30 YEARS OF MICROWAVES

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On March 1 of this year, the IEEE Microwave Theory and Techniques Society was 30 years old. I would like to share with you some of the history of our technology, our business, our society and our profession during those 30 years.

Although I will confine most of my comments to the last 30 years, much work in our field had gone on before that time. It was during World War II that Microwaves went from science to engineering, from theory to application. It was not an evolutionary process but an exciting, dynamic period of rapid, critical development. Although a large fraction of the U.S. Microwave work was carried on at the M.I.T. Radiation Laboratory, significant contributions were made at Bell Labs, Raytheon, Sperry, RCA, Sylvania, Motorola and Philco to name just a few.

In those days, microwave people called themselves "plumbers". Despite the lack of common professional or trade journal most of them knew each other or knew of each other. It was a small but extremely competent group of individuals. When the war ended things became relatively quiet in Microwaves. There was work going on in Radar and Communications. Some of the work was being sponsored by the Defense Department.

In the years shortly after the war most of our technical literature consisted of the M.I.T. Radiation Lab series, plus a few other books. In addition, articles on the technology were appearing in the IRE Proceedings, in the publications of the American Physical Society and in Electronics.

But progress was still being made in the technology. By 1952, Bill Mumford had invented the noise tube. Henry Riblet had invented the short slot hybrid. Luhrs and Tull had developed a microwave switch using the Faraday effect in ferrites. Work at Air Force Cambridge Research Center had set off a beehive of activity in Microwave Printed Circuits.

Visualize, if you will, a Microwave World without hand calculators, computer aided design or automatic network analyzers; without ferrite devices, microwave integrated circuits or swept systems; without GaAsFETs, varactors, or tunnel diodes. It was a world in which "solid state" had more to do with music than with microwaves. For those working in the field, it was a challenging time.

Our communications were mainly through contracts and personal contacts. Even in the IRE we had no separate identity. Our efforts were lumped with either Antennas, Transmission Lines or Waves.

But then, during the IRE Convention in 1951, Ben Warriner IV, an engineer with General Precision Labs, in a conversation with Larry Cummings, the IRE Technical Secretary, came up with the idea of a professional group devoted to microwave electronics. In July of that year, he circulated a letter to a number of workers in the field petitioning the formation of the group. On March 1, 1952, the IRE Professional Groups Committee, despite the misgivings of its chairman, approved the formation of the Professional Group for Microwave Electronics. At the first meeting of the Administrative Committee on May 1, 1952, it was brought up that the Professional Group on Electron Devices objected to the title. As a consequence, the name was changed to the Professional Group on Microwave Theory and Techniques with the approval of the IRE Executive Committee on June 3, 1952.

The formation of PGMTT was a clear acknowledgement that the microwave engineers of the day felt a need for an organization to give them separate identity, to help exchange information and to provide a foundation for their mutual technological interests.

Microwave Technology at the time was, in retrospect, at a very primitive stage. And yet, what had been accomplished by that time was remarkable. What we lacked in sophisticated equipment and design was made up for by hard work, patience and ingenuity. In 1952, the IRE was 40 years old. In December 1951, membership was 29,408. In January of 1953, MTT membership was 942 of whom 471 had paid their annual dues of $2.

This presentation will be a brief history of the last 30 years, in which so much has been accomplished and in which so much has changed in our field. No attempt will be made to cover every development or event. What will be included are some of the key items as determined by this very interested observer.