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HISTORY OF THE CONCEPTION OF THE US–JAPAN SEMINARS ON POLYMER SYNTHESIS

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When the chairman of this US–Japan Symposium on Polymer Synthesis, Professor Virgil Percec, asked me to tell you how the seminar series was conceived and what was involved in initiating such a successful enterprise, I was very pleased to agree to do so. The thoughtfulness of our Chairman reminded me of the writings of an ancient Chinese philosopher who said: "The one who drinks water should think of he who dug the well." I am glad that we all are drinking the water!

I am presenting here a brief history of the circumstances that led to the US–Japan Seminars on Polymer Synthesis, a cooperative program that I hope will continue for a long time. It was about 25 years ago that the initial idea of a US–Japan Seminar on Polymer Synthesis was realized. This concept led to the very successful first US–Japan Seminar in 1974. You will probably notice that from the beginning a careful sequence of the wording was established; US–Japan was used for seminars in the United States but for seminars in Japan the wording used is Japan–US. For the "Old Timers" who have been involved from the time of its creation, it seems obvious, but when the seminar was established this kind of etiquette was necessary but by no means obvious!

I would like to discuss the history of the creation of the US–Japan Seminars on Polymer Synthesis by considering three factors that were essential for the succesful completion of this undertaking. Let me first address the status of the polymer organizations in the United States and in Japan in 1968, the 43rd year of Showa in Japan, and then I would like to discuss the cooperation between the United States and Japanese organizations that developed during that period of time and the ideas from which the US–Japan Seminar on Polymer Synthesis was "hatched."

First, I would like to discuss the status of the Society of Polymer Science, Japan (SPSJ) at Showa 43 and that of the ACS Division of Polymer Chemistry (PD) in 1968.

In the SPSJ—created in 1951—the (apparently) permanent president in the 1950s and early 1960s was Ichiro Sakurada of Kyoto University; he held the chairmanship with authority for many years. In 1968 the chairmanship was handed over to A. Sobue of Tokyo University, and in 1972 to S. Kambara of the Tokyo Institute of Technology. He was followed by Y. Iwakura of the University of Tokyo. The last two presidents of SPSJ are important because they played an important part in the development of the cooperation between the SPSJ and ACS-PD.

During the same period in time the development on the American polymer scene in the Polymer Division of the American Chemical Society was as follows: The creators of the division, C. S. Marvel, H. Mark, and P. J. Flory, were active only in an advisory capacity. In the early 1960s a younger generation, notably F. H. Winslow, E. M. Fettes, and W. J. Bailey, took over the leadership of the division. When Bailey became the secretary/treasurer and then the chairman, a new period of modernization of the management of PD was introduced. It was not until Jack Elliott became the chairman that a complete reorganization and refocusing of the activities of PD occurred. Elliott directed the scientist/amateur organization into an efficiently run professional scientific organization. In 1967, Elliott invited me to become active in the activities of the division, first in the Program Committee and soon after in the Membership Committee as the subcommittee chairman responsible for the international membership of PD. This committee many years later became the Foreign Affairs Committee of the PD, responsible for international relationships.

Elliott, Jesse Hwa as the secretary, and myself as the treasurer of the division, working as a triumvirate, started to define the position of the PD not only within and vis-à-vis the ACS, but we began to think of strategies of growth and increased influence of the ACS-PD on other polymer-oriented organizations. I proposed a scheme in 1967 for the interaction and relationship of the ACS-PD with other organizations: a) Interrelationship of ACS-PD with polymer oriented or divisions within ACS; this concept of an interactive organization within ACS became the Macromolecular Secretariat with Elliott as the first general secretary (incidentally, this idea of a secretariat of interest groups became the spawning ground for about one dozen "secretariats" within the ACS); b) interrelationship of ACS-PD with polymer-oriented organizations outside the ACS but in the United States; and ultimately c) international relationship of the ACS-PD on a global scale. The most effective international relationship developed with Japan and ultimately became the Pacific Polymer Federation.

In 1972, Professor Joseph P. Kennedy was the chairman of PD at the time when I started negotiations with SPSJ. The initial discussions were held with the vice president of the SPSJ, Professor Kambara. The bilateral agreement of cooperation was finally signed with President Iwakura in 1974.

What was the status of polymer science at that time, in the late 60s, in Japan? Kyoto was very much the center of polymer science in Japan. It rested basically on three pillars, Professor I. Sakurada, German trained; Professor K. Horio, English speaking; and another professor who was not well known in the polymer community outside of Japan, Professor R. Oda. From Oda's koza (research group), the Department of Synthetic Chemistry at Kyoto University was spawned.

In the Department of Synthetic Chemistry, Professor Junji Furukawa, Teiji Tsuruta, and Takeo Saegusa became very active in the department; in the polymer

community, polymer synthesis was strongly emphasized. In the Department of Polymer Chemistry, which had 6 kozas, Professor Seizo Okamura, with his colleagues, K. Hayashi, T. Higashimura, and later Y. Imanishi and T. Tazuke, were responsible for much of the synthetic polymer chemistry being carried out. There was also important polymer synthesis work being done at Osaka University in Professor Murahashi's and Professor Tani's groups and at Osaka City University in Professor M. Imoto's group.

This was the situation in polymer synthesis in Kansai (Kyoto, Osaka) when I first arrived in Kyoto in 1966 and then on a half a year sabbatical leave as Industrial Visiting Professor in 1968. Professor Kennedy had spent about 6 weeks in Professor Okamura's group around the time of the IUPAC Symposium in Kyoto in 1966. He was the first visiting professor in Japan who came from industry.

Professor Furukawa was at that time the chairman of the Department of Synthetic Chemistry. He offered me an official visiting professorship for the fall semester of 1968. Although I was still working at DuPont, the company permitted me to go for a semester and actually supplied me with modest funds. Not only did I have an appointment as a visiting professor at Kyoto University, but I was also appointed at Osaka University. Once I arrived in Osaka, Professor Tani was my host.

After a few weeks in Kyoto, I discussed with Professor Furukawa and also with Dr. Saegusa the possibility of cooperation on individual scientific projects. I also had more ambitious ideas; I was thinking of direct US–Japan cooperation, for, example a bilateral Seminar on Polymer Synthesis. After becoming better acquainted in Kyoto, I thought that it might be possible to translate this concept into an actual meeting. I thought the timing for such a meeting was good. I was the treasurer designate of the ACS-PD and felt I had some influence on the division, and I knew Furukawa had influence on the SPSJ and the Japanese polymer community; he also had a keen interest in such a project. I thought we could move swiftly toward the organization of such a US–Japan meeting.

Some internal meetings between scientists of Japan and the United States on specific and narrow problems in polymer physics and rheology had actually been held. Professors Onogi, Kawai, and Stein were involved. These meetings were relatively small and more or less among friends. I thought it might be possible to have a meeting on polymer synthesis with a broad representation from the United States and Japan, and have it as a more national effort on either side. This required a great deal more attention to etiquette and proper representation, since we planned to involve industry as well.

However, Furukawa said immediately "This is absolutely impossible at this time." We were still in 1968, in the year that a United States phantom fighter jet had crashed into the new building of the computer center at the University of Kyushu in Fukuoka, Kyushu; the feeling about the United States and Americans in general was not very positive. There were student unrests throughout Japan, and we concluded that we should wait for the planning of our Japan–US Seminar on Polymer Synthesis. In addition, the termination of United States occupation in Okinawa was in the process of being negotiated; this situation had also opened some additional confrontational general American-Japanese feelings which we friends did not feel we could readily overcome. Since we wanted this meeting to be on an impressive national basis, we concluded that we had better wait for a more favorable time for

our seminar. We decided it would be unreasonable to do anything for about 2 years while keeping our objective in focus.

When I returned to Japan the next time, Okinawa had been returned to Japan, the student unrests had subsided, and Furukawa and I believed that we could start planning for our Japan–US Seminar on Polymer Synthesis or we could at least attempt it. First we decided on a location. Furukawa, Saegusa, and I thought that the meeting should be in Japan, in Hakone, near Mount Fuji, the symbol of Japan. We thought that this would be a very representative spot, and I also thought that we could hold the seminar at the same time that the document of cooperation between the SPSJ and ACS-PD would be signed.

I had been negotiating with the president of the SPSJ, Professor Kambara, an agreement of cooperation between the SPSJ and ACS-PD. By then I had become the chairman-elect of the ACS-PD.

One of the most important and pressing problems for our plans for this meeting was raising money to finance the proceedings. We inquired and found that the International Division of NSF and the Society for the Promotion of Science, Japan, would support such an undertaking. We approached the NSF in Washington but the initial answer was: No. We were told that there was no need for this type of meeting and that we would only give knowledge away to industrially competitive Japan. It took three applications to NSF to have the seminar approved and funded. Every half a year we applied, and the initial two applications were rejected. We had to demonstrate every time the novelty of our thinking; finally we contacted and invited the head of the NSF ofice in Tokyo, Dr. Cziesla, and asked for his help. He was able to assist us in proceeding with this meeting. At that time the Orient was new and as yet unfamiliar ground for NSF, and they needed some direct involvement in the planning of the seminar. Cziesla was the person to assist in the whole program, and he was personally present at the first US–Japan Seminar at the Fuji-View Hotel in Hakone.

Deciding on the title for the first US–Japan Seminar on Polymer Synthesis was also a problem. It was not appropriate to call it "Cationic" or "Anionic Polymerization," even though this was the actual title. It was important to go one step further; finally the seminar was called "Unsolved Problems in Ionic Polymerization." Once we had decided on the title, the NSF Tokyo Office backed our selection of the location of the seminar and the meeting was approved.

Professor Furukawa was a genius in arranging many things. He provided us with the "cream-of-the-crop" in Japanese polymer scientists and he was also able to raise extra money to make the meeting a success. Much of the actual work was done by Saegusa. The effectiveness of Furukawa was based on the fact that he had numerous company connections because he and his school friends attended the university in the harshest time of the postwar period; consequently, they were very close and reliable friends. When one of his friends was contacted, usually he offered the necessary cooperation and contributions.

One of his friends was the research director of Suntory Winery. He provided the seminar attendees with a complementary visit to the Suntory Winery in Kofu after a day of intense scientific discussions.

I arranged for the proceedings to be published by Marcel Dekker, Inc., as a special volume of the *Journal of Macromolecular Science—Chemistry* with an overflow printing prepared as a hardcover book.

Once the meeting had started, it became clear that the Japan–US Seminar on Polymer Synthesis would be a success.

On the Saturday prior to the meeting we all arrived in Tokyo and assembled at the Daiichi Hotel in Shimbashi-Tokyo. We had ordered a bus because we had to go to Hakone which is about a 2-hour drive to the hotel. This very nice meeting hotel was British-built from the 1890s and belonged to the Fujita chain of hotels; I do not think it exists anymore.

We had selected the spring of 1974 for the seminar, and it was a beautiful afternoon. As we were preparing for the departure from Tokyo, the bus arrived; it carried a big banner "Japan–US Seminar." I had taken a walk up to Hibiya Street, two blocks from the Daiichi Hotel. All of a sudden there was a big bang and I thought there was an explosion. Indeed, a bomb had exploded on the 6th and 7th floor of the Mitsui Building. I rushed back because I realized that there still existed latent anti-US feeling in Japan. We decided to take the banner off the bus and left immediately for Hakone. The Fujita hotel, called the Fuji-View Hotel, was located on Lake Kawaguchi at the foot of Mount Fuji, with a beautiful view of the mountain.

All the, now, old timers were there. From the Japanese side, Furukawa, Iwakura, Tsuruta, Hirai, Tani, Saegusa, Takeda. Takeda of the Science University was the representative of SPSJ. From the United States side there were W. J. Bailey, Stille, Harwood, and from industry, Pariser, Pearson. The first day was touch-and-go because very few people knew each other and the Japanese customs were somewhat puzzling for many Americans. Traveling to Japan was then still considered the experience of a lifetime. After the meeting was well under way we concluded that the meeting was a huge success.

By Tuesday evening, the organizers of the meeting concluded that we should try to have another Japan–US Seminar on Polymer Synthesis, this time in the United States, and we started talking about the organization of the next meeting. It was quite illegal to plan for a "next" meeting according to NSF rules because seminars were supposed to be "spontaneous" occurrences. It obviously was practically impossible to have spontaneous cooperative group projects at that time, especially with scientific groups of totally different backgrounds and personal experiences. These plans were made in the early period of interactions between the Japanese and the American systems.

For the second US–Japan Seminar Professors Kennedy (although he was not at the first Japan–US Seminar on Polymer Synthesis) and Saegusa were designated as cochairmen; the seminar was held in the Rocky Mountains in Pingree Park, Colorado, in 1978.

The most important impact on the continuity of the US–Japan Seminars was that we always had up-to-date subject titles that represented the forefront of research in polymer synthesis. In many ways we were actually "creating" directions in research in polymer synthesis, not just following the circumstances.

In the evening we held a meeting of the organizing committee which had become an "ad hoc" steering committee which included Furukawa, Tsuruta, Takeda, Saegusa, Bailey, Harwood, and myself. Late in the night we finally came to an agreement on the title of the next meeting—I guess I was responsible for proposal of this title. It was "Functional Polymers." This meeting title was much more successful than we believed at that time. We thought that we only needed a

title, but we did not fully appreciate that we had created a new direction in polymer synthesis and polymer science. The expression "Functional Polymers" became as important as other expressions in polymer science such as "isotactic," "stereoregular," "spacer groups," "macromolecular architecture," "macromolecular engineering," "macromolecular design," and "rigid rods," to mention only a few.

After the title for the 2nd US-Japan Seminar on Polymer Synthesis was adopted, within 1 year ten groups in Japan had started working on functional polymers, in part because of the attractiveness of participating in the 2nd Seminar on Polymer Synthesis in the United States. Until the time of the 2nd US-Japan Seminar on Polymer Synthesis with the title "Functional Polymers," two Departments of Functional Polymers had been created in Japan. Nothing happened in the United States; two or three groups worked in the areas without any special focus. There was no impact of the decision to hold a US-Japan Seminar on "Functional Polymers" in the United States until much later.

The definition of functional polymers at that time meant polymers with functional groups, polymers whose main characteristics and properties were based on the characteristics of the chemistry of the functional groups, not on the characteristics of the macromolecules. Today the nomenclature of functional polymers has been changed and is much broader. It implies polymer materials which serve special functions.

The first Japan-US Seminar on Polymer Synthesis was a very successful spawning ground for an equally successful 2nd US-Japan Seminar in Pingree Park almost 5 years later. We have now completed the 6th Seminar, and it looks to me that each seminar has contributed more to progress in polymer synthesis and to closer and more effective understanding, interaction, and cooperation between the scientists of our two countries.