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JAPANESE SCIENTIFIC AND TECHNOLOGI INFORMATION IN THE UNITED STATES - PUBLIC POLICY AND PRIVATE INITIATIVES

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ABSTRACT

In January 1983 a group of US government, industry and university information specialists gathered at MIT to take stock of efforts to moni acquire, assess, and disseminate Japanese scientific and technical information (JSTI). It was agreed that these efforts were uncoordinated poorly conceived, and that a clearer understanding of Japanese technical information systems and a clearer sense of its importance to end users w necessary. That meeting led to formal technology assessments, Congressi hearings, and legislation; it also helped stimulate several private initiatives in JSTI provision. Four years later there exist better coordinated and better conceived JSTI programs in both the public and private sectors, but there remains much room for improvement. This pape will recount their development and assess future directions.

I. The Problem

It is generally recognized that a nation's ability to compete in world markets is the foundation of its standard of living and that technological innovation drives the engine of economic growth. It is also recognized (usually belatedly) that there can be no quick fix for a declining economy; in the parlance of the American West, there is no "magic bullet." In the United States this concern has congealed around the currently fashionable "competitiveness issue." To extend (and mix) this metaphor, Japan is often seen as both the target and the trigger in the American competitiveness debate. We often hear that Japan is the source of the problem and is a model for its solution. In this view, study (if not emulation) of Japan should solve American economic problems. During the first half of this decade attention was focused on Japanese management. Now attention has turned toward Japanese technology.

Although no nation is more central to this collective reassessment than Japan, neither is there one less well understood. For comprehensible historical reasons, Japan has been embedded in the American debate as a technological "black box." Japan was utterly peripheral to the American industrial and research community until very recently. Japan mattered strategically, but not economically, and certainly not technologically. Americans were aware that, because of its size, Japan was potentially important; but there were so many other important markets and American technology was so far advanced, that American industry adopted a tacit policy of benign neglect.

The corrolary, as if salt in the wound, is the perception that for Japan, the American scientific and technological vault has been wide open. Japanese use of this low cost factor of production has been critical for Japanese economic success. America has been anything but peripheral for Japanese. This of course is not new to the 1980's or even to the postwar relationship between Japan and the rest of the world. For over a century the Japanese have been cultivating the skills to acquire and assess foreign technological information. Today some 13,000 Japanese study at American universities, and more than 1,000 of these students are enrolled in graduate engineering programs. Four-fifths of the doctorates awarded to Japanese nationals from us universities are in science and engineering. The absolute number is up 50% since 1980. Surely there is a model here for American scientists and engineers, especially as Japanese commercial technologies have begun to drive both civilian and military markets alike.

In this paper I will try to briefly sketch some of the recent developments that have resulted from this altered American consciousness about Japanese science and technology.

II. The Recent Past

As with most alterations of consciousness, the movement to redirect American resources in order to identify, acquire, and disseminate Japanese scientific and technical information (JSTI) can be traced to a small group of conspirators. In January 1983 information specialists from government, industry, and academia met for three days at the Massachusetts Institute of Technology to discuss mutual problems with monitoring Japanese technical developments. In many cases they had unknowingly been duplicating each other's efforts. In other cases, where resources were lacking, they were doing virtually nothing at all. It was agreed at this conference that the policy and business community needed better information on the quality, availability, and utility of JSTI.[1] Strategies were discussed for developing this information, including action by the Department of Commerce that led to the JTECH evaluations in four areas of Japanese research activity: mechatronics, biotechnology, opto-electronics, and telecommunications. It was also resolved that user surveys would be undertaken, although it was unclear who would take responsibility for the activity. A subsequent regathering of this group and others at the National Science Foundation three months later led to more discussion but little mor action.

On the government side, little more than discussion continued for the next year. In March 1984 and again in mid-1985 the House Science and Technology Committee held hearings and received testimony from users and providers of JSTI in an effort to sort through policy options. These hearings were buttressed by follow-up meetings sponsored by MIT and the Wilson Center of the Smithsonian Institutions in February 1985, by the National Bureau of Standards in June 1985, and by the Office of Naval research and the National Science Foundation in October 1986.

By this time it was clear that the converted were preaching to themselves. While we were waiting for some organization with resources to seize the initiative, the US-Japan scientific and technological imbalance continued to grow in tandem with trade frictions and budget deficits. Ev those organizations with resources and with the will to use them to enhanc the JSTI effort, such as the Japan-US Friendship Commission, were attacked in Congress, presumably because it had "Japan" and "Friendship" in its nam

Nonetheless, some progress was made. In addition to the JTECH evaluations undertaken by the Department of Commerce and the National Science Foundation, evaluations of Japanese developments in the areas of material science, materials processing, nuclear fusion and several other

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[1] The report from this conference is available from the National Technical Information Service: Richard J. Samuels and Reginald Gillmor (eds.) Japanese Scientific and Technical Information in the United States. Washington, DC: Department of Commerce National Technical Information Service, 1983.

areas were conducted between 1983-1986.[2] Each confirmed what was rapidly becoming obvious to all, viz., that the erosion of America's commercial supremacy in world markets was linked to significant technological developments in Japan. After the Government of the United States and Japan signed a Memorandum of Understanding in November 1983 encouraging the export of dual use technology from Japan to the United States for application in military systems, a group from the Defense Science Board went to Japan to identify technologies for acquisition. Its report (see footnote 2) of listed sixteen dual use technologies in which the Japanese had equivalent or superior capabilities. These technologies are not narrowly military. Included were such twenty-first century materials, processes and capabilities as gallium arsenide, fiber optics, x-ray lithography, fine ceramics, and artifical intelligence. Meanwhile, the US Embassy in Tokyo added new personnel to monitor JSTI, and discussion about how to design and implement a more comprehensive policy remained under discussion throughout the government and in Congress. For its part, the Commerce Department, through the National Technical Information Service, contracted out access to its JICST database to George Mason University.[3]

To date there has been more heat than light in government efforts to help scientists and engineers acquire, disseminate, and utilize JSTI. The most striking development was legislation introduced in the Senate that resulted in the Japanese Technical Literature Act of 1986 (Public Law 99-382). The legislation was designed to encourage the acquisition and dissemination of JSTI by requiring the government to monitor Japanese

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[2] See, for example, "Industry to Industry International Armaments cooperation Phase II- Japan," Defense Science Board Task Force for the Office of the Under Secretary of Defense for Research and Engineering (June 1985); Hane, et al., "Assessment of Technical Strength and Information Flow of Energy Conservation Research in Japan," prepared for the US Department of Energy by the Battelle Memorial Institute (September 1984); H.W. Lewis, "Biotechnology in Japan," National Science Foundation (June 1984); C.J. Hunter, "US Federal Agency Interest in Developments in Japanese Science and Technology," unpublished S.M. thesis, Department of Political Science, MIT provides an useful overview as of February 1985. The Commerce Department is required by the terms of the Japanese Technical Information Act of 1986 (see below) to provide an updated report of federal Government activity in this area by September 1987.

[3] JICST is the Japan Information Center for Science and Technology, the largest scientific and technical data base in Japan. It is administered by the Science and Technology Agency and is discussed briefly below.

Also, see two reports by Nancy Miller that summarize some of these discussions: The Availability of Japanese Scientific and Technical Information in the United States. Report prepared for the U.S. Congress. House Committee on Science and Technology. 98th Congress, 2nd Session, November 1984. Washington, DC: U.S. Government Printing Office; and Japanese Science and Technology: Some Recent Efforts to Improve U.S. Monitoring. U.S. Congress. Library of Congress. Congressional Research Service. Washington, DC: December 1986.

technical developments and to produce an annual report for broad circulation. Government agencies would be expected to work closely with professional societies, businesses, and each other to produce directories current Japanese research in English. Congress stipulated that $1 million be allocated for these related activities, including translation. But the funds, already woefully inadequate to the task, would have to be diverted from existing government budgets. Due to opposition from the White House, derived from budget politics at the time, no new funds were appropriated. As a result, the government agencies competed to avoid budget shifts more aggressively than they competed to assume the new responsibilities.

I think it fair to say that there was a great deal more progress on t business side than on the government side during this period. In Tokyo, t American Chamber of Commerce in Japan established its High Technology Committee in 1983. This group has been very active in screening, monitoring, and discussing Japanese technical developments. The American Electronic Association (AEA), with the assistance of the Commerce Department, established a Tokyo office that publishes a variety of newsletters and guides to the Japanese electronics industry.[4] Following the AEA/Commerce Department model, the Motor and Equipment Manufacturers Association (MEMA) of the United States established its own listening post in Tokyo in April 1987.

The ways in which existing businesses have begun to restructure themselves to ensure access to JSTI is of greater significance. First, there are the growing number of multinational firms, such as ICI, DuPont, Digital, Stanley, Kodak, Ciba-Geigi and IBM that have established researcl faciltiies in Japan. In addition there are the research consortia, such a MCC and others, that pool resources from several firms and that make speci efforts to monitor Japanese developments. This activity is, of course, merely a subset of the newly reorganized and substantially enhanced competitor scanning movement within multinational firms.

Private industry also took noticable steps in the information busine itself. Like takenoko after the spring rain, newsletters have rapidly proliferated. Their quality is uneven. Some are comprehensive, some are sectoral. The most comprehensive effort was taken by University Microfil of Ann Arbor, Michigan, which began its Japan Technical Information Servi in 1986. Their services include abstracts and indices in English culled from more than 600 current Japanese technical journals; in April 1987 the service became available on-line through the Dialog system. The Magnetic Society of the Institute for Electrical and Electronics Engineers began a journal of translated Japanese papers in 1985. Other services further expanded their coverage of Japanese technical information. Ten percent o the coverage in Chemical Abstracts was already Japanese in 1983, but was expanded into a new service, STN International, in 1986. But not all suc

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[4] See its newsletter, Japan Electronics Update and its excellent publication: Sources of Electronics Information in Japan. The AEA has al established an annual internship program for six to ten computer scientis and electrical engineers in Japanese firms.

efforts were successful. Engineering Index, for example, tried and failed to introduce a Japanese technology information service. Still others remain in-house. Many of the major American multinational corporations, such as General Motors, AT&T, and IBM produce and circulate Japanese technical information newsletters for internal use only.

Japanese firms have seen market opportunities here as well. A great many Japanese data bases, such as NEEDS-IR, HINET, and others continue to advertise in the English language business and technological press.[5] Now there is even on-line access to newsletters as a data base. Kyodo News Service's Newsnet, for example, combines 35 different industry newsletters on line. In June 1986 the Overseas Data Service, originally a firm that translated European STI for Japanese clients, began its Comline service, a full-text science and technology English language Japanese data base.

On the Japanese government side, there is the predictable duplication of services derived from rivalry across bureaucratic jurisdictions. The largest and best known source of JSTI is JICST, which covers over 12,000 journals (49% are Japanese titles), as well as patents and conference procedings. JICST is administered by the Science and Technology Agency. The National Center for Science Information Systems of the Ministry of Education was reorganized and expanded in 1986 as a national interuniversity research institution whose mission is to acquire and disseminate scientific information and to promote scholarship on science information systems. In 1986 MITI, for its part, began funding the Data Base Promotion Center (an affiliated but non-governmental organization) to develop four new on-line data bases: 1) JAN Item Code File Service, 2) Fine Cermaics, 3) Biomaterials, and 4) Metal-Related New Materials.

III. WHAT IS TO BE DONE?

There is always this critical and appropriate Leninist question. What can be done by information specialists and policy makers to improve the access to and use of Japanese scientific and technical information? Let us begin with education. Now that distinguished leaders of the American scientific and technical community have begun demanding "symmetrical access" for Americans in Japanese laboratories,[6] it seems to me important to stress

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[5] NEEDS-IR is a on-line information service from Japan's leading economic daily, the Nihon Keizai Shimbun (Nikkei). It is comprised of three data bases: 1) Nikkei File - abstracts from four of Nikkei's business publications, 2) IEE File - materials provided by the Institute of Energy Economics in Tokyo on world energy markets and technologies, and 3) Joint File - a bibliographic index covering more than 1,000 economic periodicals.

[6] See Japanese press reports following the "Japan-US Conference on High Technology and the International Environment," held in Kyoto in November 1986 organized by the American National Academies of Science and Engineering and by the Japan Society for the Promotion of Science. A

that the asymmetry in the flow of technical information between Japan and the rest of the world is not a Japanese problem. Demands for symmetry imp two things: 1) that Japanese laboratories are systematically closed to foreign researchers and 2) that it is a Japanese responsibility to do something about this. The first is simply not true. The second premise misdirects our energies. American universities and other agencies that ha sought placements for scientists and engineers trained in Japanese langua and culture, have received offers of placement far in excess of the limite number of candidates qualified to take advantage of them. A National Science Foundation survey of Japanese firms in 1985 identified several hundred private companies that claim to be willing to host foreign researchers. The fact is that the scientific and technical community in United States has done precious little to prepare a generation of Americai who can take advantage of the many opportunities that do exist, and the m more that would be created by more balanced access to Japanese laboratori Indeed, the problem is generalizable. No nation is going to compete or cooperate with the Japanese as equals unless and until its people underst the Japanese as well as the Japanese understand them. Until recently, in the eyes of most scientists and engineers, this was hardly worth their attention. Now that we can expect much of the world's major technologica progress to be "made in Japan" we have to learn again how to learn from abroad.

This kind of learning is not achieved with newsletters, data bases, translators. It requires much more substantive investments in human resources. It requires a new approach to the education of scientists and engineers. In the United States, several universities have begun to make these investments. Among them are the Massachusetts Institute of Technology, where the MIT-Japan Science and Technology Program was established in 1981. This Program sends 15-20 scientists and engineers t work in Japanese research laboratories each year. These students all hav completed two years of language training and extensive cultural orientations. At North Carolina State University, faculty have been taug Japanese and have spent time exploring common research interests with Japanese colleagues. At New York University, computer science students h been studying Japanese and computer science simultaneously. Technical Japanese is offered at the University of Wisconsin. Stanford University planning to send engineering students to its campus in Kyoto. These students will be placed as interns in Japanese firms. In short, what is happening is that American universities, particularly non-traditional centers of Japanese studies, are developing programs of applied Japanese studies that will bring technologically sophisticated students into cross border professional networks early in their careers. These networks and these experiences should serve to "innoculate" their professional lives

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related story was carried in the Chronicle of Higher Education, 10 Decem 1987.

In the same context, also see the essay in the February 1987 issue c Physics Today in which the former chairman of Control Data Corporation, William Norris, proposes a $10,000/person fee (in addition ot tuition) fc access to American universities by Japanese nationals..