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Partnership

Much data will be grist for the mill as the European Union research ministers work towards the priorities for the Union's next Framework. The EPS Executive has indicated what it hopes will be the outcome (p. 126), and discussions at conferences demonstrate the need to recognize European characteristics when making world-scale comparisons (p. 126). Spreading the word that physics is vital will take skill and a clearer indication of who is responsible (p. 156). Part of the grist will no doubt be data issued by the US National Science Foundation (NSF) as the 616-page *Science and Engineering Indicators 1996*, by OECD as the 80-page *Principle Indicators of Science and Technology 1996* and by Battelle in its annual report on US research spending.

US inflation-adjusted R&D spending in 1996 was only 2% lower than in 1990 despite cold-war related defence cuts, so the spending is holding up well. But it is tending to drift downward (1997 proposed spending is 0.5% less than in 1995). Inflation adjusted R&D spending for the OECD is also decreasing, but in steps with a sharp drop in 1993, a decrease of only 0.1% in 1994 and another sharp drop in 1995 when Italy and Germany cut spending significantly.

More interesting is what is happening at the relatively tangible mesoscale, notably in industry. Industry spending in the US plateaued in 1991 while university spending has increased steadily, although it remains less than 10% of the total. There has been a marked shift to funding computers, software and communications technology which together now make up 52% of US industrial R&D spending. Becoming more important are links between academia and industry (65% of US companies acquire new technology from universities), decentralisation into small business units and offshore outsourcing of R&D (Apple Computers, for instance, will spend 40 M\$US in Singapore on R&D). Observers think the implications for employment are fairly obvious (p. 128) and both the US information industry and the NSF are calling for more federal support if the US is to remain competitive. They seek not only cash but also structures such as technoparks to promote academia-industry links.

The emergence of the global village is reinforcing the importance of the information industry for the academic community. It is not everyday that Elsevier, the world's largest scientific publisher, announces plans to establish a full-text database that will distribute 1200 plus journals via Internet. By the end of 1997 *ScienceDirect* will offer "online access to searchable refereed full text on a scale much greater than anything previously available". Other physics publishers are moving in a similar direction, while it is to say the least unclear how readers will be able to pay to access these resources, even in a limited form to find out if a document exists.

The research community has its own more open approaches based on home-grown electronic journals and eprint servers. A third European mirror of the Los Alamos preprint server came on-line in Paris in July at about the same time as the American Physical Society (APS) started up an eprint server to support "the ability of physicists to communicate rapidly". It is "NOT a publication of the APS and therefore no editorial control will be extended to the content", *i.e.*, it is at the authors' risk. Many will say that this so-called enabling of authors is what authors want, and that it can be achieved with today's tools. So it is noteworthy that July saw the release of an IBM-plugin for the Netscape browser that allows T_EX adapted for electronic documents to be read on-screen. Meanwhile, hyperlinks inserted retroactively in the Los Alamos T_EX eprints illustrate that well-designed non-commercial archives can be upgraded as technology advances. But everyone will be the poorer if a flourishing partnership at the research level is jeopardised by confrontation at the business level.

P.G. Boswell