

The MTT Symposia

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THE FIRST SYMPOSIUM sponsored and financed by, and designated as the Annual Meeting of the Professional Group on Microwave Theory and Techniques of the Institute of Radio Engineers, was held at the Western Union Auditorium in New York City on May 9 and 10, 1957. However, from the formation of the PGMTT in the spring of 1952 to that first official Symposium, several technical meetings sponsored in whole or in part by the PGMTT were held and they should be mentioned for the sake of completeness.

Symposium on Microwave Circuitry, November 7, 1952

The first technical meeting sponsored by the PGMTT was held in the Western Union Auditorium in New York City, on November 7, 1952. Attendance was 210. The twelve papers presented at the Symposium were later published in the first volume of the PGMTT Transactions in March 1953. The price per copy, to members of the PGMTT, was \$1.10.

Among the speakers at that first Symposium were Georges Deschamps of ITT, S. E. Miller of Bell Labs, A. G. Fox of Bell Labs, Herb Engelman of ITT, Henry Riblet of Microwave Development Labs, D. R. Crosby of RCA, and Dave Dettinger of Wheeler Labs. It was an impressive beginning for an organization that had less than 500 dues-paying members. Dues at the time were \$2 per year.

Microwave Radio Relay Systems Symposium, November 5-6, 1953

On November 5th and 6th, 1953, a Symposium was held at the Western Union Auditorium in New York City, co-sponsored by PGMTT, the Communications Systems Group, and the Electron Devices Group of the IRE. Fourteen papers were presented, with the main concentration on Microwave Communications. The charge was \$2.00 for advanced registration and \$3.00 for registration at the door for IRE members. No record was kept of the number of attendees, but to my recollection there were at least half again as many as had attended the meeting in 1952. The papers were eventually published in each of the three group Transactions. They appeared in the third issue of the MTT Transactions dated April 1954.

Modern Advances in Microwave Techniques, November 8-10, 1954

On November 8-10, 1954, a Symposium was held at the Engineering Societies building in New York City. It was sponsored by the Polytechnic Institute of Brooklyn in cooperation with PGMTT and it was further co-sponsored

by the Office of Naval Research, the Office of Scientific Research, and the Signal Corps.

The Symposium was one of a series sponsored by the Polytechnic Institute of Brooklyn and the Microwave Research Institute. It was a distinguished Symposium. The papers of the Symposium were published in a 492-page book. The book was mailed free to each paid member of the PGMTT. Al Beck acted as the MTT representative on that Symposium Committee.

National Symposium on Microwave Techniques, February 2 & 3, 1956

On February 2-3, 1956, a meeting was held at the Benjamin Franklin Center for Physical Sciences at the University of Pennsylvania sponsored by the Professional Group on Antennas and Propagation, PGMTT, and the Philadelphia Section of the Institute of Radio Engineers. The papers were devoted to Microwave Components, Antennas, Guided Microwave Transmission, Scatter Propagation and Radiation, Ferrite Theory, and Ferrite Devices. In conjunction with the meeting there was a cocktail party. Tours of the physical sciences building were made available during the lunch recess.

Don King acted as liaison for PGMTT, with the help from Ben Warriner and Bill Sharpless. In addition, the PGMTT advanced \$200 to the Steering Committee for expenditures to be incurred. Dick Schwartz of the Moore School of Electrical Engineering was the General Chairman of the Symposium and D. R. Crosby of RCA Camden was the Program Chairman.

There were 27 contributed papers in the Program, plus two invited papers and five panel speakers. The program consisted of two sets of two parallel sessions each, except for a stand-alone panel discussion. Dr. Wilmer Barrow of Sperry acted as panel moderator. The Symposium was considered a great success and resulted in a net surplus of \$467, which was divided equally among the sponsors. The papers from that meeting appeared in the October 1956 issue of the PGMTT Transactions.

Symposium on Microwave Properties and Applications of Ferrites, April 2-4, 1956

While the Philadelphia Symposium was being planned, there was also discussion going on about a Ferrite Symposium to be sponsored by Air Force Cambridge Research Center, PGMTT, and Harvard University. This program was spearheaded by Dr. C. Lester Hogan, then of Harvard. It was held on April 2-4, 1956.

The philosophy behind the Symposium was to bring to Harvard as many ferrite papers of an engineering nature as possible. The first day was devoted to invited papers of

a tutorial nature. The last two days were devoted to contributed papers from engineers on devices and gadgets. PGMTT agreed to co-sponsor, provided the papers that were to be published would be edited by PGMTT.

Twenty-eight papers were presented at the Symposium, eight of which were invited. Attendance was just under 300. Among the people who presented papers at that Symposium were Lester Hogan, Ben Lax, Nicolaas Bloembergen, Dean Van Vleck from Harvard, and all the ferrite experts of that era.

On the second evening of the Symposium, a banquet was held in the Hotel Commander in Cambridge, MA. The speaker of the evening was Professor George Wald of Harvard University. He spoke on "Human Vision and the Spectrum."

Perhaps the highlight of the evening and the PGMTT historical event of note was the presentation of the first Microwave Prize. At that time it was called the Annual Award. It was for an outstanding contribution to the microwave art published in the Transactions of the PGMTT. It was presented to Herman Chait and Nicholas Sakiotis for their paper entitled "Properties of Ferrites in Waveguide," which had appeared in the Transactions of November 1953.

1957 Annual PGMTT Meeting, May 9–10, 1957

Although the matter of an annual PGMTT meeting had been discussed at length and had received much attention by the Administrative Committee since the formation of the Professional Group, it was not until the Adcom meeting of November 1, 1966 that the PGMTT unanimously voted to solely sponsor and finance an annual meeting.

That first meeting, which was sponsored by PGMTT with the aid of the New York, Northern New Jersey, and Long Island chapters, was held on May 9th and 10th, 1957, in the Western Union Auditorium in New York City. The title of the Symposium was "Microwave Ferrites and Related Devices and their Applications." Tore Anderson was Chairman of the Steering Committee and Sam Weissbaum was the Chairman of the Technical Program Committee.

The Symposium generated a cash surplus of \$910. Total attendance was 306. The Long Island chapter was responsible for finances, the New York chapter was responsible for the local arrangements, and the Northern New Jersey chapter, which proposed the meeting in the first place, was in charge of publicity and organization.

The technical program committee found that their response to a call for papers was relatively meager until the deadline date. However, through correspondence and phone calls, they were able to put together a very respectable program. Of 30 papers submitted to the technical program committee, 20 were selected. In addition, three papers were invited. The Symposium ended in a round table discussion conducted by Lester Hogan and including many of the ferrite leaders of the period.

On the second evening, 67 people attended a smorgasbord dinner at the Three Crown Restaurant, on 54th Street. The highlight of the evening was the presentation of the Microwave Prize to Robin I. Primich of Canada, for his

paper entitled "A Semi-Infinite Array of Parallel Metallic Plates of Finite Thickness for Microwave Systems." The paper was published in the MTT Transactions in July 1956.

About This History

To this point I have tried to document those meetings that were considered PGMTT meetings by the Administrative Committee through the first annual Symposium. However, there were other meetings in which the Group was involved. These included technical sessions at the IRE Convention and Wescon each year. There were URSI meetings held in Washington, DC, usually in May, that involved PGMTT participation. Some of the papers from those meetings were published in the PGMTT Transactions. There was also the Symposium on Microwave Strip Circuits held at Tufts College on October 11–12, 1954, sponsored by Tufts and Air Force Cambridge Research Center. Those papers were published in the Transactions on March 1955. There were other meetings of interest, but our present concern is with the history of the MTT Symposia.

The rest of this history will consist of a short discussion of each Symposium. Some attempt is made to identify highlights, landmarks, breakthroughs, etc. To reduce the written length of this report I have included a series of tables at the end that you might find interesting and helpful. They are:

- I General Information
- II Technical Program and Publication Information
- III Miscellaneous Symposia Data
- IV The Symposium Name
- V Symposia Themes
- VI Commercial Exhibits at MTT Symposia
- VII Microwave Career Awards
- VIII Microwave Application Awards
- IX Microwave Prize Winners
- X Honorary Life Members
- XI National Lecturers
- XII Chairmen of the Administrative Committee.

Some of the Tables (I through VI) provide information about the annual event. Others (VII through XII) are listed because it is tradition to honor the individuals listed at the annual banquet.

Since our Society has gone through several name changes, including PGMTT, PTGMTT, G-MTT, S-MTT, and MTT-S, I shall for simplicity henceforth refer to it simply as MTT. If you are anxious to know when it was referred to as what, let me call your attention to Table IV.

One final note, I shall henceforth refer to the MTT National Administrative Committee as the Adcom.

1958—Stanford

Whereas the 1957 Symposium was designated the first annual Symposium of MTT, in reality it was the climax of a series of microwave meetings that had been held on the East Coast, primarily in the New York City area.

The first of the Annual Symposia as we know them today was undoubtedly the meeting that took place in May

of 1958 at Stanford University in Stanford, CA. With Arthur Aden as Chairman, the Symposium Committee organized their program using sophisticated long-range planning techniques. They prepared sample solicitation letters, acceptance letters, and rejection letters. They had a long-range calendar of events. Many of the things that symposia committees do today were first established at the Stanford meeting in 1958.

It was also, for many Easterners, the first time they had attended a meeting so far away from home. It was perhaps a bit of a culture shock, because the weather was so mild and comfortable and the sun seemed to be shining all the time. It also established the concept of having a meeting somewhere other than in the proximity of IRE Headquarters in New York City.

It was a three-day Symposium. The first day was devoted to papers on Ferrites. The second day was devoted to papers on Microwave Physics and the third day was split between Microwave Techniques and Microwave Filters.

Mike Leifer was toastmaster at the banquet. The highlight of the banquet was a talk by Dr. Terman, who later became even more famous as the "Father of Silicon Valley." He spoke on "Basic Research in Industry and Education." It was an exciting, stimulating meeting. The forerunner of one of the best series of Annual Meetings held by any entity of the IRE/IEEE.

A great deal of credit should go to the Steering Committee of that Symposium, including Art Aden, the Symposium Chairman, Kiyo Tomiyasu, the Technical Program Committee Chairman, George Keitel, Publicity Chairman, Hal Schroeder, Local Arrangements Chairman, and Ted Moreno, Finance Chairman. That meeting set a standard which the Symposia that followed did well to attain.

The Steering Committee established a policy of inviting the prior year's Symposium Chairman to be a member of their Steering Committee. The 1957 Symposium Chairman, Tore Anderson, acted in that capacity.

Another tradition that began at that meeting was to have a meeting of the Adcom during the Symposium. At the Adcom meeting, it was brought up that there was a growing sentiment for holding the Annual MTT meeting alternately on the East and West Coasts, and possibly in other centers of microwave activity, such as Chicago.

Another very vital tradition established by the Stanford Symposium Committee was the preparation of a comprehensive final report.

1959—Boston

The decision to hold the 1959 Symposium in the Boston area was made at the September 17, 1958 meeting of the Adcom.

The 1959 meeting was held at Harvard, through the good offices of Karl Willenbrock, who was at Harvard at the time. It is interesting to note that in those early days the decision to hold the Symposium was made less than a year prior to the actual Symposium itself. The Harvard Symposium was again a three-day symposium, but unlike the meeting in Stanford, the weather varied from very wet to very sunny.

In addition to the regular sessions, there was an evening session of talks devoted to Electron Accelerators capped by a visit to the Cambridge Electron Accelerator.

A breakthrough at the Boston Symposium was the first foreign paper. It was an invited paper entitled "A Survey of the Microwave Research in Japan in 1958." It was presented by Mr. Isao Someya, then Secretary of the Tokyo Chapter of MTT.

Perhaps the highlight of the Symposium and maybe one of the highlights of all of our Symposia was the banquet speech given by Dr. E. M. Purcell of Harvard. Dr. Purcell's credentials for speaking to that group were excellent, since he had been a microwave researcher at the MIT Radiation Laboratory during World War II and was a co-author of one of the MIT Rad Lab Series Volumes, Volume VIII. He was also a Nobel Prize Winner for physics. His talk was the first that many of us had heard on the prospects of listening to outer space. Not only was his talk of great interest to the audience, but his presentation was outstanding.

Part of the key to the great success of the Boston meeting was the excellent information derived from the Stanford meeting.

1960—San Diego

On January 19, 1959, at a meeting of the Adcom in Palo Alto, CA, there was a long discussion on the matter of the national meeting for 1960 and the general philosophy of national meetings. The San Diego and Los Angeles chapters had petitioned the Adcom, requesting that the 1960 National Meeting be held in their respective locality. It should also be pointed out that the Adcom itself was beginning to have meetings around the country, giving consideration to the fact that MTT membership was spread around the country, with perhaps major concentrations on the East and West Coasts.

The matter of a selection between San Diego and Los Angeles resulted in a long and heated debate. There was a secret ballot taken and the first secret ballot resulted in a tie. At that point, there was further discussion of the proposals and a second ballot was taken. In the second ballot each voting member weighted his votes from 1 to 10, giving a total of 10 points. On the basis of this proportional ballot, San Diego was selected for the 1960 National Meeting. It was also at this Adcom meeting that it was generally agreed that future Symposia would be held some time around the middle of May. It was also the first Symposium at a location which was not a center of microwave activity.

During the year prior to the meeting, there was some apprehension on the part of the Adcom that the group in San Diego, having had no prior experience either with the Adcom or with the National Meeting, might need help from the Adcom. As a consequence, Bob Hansen, who was a member of Adcom at the time, was made a member of the Steering Committee.

Another feature of the San Diego Symposium was the fact that it was being held in a relatively isolated area. The entire program took place on an island in San Diego Bay

in the confines of the Del Coronado Hotel, including the Technical sessions, the rump sessions, the banquet, and the cocktail party. There was very little in the immediate vicinity to distract attendees. One of the features introduced at that Symposium was the distribution of reprints of papers after the sessions.

Dr. Bill Edson was the Banquet Speaker and he spoke on "Future Microwave Power Sources." In particular, he talked about the trends in microwave power tubes.

The overall impression of the Symposium was that it was a success. The fact that San Diego was not a center of microwave activity did not seem to deter from the interest and the attendance. Besides, Tijuana was not far away. One of the positive results was the fact that having a meeting in an isolated area with no distractions perhaps enhanced the ability to exchange information with microwave colleagues.

1961—Washington, DC

At a meeting of the Adcom on February 8, 1960, requests from the Long Island, Washington, DC, Baltimore, and Boulder chapters for the 1961 Symposium were presented. After due consideration, Washington, DC was selected. Gus Shapiro, who was a member of Adcom and the Technical Program Chairman of that Symposium, reported that they were considering the possibility of publishing all the Symposium papers, without prior review, in a special issue of the Transactions. They planned to have it ready at the time of the Symposium. There was concern, however, that since the caliber of the papers in the Transactions must be maintained at a high level, his proposal was not possible, since the papers in question could not be reviewed in time. However, it was suggested that a convention record might be more suitable. As a consequence, the first MTT Symposium Digest came into being. It was an $8\frac{1}{2} \times 11$ -in 64-page booklet consisting of 500-word abstracts of all the papers to be presented. It was the first in a long and continuing line of valuable MTT publications.

During the course of planning for the Symposium, there was some apprehension that, in view of the number of papers that had been submitted for consideration and the likelihood of invited panel sessions, there might be need for parallel sessions.

But the thing that people remember the most about the Washington Symposium was the matter of the banquet speaker. When Gus Shapiro first presented the details of the 1961 Symposium to the Adcom in September of 1960, he mentioned that Dr. John Pierce of Bell Labs had accepted an invitation to serve as the Banquet Speaker. About two months prior to the Symposium, Dr. Pierce was obliged to withdraw, due to conflicting meetings abroad. At a meeting of the Adcom, Gus Shapiro gave assurances that he would make arrangements for a speaker, but he refused to elaborate beyond the assurance that the talk would be of great interest to everyone. Nothing more was said about the affair until the Sunday night before the Symposium was to start. That night, we were told that the talk would be one that no one could afford to miss.

On the day of the banquet a number of attendees were

called out of sessions by Gus Shapiro on a matter of some importance. Each person was sworn to secrecy and then told that a Russian official had been invited to speak on the microwave industry in Russia. The reason for the secrecy was to prevent the nontechnical press from attending and thereby possibly embarrassing our guest. It was further explained that the guest had agreed to a question and answer period. The guest had been warned that the questions might be delicate, but he nevertheless expressed a willingness to participate. To insure the success of the questioning period, Gus decided to plant a few key questions in the audience. He felt this would help stimulate the discussion. At the cocktail party, prior to the banquet, a few people met the guest of honor. By most standards, he was a typical-looking Russian: stocky, medium height, graying, with an arrogant yet suspicious look on his face. He was introduced as Ivan Serov. He spoke with a heavy accent, but could be understood. A few of the guests had their pictures taken with him.

After dinner, Mr. Serov was introduced. He started out by explaining that although he was not an engineer, his position was equivalent to that of a member of management in a large engineering combine. Since he was not technically trained, he was obliged to confine his comments to those details of a relatively general nature. He then proceeded to discuss a number of items of a microwave nature that Russian engineers were working on. He mentioned perhaps ten or more items in which he indicated that the Russians were at least slightly ahead or considerably ahead of our technology. This included Millimeter Waves, Solid-State Signal Sources, Communications Systems, Long Range Transmission of Microwave Signals, etc. He had a few more platitudes to convey to the audience, and then he agreed to take questions. As it turned out, there was no need for any planted questions, because suddenly everyone was on their feet, anxious to ask all sorts of questions. Although he was unable to answer in any technical detail, he agreed to furnish the name of the person and the university from which further information on any particular item could be obtained. It was a very sobering experience.

At that point, Gus called a halt to the question and answer period and was about to conclude the banquet, when he noted a gentleman in the audience. He felt that in view of the tone of Mr. Serov's talk and the discussion that followed, it would be helpful to ask the gentleman to present a short rebuttal. He then prevailed upon Mr. Paul R. Conroy of the U.S. Information Agency to comment on Mr. Serov's remarks. The entire audience was dumbfounded as the stocky, greying, suspicious-looking Mr. Serov approached the podium and revealed that he, in truth, was Dr. Conroy of the U.S.I.A. He pointed out that the entire talk was a hoax and was so designed as to help educate and alert people to the workings of the Russian mind. This, incidentally, in perfect English. Needless to say, the meeting broke up in chaos. Of the 180 attendees at the banquet, it is questionable whether anyone saw through the disguise. It was a sweet night of triumph for Gus Shapiro.

One of the highlights of that Symposium, which was lost

in the excitement of the Shapiro ploy, was a 20-minute talk given by Dr. George Southworth prior to the Serov presentation. He talked about some of the work that he had done in the microwave field over his long career. As the man who was given credit for doing the first work in waveguide, it proved to be a fascinating topic that could have stood on its own were it not for what followed.

1962—Boulder

The 1962 Symposium in Boulder celebrated the 10th Anniversary of the Adcom. Although one could think of the meeting at San Diego as having been isolated, it is still true that one can fly into San Diego on a national airline. To reach Boulder, one must fly into Denver and then rent a car and drive several miles to Boulder. However, the end reward is exactly that, a reward. Boulder is one of the most beautiful cities in the country and the National Bureau of Standards facilities were ideal for the MTT meeting.

In addition to the technical sessions, there were tours of the NBS Boulder Laboratories. A tour was made available for participants to visit the Air Force Academy.

The Banquet Speaker was Dr. Wilmer L. Barrow, who had been active in microwaves from the late 1930's while at MIT and then later at Sperry Gyroscope Co. His subject was "The Reminiscences of a Microwaver."

In addition to the usually excellent technical program to which the attendees had become accustomed, a key feature of the 1962 Symposium was the new version of the Symposium Digest. Unlike its predecessor, it was a 179-page volume, 6×9-in in size. The Digests have become archival in nature because of the good quality and the hard work that has gone into their preparation. The interesting thing about the Washington and Boulder Digests was the fact that neither Committee called much attention to that fact. But, just as the meeting in Stanford in 1958 set a pattern for future Symposia, so too did the Symposium Digests in 1961 and 1962 set a pattern for future Symposium Digests.

1963—Santa Monica

As the success of the Symposium grew, petitions by the chapters were coming in at an earlier date each year. For example, in 1960, there was consideration for the 1963 Symposium. At a November Adcom meeting that year, the Los Angeles chapter indicated that they would put in a bid for 1963 or 1964. At the same time, Long Island indicated an interest in either 1963 or 1964. It was also pointed out at the same meeting that several professional groups were having two national symposia per year, usually located in different parts of the country and it was felt that perhaps MTT might consider doing the same in the future. Japan was interested in holding a symposium in Tokyo and Dr. Michiyuki Uenohara, then of Bell Labs, was invited to attend an Adcom meeting to discuss that possibility.

The vote to hold the meeting at the Hotel Miramar in Santa Monica in 1963 was made on September 14, 1961. As attendance at the Symposia grew and the preparation became more complex, more time was required between the acceptance of a proposal and the date of the meeting.

This Symposium continued the gradual drifting away from the heavy emphasis on passive component papers towards the growing interest in active devices.

Reflecting the increased activity at each succeeding Symposium, the Digest, although still 6×9-in in size was now 210-pages long. This was also the time during which the financial condition of MTT was marginal at best, as a consequence, to defray the cost of the Digest, institutional listings were introduced for the first time. For that digest, there were 57 listings at \$50 each.

One final note of interest was the banquet speech of Dr. Bernard M. Oliver of Hewlett Packard. It was entitled "Problems of Deep Space Communication" and was devoted to the same subject as covered by Dr. Purcell in 1959, listening to outer space.

1964—Long Island

At the September meeting in 1962, the proposal to hold the 1964 Symposium on Long Island was approved. It is important to know that the 1964 Symposium was the first one to include "International" in its title. Of the 657 attendees, 24 were from outside the U.S. Interestingly enough, it was held at the International Hotel at the JFK International Airport on Long Island.

The Banquet Speaker that year was Dr. Eugene Fubini, who was then the Assistant Secretary of Defense. At that time, there were a number of hard decisions to be made relative to the defense budget; in particular, 5-percent reductions in R & D. Dr. Fubini confined his remarks to those matters. His speech had a sobering effect on the attendees.

One of the highlights of the banquet was the announcement that Bill Mumford was made an Honorary Life Member of the Adcom. Another highlight was the fact that not too far away was the New York World's Fair. A number of Symposium attendees took advantage of the proximity to visit and enjoy.

Institutional listings were again included in the Digest. The purpose was to reduce the cost of registration rather than to defray the cost of the Digest.

1965—Clearwater

The 1965 Symposium was held at the Jack Tar Harrison Hotel in Clearwater, FL. Although the Rolling Stones were registered at the hotel during the Symposium, it had no visible impact on the attendees. Here again, the Adcom was faced with holding a Symposium in an area which was clearly not a center of microwave activity, but it did provide the isolation that proved so attractive at the San Diego meeting. The climate and ambiance were also important factors. In all other particulars it was a traditional MTT Symposium.

The Banquet Speaker was Dr. Thomas L. Martin, Jr., the Dean of the College of Engineering and the Director of Engineering and Industrial Experimentation of the University of Florida. He gave a very timely, and timeless talk, "The Problem of the Obsolete Engineer." Prior to his talk, in a real change of pace, the attendees were entertained by

a group of young Greek dancers from the nearby community of Tarpon Springs.

1966—Palo Alto

The 1966 Symposium returned to the Palo Alto area. As one might expect of the group in the Palo Alto area, they introduced a number of innovations. Among them was the extension of the Symposium from three to four days. Also, they concentrated on making the Symposium truly international by obtaining travel funding from the U.S. Army Research Office and the Office of Naval Research to pay for the expenses of several invited speakers from universities abroad. This contributed greatly to the success of the Symposium.

In addition to the usual day sessions, they also had two evening sessions. It was a full program, probably the most comprehensive in the history of MTT to that time. The Digest itself was now in the excess of 300 pages.

To preserve the international flavor of the Symposium, the Microwave Prize Winner that year was Hendrik Bosma from Phillips, in the Netherlands, and the Banquet Speaker was Professor John Brown of the University College of London, England. He spoke on "Technical Education in Developing Countries."

Characteristic of banquets during this period is the fact that in addition to the Keynote Speaker, there was usually some type of vocal group to entertain. That year, they had a group called the Rovers. A highlight of the banquet was the announcement that Al Beck was made an Honorary Life Member.

The meeting itself was held at the Cabana Motor Hotel in Palo Alto and guided tours of the Stanford Linear Accelerator were arranged for Symposium registrants. The meeting set a record for attendance at 758.

1967—Boston

Following the pattern that had been set eight years earlier, the Palo Alto Symposium was followed by a Symposium held in Boston and again, following the lead of Palo Alto, the Symposium in Boston was a four-day Symposium. However, there was only one evening devoted to two parallel sessions. The sessions were held in the New England Life Hall and the banquet and other social events were held in the Statler Hilton Hotel.

Again, following along in the Palo Alto example, an attempt was made to solicit funds from various government agencies to defray the cost of the attendance of foreign visitors. Unfortunately, they simply refused to provide funds. At the last minute, some of the local area microwave companies helped to finance some of the expenses of visitors from Japan and Western Europe. But it was agreed that the exercise would not be repeated in future Symposia.

The banquet featured Professor John C. Slater, who, at the time, was with the University of Florida. He spoke of his days at MIT and at the MIT Radiation Laboratory and the early days of microwaves. A highlight of the banquet was the presentation of the Morris E. Leeds Award, one of

the most prestigious IEEE awards to Bill Mumford.

In keeping with the tradition set in the prior years, Boston again set a record for attendance at 794, which was not exceeded until 1977 at San Diego, when with the help of exhibits attendance reached 810.

1968—Detroit

The 1968 Symposium was held at the Howard Johnson's New Center Motor Lodge in Detroit, MI. The Symposium was returned to a three-day event, with one evening devoted to parallel sessions.

The technical content of the Symposia was beginning to expand and cover new and exciting areas for microwave people. But despite the rapid emergence of new areas of technology, such as microwave integrated circuits, new solid-state devices, microwave acoustics, and optical waveguide components, the traditional topics such as ferrites, filters, and passive components continued to generate great interest at the Symposia.

The Banquet Speaker was Dr. Jeff Voss of the University of Alberta. He was then Chairman of the International Microwave Power Institute. His talk entitled "Of Baking and Biology" gave some insight into the growing world of industrial microwaves. Also, at the banquet, the first National Lecturer, Dr. Art Oliner, was presented with a handsome recognition plaque. This traditional ceremony continues to this day.

1969—Dallas

In anticipation of a large attendance, and recognizing the fact that the breadth of microwave interest was expanding in many directions, the Dallas Steering Committee introduced full parallel sessions for the three days of the Symposium. This expanded the opportunity of having more papers, but it also made it possible to limit the number of papers more severely in a particular session. This effort resulted in an increase from a previous high of 61 papers to a new high of 96. The concept of parallel sessions has remained with us and has continued to grow.

In addition to three days of parallel sessions, there were also three concurrent panel discussions on the first evening of the Symposium. They were on the topics of Microwave Energy Applications, Non-Communication Techniques for Fabrication and Production of Microwave Integrated Circuits, and Noise and Solid-State Devices and Systems. It was at this Symposium that Leo Young, as the Keynote Speaker and Chairman of the Adcom, spoke out on the plight of the engineer in his keynote address entitled "IEEE, G-MTT and You." These were the early days of general concern by certain individual members of the IEEE for the engineer and the manner in which he was being treated. It was the very beginning of the professional action movement that has since become fundamental to the IEEE.

1970—Newport Beach

The 1970 Symposium was held at the Newporter Inn at Newport Beach, CA. It was the first year a theme had been selected for a Symposium. The theme for the meeting was

"Microwaves: The Fourth Decade."

The program was expanded to four days and in addition, there were six sets of three parallel sessions. There were evening sessions on two nights. One night session was devoted to a panel discussion on the Engineer, Technology, and Society. It was a very interesting session, and it brought out a number of individuals who were quite concerned about the plight of the engineer as expressed by Leo Young in the prior Symposium.

The history of professional action within the IEEE has been well documented, but it is important to note that among the contributors to that action were some of the people who spoke at that 1979 MTT Symposium panel session. The climax of all that activity was a vote taken by the United States members of the IEEE for a constitutional amendment that now permits the Institute to engage in matters of legislation, social, ethical, and economic concern without diluting the technical activities. That panel session was an important event in our history. It should also be noted that, although the panel session ended at a reasonable hour, it was followed by a series of small group discussions that went on into the early hours of the morning. On the second night of the Symposium, there were parallel panel sessions on the Microwave Engineer and the Computer and the Applications of Microwave Integrated Circuits.

Another Symposium trend that was more in evidence was the increased number of non-U.S. papers presented. For 1970, the number was 17 out of a total of 92.

It was another of our isolated Symposia, and it was fortuitous that it was isolated, because of the great interest in professional action, plus the rapidly expanding field of microwave technology.

1971—Washington, DC

In 1961, when the Symposium was held in Washington, the Committee had discussed the possibility of some type of publication of the technical papers. The discussion resulted in the first Digest. The 1971 MTT Symposium Committee, not to be outdone by their 1961 brethren, introduced the $8\frac{1}{2} \times 11$ -in full-size format of the Digest. In addition, they introduced the new MTT logo on the cover. The new size was required to accommodate the increased number of papers. It remains that size, but much fatter today. The meeting was held at the Marriott Twinbridges Motor Hotel in Washington. It was a three-day Symposium made up of parallel sessions on each day. Continuing the interest in Professional Action, a panel discussion on Changing Priorities and Engineering was held the first evening.

There was also, for the first time, a student paper contest. The contest was opened to undergraduates and first-year graduate students to stimulate interest in the microwave field and to attract into the field the talented new engineers needed to keep the specialty viable. The student who won that first prize was T. A. Saponas, of the University of Colorado, for his paper entitled "Generation of Confined Spectrum Pulses Using an Absorption Pin Diode Modulator."

Judging from the wide diversity of the sessions, it was clear that the Washington Symposium was unique and presented new and interesting challenges to future Symposia. However, they did not reach the same level of excitement that they had reached in 1961 with regard to their Symposium banquet. The banquet speaker was excellent, but he was also conventional. He was Walter Hinchman, from the Office of Telecommunication Policy. He spoke on "Changing National Priorities—A New Challenge for the Communications Engineer."

In keeping with the theme "Microwaves for a Better World" several papers on automobile radar and millimeter-wave communications systems were presented. It was a typical Washington gathering, setting new goals and new challenges for Symposia to follow.

1972—Arlington Heights, IL

The 1972 Symposium was held in the Arlington Park Towers Hotel in Arlington Heights, IL. It was sponsored by the Chicago chapter of MTT. Perhaps the most significant feature of the Symposium was the introduction of an industrial exhibit program. In addition, there was on view a microwave Historical Exhibit, which was a pictorial display of some of the earliest products and devices by different microwave companies.

The matter of microwave industrial exhibits had been discussed at great length at Adcom meetings, up to the time they were actually voted on for the Chicago meeting. At the end of the banquet at the 1970 Symposium, Leo Young, who was Chairman at the time, took a survey of people as to whether they wanted industrial exhibits at the MTT Symposium. The survey revealed that the majority of people did not want the exhibits. On the other hand, the Adcom pinched by the need for added funding, and aware of the realities of the marketplace, voted for exhibits and subsequently had exhibits at the Arlington meeting.

It was actually at an Adcom meeting on September 13, 1971 that a vote was taken in favor of having industrial exhibits at national symposia, when possible. At the first symposium-cum-exhibits there were 19 companies with 16 displays.

The theme of the Symposium was "Microwave International." This was highlighted by an evening panel session devoted to "Microwave State of the Art International," in which a number of visitors from overseas were invited to comment on the state of the art in their own countries.

The banquet speaker that year was Mr. William Magruder, who was a special assistant to President Nixon. His talk was on "Technology and National Goals." He challenged the microwave profession in a number of areas. He said there was no voice for technology in Washington and suggested moving IEEE Headquarters to the capital. He said that although the policy makers in Washington were technical illiterates, the technical people were policy-making illiterates. Although he received a standing ovation, because of what, he said, were time constraints, Mr. Magruder refused to answer any questions after his talk and immediately headed for the exit—with Marion Hines in hot pursuit.

1973—Boulder

The 1973 MTT Symposium was held at the University of Colorado in Boulder. Although the pattern of a three-day Symposium was adhered to, the matter of parallel sessions was expanded. On the first day there were two parallel sessions each day. Also, on the first evening, there were two panel sessions in parallel. One was on Millimeter-Wave Integrated Circuit Techniques and the other one was Non-linearities in Microwave Devices and Systems. On the final evening of the Symposium, there was a Workshop on the Biological Effects of Microwave Radiation.

One of the unfortunate aspects of the 1973 Symposium was the necessity to drop the student paper contest, which had been a feature of the Symposium. The reason for dropping the contest was that the Symposium Committee was unable to find anyone who was willing to take on the responsibility of running it. The Banquet Speaker that year was Ray Stanish, who spoke on "Einstein, Relativity and all that Jazz." A dramatic highlight of the banquet evening was the announcement that three new honorary life members had been elected. They included Don King, Ted Saad, and Kiyo Tomiyasu.

There were 15 exhibitors at the Symposium, who took 16 booths. One could assume that if there were 15 exhibitors willing to spend money to exhibit in as isolated an area as Boulder, CO, the idea of paid exhibits at Symposia was a success.

1974—Atlanta

The theme for the 1974 Symposium, held in Atlanta, GA, was "Together in '74." The reason for the theme was the fact that, in addition to the MTT Symposium, the Antennas and Propagation Symposium and the URSI meeting were being held at Georgia Tech at about the same time.

This was a very ambitious technical program, with many parallel sessions, some of which were joint with AP and URSI. In the evening there were more parallel sessions, one a panel session. It was a very busy Symposium.

It was also at the banquet that year that MTT first awarded the Microwave Career Award and the Microwave Applications Award. The recipients that year were Bill Mumford for the Career Award and Ed Crystal for the Microwave Applications Award. Dr. Lester Hogan, who was then President of Fairchild Camera and Instrument Company, was the banquet speaker. He spoke on "The World of Technology, Opportunities and Responsibilities for Us All."

This was the first time that the Symposium had been held in Atlanta and one of the few times that it had been held in the South. In addition to the AP Symposium, the URSI meeting, and the MTT Symposium, there was a conference on Sub-Millimeter Waves and the 12th Symposium on Electromagnetic Windows meeting on the Georgia Tech campus, all within a 10-day period. It was a rare opportunity for people interested in the field.

Because of the fact that the Symposium was held in conjunction with AP, exhibitors were given an opportunity to reserve a booth for either time period, i.e., the first two

days for the AP Symposium, plus the third day, which was an overlap day, or the last two days, which were devoted to the MTT Symposium, plus the overlap day. The cost of either arrangement was \$400 a booth. If someone opted for the full week, the cost was \$700.

In view of the number of related meetings going on at about the same time and the number of parallel sessions, the Atlanta meeting was by far the most ambitious and busiest in the history of the MTT up to that time.

1975—Palo Alto

The 1975 Symposium in Palo Alto introduced a number of innovations. One of the most important was the first separate invited foreign session, entitled "Millimeter Wave Communications in Japan." The session was organized by the Chairman of the Tokyo chapter, Professor Shigebumi Saito, of the University of Tokyo. Another new feature was a professional action panel, chaired by Fay and Leo Young on the evening of the first day.

The banquet was organized as a Western style steak barbecue at a nearby lodge. A highlight of the banquet was a bit of entertainment by Professor Roy Pritts of the University of Colorado's School of Music performing on the "MOOG Synthesizer."

The exhibitors, who now numbered 34, were located under a colorful circus tent in what had been Rickey's parking lot. Despite an excellent program and the addition of exhibits, the attendance at the Palo Alto meeting in 1975 did not reach the level of the 1966 meeting in Palo Alto. This was due undoubtedly to the weak condition of the microwave industry at the time.

Another point that should be made about the Symposium was that, of a total of 124 papers presented, 32 were by foreign authors. This was a trend that continued to grow.

1976—Cherry Hill, NJ

The 1976 Symposium at Cherry Hill, NJ, was the "Bi-Centennial Symposium." It was sponsored jointly by four chapters in New York, New Jersey, and Philadelphia. It was a three-day Symposium, with many parallel sessions. There were over 110 papers presented at the Symposium with contributions from many international sources.

The Banquet Speaker was Dr. William Lenoir, a NASA Astronaut and then leader of NASA's Powersat Program. His talk centered on the Shuttle Program.

An interesting feature for the exhibitors was the lunch-time exhibitors talk. At a simple \$3 lunch of sandwich and beer, exhibitors were allowed to explain their new products and techniques. It was a well-received feature of the Symposium that, for some reason, has never been repeated.

The Cherry Hill Symposium was a milestone event in the sense that it was the last year that the exhibits were handled by the local committees. At the September 9, 1975 meeting of the Adcom, Howard Ellowitz of the Microwave Journal, presented a proposal for joint MTT/Microwave Journal organization and administration of the MTT Symposia exhibits. A vote was taken in favor of MTT approving in principle the concept of a continuing exhibit/man-

agement group and a committee was appointed to study the concept further. Pete Rodrigue was appointed Chairman of the Study Committee.

After much negotiation between the Sub-Committee and the Publisher of the Microwave Journal and considerable discussion by the Adcom, an agreement was finally signed on December 30, 1976. It was a four-year contract, with a fifth-year option.

1977—San Diego

The first of the MTT Symposia with professional management for the exhibits was held at San Diego. There were three days of full parallel sessions, plus a workshop on Solid-State Transmitters for Terrestrial Radio Relays on the first day and three parallel workshops on the day following the third day, including Solid-State, Millimeter-Wave Technology, Gallium Arsenide Applications, and Applications of Radiation to Cancer Treatment.

One of the interesting techniques used at this particular Symposium was to send papers to reviewers without author identification. This was an attempt by the Technical Program Committee to give new authors a chance to be recognized. Unfortunately, it didn't work out quite as well as they had hoped, but later committees have continued the effort. Another feature of this Symposium was that there were no planned night sessions and, perhaps even more important, there was no smoking allowed in any of the meeting rooms.

There was a total of 63 commercial exhibitor booths sold at the Symposium. There were 116 different microwave companies listed as exhibitors. Since many companies were represented by their representatives in the area, there were often more than one company in a booth. There were also four companies that had two booths each and one company that had three.

For a first, professionally managed exhibition, the Symposium was a complete success for the exhibitor management, the MTT, and the attendees.

One of the highlights of the Symposium was the banquet. The featured speaker was Mr. Hal Puthoff, who made a presentation on the psychic research he was doing at Stanford Research Institute.

In addition to the several awards usually presented at the Banquet, it was announced that Seymour Cohn and Art Oliner had been named Honorary Life Members of the Adcom.

Benefitting from expanded exhibits, the enlarged technical program, and the perfect climate of San Diego, the 1977 Symposium, with 810 attendees, surpassed the previous attendance record set in Boston 10 years earlier.

1978—Ottawa, Canada

The 1978 Symposium, which was held in the Chateau Laurier Hotel in Ottawa, followed in the footsteps of the 1977. There were three days of parallel sessions, preceded by two workshops on Monday and followed by two workshops on the Friday. During the evening of the first day of the Symposium itself, there were two parallel panel sessions, one on "High Speed Logic for Digital Microwave

Systems" and one on "Millimeter-Wave and Optical/IR Technologies."

This was the first annual MTT Symposium held outside the U.S. Perhaps because the meeting was held in late June, the weather in Ottawa was ideal.

One of the attractions of holding the meeting in Ottawa at that particular time, in addition to the international atmosphere, was the participation of the International Microwave Power Institute and the Conference on Precision Electromagnetic Measurements, both of whom had meetings during the same week at MTT. There was also a symposium on Electromagnetic Fields and Biological Systems, which was sponsored both by AP and MTT with the cooperation of URSI. This helped add a few exhibitors and also a few attendees to the sessions.

The Banquet Speaker that year was Dr. George Sinclair, who spoke on "Is the Engineer Losing Contact with the Real World?" Dr. Sinclair, in addition to being a professor of electrical engineering at the University of Toronto, was also chairman of his own company in Canada and a former member of the Adcom.

There were 100 exhibitors at that Symposium, but there were only 70 booths. Many of the exhibitors doubled up with other companies in the booths of their sales representatives. But, as in the previous years, the Symposium continued to expand. Although it was listed as a three-day program, with the workshops starting the day before the main body of the Symposium and workshops on the day after, the Symposium was now taking a full week.

1979—Orlando

The 1979 Symposium was held in Orlando, FL, with the theme "The World of Microwaves." The Symposium was made up of parallel sessions over the first three days of the week, followed by seven workshops, and specialty conferences on the last two days of the week.

The trend towards foreign or international participation of the Symposium continued. Of 174 papers presented at the Symposium, 56 came from foreign countries, 10 countries being represented in the group. There was one important evening session devoted to Engineering Technology and Education in Mainland China.

The interest in the supernatural, or extrasensory perception, was picked up again by the Banquet Speaker, who was Dr. John Nash Ott. He spoke on "The Cause and Effect Observations Relating Light Spectral Distribution to Such Everyday Life Factors as Behavior, Cell Growth, Tumor Formation, Longevity, etc." The talk was controversial to say the least.

The number of exhibits continued to grow. There were 90 booths at the Symposium in Orlando. In addition to all the other activities associated with the Symposium, there was the natural interest and distraction from Disney World.

The Orlando Symposium was the first to have an attendance of 1000.

1980—Washington, DC

In 1980, the MTT Symposium returned to Washington, DC for the third time. Again, it was a three-day Sym-

posium with all parallel sessions. The main Symposium program was preceded by two days of workshops. The theme of the Symposium was "Technology Growth for the Eighties." The trends toward digital, monolithic, gallium arsenide technology, computer-aided techniques continued, and yet ferrites were still of interest, as were microwave measurements and field theory.

The banquet included a concert by the U.S. Marine Corps Band, combined with a tri-service Color Guard. Entertainment was provided by Mark Russell, the political satirist and TV celebrity.

The exhibits continued to grow in size and in interest, as did the attendance. There was greater interest in the social programs than ever before. In particular, the spouses' program was well attended. The technical program highlighted the concern that microwave companies were beginning to have relative to the international aspects of the technology. Two of the invited sessions dealt with communication technology in Japan and Europe. The third invited session was entitled "The Export of Technology from the U.S."

This was also the Symposium at which the first full-fledged Microwave Historical Exhibit was put on display. It was made up of a collection of components that were obtained from a variety of industrial companies, including Raytheon and Westinghouse, the MIT Radiation Laboratory Collection, NRL, and the Signal Corps. It was highlighted by a radar set provided by Westinghouse, plus some magnetron artifacts supplied by the M.O. Valve Co., in England. The Historical Exhibit was so well received, it was made a regular feature of future MTT Symposia.

1981—Los Angeles

The 1981 Symposium was held at the Bonaventure Hotel in Los Angeles. It was held jointly with the Antennas and Propagation Society and URSI.

There was an overlap of the conferences in the middle of the week and as a consequence, a plenary session jointly with the other two groups was arranged for the morning. It was a most effective session.

The exhibits continued to grow and the Historical Exhibit was enlarged by a factor of at least two. The technical meeting consisted of four parallel sessions at which 168 papers were presented, 69 from outside the U.S. There were seven workshop sessions held the two days following the main program of the Symposium. There were 155 booths sold in the exhibition itself.

The banquet was highlighted by an interesting talk by Dr. Irving Bengelsdorf on how the brain works. It was entitled "Snake-Root, Tremors and Mental Illness." This was followed by entertainment by a young group of singers who sang everything from rock and roll to barbershop quartet numbers.

The Symposium broke all records for any similar Symposium. The total registration, including APS and URSI, was 2,050. Of this the MTT-S total was 1,502.

One of the features of the Symposium was the matter of offering people an opportunity to register for one day only at a somewhat reduced price. 207 people accepted the

offer. Registrants for the exhibits alone totaled 1,000.

The Symposium had become big business; despite Al Clavin's ambition to break even, he failed miserably, recording a surplus in excess of \$90 000.

1982—Dallas

The 1982 Symposium represented the 30th anniversary of the formation of the MTT Administrative Committee, leading to the theme "30 Years of Microwaves." The meeting took place in the Hyatt Regency Hotel in Dallas, TX.

The meeting itself lasted an entire week, from Monday through Saturday. On Monday, there was a workshop on Advances in Optical Communications. The opening session of the main Symposium program took place on Tuesday morning, followed immediately by three days of parallel sessions. On Friday, there were two workshops and what was then listed as the IEEE Microwave and Millimeter Wave Monolithic Circuits Symposium. Finally, on Saturday, there was a workshop on Automatic RF Techniques put on by the ARFTG group. It was a busy week, with many activities occurring simultaneously.

172 papers were presented. There were over 160 exhibitors, and even the MTT Historical Exhibit was given added emphasis.

One of the features of the Symposium was an invited paper by Dr. Huang Hung-Chia who was Chairman of the Society of Microwaves, Chinese Institute of Electronics, People's Republic of China. He spoke on "Microwave Technology in China Over the Last 30 Years."

However, it was a typically Western symposium. The banquet was highlighted by a group called Riders in the Sky, who featured Western swing, old cowboy ballads, and innovative cowboy sketches. A highlight of the evening's activities was the announcement that Leo Young had been named an Honorary Life Member of the Adcom.

1983—Boston

For the first time since 1967, the Microwave Symposium was held in Boston. The entire program took a full five days, starting with a workshop Monday and two workshops on Tuesday. In addition, the new "IEEE Microwave and Millimeter-Wave Monolithic Circuit Symposium" took place on Tuesday.

Wednesday was the opening day of the main Symposium. Through the efforts of Ralph Levy, the Technical Program Chairman, the number of parallel sessions was reduced from four to three in order to provide fewer conflicts, permitting attendees to hear a larger percentage of the papers.

However, on the first two days—Wednesday and Thursday—the parallel sessions were followed by late afternoon open-forum sessions consisting of about 18 papers each. This was a first for MTT. The open forum sessions, which are also known as poster sessions, appeared to be well received. There was heavy attendance and there appeared to be much give and take between the speakers and attendees.

The entire meeting was held at the Sheraton Boston

Hotel, and the adjacent Hynes Auditorium. There were over 260 exhibitors. The Historical Exhibit was also in the hotel, on a path between the exhibits and the Technical sessions.

The highlight of the banquet was a talk given by Dr. Carl Sagan on "In Search of Extra-Terrestrial Intelligence." It seems interesting to note that at the first Boston Symposium Dr. Ed Purcell of Harvard gave a substantially similar talk. Unlike Dr. Purcell's talk, however, Dr. Sagan was able to accompany his talk with spectacular slides of some of the planets taken in outer space.

Among other new features of the Symposium was the first appearance of the Symposium Digest in hard cover, and an $8\frac{1}{2} \times 11$ -in technical program and information pamphlet.

The social activities had attained new prominence and sophistication as a result of the 1980 Symposium in Washington. In Boston, special tours were provided each day for spouses, but the highlight was a Tuesday night wine and cheese reception held in the new wing of the Boston Museum of Fine Arts sponsored by the Microwave Journal to celebrate its 25th anniversary.

Without fear of being called parochial, one could state that the Boston Symposium was an outstanding event.

Conclusion

And that is the History of Microwave Symposia through 1983. Much has been accomplished, many changes have taken place. The importance of the Symposium has grown dramatically.

There have been a number of key events that have shaped this history. There was the decision to hold meetings in different parts of the country, there was the introduction of the Digest, the increased participation of foreign speakers, the commercial exhibits, the historical exhibit, the growth of the social program, and, most important, the generation of surplus.

Some of these events are so significant, they have begun to have greater influence on our Symposium than was originally intended. In particular, the introduction of commercial exhibits with the resulting surplus could have a dominating influence on where and how future Symposia will be held. In the next four years, our Symposium will be held in San Francisco, St. Louis, Baltimore, and Las Vegas. It is possible that when those meetings have been held, we may conclude that our exhibits will be the controlling element in future Symposia, unless we are willing to sacrifice a growing surplus.

TABLE I
MTT ANNUAL SYMPOSIA GENERAL INFORMATION

YEAR	DAYS	SITE	CHAIRMEN	ATTENDANCE	SURPLUS	SPONSORING CHAPTERS
1957	May 9, 10	New York	Tore N. Anderson	306	\$910	NY, No. NJ, & LI
1958	May 5-7	Stanford	Arthur L. Aden	437	929	San Francisco
1959	June 1-3	Cambridge	Wilbur L. Pritchard	615	1377	Boston
1960	May 9-11	San Diego	David Proctor	584	343	San Diego
1961	May 15-17	Washington, DC	Robert O. Stone	545	0	Washington, DC
1962	May 22-24	Boulder	George E. Shafer	465	127	Denver-Boulder
1963	May 20-22	Santa Monica	Dean B. Anderson	589	1167	Los Angeles
1964	May 19-21	Long Island	Saul W. Rosenthal	657	1344	Long Island
1965	May 5-7	Clearwater	Rudolf E. Henning	468	1777	FL West Coast
1966	May 16-19	Palo Alto	Peter D. Lacy	758	2829	San Francisco
1967	May 8-11	Boston	Richard W. Damon Max Michelson	794	2561	Boston
1968	May 20-22	Detroit	M. C. Horton Joseph E. Rowe	493	3790	S. E. Michigan
1969	May 5-7	Dallas	Ben R. Hallford James C. Sadler	730	2816	Dallas
1970	May 11-14	Newport Beach	Samuel Sensiper	582	3000	Los Angeles
1971	May 16-19	Washington, DC	H. Warren Cooper	460	3707	Washington
1972	May 22-24	Arlington Heights	Larry H. Hansen Robert M. Knox	469	7233	Chicago
1973	June 4-6	Boulder	David F. Wait	586	16 330	Boulder-Denver
1974	June 12-14	Atlanta	George P. Rodrigue	615	12 000	Atlanta
1975	May 12-14	Palo Alto	E. Wesley Matthews	631	12 002	San Francisco
1976	June 14-16	Cherry Hill	Bernard De Marinis	680	30 570	No. Jersey, Phila. NY/LI, NJ
1977	June 21-23,	San Diego	David Rubin	810	31 500	San Diego
1978	June 27-29	Ottawa	A. L. Van Koughnett	650	20 000	Ottawa, Montreal
1979	Apr. 30-May 2	Orlando	Rudolf E. Henning	1000	57 825	Orlando, FL West Coast
1980	May 28-30	Washington, DC	Lawrence R. Whicker	1003	63 006	Washington, DC
1981	June 15-19	Los Angeles	Alvin Clavin	1502	92 646	Los Angeles
1982	June 15-17	Dallas	David N. McQuiddy, Jr	1267	75 424	Dallas
1983	May 31-June 3	Boston	Harlan B. Howe, Jr.	2306*	75 000(est.)	Boston
1984	May 30-June 1	San Francisco	Stephen F. Adam			San Francisco
1985	June 4-6	St. Louis	Fred J. Rosenbaum			St. Louis
1986	June 2-4	Baltimore	Edward Nichenke			Baltimore

*Includes 522 for the Monolithic- and Millimeter-Wave Symposium.

TABLE IIa
TECHNICAL PROGRAM INFORMATION

TECHNICAL PROGRAM		FINAL PROGRAM									
YEAR	CHAIRMEN	PAPERS			SESSIONS						
		Total Papers Submitted	Contributed	Invited	Non-U.S. Contributed	Non-U.S. Invited	Number	Evening	Panels	Sets in Parallel	Maximum No. in Parallel
1957	Samuel Weisbaum	20	20	3	0	0	5	0	1	0	—
1958	Kiyo Tomiyasu	79	33	6	0	0	6	0	0	0	—
1959	Henry J. Riblet		44	11	0	1	7	1	0	0	—
1960	David B. Medved	82	29	10	1	0	6	1	2	0	—
1961	Gustave Shapiro	65	20	7	1	0	7	1	3	1	2
1962	Robert W. Beatty		34	3	0	0	10	0	0	0	—
	Donald D. King										
1963	Irving Kaufman	51	23	13	3	0	9	0	0	0	—
	Max T. Weiss										
1964	Leonard Swern	83	41	4	3	0	5	0	0	0	—
1965	John E. Pippin	99	46	2	1	0	6	0	0	0	—
1966	Leo Young	93	46	15	1	8	10	2	0	0	—
1967	Theodore S. Saad	103	53	8	7	6	8	2	1	1	2
	Carl E. Fafflick										
1968	George I. Haddad	117	41	4	7	0	6	2	2	1	2
	Robert J. Wenzel										
1969	John B. Horton	175	88	8	9	1	12	1	3	6	2
	R. R. Webster										
1970	R. H. Duhamel	153	84	8	16	1	15	1	2	6	3
	George S. Kasai										
1971	Robert V. Garver	163	71	8	16	1	13	1	1	6	2
	Marvin Cohn										
1972	Charles M. Knop	165	71	12	27	2	12	1	1	6	2
	Peter P. Toullos										
1973	Robert W. Beatty		108	11	17	1	15	1	2	6	3
	Ernest L. Komarek										
1974	Gordon R. Harrison	168	120	27	21	1	23	1	2	6	5
1975	Stephen F. Adam	198	104	20	23	9	19	1	2	6	3
	Lou Cuccia										
1976	Martin Caulton	134	101	25	23	3	24	2	2	7	4
	Fred Sterzer										
	Jesse J. Taub										
1977	Gerald Schaffner	252	146	6	48	0	24	0	1	6	4
	Hriar Cabayen										
1978	Willem J. Steenart	230	160	0	64	0	24	1	3	6	4
1979	James L. Allen	260	168	5	56	0	27	1	1	6	4
	James Wiltse Jr.										
1980	R. C. Van Wagoner	222	140	17	60	15	23	0	0	6	4
1981	Don Parker	257	141	27	49	20	24	2	5	8	4
1982	J. K. Butler	261	162	10	55	2	25	0	0	6	4
	Steven L. March										
1983	Ralph Levy	276	161	2	54	0	22	0	2	6	3
	Gordon P. Riblet										

TABLE IIb
TECHNICAL PUBLICATION INFORMATION

MEETING AND DATE	PUBLISHED RECORD
Symposium on Microwave Circuitry (sponsored by IRE PGMTT), Nov. 7, 1952	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-1, Mar. 1953
Microwave Radio Relay Systems Symposium, (sponsored by MTT, COM, ED) Nov. 5–6, 1953	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-2, Apr. 1954
[Symposium on Millimeter Waves], joint IRE PGMTT and URSI, May 5, 1954	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-2, Sept. 1954
URSI-IRE Symposium, Microwave Sessions, (PGMTT—sponsored sessions), May 2–5, 1955	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-3, Dec. 1955
National Symposium on Microwave Techniques, (sponsored by IRE PGMTT), Feb. 2–3, 1956	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-4, Oct. 1956
Annual PGMTT Meeting, May 9–10, 1957	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-6, Jan. 1958
PGMTT National Symposium, May 5–7, 1958	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-7, Jan. 1959
PGMTT National Symposium, June 1–3, 1959	<i>IRE Trans. Microwave Theory Tech.</i> , 1960 (papers published along with nonsymposium papers; not included in this index)
PGMTT National Symposium, May 9–11, 1960	<i>IRE Trans. Microwave Theory Tech.</i> , vol. MTT-9, Jan. 1961
PGMTT National Symposium, May 15–17, 1961	Digest
PGMTT National Symposium, May 22–24, 1962	Program and Digest
PTGMMT National Symposium, May 20–22, 1963	Program and Digest
PTGMMT International Symposium, May 19–21, 1964	Program and Digest
G-MTT Symposium, May 5–7, 1965	Program and Digest
G-MTT International Symposium, May 16–19, 1966	Digest of Technical Papers
G-MTT International Microwave Symposium, May 8–11, 1967	Program and Digest
G-MTT International Microwave Symposium, May 20–22, 1969	Digest and Technical Program

TABLE IIb (Continued)
TECHNICAL PUBLICATION INFORMATION

MEETING AND DATE	PUBLISHED RECORD
G-MTT International Microwave Symposium, May 5-7, 1969	Digest of Technical Papers
G-MTT International Microwave Symposium, May 11-14, 1970	Digest of Technical Papers
IEEE-GMTT International Microwave Symposium, May 16-19, 1971	Digest of Technical Papers
IEEE-GMTT International Microwave Symposium, May 22-24, 1972	Digest of Technical Papers
IEEE-G-MTT International Microwave Symposium, June 4-6, 1973	Digest of Technical Papers
IEEE S-MTT International Microwave Symposium, June 12-14, 1974	Digest of Technical Papers
IEEE MTT-S International Microwave Symposium, May 12-14, 1975	Digest of Technical Papers
IEEE-MTT-S International Microwave Symposium, June 14-16, 1976	Digest of Technical Papers
IEEE MTT-S International Microwave Symposium, June 21-23, 1977	Digest
IEEE MTT-S International Microwave Symposium, June 27-29, 1978	Digest
IEEE MTT-S International Microwave Symposium, Apr. 30-May 2, 1979	Digest
IEEE MTT-S International Microwave Symposium, May 28-30, 1980	Digest
IEEE MTT-S International Microwave Symposium, June 15-19, 1981	Digest
IEEE MTT-S International Microwave Symposium, June 15-17, 1982	Digest
IEEE MTT-S International Microwave Symposium, May 31-June 3, 1983	Digest

TABLE III
MISCELLANEOUS SYMPOSIA DATA

YEAR	BANQUET		REGISTRATION COST				STUDENTS
	ATTENDANCE	PRICE*	IEEE MEMBERS		NON MEMBERS		
			PRE REG	AT DOOR	PRE REG	AT DOOR	
1957	100	\$7.50	\$ 6	\$ 6	\$ 8	\$ 8	—
1958	183	5	3	3	5	5	1
1959	175	6	3	3	5	5	0
1960			3	4	5	6	1
1961	157	8	6	8	8	10	3
1962	255	4.25	7	10	9	12	0
1963	175	8.50	6	6	10	10	4
1964	243	10	6	8	8	10	2
1965		7.50	6	8	8	10	2
1966	274	8.50	6	8	8	10	2
1967		12	7	9	12	14	3
1968	181	10	10	12	15	17	4
1969	251	10	10	12	15	17	4
1970	175	14	14	17	22	25	4
1971	114	14	16	18	25	30	2
1972	211	8	25	28	37	42	7
1973	251	10	30	40	40	50	10
1974	225	8	25	30	35	40	10
1975	301	12	30	40	40	50	10
1976	260	12.50	40	50	50	60	10
1977	342	12.50	40	50	50	60	10
1978	269	17.50	50	65	65	80	12
1979	450	16	50	65	60	75	10
1980	447	24	55	65	70	85	10
1981	500	25	70	90	90	110	25
1982	525	25	60	75	75	90	15
1983	800	30	60	75	75	90	15

*Prices at the Symposium

TABLE V
SYMPOSIA THEMES

TABLE IV THE SYMPOSIUM NAME	
1957	Annual PGMTT Meeting
1958-1962	PGMTT National Symposium
1963	PTGMTT National Symposium
1964	PTGMTT International Symposium
1965	G-MTT Symposium
1966	G-MTT International Symposium
1967-1970	G-MTT International Microwave Symposium
1971-1973	IEEE G-MTT International Microwave Symposium
1974	IEEE S-MTT International Microwave Symposium
1975-	IEEE MTT-S International Microwave Symposium

1957	Microwave Ferrites And Related Devices And Their Applications
1962	-10th Anniversary
1970	Microwaves The Fourth Decade
1971	Microwaves For A Better World
1972	Microwave International
1973	Applications In The 70's
1974	Together In 74
1975	Microwaves in Service to Man
1976	The Bicentennial Symposium
1979	The World Of Microwaves
1980	Technology Growth For The 80's
1981	Around The World With Microwaves
1982	Thirty Years Of Microwaves

TABLE VI
COMMERCIAL EXHIBITS AT MTT SYMPOSIA

YEAR	LOCATION	# OF COMPANIES	# OF BOOTHS
1972	Arlington Heights	19	16
1973	Boulder	15	20
1974	Atlanta	16	16
1975	Palo Alto	34	34
1976	Cherry Hill	42	38
1977	San Diego	119	64
1978	Ottawa	109	78
1979	Orlando	90	98
1980	Washington, DC	123	138
1981	Los Angeles	156	154
1982	Dallas	170	199
1983	Boston	242	262

TABLE VII
MICROWAVE CAREER AWARD

1973	William W. Mumford	1979	Seymour B. Cohn
1974	Harold A. Wheeler		Werner J. Kleen
1975	Henry J. Riblet	1980	Kiyo Tomiyasu
1976	John R. Whinnery	1981	Arthur Oliner
1977	Ernst Weber		Akio Matsumoto
1978	A. Gardner Fox	1982	Marion E. Hines

TABLE VIII
MICROWAVE APPLICATIONS AWARD

1973	Edward G. Cristal	1978	Dale H. Claxton
1974	Dean F. Peterson III	1979	Erwin F. Belohoubek
	Philip H. Smith	1980	Julius Lange
1975	Joseph F. White	1981	Charles R. Boyd, Jr.
1976	Martin G. Walker	1982	Les Besser
1977	Stephen I. Long		

TABLE IX
MICROWAVE PRIZE WINNERS

1955	Herman N. Chait, Nicholas G. Sakiotis
1956	Robin I. Primich
1957	Harold Seidel
1958	Ladislav Goldstein
1959	Bert A. Auld
1960	A. F. Harvey
1961	George Matthaei
1962	Leonard Lewin
1963	Leo Young
1964	Seymour B. Cohn
1965	Hendrik Bosma
1966	Arthur Oliner
1967	Robert Wenzel
1968	William Gabriel
1969	John D. Rhodes
1970	William J. Evans
1971	Marion E. Hines
1972	Harrison E. Rowe, Dale T. Young
1973	W. Richard Smith, Henry M. Gerard, William R. Jones
1974	Charles A. Liechti, Robert L. Tillman
1975	Tullio E. Rozzi, Wolfgang F. G. Mecklenbraur
1976	Robert A. Pucel, Daniel Masse, Richard F. Bera
1977	Marion E. Hines, Ronald S. Posner, Allen A. Sweet
1978	Anthony R. Kerr, Daniel N. Held
1979	Eric R. Carlson, Martin V. Schneider, Thomas F. McMaster
1980	Hatsuaki Fukui
1981	Kunikatsu Kobayashi, Yoshiaki Nemoto, Risaburo Sato
1982	Kazuhiko Honjo, Yoichiro Takayama

TABLE X
HONORARY LIFE MEMBERS

Andre G. Clavier	1894-1972
George C. Southworth	1890-1972
Alfred C. Beck	
Seymour B. Cohn	
Donald D. King	
William W. Mumford	
Arthur A. Oliner	
Theodore S. Saad	
Kiyo Tomiyasu	
Leo Young	

TABLE XI
NATIONAL LECTURERS

1967	Arthur A. Oliner
1968	Leo Young
1969	Richard W. Damon
1970	Harold Sobol
1971	Carl Blake
1972	Theodore S. Saad
1973	John L. Allen
1974	Seymour Okwit
1975	Robert W. Beatty
1976	Fred Sterzer
1977	John M. Osepchuk
1978	Charles A. Liechti
1979	James C. Wiltse, Jr.
1980	Robert A. Pucel
1981	Ferdo Ivanek
1982	Joseph A. Giordmaine

TABLE XII
NATIONAL ADMINISTRATIVE COMMITTEE

CHAIRMEN	
1952-1953	Ben Warriner
1953-1954	Andre G. Clavier
1954-1955	William W. Mumford
1955-1956	Alfred C. Beck
1956-1957	Herbert F. Engelmann
1957-1958	Wilbur L. Pritchard
1958-1959	Theodore S. Saad
1959-1960	Arthur A. Oliner
1960-1961	Kiyo Tomiyasu
1961-1962	Tore N. Anderson
1962-1963	Seymour B. Cohn
1963-1964	Donald D. King
1964-1965	Helmut Altschuler
1965-1966	Eugene N. Torgow
1966-1967	Saul W. Rosenthal
1968	Rudolf E. Henning
1969	Leo Young
1970	John H. Bryant
1971	Seymour Okwit
PRESIDENTS	
1972	Alvin Clavin
1973	John B. Horton
1974	Robert A. Rivers
1975	H. Warren Cooper III
1976	George P. Rodrigue
1977	Lawrence F. Whicker
1978	Harold Sobol
1979	Don Parker
1980	Stephen F. Adam
1981	Fred Rosenbaum
1982	Richard A. Sparks
1983	Charles T. Rucker