \underline{f} = I/\underline{h} \times \underline{f}$$

ahol:

| | |
|---|---|
| $R_w$: | Relatív Szakterületi Idézettség (az értékelendő cikkek tényleges idézettsége a szakterület átlagához viszonyítva), |
| OCR: | Observed Citation Rate (az illető csoport cikkeinek ötéves idézettségi átlaga [1]; idézetek száma (I) osztva a cikkszámmal (n) ) |

Különböző létszámú kutatócsoportok összehasonlítására a $P_w/k$ mutatószám használandó, ahol k a kutatók száma.

*Hasonló tudományterületeken* dolgozó kutatócsoportok összehasonlító értékelésére egyszerűbb mutatószámok is alkalmazhatók. Ilyen például:

*c. Teljes Súlyozott Hatás* (TWI)

$$TWI = \Sigma_{i=1}^{n} n_i h_i$$

ahol azoknak a folyóiratoknak a Garfield szerinti hatástényezőit vagy öt évre vonatkoztatott idézettségi átlagait ($h_i$) összegezzük, ahol az illetők a cikkeiket publikálták ($n_i$ az i-edik folyóiratban megjelent cikkek száma).

Ha egy vagy két év publikációra vonatkozó adatokat összegezünk, akkor rövid időtávra, ha ennél hosszabb időszakra vonatkoztatunk, akkor hosszabb időtávra szóló mind mennyiségi, mind hatáskarakterű mutatószámot kalkulálhatunk. A megfelelő fajlagos adatot a kutatók számával való osztás adja.

*d. Kutatónkénti Átlagos Idézettség* ($Q_r$)

$$Q_r = I/k$$

$Q_r$, TWI-hez hasonlóan, nem független attól a tudományterülettől, ahol az illető csoport dolgozik. Fajlagos indikátor, hiszen egy kutatóra normálja az idézetek számát (I). Hosszabb időtávra szólóan érdemes figyelembe venni (minimum 3-5 év idézeteinek alapján), k a kutatók száma (kapacitása) a csoportban. A $Q_r$-mutatószám mind mennyiségi, mind hatás (színvonal, minőség) összefüggésekre egyaránt vonatkozik.

Természetesen a $P_S$, valamint az ECR, OCR és $R_w$ mutatószámok mint hatást (bizonyos értelemben színvonalat, minőséget) tükröző adatok külön-külön is használhatók.

6. *Átlagos kooperációs hányad* ($\underline{f}$)

Célszerű lenne, ha a cikkek teljes "credit"-je az azokat létrehozó intézmények (csoportok) között hozzávetőlegesen a végzett munka arányában osztódna szét. Ezzel szemben csupán az első szerző intézményét enyhén preferáló algoritmust javasolok az egyszerűség kedvéért:

| Összes szerzői munkahelyként megadott intézmény* száma | sorrendje: 1. | 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|---|---|
| 1 | 1 | | | | | |
| 2 | 0.6 | 0.4 | | | | |
| 3 | 0.5 | 0.25 | 0.25 | | | |
| 4 | 0.4 | 0.20 | 0.20 | 0.20 | | |
| 5 | 0.3 | 0.175 | 0.175 | 0.175 | 0.175 | |
| 6 | 0.2 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 |

* Az egy adott intézményen belüli kooperációt figyelmen kívül hagyhatjuk.

Az intézményi részhányad azt jelenti, hogy ahány *különböző intézmény* kutatója, csoportja szerepel a cikk szerzőjeként, annyifelé osztandó a cikk egységnyinek tekintett "credit"-je. (Tudnivaló, hogy a szerzők sorrendje nem mindig és nem teljesen korrelál a végzett munka mértékének és kiválóságának megfelelően összeállítható sorrenddel, de többé-kevésbé mégis tükrözi azt [2]).

Az értékelés részleteiről, valamint a mutatószámokról bővebben a [3] és a [4] irodalmi hivatkozásban olvashatunk.


[1] Braun,T., Glänzel,W., Schubert,A.: Országok, szakterületek tudománymetriai mutatószámai 1981-1985, MTA Könyvtár, 1992
[2] P.Vinkler: Research contribution, authorship and team cooperativeness, to be published in *Scientometrics*, 1992
[3] Evaluation of some methods for the relative assessment of scientific publications, *Scientometrics*, 10 (1986) 157
[4] An attempt of surveying and classifying bibliometric indicators for scientometric purposes, *Scientometrics*, 13 (1988) 239


*Vinkler Péter, MTA KKKI*

## Charting the decline

The letter from *J.F. Lamb* [1] has prompted us to examine some data extracted from a recently published study [2]. Table 1 shows country-by-country mean citation rates of papers published in *Nature* during 1981-85 as related to the mean citation rate of all papers published in *Nature* in the same period. All countries publishing more than ten papers are shown.

The relative citation rate (RCR) has a value greater than 1 when the papers of the country in question are cited above the journal's average and conversely. *Nature* published 8043 papers in 1981-85 with an average citation rate of 16.63.

**Table 1**
**RCR of papers in *Nature***

| Country | RCR | Country | RCR |
|---|---|---|---|
| Sweden | 1.92 | Poland | 0.70 |
| Switzerland | 1.78 | Italy | 0.67 |
| Japan | 1.46 | Austria | 0.67 |
| USA | 1.18 | Norway | 0.64 |
| West Germany | 1.17 | Canada | 0.62 |
| Denmark | 1.07 | USSR | 0.52 |
| Israel | 1.05 | Australia | 0.46 |
| The Netherlands | 1.01 | Spain | 0.46 |
| France | 0.92 | Brazil | 0.41 |
| Belgium | 0.79 | New Zealand | 0.41 |
| United Kingdom | 0.77 | Ireland | 0.35 |
| Hungary | 0.75 | South Africa | 0.23 |
| Finland | 0.70 | India | 0.14 |

As can be seen, Sweden heads the ranking, followed by Switzerland, Japan, the United States and West Germany. The United Kingdom is ranked eleventh. This could be considered to be in line with the reports of Lamb and others on the decline of British science [3,4] although other studies did not find any statistical decline in the indicators of British science during the 1980s [5-8]. For that reason, we consider the whole problem of the decline of British science is still open to discussion – leaving aside questions such as what is meant by decline [9] and whether whatever it is, is correlated with the decline in funding, for example.

Accordingly, we have repeated the same exercise with another 'high quality' periodical, the *Biochemical Journal*.

Table 2 presents the results, covering 4475 papers published on 1981-85, with an average citation rate per paper of 6.90. As will be seen, the United Kingdom is ranked in first position.

Our sole purpose here is to suggest that a counting such as that of Lamb is not by itself a sufficient measure of decline.

Bibliometric methods are not the most serviceable tools unequivocally to prove such a decline during the 1980s. A more realistic approach would show [2] that British science, like science in other countries, is in decline in some fields and on an upward move in others.

Moreover, in any population of papers, the distribution according to quality (citation rate is but a proxy) is highly skewed. Our investigations [2] indicate that probably the most important factor in improving scientific performance of a country is finding a way to raise the quality and not quantity of the publications by influencing the skew distribution to have a low quality 'tail' as short as possible.

**Table 2**
**RCR of papers in the *Biochemical Journal***

| Country | RCR | Country | RCR |
|---|---|---|---|
| United Kingdom | 1.22 | Norway | 0.80 |
| Sweden | 1.21 | Canada | 0.79 |
| Switzerland | 1.16 | France | 0.79 |
| Belgium | 1.12 | Spain | 0.79 |
| Denmark | 0.92 | Austria | 0.79 |
| The Netherlands | 0.92 | Hungary | 0.74 |
| South Africa | 0.90 | Ireland | 0.67 |
| West Germany | 0.89 | Finland | 0.66 |
| USA | 0.89 | Poland | 0.64 |
| Australia | 0.87 | Argentina | 0.63 |
| Israel | 0.82 | USSR | 0.49 |
| Japan | 0.81 | India | 0.41 |
| New Zealand | 0.80 | Chile | 0.25 |


[1] *Nature*, 343 (1990) 404
[2] *Scientometrics*, 16 (1989) 3
[3] *Nature*, 316 (1985) 587
[4] *Nature*, 330 (1987) 123
[5] *Science & Public Policy*, 15 (1988) 165
[6] *Scientometrics*, 14 (1988) 475
[7] *Scientometrics*, 15 (1989) 165
[8] *The Evaluation of Scientific Research*, Ciba Foundation Conference, p. 32 (Wiley, Chichester, 1989)
[9] *ISIS*, 75 (1984) 697

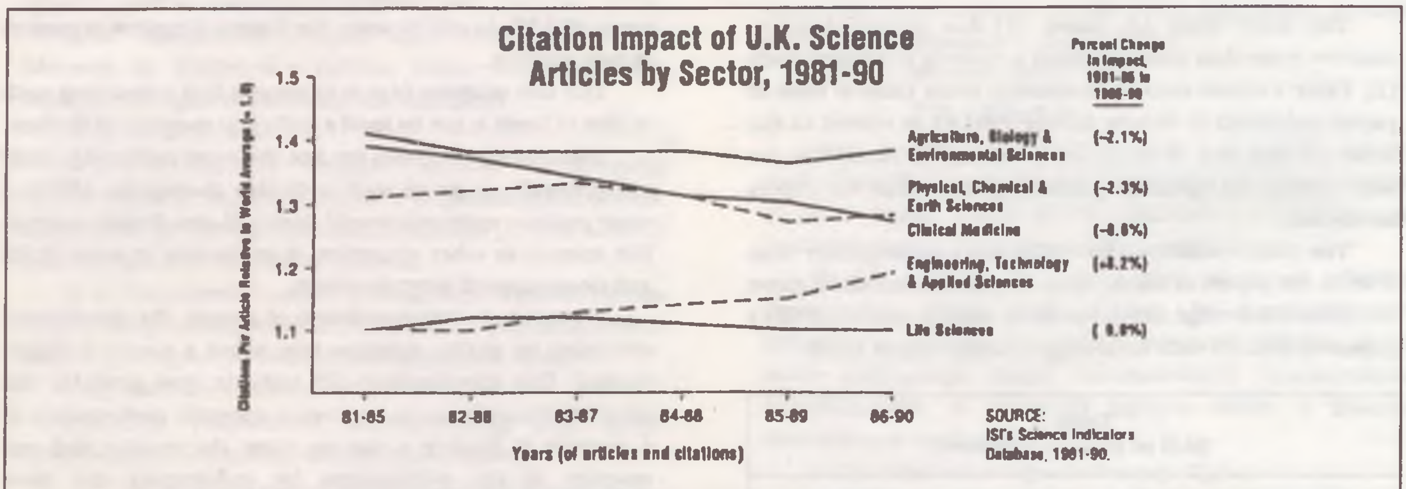

*T. Braun, A. Schubert, Nature, 345 (24 May 1990) 286*

## Weaker Papers in Medicine, Physical Sciences Drag U.K. Science Down

### But Applied Science Up in 1980s

As a follow-up to the recent report on the scientific performance of each of the Group of Seven nations (see *Science Watch*, 2 (Jan-Feb 1991) 1-2), *Science Watch* decided to take a closer look and analyze the citation-per-paper performance of each country in five broad fields of research. In this a first of a seven-part series, the focus is on the United Kingdom – the country that exhibited the largest decline in citation impact during the 1980s (-3.4%).

As the chart shows, of all U.K. journal articles those in clinical medicine and the physical sciences (physics, chemistry, and earth sciences) lost the most ground during the decade. The citation impact of clinical studies fell some 8.6%, and the decline was steady from the beginning of the end of the 1980s. For papers in the physical sciences, the downturn came around 1985 and amounted to a loss in impact of 2.3%.




On the other hand, articles representing the applied sciences (such as engineering, technology, and other applied fields) rose dramatically in impact – an 8.2% increase.

Articles in the basic biological and agricultural science turned in a relatively steady performance.

To obtain these results, *Science Watch* sorted U.K. articles published in some 3000 of the world's leading journals into five categories corresponding to the journal coverage of each of the five science editions of ISI's Current Contents. Only articles (and not other types of items, such as reviews, editorials, letters, meeting abstracts, etc.) were tracked: by restricting the analysis to article alone, *Science Watch* attempted to assess, as precisely as possible, the impact of original research from each nation.

The time series chart depicts the citation per paper for articles published and cited during six successive and overlapping five-year periods. The average (=mean) citations-per-paper figures for U.K. articles in each category and for each period were then compared to the respective world average to arrive at measures of relative performance.

The table on the next page provides supplementary data on the "uncitedness" and volume of U.K. science articles.

The major trends in each area can be summarized as follows:

– Papers published in journals of clinical medicine showed the worst performance – a loss of 8.6% in relative citation impact and a 7.9% loss in real terms. The group also exhibited the largest increase in uncitedness (+3.4% vs. an average of just +0.3%), and by far the largest increase in number of articles published (+31.4, or 8.1% more than the world's average increase of 23.3%). In other words, U.K. clinicians produced more during the decade but much of it was of marginal influence.

– Articles in the physical sciences rose in their citation impact early in the decade but fell in 1985 and thereafter. For the decade the decline was 2.3% (in real terms, citation impact was actually up 1.7%, but this was not enough to keep pace with the rest of the world). Uncitedness in the physical sciences rose 2.9%, compared to an average increase of 2.0%. Volume rose only about a third that of the world average.

– The impact of articles in agricultural biology and environmental sciences dropped 2.1% during the 1980s, but the decline came early in the decade. The group showed almost no increase in volume (just +2% vs. a +9.5% average for the world) and a 1.1% increase in uncitedness compared with an average of +0.2%.

– Articles in the life sciences, representing basic biological research, were the constant feature in the changing landscape of U.K. science: relative citation impact ended the decade where it began (the real increase of 6.9 closely matched that of the world); uncitedness rose only slightly more than the world average (+1.1% vs. +0.8%); and the increase in volume was well below the world average (+13.3% vs. +19.2%).

– Articles representing engineering, technology & applied sciences soared 8.2% in impact over the decade (in real terms they rose 3.2%). The performance for the United Kingdom was especially strong in the last five year period, 1986-90, and uncitedness actually fell during the last two periods from a high in 1984-88. The increase in volume of 12.0% was two-thirds the world average of +18.1%.

**Percent of Uncited U.K. Articles by Sector**

| Years | AB&ES | PC&ES | CM | ET&AS | LS |
|---|---|---|---|---|---|
| 1981-85 | 40.1 | 32.1 | 42.7 | 59.3 | 29.1 |
| 1982-86 | 40.6 | 32.4 | 43.2 | 60.7 | 29.5 |
| 1983-87 | 40.3 | 32.9 | 43.8 | 60.8 | 29.6 |
| 1984-88 | 40.3 | 33.7 | 45.1 | 60.9 | 29.9 |
| 1985-89 | 40.8 | 34.6 | 45.8 | 60.7 | 30.2 |
| 1986-90 | 41.2 | 35.0 | 46.1 | 60.4 | 30.2 |
| Change 81-85 vs. 86-90 | +1.1 | +2.9 | +3.4 | +1.1 | +1.1 |
| Average change 81-85 vs 86-90 | +0.2 | +2.0 | +0.3 | +0.1 | +0.8 |

**Percent Changes in Volume of U.K. Articles by Sector 1981-85 vs. 1986-90**

| Years | AB&ES | PC&ES | CM | ET&AS | LS |
|---|---|---|---|---|---|
| U.K. articles 81-85 vs. 86-90 | +0.2 | +4.4 | +31.4 | +12.0 | +13.3 |
| Average change 81-85 vs. 86-90 | +9.5 | +15.0 | 23.3 | +18.1 | +19.2 |

Thus, clinical medicine and the physical sciences appear to be the problem areas of U.K. science. Clinical medicine, in particular, shows a decline in citations per paper, both in relative and in real terms, a great increase in the number of paper published, and an increase in the percentage of those papers left uncited during the periods studied. The physical sciences seem to have suffered a blow at mid-decade from which they have only recently begun to recover. Amid concern for these two areas, however, there is some room for satisfaction in the nation's robust performance in the applied sciences and relatively steady showing in the basic biological, agricultural, and environmental sciences.

*Science Watch 2 (March 1991) 8*

## Most cited economists in the SSCI

**1966-1986, ranked by total primary author citations**

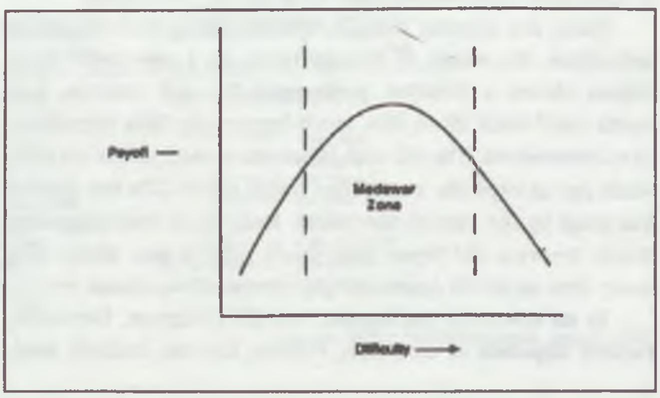
| A | | B | C | D |
|---|---|---|---|---|
| 1. | * | Arrow, K.J. | (1921) | 7,807 |
| 2. | * | Samuelson, P.A. | (1915) | 6,867 |
| 3. | * | Simon, H.A. | (1916) | 5,894 |
| 4. | * | Friedman, M. | (1912) | 5,219 |
| 5. | | Becker, G.S. | (1930) | 4,947 |
| 6. | | Fama, E.F. | (1939) | 4,512 |
| 7. | | Feldstein, M. | (1939) | 4,512 |
| 8. | | Theil, H. | (1924) | 4,207 |
| 9. | * | Stigler, G.J. | (1911) | 4,150 |
| 10. | | Baumol, W.J. | (1922) | 4,053 |
| 11. | * | Buchanan, J.M. | (1919) | 3,428 |
| 12. | | Galbraith, J.K. | (1908) | 3,370 |
| 13. | * | Tobin, J. | (1918) | 3,214 |
| 14. | + | Keynes, J.M. | (1883-1946) | 3,022 |
| 15. | * | Modigliani, F. | (1918) | 2,898 |
| 16. | | Barro, R.J. | (1944) | 2,826 |
| 17. | + | Robinson, J. | (1903-1983) | 2,718 |
| 18. | * + | Hicks, J.R. | (1904-1989) | 2,650 |
| 19. | | Lucas, R.E. | (1937) | 2,615 |
| 20. | | Sen, A.K. | (1933) | 2,584 |
| 21. | * + | Myrdal, G. | (1898-1987) | 2,477 |
| 22. | * | Solow, R.M. | (1924) | 2,286 |
| 23. | | Griliches, Z. | (1931) | 2,260 |
| 24. | | Sargent, T.J. | (1943) | 2,119 |
| 25. | | Bowles, S. | (1939) | 2,035 |
| 26. | + | Hotelling, H. | (1895-1973) | 2,015 |
| 27. | | Mincer, J. | (1922) | 2,004 |
| 28. | | Coase, R.H. | (1910) | 1,950 |
| 29. | | Nerlove, M. | (1933) | 1,942 |
| 30. | * | Debreu, G. | (1921) | 1,931 |
| 31. | | Jorgenson, D.W. | (1933) | 1,929 |
| 32. | | Zellner, A. | (1927) | 1,830 |
| 33. | * | Schultz, T.W. | (1902) | 1,816 |
| 34. | | Phelps, E.S. | (1933) | 1,815 |
| 35. | | Black, F. | (1938) | 1,714 |
| 36. | | Stiglitz, J.E. | (1942) | 1,695 |
| 37. | | Olson, M. | (1932) | 1,662 |
| 38. | * | Klein, R.L. | (1920) | 1,641 |
| 39. | | Malinvaud, E. | (1923) | 1,625 |
| 40. | + | Lintner, J. | (1916-1984) | 1,623 |
| 41. | | Granger, C.W.J. | (1934) | 1,604 |
| 42. | | Jensen, M.C. | (1939) | 1,602 |
| 43. | | Musgrave, R.A. | (1910) | 1,564 |
| 44. | | Bhagwati, J.N. | (1934) | 1,561 |
| 45. | | Alchian, A.A. | (1914) | 1,544 |
| 46. | | Mansfield, E. | (1930) | 1,503 |
| 47. | * + | Kuznets, S. | (1901-1985) | 1,502 |
| 48. | | Chow, G.C. | (1929) | 1,483 |
| 49. | | Hirshleifer, J. | (1925) | 1,417 |
| 50. | | Chenery, H.B. | (1918) | 1,382 |

A = rank, B = name, C = birth year-death year, D = total primary author citations. An asterisk (*) indicates a Nobel laureate. A cross (+) indicates deceased.

*Current Contents (March 12, 1990) 5*

## Choosing a problem

Perhaps the most important single step in the research process is choosing a question to investigate. What most distinguishes those scientists noted by posterity is not their technical skill, but that they chose interesting problems. There is some guidance that may be given.




**On the Figure:** Relationship between degree of difficulty and payoff from solving a problem. Solving problems that are too easy does not advance science, whereas those that are too difficult may be impossible for other scientists to understand, i.e., they are premature. The Medawar zone refers to science as "the art of the soluble."

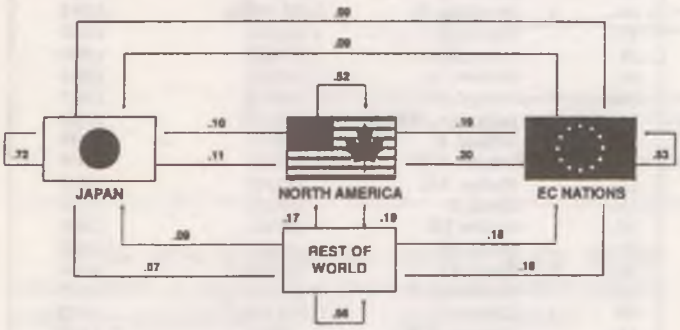
*C. Loeble, BioScience, 40(2) (1990) 123-129*

## Citations Reveal Japan's Scientific Insularity

### Weak Links with US & EC Research Communities

Japanese scientists are much more parochial when it comes to using the world's scientific literature than are scientists in North America, the European Community (EC) nations, or the rest of the world. Moreover the scientific community in Japan is linked to those of North America (United States and Canada) and the EC only about half as strongly as the North American and EC communities are linked to each other. Despite continuing advances in communication between East and West – both technological and cultural – Japan, at least in regard to basic research, shows all the signs of being the island nation that it is.

These are a few of the conclusions that can be drawn from the data presented in the diagram. The numbers next to each arrow are measures of the strength of the citation links between Japan, North America the EC and the rest of the world – not only from one region to the the others, but also from each to itself.




### Trade Balances in Science

To obtain these measures, ISI's Research Department analyzed some 2.92 million citations recorded in the *Science Citation Index* (*SCI*) over five years (1984-1988) to the approximately 897,000 papers indexed in the *SCI* in 1984. It then performed an iterative matrix normalization on the actual citations from each region to others and to itself.

This procedure compensated for the asymmetry in size of the units compared and gave each region the opportunity to cite and to be cited as much as others, despite wide variations in the number of papers indexed from each region in 1984 and the citations from each during 1984-1988.

Once the playing field is levelled using this weighting technique, the world of science takes on a new look. Each region shows a decided preference for self citation, but Japan cited itself 29 to 38% more frequently than the others cited themselves. The EC and Japan cited each other equally, while Japan cited the rest of the world about 22% less than it was cited by the rest of the world. Only in its exchange with North America did Japan give more than it got: about 10% more cites to North American papers than from them.

In its scientific exchanges, the EC (Belgium, Denmark, Federal Republic of Germany, France, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and the United Kingdom) exhibits equanimity with its "trading partners". The EC cited Japan and the rest of the world as much as each cited the EC. The EC did, however, cite North American papers slightly more than North America cited theirs. Notable also is that the link between the EC and the rest of the world – including nearby Switzerland, the Scandinavian countries, and Eastern Europe – was the next strongest citation linkage behind that between North America and the EC.

North America cited the EC and the rest of the world to approximately the same degree. It actually gave the rest of the world 12% more citations than it receive from it, dispelling the argument that is sometimes heard that U.S. and Canadian scientists neglect research from elsewhere. North America, too, had the lowest rate of self citation among the four regions.

**Worldwide Citation Flows 1984-1988**

| *Citations from:* | Citations to: N. America | EC | Japan | Rest of World | Total |
|---|---|---|---|---|---|
| *N. America* | 1078339 | 207019 | 41913 | 123383 | 1450654 |
| *EC* | 292197 | 402295 | 26927 | 83576 | 804995 |
| *Japan* | 60448 | 25462 | 75681 | 12641 | 174232 |
| *Rest of World* | 185915 | 98760 | 18321 | 185381 | 488377 |
| *Total* | 1616899 | 733536 | 162842 | 404981 | 2918258 |
| # '84 papers | 335794 | 187106 | 39840 | 334000 | 896740 |

Source: ISI's *Science Citation Index*, 1984-1988.

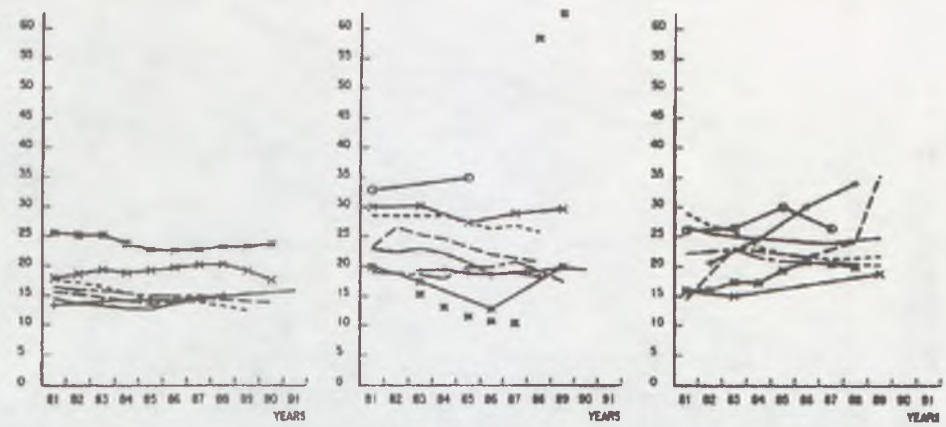
The table lists the number of 1984 articles indexed from each region and the actual, unweighted citation flows. It shows that eight North American papers were indexed in the Science Citation Index in 1984 for every one Japanese paper. It shows, too, that North America was the only region that had a "trade surplus" in citations (1.45 million citation given out but 1.62 million citation received). According to citation data, North America was a scientific "creditor", while the EC, Japan, and the rest of the world were scientific "debtors"

*Science Watch, 1(2) (February 1990) 7-8*

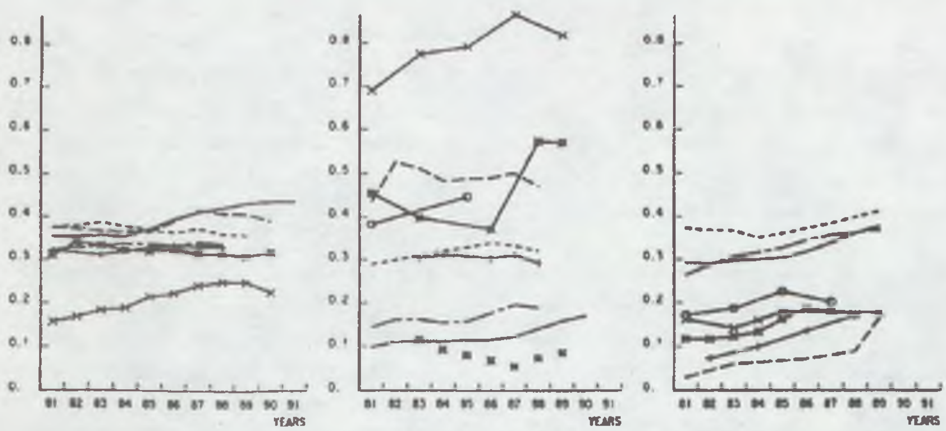
"Forget enlightenment. I want you to concentrate on the structure of the protein molecule."

# OECD Research and Development Indicators. Expenditures on R&D

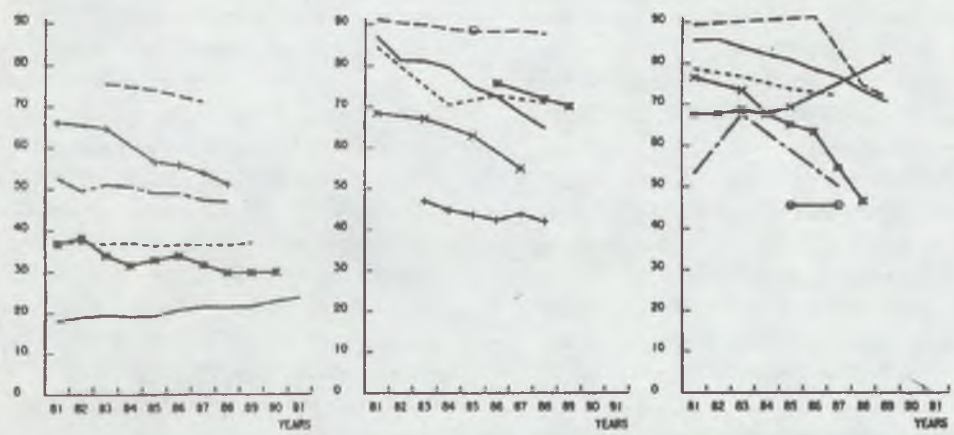
R&D IN THE HIGHER EDUCATION SECTOR AS A PERCENTAGE OF GROSS DOMESTIC EXENTITURE ON R&D




EXPENDITURE ON R&D IN THE HIGHER EDUCATION SECTOR AS A PERCENTAGE OF GDP




GENERAL UNIVERSITY FUNDS AS A PERCENTAGE OF R&D EXPENDITURE IN THE HIGHER EDUCATION SECTOR




**MAJOR ECONOMIES**

- UNITED STATES
- JAPAN
- GERMANY
- FRANCE
- UNITED KINGDOM
- ITALY
- CANADA

**MEDIUM ECONOMIES**

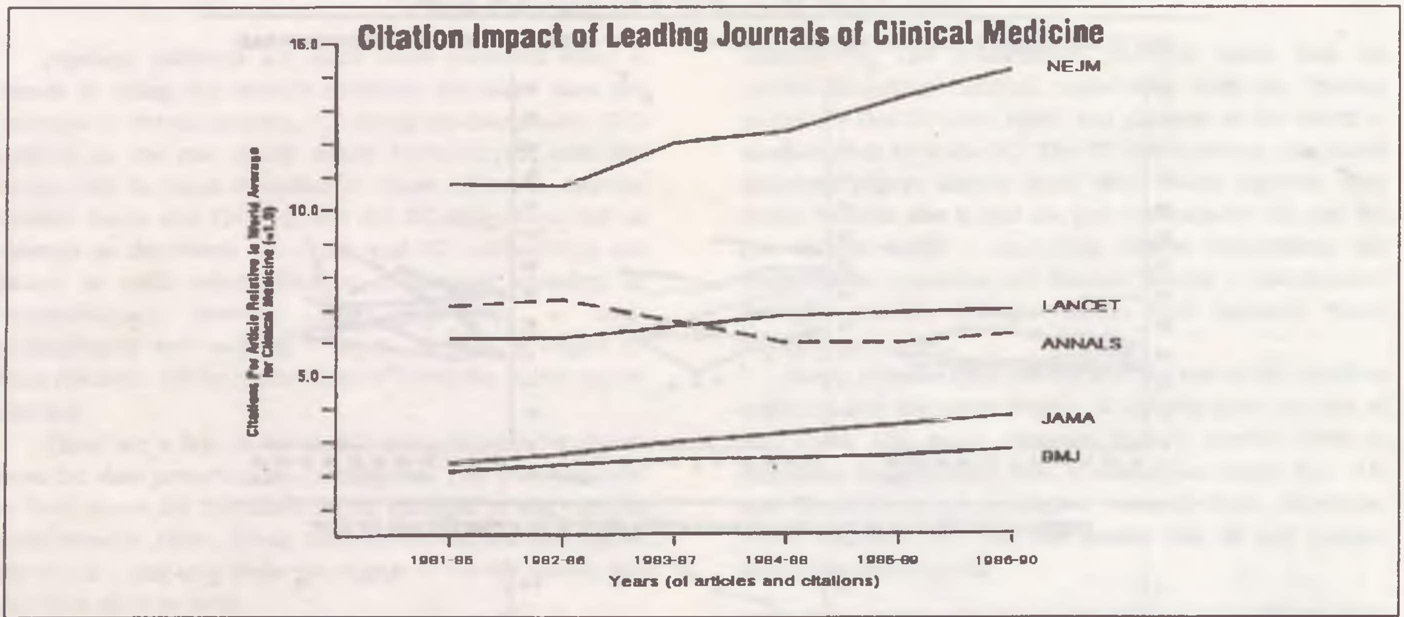
- SPAIN
- TURKEY
- AUSTRALIA
- NETHERLANDS
- YUGOSLAVIA
- BELGIUM
- SWEDEN
- SWITZERLAND
- AUSTRIA

**SMALL ECONOMIES**

- DENMARK
- NORWAY
- GREECE
- FINLAND
- PORTUGAL
- NEW ZEALAND
- IRELAND
- ICELAND

*Source: OECD, STIID Data Base, August 1991*

## New England Journal of Medicine Exhibits Sharp Increase in Influence during 1980s




As Jerome P. Kassirer, of Tufts University and the New England Medical Center in Boston, takes over the helm this month from Arnold S. Relman as Editor-in-Chief at the *New England Journal of Medicine*, he will find the publication shipshape.

Relman's 14 years in the top post have been good ones for the *Journal*. Many now consider it the premier venue for the publication of original medical research. It has also become, under the influence of Relman, a central forum for debate and discussion of many ethical, legal, and economic issues that affect health care and the medical profession. Nearly every week, the media feature one or more stories reported in the current issue of *NEJM*. This combination of key papers, important issues, and growing public interest in the latest medical findings has doubtless contributed to the *Journal*'s 40% increase in circulation – from 167,000 to 233,000 – during Relman's tenure.

As the chart above shows, original research reports (articles) published in *NEJM* during the period 1981-90 received a substantially greater number of citations per paper, on average, than those published in the other leading medical journals. For this analysis, the citations per paper rate for articles published and cited during six successive and overlapping five-year periods was obtained for each of the top five journals of clinical medicine.

Articles appearing in *NEJM* during 1981-85 exhibited approximately 11 times the average citation impact of journals of clinical medicine. By the period 1986-90, *NEJM* had sharply increased its impact, reaching a citations per paper rate of just over 14 times the average.

Not only did *NEJM* boost its citation impact over the last decade, but it also increased its percentage of cited articles from 90.0% to 95.2%, meaning that only 4.8% of original research reports published during 1986-90 were left uncited, and most of these were likely articles appearing late in 1990 which hadn't had sufficient time to collect any citations. In other words, actually all articles published in *NEJM* were cited by others. The "citedness" rate in 1981-90 for the other journals were 84.2% for the *Annals*; 82.1% for *The Lancet*; 76.8% for the *BMJ*; and 65.6% for *JAMA*.

**More Hot Papers, Too**

Moreover, according to *Science Watch* statistics, *NEJM* published more hot papers and blockbuster papers than the other leading journals. During the past 18 months, *Science Watch* has published 10 lists of the Top Ten papers in medicine. *NEJM* has averaged 4 to 5 papers in each ranking. Currently, among the 1,060 articles in ISI's Hot Papers Database (which includes papers published since May 1 1989), 25 are from *NEJM*, 6 from the *Annals*, 5 from *The Lancet*, and 3 and 2, respectively, from *JAMA* and the *BMJ*. The topics treated among the 25 current hot papers from *NEJM* include: the efficacy of zidovudine; genetic alterations in colorectal tumors; modifications of low density lipoprotein that increase its atherogenicity; the use of TIL and IL-2 in treating metastatic melanoma; the action of neutrophils; the effects of captopril following myocardial infarction; and lyme disease, among others.

In terms of blockbuster papers (those that have collected 100 or more citations since publication), *NEJM* likewise fielded more – 3.9% of all articles – than did its peers during 1981-90. The percentages for the others were: 2.7% for the *Annals*; 1.1% for *The Lancet*; .4% for the *JAMA* and .2% for the *BMJ*.

Clearly, Kassirer has a solid base on which to fashion a new era for *NEJM*.

*Science Watch, (June 1991) 7*

*Készült az MTAK házi sokszorosító részlegében* *Felelős kiadó: az MTAK főigazgatója*