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# THE INTERNS: EXPERIENCES IN JAPAN AND RETURN TO THE UNITED STATES

## Placements in Japan

Interns were placed with some of Japan's leading private company, government and university research laboratories. MIT's international reputation was useful in obtaining good placements since prestige is particularly important in Japan. The program uses personal contacts developed between MIT faculty and Japanese researchers and links with MIT's Japanese alumni. "When prospective interns first approach the program, I send them back to their MIT professors to get names of Japanese contacts," said Patricia Gercik, the program's Assistant Director. It was felt that MIT's success might not be easily repeated by less well-known or less prestigious institutions. One suggestion was a Congressional Japanese Fellowship Program which would provide an appropriate imprimatur.

In Japan, the interns were treated like other Japanese employees - living in dorms or company housing and participating in social occasions with their Japanese colleagues. The program has produced a "guide to hosting MIT students" that helps to convince Japanese firms that these students ought not to be segregated and treated specially. The object is to integrate them into the life of the laboratory. Shari Yokota, who worked two years at NEC's Central Lab researching diamond thin films, said that it took the first year to find her way around. "The second year was the most productive."

## Access to information and facilities

Japanese sponsors placed no special limits on interns' access to information and

facilities. Gontran Kenwood, an industrial automation engineer, was the first foreigner in his Hitachi lab and was involved in all meetings with no special restrictions on information. At the same time, the interns had to conform to Japanese practices. For instance, while Mark Holzbach was working on holographic technology at the Tokyo Institute of Technology, he wanted to do an experiment using special equipment at a private company, Dai Nippon Printing. However, even though Dai Nippon had invited him, Holzbach could not do work there because the university lab had a longstanding relationship with another company, Toppan Printing.

Interns who had worked in universities noted that Japanese university labs often had meager equipment. Different research groups within the laboratory did not readily share equipment. In contrast, the equipment and facilities at private corporate labs were generally very good.

## Technology transfer

Interns cited cases where they learned something about specific technologies used in Japan. Peter Whitney spoke about a Japanese method of dealing with impurities in semiconductor materials. The usual American approach is to remove impurities, which is difficult and expensive. In Japan, he learned about techniques to add other impurities to cancel out the original impurities. "The Japanese solution is not elegant, but it works," said Whitney.

However, in general, the interns did not bring back any technologies unknown in the

United States. This was not seen as a problem. The interns believed that learning about the process of Japanese technology development was more important than gaining information about individual technologies. This is consistent with the program's philosophy. As mechanical engineer Michael Caine remarked: "Soaking up specific technology is not the point, since the technology can become obsolete very quickly." He emphasized the importance of learning the process by which technology is developed and how it is used in Japan and in making contacts which will be important throughout his career. At Toshiba where Caine worked on developing image processing software, he saw how research was driven by the needs of manufacturing plants. "I learned respect for the Japanese approach."

Materials scientist Peter Whitney said his experience at NTT's Musashino Laboratory showed him how Japanese research was managed. He concluded that "much of the conventional wisdom about Japan is true." There was a high degree of research collaboration within his group, with individual researchers working on parts of a problem which built on the work of colleagues. At the same time, he saw little interaction between different research groups in the company. Whitney reported that his colleagues at NTT frequently sought his views on ways to tackle research problems. His experience with basic research was in great demand by NTT, as it seemed to be an area where the Japanese lack experience and creativity. Other American engineers had similar experiences.

Engineer Gontran Kenwood worked on a new color image processing project at Hitachi's industrial engineering laboratory. The lab's work was funded by factories,

which meant he had to make plant visits. "This encourages researchers to develop products suitable for manufacturing," observed Kenwood. "In the U.S., credit is given to engineers who fix machines and keep them running; in Japan the aim is to design products which can be easily manufactured." He also suggested that the Japanese concentrate on trying to avoid problems which might arise in manufacturing, while the American engineers tend to solve problems after they occur.

### **The importance of knowing Japanese**

The interns emphasized that learning to speak read, and write Japanese took a considerable commitment. They felt that their two years of preparation was the minimum needed--more would have been helpful. But Samuels, drawing on the Chinese analogy of letting a hundred flowers bloom, discussed other ways of gaining Japanese experience, including Stanford's approach of sending engineers and scientists to Japan for shorter periods with less language training. Cornell's intensive nine-week language program is another option for learning Japanese.

The interns repeatedly stressed the benefits of being able to communicate in Japanese. Vince McNeil, an electrical engineer who had spent a year at the Tokyo Institute of Technology, said that to fully interact with Japanese colleagues, "you have to speak the language and you need to know the nuances of the language, including the cultural nuances." McNeil added that being able to read kanji is important to handle dangerous chemicals safely in the labs.

Chris Mizumoto, an intern with Hitachi now placed at Yokogawa Medical Systems, a

joint venture with General Electric, communicates in Japanese as much as possible and writes reports in Japanese. As a result, he is aware of technical changes unknown to GE joint-venture engineers in the U.S., because the Japanese engineers do not always communicate the changes to the GE engineers in English. Japanese engineers and scientists may have had English training in school, but instruction is often not geared to conversation, and their English grows rusty through disuse. Consequently many Japanese feel uncomfortable using English.

### **Return to the United States**

Interns looking for employment on their return to the United States mostly felt that their experience was an asset. "The program has given me a premium in the job market," said GE's Gontran Kenwood. Added Peter Whitney, "It was a hot topic, which took up 10 to 50 percent of the time in job interviews." Taking part in the program showed he could take the initiative and master a challenge, Whitney said. When he looked for jobs in the United States, the MIT program responded rapidly to help him make connections with the corporate sponsors, but there were delays in reaching the specific people responsible for hiring. He ultimately took a job with a small firm, Lasertron, rather than with a corporate sponsor.

Overall, the interns' comments confirmed the impression from the corporate sponsors' remarks: while employers take a positive

view of the program, they are not always interested in making immediate use of the interns' Japanese experience, or able to do so. Peter Whitney said that he is not using the results of any particular projects he worked on at NTT, although he may do in the future. Shari Yokota on returning from working at NEC's labs, took a job with Crystallume, a new California start-up firm, principally because this small company allowed her to conduct research even though she had only a B.S. degree. At Crystallume, Yokota works on diamond thin films, using a different approach from the one used at NEC's lab. Yokota occasionally translates Japanese technical papers.

The interns hope to encourage their companies to make use of their experience. Peter Whitney remarked that he would try to convince the head of his company of the importance of maintaining contacts with Japan. Peter Schindler, now at MIT after returning from IBM-Japan, felt that while his Japanese may not be useful now, it may be in the future. He hopes to return to work in Japan.

One of the MIT program's aims is to give scientists and engineers the opportunity to develop lifelong contacts with Japanese researchers. It is still too early to evaluate the program's success in this. There was some indication that interns had begun to establish strong links with Japanese colleagues. For example, Peter Whitney maintains a network with NIT researchers and exchanges papers. He can use these contacts to widen his circle to other Japanese contacts.