2. évfolyam • 11. szám • 1992. november

I M P A K T

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.]

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ISSN 1215-3702

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Centers of excellence emerge from evaluation of East German science

General employment picture

When the Science Council started nearly two years ago with its detailed evaluation of the institutes of the East German *Akademie der Wissenschaften*, or Academy of Sciences, it was generally predicted that about two-thirds of the scientists working in the institutes would be dismissed. The actual results have turned out to be somewhat less brutal than feared: The council's final report recommended retaining about 13 300 jobs of the original 30 000 – most of them to be funded by the federal and state governments in combination.

Taking into account the fact that many former academy employees were working on soft money, and other factors, the real staff reductions will be on the order of 20-30%, says Wilhelm Krull, the head of the research policy unit at the Science Council and the coordinator of the council's evaluation.

Max Planck working groups and institutes, Fraunhofer institutes and "blue-list" institutes are being created at some of the locations highlighted on the map, which shows the five "new states."

In physics the results seem to have been about as severe as expected. The Science Council sub-committee headed by Helmut Gabriel of the Free University, Berlin, identified about 6600 academy jobs in physics, about three quarters of them in applied physics and 30% alone devoted to the development and construction of scientific instruments and apparatus. The committee recommended retaining 2400 positions, barely over a third.

Reorganization of institutes

The Science Council report on the East German academy institutes was released in the middle of the last year, several month ahead of schedule. The subcommittee's report on physics research covers 11 institutes and represents an analysis of daunting complexity. In almost every instance, working groups within each institute are to be

reestablished as autonomous institutions of several possible types or reaffiliated with national institutions such as the Max Planck Society or the Fraunhofer Society, both of which are based in Munich, or with *Grossforschungseinrichtungen*, or large research establishments – Germany's national labs – which are funded primarily by the *Bundesministerium für Forschung und Technologie* (*BMFT*).

Max Planck Groups

X-ray bending in layered systems,
Humboldt University, Berlin
Leader: Rolf Köhler (formerly of the East German Akademie der Wissenschaften)
Partner: Max Planck Institute for Solid-State Research, Stuttgart – Hans Joachim Queisser
Non classical radiation
Humboldt University
Leader: Harry Paul (AdW)
Partner: MPI for Quantum Optics, Garching – Herbert Walther
Quantum chemistry
Humboldt University
Leader: Joachim Sauer (AdW)
Partner: MPI for Solid State-Research – Hans-Georg von Schnering
Theory of reduced-dimension semiconductors
Humboldt University
Leader: Roland Zimmermann (AdW)
Partner: MPI for Solid-State Research – Peter Fulde
Non-linear dynamics in astrophysics
University of Potsdam
Leader: Jürgen Kurths (AdW)
Partner: MPI for Extraterrestrial Physics, Garching – Eugen Morfill
Theoretical many-body systems
University Rostock
Leader: Gerd Röpke (University of Rostock)
Partner: MPI for Nuclear Physics, Heidelberg – Hans A. Weidenmüller
Theory of complex and correlated electron systems
University of Dresden
Leader: Helmut Eschrig (AdW)
Partner: Fritz Haber Institute of the Max Planck Society, Berlin – Matthias Scheffler
Mechanics and heterogeneous solid bodies
Technical University, Dresden
Leader: Wolfgang Pompe (AdW)
Partner: MPI for Metal Research, Stuttgart – Hellmut Fischmeister
X-ray optics
Friedrich Schiller University, Jena
Leader: Eckhart Förster (Schiller University)
Partner: MPI for Quantum Optics, Garching – Siegbert Witkowski
Physics and chemistry of interstellar dust in areas of stellar formation
Schiller University
Leader: Thoms Henning (Schiller University)
Partner: MPI for Radioastronomy, Bonn – Peter G. Mezger
Gravitation theory
Schiller University
Leader: Gernot Neugebauer (University of Jena)
Partner: MPI for Astrophysics, Garching – Jürgen Ehlers

The Science Council's task was especially challenging because talented researchers in the East sometimes were not permitted to publish in the best international journals or attend international conferences, because their political attitude or conduct was deemed incorrect. (Mayer-Kuckuk mentioned Gerd Röpke, a theorist at Rostock, as an example of a person who was not as well-known to Western physicists as he deserved to be, because he refused to go along and get along.) The other side of the coin, of course, was the more prominent East German physicists sometimes obtained their positions as a reward for correct behavior.

The council's next-most-common recommendation, also a result of the East German focus on applied research, has been to reestablish institutes or groups as Fraunhofer institutes or outposts (see list). But affiliations with the Max Planck Society or with the national labs also are suggested, and in some instances units would be incorporated into working groups that Max Planck Institutes have sponsored at universities in the new states (see list).

Science Council review

An evaluation of the kind the Science Council just carried out inevitably gives rise to resentment and complaints of injustice, which often are difficult or impossible for an outsider to assess. In this instance the Science Council's work has been accompanied by charges that its recommendations were biased, that westerners sometimes gave work a low rating because they felt threatened by it. On the whole, however, it seems to be the case – as Krull has claimed – that the council's evaluation has been received as fair and more sympathetic than expected.

"Against previous expectation," Krull has written, "the Science Council's expert group did not encounter a 'desert' in the research establishment of the former GDR. What they found was more than mere oases – despite the political damage sustained by science. Indeed it could be said that... the picture of science was impressive [and that] what was achieved is sometimes amazing."

Fraunhofer Establishments

Institute for Integrated Circuits
Erlangen
Leader: Dieter Seitzer
Establishment for Applied Optics and Micromechanics
Jena
Leader: Wolfgang Karthe
Establishment for Electron Beam and Plasma Technology
Dresden
Leader: Sigfried Schiller
Establishment for Ceramics Technologies and Sinter Materials
Dresden
Leader: Waldemar Hermel
Establishment for Materials Physics and Layer Technology
Dresden
Leader: Wolfgang Pompe

Centers of excellence

The Science Council gave high ratings to parts of the Institute for Solid-State Physics and Electron Microscopy in Halle, which was built up over several decades by Heinz Bethge – a name not quite as familiar of Westerners as Lanius, perhaps, but now recognized to be of comparable stature. The council found Halle's position among the East German institutes to be "outstanding". Because of the quality of its research was deemed to meet the standards of Max Planck Institutes, the council recommended its reestablishment as an MPI, which has occured.

The other MPI that has been established in the east is not strictly speaking in physics but has missions that certainly overlap somewhat with physics: The Institute for Colloid and Boundary Surfaces Research at Berlin-Adlershof.

Another of the physics establishments to receive a very high rating from the council was the Institute for Semiconductor Research in Frankfurt an der Oder. Officials at BMFT say that even though this institute worked for a local semiconductor manufacturer, industrial demands apparently were not too exacting, so a group there was able to do serious materials research – "real forefront work".

Physics Today, 1992 (May), 51-55

Recognizing good work

Few people in research would argue with Maddox [1] about a lot of published research being impenetrable to readers. The question is what to do about it. I spend a lot of my time teaching scientists how to publish 'reader-friendly' papers; one of the tools I use is to get them to review well-written papers, such as Watson and Crick's classic, [2] slices of Einstein's theory of relativity [3] and so on.

The problem is that they know the work is good and they often adjust their opinions accordingly, so I recently did something different. I gave 24 scientists a copy of a paper by Pontecorvo[4] and asked them to read it and to analyse it according to what they thought was good or poor. I gave them no other information about the paper or why I had chosen it, but they were given as much time as they wanted to come to a decision. (The main text is about a thousand words and most were done in 20 minutes.)

I then asked them to assemble along a line ranging from 'great' to 'rubbish' with the mid-point being the dividing line between when an editor should accept it or reject it. Only one person thought it should have been published and most of the rest clustered near 'rubbish'. We had a good exchange of views from both sides but nobody elected to change camps.

Then I told them that I had chosen it because *Current Contents* had listed it as a citation classic (that is, a paper cited more than 400 times) and because it is a well written paper. They were surprised and confused, and found these facts difficult to accept.

My own interpretation (which I discussed with them at the time) is that their judgement was clouded by a mixture of inexperience and perfectionism. Perfectionism is an occupational hazard in science; scientists can easily get hooked into rejecting anything that has a demonstrable flaw (Pontecorvo writes well, but the perfect paper has yet to be written, so my group could all find plausible – to them – grounds for rejection.)

I think this shows a weakness in the way in which we educate researchers, which is not confined to Australia. Too often, students are left to use osmosis to learn how to publish, but this is turning out a proportion (most?) who cannot recognize good papers when they see them. If they cannot do that, what are they going to model their own papers on?

My suggestion is that academics and anyone else involved in the management of research should spend time with students and less experienced scientists to analyse important papers in order to understand how the authors made their points, not just what the points were. This should be an integral part of any higher education and my concern is that too few do it.

Robert Brown
Queensland Industries, Brisbane, Australia

[1] **Maddox, J.:** *Nature* **305, 477-478 (1983).**
[2] **Watson, J.D. & Crick, F.H.:** *Nature* **171, 737-738 (1953)**
[3] **Einstein, A.:** Relativity: the special and general theory. (Authorised translation by Robert W. Lawson).
[4] **Pontecorvo, G.:** Somatic Cell Genetics 1, 397-400 (1975).

Productivity drive

In a recent study on prolific productivity among prominent scientists (*Medical Hypotheses*, in the press), I have identified eight scientists who have been authors of more than 1,000 research publications, including books, monographs and patents as well as regular papers. They are, in chronological order, Thomas Alva Edison, Paul Karrer, Margaret Mead, Giulio Natta, Hans Selye, Herbert C. Brown, Tetsuji Kametani and Carl Djerassi. Among these, Karrer, Natta and Brown were Nobel prizewinners in chemistry. Four criteria that I was able to identify as clues to their prolific productivity are (1) enthusiasm for compulsive work and eccentric life style, (2) physical and/or environmental handicap, (3) pioneering efforts in a new research field and (4) selection of research area, predominantly organic chemistry. If one takes into account the publications of scientists on social and political issues as well, I believe that Bertrand Russell and Linus Pauling (both Nobel prizewinners) also share the credit for prolific productivity, lasting for seven decades.

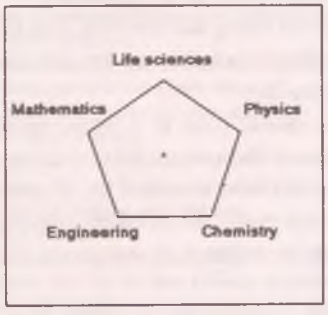
Sachi Sri Kantha
Osaka BioScience Institute, Japan

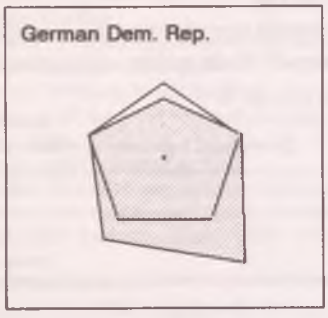
Kutatási erőfeszítések országonkénti szakterületi megoszlása, 1980-1989

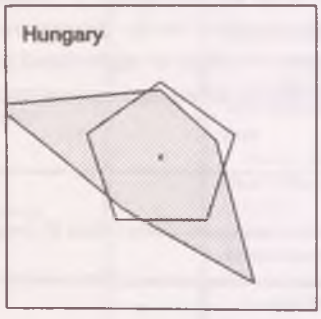
2. A volt szocialista tábor országai

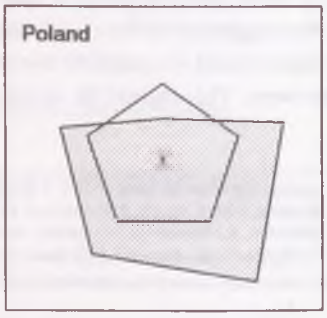
A kutatási erőfeszítések relatív szakterületi megoszlását az egyes országokban az *aktivitási (erőfeszítési) index* segítségével szokás jellemezni. Ez a mutatószám a kutatási erőfeszítést a megjelent publikációk segítségével méri. Egy adott szakterületen megjelent publikációk százalékos részesedését valamely ország teljes publikációs termésből ugyanennek a szakterületnek a világ teljes publikációs termésében való részesedéséhez mérhetjük. Ha a mutatószám értéke 1, akkor az illető ország az adott szakterületen pontosan a világátlagnak megfelelő publikációs aktivitást mutat. 1-nél kisebb, ill. nagyobb index érték a világátlagtól elmaradó, ill. azt meghaladó relatív erőfeszítésről tanúskodik.

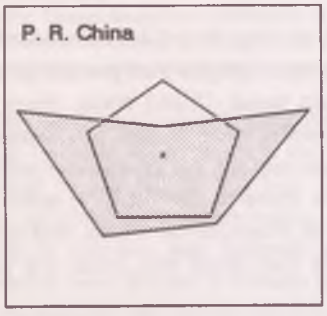
Az *Impakt* egyik korábbi számában áttekintő ábrákat közöltünk az országok publikálási intenzitás szerinti rangsorairól a természettudományok öt nagy szakterületén (élettudományok, fizika, kémia, műszaki tudományok, matematika) [1]. Ennek mintegy kiegészítése a jelen összeállítás, amelyben egyes országok kutatási erőfeszítéseinek szakterületek szerinti megoszlását ábrázoljuk "gyémánt ábrák" (*diamond chart*) segítségével. Ezeken az ábrákon az egyes szakterületek aktivitási (erőfeszítési) indexét az origóból egy szabályos sokszög (esetünkben – az öt fő szakterületnek megfelelően – ötszög) csúcsaiba irányuló egyenesszakasz hossza reprezentálja. Magán az ábrán az egyenesszakaszok végpontjait összekötő sokszög ("gyémánt") látható. A sorozat első ábrája a világátlagokat reprezentáló üres szabályos ötszöget mutatja a csúcsaiban az egyes irányoknak megfelelő szakterületek megnevezésével. Minden egyes ország diagramján a világátlagokat reprezentáló üres szabályos ötszög és az ország aktivitási indexeit mutató besatírozott ötszög együtt látható a könnyebb összehasonlíthatóság kedvéért. (Az ábrák az MTAK Informatikai Igazgatóságán az *SCI* adatbázis alapján épített "Scientometric Indicators Datafiles" adataiból készültek.)

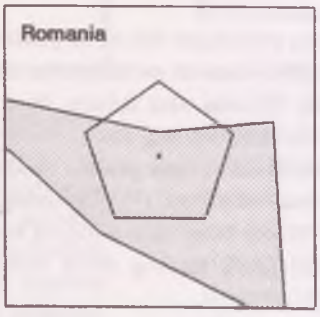


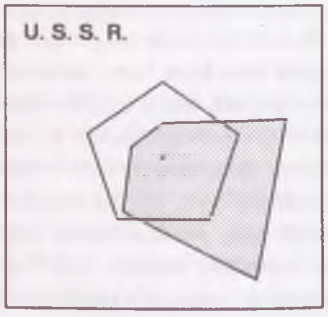












[1] Országok szakterületi publikálási intenzitása a természettudományokban, 1980-1989, *Impakt*, 2(9) (1992) 4-5

Language use in international research: A citation analysis

Language and author distribution

Table 1 presents the top 15 languages in the 1984 ISI data base, ranked by total number of source items. English clearly predominates, with about 760,000, or 85 percent of the total, written in English. Of these, 362,602, or 48 percent, were cited over 2.8 million times from 1984 to 1988. Dividing citations by total source items gives a five-year total impact of 3.74 citations, which is more than four times greater than that of other languages shown in Table 1. Dividing instead by cited source items gives a cited impact of 7.84, at least three times higher than that of other languages.

Thirty other languages are represented in the 1984 ISI data base, accounting for 15 percent of all source items. German is the second most frequent language of publication, with 43,500 source items, or 5 percent of the total. French is third with 35,000 source items, or 4 percent. German has the second highest cited impact, 2.78, followed by French, 2.55. While Russian-language source items in the ISI data base rank fourth in sheer numbers, they rank second on total impact, with 0.9 citations per source item.

Table 2 presents the top 17 nations in the 1984 ISI data base, ranked by number of source items. Source items with first authors based at U.S. institutions lead the list, accounting for 42 percent of the 722,295 addressed source items. The United Kingdom, with 9.3 percent, is second, followed by West Germany, 5.7 percent; the USSR, 5.6 percent; and Japan, 5.5 percent.

Switzerland's source items rank first in total impact (5.89) and cited impact (10.28). While Sweden shows the second highest total impact (5.81), its cited impact of 8.42 is third after that of the United States (9.28). The Netherlands comes in third and fourth in total (5.13) and cited impact (7.98), respectively, followed by the United Kingdom at 4.14 and 7.69.

Table 1
Language distribution of 1984 ISI source items, listing the top 15 languages of publication by total items

Language	Items: Number	Items: % of Total	Citations, 1984-88: Number	Citations, 1984-88: % of Total	Cited Items	Total Impact	Cited Impact
English	759,753	84.7	2,841,591	97.4	362,602	3.74	7.84
German	43,533	4.9	27,745	1.0	9,989	0.64	2.78
French	35,050	3.9	17,081	0.6	6,707	0.49	2.55
Russian	30,578	3.4	26,284	0.9	11,238	0.86	2.34
Spanish	7,161	0.8	945	-	549	0.13	1.72
Japanese	5,743	0.6	2,809	0.1	1,354	0.49	2.07
Italian	5,626	0.6	201	-	156	0.04	1.29
Czech	1,847	0.2	449	-	295	0.24	1.52
Dutch	1,206	0.1	100	-	52	0.08	1.92
Portuguese	1,096	0.1	176	-	125	0.16	1.41
Swedish	780	0.1	12	-	10	0.02	1.20
Polish	710	0.1	163	-	114	0.23	1.43
Hungarian	686	0.1	178	-	102	0.26	1.75
Chinese	682	0.1	219	-	131	0.32	1.67
Ukrainian	622	0.1	169	-	100	0.27	1.69
16 other languages	1,667	0.2	136	-	87	0.08	1.56
Total	896,740	100.0	2,918,258	100.0	393,611	3.25	7.41

Table 2
National distribution of 1984 ISI source items, listing 17 countries with at least 6000 items

Nation	Items: Number	Items: % of addressed items	Citations, 1984-88: Number	Citations, 1984-88: % of addressed items	Cited Items	Total Impact	Cited Impact
United States	303,613	42.0	1,495,949	51.6	161,126	4.93	9.28
United Kingdom	67,439	9.3	279,260	9.6	36,295	4.14	7.69
Fed. Rep. Ger.	41,147	5.7	160,682	5.5	22,240	3.91	7.22
USSR	40,295	5.6	43,325	1.5	14,327	1.07	3.02
Japan	39,840	5.5	162,842	5.6	25,343	4.09	6.43
Canada	32,181	4.5	120,950	4.2	17,775	3.76	6.80
France	31,621	4.4	119,516	4.1	17,184	3.78	6.96
Italy	15,421	2.1	48,089	1.7	8,740	3.12	5.50
Australia	15,058	2.1	57,643	2.0	8,873	3.83	6.50
India	14,346	2.0	19,586	0.7	6,755	1.37	2.90
Netherlands	11,136	1.5	57,145	2.0	7,162	5.13	7.98
Sweden	9,9662	1.3	56,090	1.9	6,660	5.81	8.42
Switzerland	8,316	1.2	48,941	1.7	4,760	5.89	10.28
Ger. Dem. Rep.	7,055	1.0	10,520	0.4	3,000	1.49	3.51
Israel	6,734	0.9	26,704	0.9	4,109	3.97	6.50
Spain	6,231	0.9	15,026	0.5	3,094	2.41	4.86
Belgium	6,002	0.8	22,896	0.8	3,370	3.91	6.79
149 other nations	66,198	9.2	152,354	5.3	33,203	2.30	4.59
Addressed source items	722,295	80.5*	2,896,888	99.3*	384,016	4.01	7.54
Unaddressed source items	174,445	19.5*	21,370	0.7*	9,595	0.12	2.23
Grand total	896,740	100.0*	2,918,258	100.0*	393,611	3.25	7.41

* Percentage of grand total, not of addressed items.

About 175,000 source items did not list an address. These include editorials, correction notes, commemorations, obituaries, and other anonymous source items. Their impact is rather low compared to that of all ISI items.

Who writes in what languages?

One measure of a nation's language use is the number of source items it produces in various languages. Table 3 lists nations by the number of source items written in English, German, French, Russian, Spanish, and Japanese. Also shown are the proportions that these numbers represent of a given nation's and language's total source items and the impact of the source items.

Not surprisingly, the leading nations within each language are the native speakers, nations in which the language is spoken. For example, over half of the English-language source items were written by first authors from the United States, the United Kingdom, Canada, and Australia. West and East Germany account for 49.8 percent of all German-language items. France takes 43.2 percent of all French source items while the Soviet Union, with 98.9 percent of the Russian-language items, and Japan with 98.8 percent of the Japanese-language items, are virtually the only nations writing in Russian and Japanese, respectively.

Regardless of its native language, a nation's English-language publications have the highest impact. For example, 59 percent of West Germany's 41,000 source items were in English and 41 percent in German. Its English-language publications had a cited impact of 8.87 and a total impact of 5.83, compared to 3.08 and 1.16, respectively, for German. Switzerland's exceptional citation record, discussed earlier, is even better in English. Its cited impact of 11.71 and total impact of 7.67 are well above the second-ranked United States, at 9.29 and 4.95, respectively.

Table 3
Who writes in what languages.
Listing nations in order of their publications in the top six languages in the 1984 ISI data base

Source Language Author Nation	Items	Citations, 1984-88	% of Total Items	% of a Nation's Total Items in a Given Language	Total Impact	Cited Impact
English	759,753	2,841,591	100.0		3.74	7.84
United States	302,225		39.8	99.5	4.95	9.29
United Kingdom	67,232		8.8	99.7	4.15	7.70
Japan	36,571		4.8	91.8	4.38	6.65
Canada	31,040		4.1	96.5	3.88	6.86
Fed. Rep. Ger.	24,231		3.2	58.9	5.83	8.87
France	16,301		2.1	51.6	6.45	8.93
Australia	15,017		2.0	99.7	3.84	6.50
India	14,320		1.9	99.8	1.37	2.70
USSR	13,980		1.8	34.7	1.25	4.46
Italy	13,547		1.8	87.9	3.53	5.59
Netherlands	10,751		1.4	96.5	5.30	8.05
Sweden	9,432		1.2	97.6	5.94	8.46
152 other nations	205,106		27.0			
German	43,533	27,745	100.0		0.64	2.78
Fed. Rep. Ger.	16,737		38.4	40.7	1.16	3.08
Ger. Dem. Rep.	4,902		11.3	69.5	0.74	2.34
Austria	1,799		4.1	44.7	0.69	2.25
Switzerland	1,632		3.7	19.6	0.03	1.62
United States	400		0.9	-	0.36	2.51
63 other nations	18,063		41.5			
French	35,050	17,081	100.0		0.49	2.55
France	15,156		43.2	47.9	0.94	2.66
Canada	1,049		3.0	3.3	0.37	2.06
Belgium	976		2.8	16.3	0.60	2.12
Switzerland	554		1.6	6.7	0.65	2.26
United States	406		1.2	-	0.33	2.60
86 other nations	16,909		48.2			
Russian	30,578	26,284	100.0		0.86	2.34
USSR	30,247		98.9	75.1	1.10	2.34
Bulgaria	104		0.3	7.9	0.34	1.67
Ger. Dem. Rep.	47		0.2	0.7	0.19	1.27
United States	27		0.1	-	0.30	1.33
Hungary	17		0.1	0.5	0.47	1.60
Fed. Rep. Ger.	13		-	-	0.31	4.00
Poland	10		-	0.2	0.90	2.25
23 other nations	113		0.4			

Source Language Author Nation	Items	Citations, 1984-88	% of Total Items	% of a Nation's Total Items in a Given Language	Total Impact	Cited Impact
Spanish	7,161	945	100.0		0.13	1.72
Spain	2,044		28.5	32.8	0.26	1.81
Chile	632		8.8	55.3	0.22	1.86
Argentina	550		7.7	28.6	0.17	1.63
United States	415		5.8	0.1	0.05	1.18
Mexico	166		2.3	15.1	0.20	1.62
Venezuela	129		1.8	24.0	0.20	1.18
Brazil	68		1.0	2.3	0.18	1.71
34 other nations	3,157		44.1			
Japanese	5,743	2,809	100.0			
Japan	5,671		98.8	7.9	0.83	2.15
People's Republic of China	29		0.5	1.0	0.24	1.75
Taiwan	17		0.3	2.1	0.00	0.00
Italy	12		0.2	0.1	0.00	0.00
5 other nations	14		0.2			

Unilingual and bilingual nations

English is virtually the exclusive language of publication for the United States, the United Kingdom, and Australia. This is shown in the fourth column of data in Table 3: the percentage of a nation's total 1984 source items that were in English. Over 99.5 percent of U.S., U.K., and Australian source items were in English.

These nations are essentially unilingual in the sense that they write almost only in English and their foreign language publication is comparatively insignificant. The same is true of ISI-indexed publications from Sweden (97.6 percent are in English), Canada and the Netherlands (96.5 percent for both countries), and Japan (91.8 percent).

For West Germany, France, and Italy, English represents a smaller but still majority share of total source items. In each case, the second language of publication is the native language. Added together, English-language and native-language items amount to 99 percent of the total. Thus these nations are bilingual in the sense that they are proficient in two written scientific languages, English and their own.

Summary and conclusions

The data presented here document the predominance of English as the primary language of international research. More source items are published in English by both native and nonnative speakers than any other language, and they have the highest impact. Also, most major scientific nations, regardless of their native language or languages, cite the English-language literature almost exclusively.

In most non-English languages represented in the ISI data base, especially Japanese and Russian, the majority-share producers and consumers are the native-speaking nations. Thus barriers of varying permeability exist around all non-English languages to some extent. These barriers, however, do not prevent or diminish a balanced awareness of research from a given country. As was shown, there is good intranational citation of the world literature, and it is primarily through a nation's English-language publications that the rest of the world learns of its research.

It should be kept in mind that this analysis reflects only one portion of the spectrum of research commmication – formal publication. It might be argued that research publications are the most linguistically transparent form of communication: they are high in numeric and graphic content, and their structured narrative uses a high proportion of technical terms having universal meaning. Thus unilingualism might not be a hard barrier against comprehending the gist of published research.

Unilingualism is a limitation in other, perhaps more professionally important, forms of communication, however. For example, leading-edge research is discussed in personal conversations, departmental meetings, professional conferences, and other verbal exchanges between colleagues well before it appears in print. Thus conversational fluency in more than one language remains a valuable professional asset for researchers. It is also personally enriching, enabling researchers to appreciate more deeply the expression of other nations and cultures – their art as well as their science.

E. Garfield and A. Welljams-Dorof
Annals of the American Academy of Political and Social Science 511(1990) 10-24
(excerpts)

Publish in English, or perish?

A French scientist claims that he was denied promotion within the country's largest research organization because none of his work had been published in English. His accusation has reopened a debate between the country's research establishment, which maintains that English is the new international language, and cultural and political forces that are trying to prevent further erosion of the status of their mother tongue.

The unlikely figure at the centre of this debate, which extends into the presidential palace, is Claude Roux, a lichenologist at the Mediterranean Institute of Ecology and Palaeoecology at the Faculty of Science and Technology at Saint-Jerôme, Marseille. For the past two years, Roux has applied for promotion to the level of director of research at the Centre National de la Recherche Scientifique (CNRS). He was one of 40-50 scientists who had applied each year for eight such positions.

After his second unsuccessful attempt, Roux says that a member of the jury, Jacques Balandreau of the Institut de l'Information Scientifique and Technique (INIST) in Nancy, told him that "your dossier is very good, but you have no chance of being retained because you have not published in English". The confidential report on Roux's application makes no reference to this as a reason for his unfavourable recommendation.

Roux claims his case is part of a pattern by the CNRS to pressure its scientists into publishing in English. "The CNRS message is very clear – you have no future unless you publish in English." In February, Roux says, the president of the CNRS Commission visited his laboratory and "recommended that we associate with an Anglophone author, for the purposes of publication, even if his role was essentially limited to that of a translator."

The Haut Conseil de la Francophonia, a committee under the patronage of French President François Mitterand, has taken up Roux's cause. In its reply to a letter from Roux, the council does not claim to know the true reason for the CNRS decision but nevertheless warns against "cultural alienation", adding that "we have without doubt no need to use English to contribute to the advancement of science."

In 1989, there was a national outcry when the Pasteur Institute decided to publish its journals in English. It was seen as a belated reaction to a trend within the scientific community to converse in English. This is particularly the case in such fast growing fields as molecular biology, but less so in the area in which Roux works.

The president of the jury that evaluated Roux, Robert Barbault of the University of Paris VI, believes that the CNRS position on the importance of English makes perfect sense. "Researchers are not only there to work, but also to diffuse their discoveries", he says. "This diffusion is most efficient if it is via widely read journals, that is in English. Publishing in English not only promotes French science abroad, but also draws attention to other published works in French. To advise a candidate for the post of director of research to make an effort to publish in English is the logical consequence of this."

Leaving aside Roux's case, some French scientists say that the government needs to enforce a clear, consistent policy on the subject of using French in their work. In a letter to Mitterand, Marcel Barbero of the faculty of Sciences at Marseille states "we can no longer accept that the governing boards of the national research organisations, despite the declarations of the Head of State, the government and the ministries, continue to ignore French as an international language of communication and expression in science." He says that the CNRS no longer subsidises scientific journals in French, and that even CNRS conferences held in France are conducted in English.

The CRNS has ignored these directives "because it is more in touch with the scientific realities", says Barbault. "Conferences have to be held in English, and even when we ask the government for cash for translation facilities they don't give it." Roux says such CNRS policies are nonsense, especially when applied to a small field such as lichenology, where "publication in English is not really a consideration".

Whether Roux was qualified for the promotion is, of course, difficult to know. Says Barbault, "not all researchers have the opportunity to direct a team. The job calls for more than just being a good researcher. You have to be an animator and a leader, too."

A similar ambiguity exists when trying to compare the quality of Roux's French publications with comparable publications in English-language journals. Balandreau says that "I simply told him that, if you want to increase your chances (of promotion), you must publish in English-language journals which are peer-reviewed. Roux has a large number of articles, but they are mostly in provincial publications."

Roux disputes that statement. Of 97 publications, 24 of them in the past three years, he says that 15 have appeared in CNRS class-A peer-reviewed international journals (8 French, 7 foreign); 4 in other foreign peer-reviewed journals with a majority of foreign participation; 41 in French journals with peer-review boards composed mainly of foreign scientists; and 31 in other French peer-reviewed journals. Roux says the CNRS is wrong to place a higher value on non-peer-reviewed journals in English than in peer-reviewed French journals.

Whatever the outcome of the Roux case, the government now seems ready to take action. This month, the high council decided that publication of scientific reviews and educational works in French should be a criterion in the evaluation of researchers. It also announced plans to start a European multilingual peer-reviewed journal along the lines of *Nature* and *Science*. The proposed journal, which is expected to contain a substantial portion of articles in French, has apparently received support from the European Community. Other possibilities include a multilingual *Science Citation Index* a council office in New York to complement the existing one in Geneva.

David Bakewell, Nature, 356 (23 April) (1992) 648.

Tandem treatment boosts cure rates after colon cancer surgery

A study on a new and promising adjuvant therapy for post-operative treatment of colon cancer has this period joined the ranks of medicine's hottest papers.

Paper #8 is the preliminary report of a national trial in which the chemotherapeutic agent fluorouracil was combined with levamisole, an immunopotentiator, in the treatment of advanced colon cancer immediately following surgical resectioning. Several regional cancer-treatment groups took part in the study, which involved a total of more than 1,200 patients. The results obtained indicated that the combination of these two drugs significantly reduced the rate of recurrence in cases where cancer had spread to adjacent tissue or to regional lymph nodes – cases generally offering a poor prognosis.

"This is the first convincing evidence that we can truly improve cure-rates by surgical adjuvant treatment of colon cancer, which of course is one of the most common malignant diseases afflicting people in this country," says Charles G. Moertel of the Mayo Clinic in Rochester, Minnesota. "This was a relatively early report, but the results were so striking that we announced our results. Later this Spring, at the meeting of the American Society for Clinical Oncology, we'll be giving the final report on this trial. There are also follow-up studies currently in progress that involve major cancer-treatment groups around the country. Right now, this is generally accepted nationwide as the standard therapy for any patient who has had surgery for colon cancer but who is at high risk of recurrence."

What's hot in Medicine...

Rank	Paper	Citations This Period (Nov-Dec 91)	Rank Last Period (Sep-Oct 91)
1	L.C. Cantley, K.R. Auger, C. Carpenter, B. Duckworth, A. Graziani, R. Kapeller, S. Soltoff, "Oncogenes and signal transduction," *Cell*, 64(2): 281-302, 25 January 1992.[Tufts U., Boston, Mass.]	39	5
2	H.J. Alter, R.H. Purcell, J.W. Shih, J.C. Melpolder, M. Houghton, Q.L. Choo, G. Kuo, "Detection of antobody to hepatitis-C virus in prospectively followed transfusion recipients with acute and chronic non-A, non-B hepatitis," *New Engl. J. Med.*, 321(22):1494-1500, 30 November 1989. [NIAID, Bethesda, Md.; Chiron Corp., Emeryville, Calif.]	37	3
3	E.R. Fearon, B. Vogelstein, "A genetic model for colorectal tumorigenesis," *Cell*, 61(5):759-67, 1 June 1990. [Johns Hopkins U. Sch. Med., Baltimore, Md.]	34	1
4	J.M. Nigro, S.J. Baker, A.C. Preisinger, J.M. Jessup, R. Hostetter, K. Cleary, S.H. Bigner, N. Davidson, S. Baylin, P. Devilee, T. Glover, F.S. Collins, A. Weston, R. Modali, C.C. Harris, B. Vogelstein, "Mutations in the p53 gene occur in diverse human tumor types," *Nature*, 342(6250):705-8, December 1989. [John Hopkins U. Sch. Med., Baltimore, Md.; Duke U. Durham, N.C.; NCI, Bethesda, Md.; Leiden St. U. The Netherlands; U. Michigan, Ann Arbor]	28	2
5	P.A. Volberding, S.W. Lagakos, M.A. Koch, C. Pettinelli, M.W. Myers, D.K. Booth, H.H. Balfour, R.C. Reichman J.A. Bartlett, M.S. Hirsch, R.L.Murphy, W.D. Hardy, R. Soeiro, M.A. Fischl, J.G. Bartlett, T.C. Merigan, N.E. Hyslop, D.D. Richman, F.T. Valentine, L. Corey, and the AIDS Clinical Trial Group of NIAID, "Zidovudine in asymptomatic human immunodeficiency virus infection: A controlled trial in person with fewer than 500 CD-4 positive cells per cubic millimeter," *New Engl. J. Med.*, 322(14):941-9, 5 April 1990. [22 U.S. institutions]	26	10
6	D.D. Ho, T. Moudgil, M. Alam, "Quantitation of human immunodeficiency virus type-1 in the blood of infected persons," *New Engl. J. Med.*, 321(24):1621-5, 14 December 1989. [UCLA Sch. Med., Los Angeles, Calif.]	24	*
7	A.J. Weiner, G. Kuo, D.W. Bradley, F. Bonino, G. Saracco, C. Lee, J. Rosenblatt, Q.L. Choo, M. Houghton, "Detection of hepatitis C viral sequences in non-A, non-B hepatitis," *Lancet*, 335(8680):1-3, 6 January 1990. [Chiron Corp., Emeryville, Calif.; Ctr, Disease Control, Atlanta, Ga.]	24	*
8	C.G. Moertel, T.R. Fleming, J.S. MacDonald, D.G. Haller, J.A. Laurie, P.J. Goodman, J.S. Ungerleider, W.A. Emerson, D.C. Tormey, J.H. Glick, M.H. Veeder, J.A. Mailliard, "Levamisole and fluorouracil for adjuvant therapy of resected colon carcinoma," *New Engl. J. Med.*, 322(6):352-8, 8 February 1990. [10 U.S. institutions]	24	*
9	B.D. Kahan, "Drug therapy: Cyclosporine," *New Engl J. Med.*, 321(25):1725-38, 21 December 1989. [U. Texas Med. Sch. Houston]	21	*
10	E.R. Fearon, K.R. Cho, J.M. Nigro, S.E. Kern, J.W. Simons, J.M. Ruppert, S.R. Hamilton, A.C. Preisinger, G. Thomas, K.W. Kinzler, B. Vogelstein, "Identification of a chromosome-18q gene that is altered in colorectal cancers," *Science*, 247(4938):49-56, 5 January 1990. [Johns Hopkins U. Sch. Med., Baltimore, Md.; Inst. Curie, Paris, France]	21	4

SOURCE: ISI's Hot Papers Database
NB. Only papers published since November 1989 are tracked. As asterisk indicates that the paper was not ranked in the Top Ten during the last period. In the event that two or more papers collected the same number of citations in the most recent bimonthly period, total citations to date determine the rankings.

(Continued on next page)

The other new arrival to the Top Ten is an investigation of the role of the hepatitis C virus in cases of non-A, non-B hepatitis (paper #7). The hepatitis C virus was a dominant theme among the most-cited papers in medicine early last year (see *Science Watch*, 2[1]:7, January/February 1991), and papers dealing with this topic have made intermittent appearances ever since. The paper currently ranked second, which reports on a study measuring antibody to hepatitis C in progressively followed transfusion recipients, regained a place in the Top Ten last Fall and has remained there until now (*Science Watch*, 2[9]:5, October 1991). Next period, however, this report will exceed *Science Watch*'s two-year age limit for Top Ten consideration, and thus ascend to hot-paper heaven.

Several other "oldies" in the chart are singing their swan-songs this period. These include a discussion of the p53 tumor suppressor gene by Bert Vogelstein of Johns Hopkins University and colleagues (paper #4). Mutations in this gene have been implicated in many common human malignancies, including cancers of the colon, breast, and lung. Also soon to earn its place in the hot-papers pantheon is paper #6, which describes methods for quantifying the virus burden in the blood of persons infected with HIV. As lead author David Ho told *Science Watch* early last year, these methods allow researchers to monitor the effects of drugs on virus levels in patients, and therefore assist in the assessment of new AIDS treatments (see *Science Watch* 2[1]:7, January/February 1991).

Overall, interest in the genetic and cellular mechanisms of cancer remains keen, witnessed by four papers on the current list, including the review of oncogenes and signal transduction that currently tops the chart (see #1, #3, #4, and #10).

Science Watch, (February/March 1992) 7

Egy újabb hazai idézettségi klasszikus

Az *Impakt* 1991 májusi próbaszámában körvonalaztuk az Institute for Scientific Information, Philadelphia által bevezetett "citation classic" fogalmát, és bemutattuk az intézet által addig az időpontig kiválasztott klasszikus magyar közleményeket, témájukat, keletkezésük körülményeit.

2. évfolyamunk 2., 9., illetve 10. számában tovább folytattuk magyar idézettségi klasszikusok bemutatását, s nagy örömünkre szolgál, hogy az alábbiakban ismét egy ilyet mutathatunk be olvasóinknak.

This Week's Citation Classic — Current Contents, Sept 21, 1992

Gáspár R., Über eine Approximation des Hartree-Fockschen Potentials durch eine universelle Potentialfunktion (On an approximation of Hartree-Fock potentials through a universal potential function). *Acta Phys. Hung.* 3:263-86, 1954.

Variational method is used to show that a density, ρ-dependent functional ≈ $c\rho^{1/3}$ approximates the exchange potential including self exchange. Thomas-Fermi atomic number, Z, dependent scaling transformation is used to find functionals for the potential field and particle density of neutral atoms, transforming them into universal functionals of the scaled distance. Simple analylical expressions for these quantities are given, and it is demonstrated that they yield orbitals in good agreement with those of the Hartree-Fock theory. [The SCI® indicates that this paper has been cited in more than 405 publications.]

*

Density-Dependent Exchange Potential and the Many-Electron Schrödinger-Equation

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In the Hartree-Fock theory of atoms, molecules, and solids, the electron-electron interaction terms may be reduced to the sum of the coulombic self energy of the electrons containing the density ρ of electrons and the exchange energy which is the sum of numerous terms of complicated expressions, the so-called exchange terms. The number of these exchange terms grows as $N \approx {}^1/_8\, n^4$, where n is the number of basis functions, a multiple of the number of electrons. If n is large, N grows very rapidly. In a solid where the number of electrons is ≈ $10^{23}/cm^3$ the numerical value of the exchange energy cannot be computed. The necessity of finding a simple approximate expression for the exchange energy and its potential was trivial until the advent of solid-state devices in the early 1950s.

In a 1952 paper [1], I demonstrated that the reduced effective nuclear charges Z_p/Z of neutral atoms determined by the SCF method without exchange, as functions of the Thomas-Fermi scaled variable, are nearly independent of the atomic number Z, and they make possible the determination of the joint electrostatic potential field of the nucleus and electrons by a transformation. Looking for an appropriate expression for the exchange term of the potential field, I developed an equation by a variational treatment. In the Thomas-Fermi theory this term was introduced earlier by Dirac. Nearly 10 years later, in 1965, W. Kohn and L.J. Sham [2] independently reinvented this exchange potential, and, with computers, they demonstrated its great utility. J.C. Slater, who also invented a similar expression for the exchange potential but with a different numerical factor, further developed the theory by introducing an adjustable numerical factor α into the potential and summarized the results of the application to various atomic, molecular, and solid-state problems in the paper [3]. A summary on the theoretical foundation of the α factor may be seen in a work I published with A. Nagy [4].

The local density functional theory has been further developed with refinements of the self-interaction correction and the gradient correction. The correlation of the motion of the electrons by their coulomb-field may be taken into account by the density functional theory, too. All the developments have been reviewed in detail by the paper of R.O. Jones and O. Gunnarsson [5].

[1] **Gáspár R.**, An analytical method for the approximate determination of the eigenfunctions and energies of electrons in atoms. *J. Chem. Phys.* 20:1863-5, 1952.
[2] **Kohn W. & Sham L.J.**, Self-consistent equations including exchange and correlation effects. *Phys. Rev.* 140:A1133-8, 1965. (Cited 3,255 times)
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[5] **Jones R.O. & Gunnarsson O.**, The density functional formalism, its applications and prospects. *Rev. Mod. Phys.* 61:689-746, 1989.

Magyar cikkek kiváló természettudományos folyóiratokban 1980-1989

A természettudományi alapkutatás és a tudományos kommunikáció jelenlegi rendszere alapvetően a primer folyóiratirodalomra épül. A modern tudomány a kommunikáció egy olyan sajátos mechanizmusát hozta létre, amely a 17. században az első tudományos folyóiratok megjelenésével vette kezdetét, és azóta alapjában véve nem változott. Röviden: ez a mechanizmus részeredmények szelektív publikálására épül. A lényeg a részeredmények folyóiratcikkek formájában történő *válogatott* publikálása, amely lehetővé tette az alapkutatási tevékenység eredményes művelését, és ez a mechanizmus biztosította és biztosítja ma is a tudomány fejlődését. Az a tény, hogy egy cikket elfogadtak egy jól ismert, kiváló* folyóiratban, valószínűleg a legjobb jele annak, hogy értékes eredményeket közöl. Ahogyan az a felsorolásból látható, a közleményekben leírt eredmények számos esetben nemzetközi együttműködésben jöttek létre, amely a mai, korszerű kutatás egyik lényeges éltető eleme.

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