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Number 92, Winter 1979



OUTGOING PRESIDENT'S MESSAGE

by Harold Sobol

This communique marks the end of my term as President and I wish to thank AdCom for electing me to the office and for their support during 1978. It is a pleasure to work with this dedicated team who devote so much time and effort to shaping and running the Society. Our society, which is one of the outstanding in IEEE, is a tribute to these individuals.

I want to congratulate our newly elected officers, Don Parker, President and Steve Adam, Vice President, and our new AdCom members, Bert Berson and Bob Hicks. These people have, through many years of efforts and contributions, demonstrated their professionalism and dedication and will certainly carry on the traditions and excellence of our Society.

A key event of our Fall meeting is the selection of award winners. I am delighted to announce that Gardner Fox has been selected to receive the Microwave Career Award. Gardner, over the years, has made significant contributions in waveguide, antenna and quantum electronic technologies and has opened the path that many of us follow today. D. N. Held and A. R. Kerr were selected to receive the Microwave Prize for their excellent set of papers entitled "Conversion Loss and Noise of Microwave and Millimeter Mixers" that appeared in the February 1978 Transactions. Dale Claxton has been selected to receive the Microwave Applications Award for his work on microwave integrated circuits. The official presentation of the awards will be made at our Symposium next May in Orlando. Congratulations to these very deserving winners.

During 1978, AdCom addressed some very important issues including registration of engineers and new nomina-

(Continued on page 2)



1979/1980 MTT-S NATIONAL LECTURE

James C. Wiltse

"MILLIMETER WAVES FOR THE 80s"

Millimeter-wave activity has been increasing for the past several years, inspired by technology advances and an increased need for sensors capable of operating in adverse environments (smoke, fog, dust, rain) or making special remote measurements. Numerous applications are being investigated, but those involving missile guidance, target acquisition and tracking, and remote sensing appear to be providing the greatest impetus. Major measurement programs have been initiated to obtain better characterization of propagation effects (attenuation, backscatter) ground or sea clutter, multipath effects, and target signatures.

The presentation will briefly summarize the state-of-the-art in components, sources, and receivers, and discuss the measurement programs mentioned above. From this basis, the more important current applications will be described in some detail. A projection of possible future applications will also be given.

The National Lecture may be scheduled by writing or calling:

Dr. James C. Wiltse, Jr.
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332
(404) 894-3494

James C. Wiltse received BEE and MEE degrees from Rensselaer Polytechnic Institute and the doctorate from Johns Hopkins University. His fields of interest include microwaves, millimeter-waves, infrared and lasers with applications to radar, radiometry, communications, and countermeasures. He is currently at the Engineering Experi-

(Continued on page 4)



MEET NEW MTT-S PRESIDENT

Don Parker

Don Parker received his BSEE from Brigham Young University, MS in Applied Phys from Harvard University, and ScD in EE from MIT. He is with Hughes Aircraft Company, Canoga Park, California, where he is Manager of Microwave Department. Prior to joining Hughes, he was with Stanford Research Institute, Palo Alto, California, as Director of Electromagnetic Techniques Laboratory, and MIT Lincoln Laboratory, Lexington, Mass., as Staff Member. Don was also with the USAF Electronics Systems Division as a First Lieutenant.

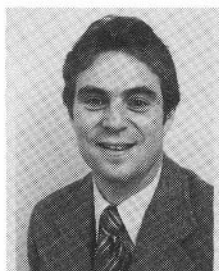
Don has been an active member of the MTT-S. He was Editor of the MTT Transactions from 1975 to 1977. In 1978 he was Vice President of the MTT-S ADCOM. He has published many technical papers in the fields of IMPATT sources, frequency multipliers, antennas, and RCS measurements.



NEW ADCOM MEMBERS



Robert B. Hicks



Bert Berson

Robert B. Hicks joined Collins Radio in 1959. He currently is Manager of Microwave Radio Product Development, Collins Transmission Systems Division of Rockwell International. This department is responsible for development of line-of-sight analog and digital microwave radio equipment and related components. Prior to assuming his present position, he was Manager of RF and IF Component Development. He has previously served in various assignments encompassing both hardware design and computer aided design.

He received his BSEE degree from the University of Oklahoma (1959) and his MSEE degree from Southern Methodist University (1967).

Bob is a Senior Member of IEEE, member of MTT-S, Chairman of MTT-16, Secretary/Treasurer for the MTT-S ADCOM during 1978, past Secretary of the Dallas Chapter

Communications Society, and a member of the 1982 MTT-S Symposium steering committee.

Bert Berson is with the Hewlett Packard Microwave Semiconductor Division where he is currently Manager of Research and Development responsible for the development of discrete devices, integrated circuits and hybrid components, at frequencies from several MHz up into the millimeter-wave range. He was formerly employed at the RCA David Sarnoff Research Center, where he was Head, Microwave Materials and Device Technology in the Microwave Technology Center. Previously, he was a senior physicist with the Pomona Division of the General Dynamics Corporation.

He received his B.E.E. from City College of New York in 1960 and his master's degree in engineering physics from the University of Rochester, New York, in 1963. He has authored and delivered over thirty technical papers, has been awarded two patents and has several patents pending.

Bert has been an active member of MTT-S. He is currently Co-chairman of the MTT-S Technical Committee on Microwave and Millimeter-wave Devices, a member of the International Microwave Symposium Technical Program Committee, Chairman of the Microwave Subcommittee of the International Solid State Circuits Conference Technical Program Committee, a member of the editorial review board of Microwave Systems News.



OUTGOING PRESIDENT'S MESSAGE (CONT.)

tion and election procedures for AdCom members. The preliminary IEEE recommendations on registration were developed by the IEEE Ad Hoc Committee on Registration and published in a recent issue of The Institute. MTT AdCom chose by a wide margin not to support these recommendations primarily since we felt that many key issues were not addressed and that the recommendations in general were not practical to implement. The subject of nominations and elections is still an open issue and will be addressed at future meetings. During 1978 we instituted our efforts to strengthen our efforts on new technologies. The output of this effort will be the workshop on GaAs Logic Devices at the Orlando Symposium.

The next major event for MTT and AdCom will be the January meeting of the 1979 Symposium Technical Program Committee in Orlando to choose papers for the May Symposium and the January AdCom meeting.

I've enjoyed my assignment during the past year and I would like to offer my best wishes to the new leadership for the coming year.





EDITOR'S NOTES

H. J. Kuno

Recent decline in the MTT-S membership should be of concern to many microwave engineers. From 1976 to 1978 the MTT-S membership dropped by 12% (approximately by 6% each year). This is in contrast to the fact that the total IEEE membership increased over the same period. Also, considering the fact we enjoyed very successful Microwave Symposia in both 1977 and 1978 and the fact that the microwave industry in general has been experiencing a boom, one cannot help but wonder why the membership is decreasing and what should be done to reverse the trend.

What are the causes for the decline? The last exodus of microwave engineers from the aerospace industry because of the early 70's recession? Lack of new microwave engineers? Is the MTT-S not serving its members' needs and interest? Has the microwave field matured? The membership decline may not be due to any single reason.

With the end of the 70's decade we must be prepared for the 80's; let us reflect on two questions: (1) are the MTT-S members needs and interests being served sufficiently? (2) Has the microwave field matured?

I for one don't subscribe to the argument that the microwave field is a matured one. Let us just consider the fact that most microwave systems currently in use cover frequencies below 12 GHz. Systems development above 12 GHz has just begun only very recently. At frequencies above 100 GHz, only selected number of components are available. The millimeter-wave and submillimeter-wave regions, particularly above 100 GHz, are yet to be explored. Thus there is a vast amount of challenging work still remaining. We have just covered a very small portion of the microwave field to date. This challenge should be attracting new, ambitious engineers. The MTT-S must serve the needs of new technical frontiers as well as the well-established fields. We must serve those who are or will be working at millimeter-wave and submillimeter-wave frequencies. The MTT-S must serve high power fields such as microwave tubes as well as high power ferrite and solid state devices. Optical and quasi optical techniques will be used at millimeter and submillimeter-wave frequencies. The technical committees, the Transactions, and the annual Microwave Symposium must make a conscious effort to cover these frontiers. We must move on. It is time to prepare ourselves for the 1980's and beyond.



CHAPTER ACTIVITIES

by R. A. Sparks

In today's climate of unusual business activity, it is easy for the individual to miss attending important IEEE technical meetings because of the press of more immediate problems. The way to insure that this doesn't happen too often is better planning of your time. And the key to better planning may be nothing more than maintaining a current appointment calendar of both business and personnel commitments of your time that you can refer to quickly and easily.

Your Chapter Officers have dedicated considerable time and effort in preparing a technical program and lining up speakers for monthly or bimonthly meetings. It can be very discouraging to make all the arrangements for a technical meeting and have only 6 or 10 attendees; of course, in the smaller chapters this number may represent a significant percentage of the local members but in most cases this is not true. Your Chapter Officers, I am sure, would welcome your inputs on specific topics and speakers that you would like to hear.

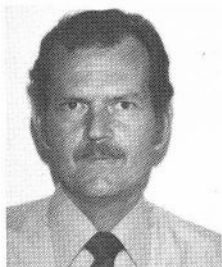
The MTT-S National Lecturer for 1978 — 79, Dr. Charles Liechti, has planned a very busy schedule for presenting his talk on Microwave FET's; a copy of the dates and places he will visit is shown in the Newsletter. If your Chapter would like to hear his talk and its not indicated in the schedule you should contact him directly to see if he can possibly arrange a visit.

Lecture series, one-day seminars and short courses continue to be a major supplement to the continuing education program of microwave engineers. Any Chapter Officer or member that is interested in organizing a lecture series or seminar, please contact Dr. Neil Pundit, Director of Technical Activities at IEEE Headquarters or me or any of the Chairmen of the Technical Committees shown in the MTT-S Directory for further information.

The decline in MTT-S Membership continues as a major concern of the Administrative Committee. Perhaps a significant cause for the reduction in active MTT-S members is the recent formation of the Quantum Electronics and Applications Society.

Many of you have read the editorials in the microwave trade journals commenting on the decline in MTT-S membership and asking "Where have all the microwave engineers gone?" There is probably not a single, simple answer, but any thoughts or comments that you have would be of interest. Write to me directly or to the Editor of the Newsletter.

MICROWAVE APPLICATION AWARD



DALE H. CLAXTON

For the development of microwave silicon and GaAs microwave analog and digital integrated circuit.

Dale H. Claxton was born in Stapleton, Staten Island, N.Y. on June 11, 1943. He received the B.S. and M.S. degrees in electrical engineering from U.C.L.A. in 1972 and 1974 respectively. He joined TRW Defense and Space Systems Group in April, 1973 and is currently a Section Head in the Microwave Technology Department of the Communications and Antennas Laboratory. Since joining TRW, he has been involved in the research and development of microwave devices, circuits and subsystems for high performance communications systems. Areas of past and current research include broadband low noise IMPATT, bipolar and FET VCO's, bipolar transistor analog integrated circuits, GaAs transferred electron logic devices and FET's, high speed digital and analog GaAs integrated circuits, and the systems applications of the above.

Mr. Claxton is a member of Tau Beta Pi and the Electron Devices, Solid State Circuits and Microwave Theory and Techniques Societies of the IEEE.



NATIONAL LECTURE (CONT.)

ment Station, Georgia Tech, in the Office of the Director. Earlier Dr. Wiltse spent 14 years with Martin Marietta Corporation, where for 4½ years he was Director of Research and Technology at the Orlando Division. He also served as Director of Electronics Engineering and as a Principal Research Scientist. Prior to that, Dr. Wiltse was Director of Advanced Technology for Electronic Communications, Inc.

Dr. Wiltse has published about forty technical articles, two books, and several patent disclosures, and has made numerous presentations at technical meetings and symposia. His IEEE activities include serving as a member of the AdCom for the MTT-S, the Editorial Review Boards of the MTT and AP Transactions. He is a member of the Steering Committee and Co-Chairman of the Technical Program Committee for the 1979 International Microwave Symposium, and will be the Guest Editor of the Symposium Transactions issue. Dr. Wiltse was Chairman of the Orlando IEEE Section in 1974-75, and a member of the Orlando Section Executive Committee from 1968 to 1978. He has been a member of the technical program committees and a session chairman at several International Microwave Symposia and at SouthEastCon.

MICROWAVE CAREER AWARD



A. GARDNER FOX

For contributions to waveguide, antenna, non-reciprocal and laser devices.

A. Gardner Fox was born in Syracuse, New York on November 22, 1912. He received the B.S. and M.S. degrees in electrical engineering from the Massachusetts Institute of Technology, Cambridge, in 1935.

He has been a member of the technical staff of the Bell Laboratories since 1936. His early work was concerned with shortwave radio transmitters and an early radar project. In 1939, he joined the Radio Research Department at the Holmdel Laboratory where he engaged in research on waveguides. During World War II he was concerned with the design of microwave radar antennas and filters at the Whippany Laboratory. In 1944 he returned to Holmdel where he took part in the pioneering of the Bell System's first microwave radio-relay system, and later engaged in millimeter wave research. From 1953 he was in charge of the Department of Microwave Physics doing device research on ferrites, dielectrics, and semiconductors. In 1959 he became interested in the efforts to produce an optical maser, and turned his attention to the theory of optical resonators. He then headed the Department of Coherent Wave Physics which has been involved in research on lasers, modulators, and nonlinear optics. Since February 1976 until his retirement in 1978 he was head of the Department of Radio Systems Research. He holds 53 patents in the microwave and quantum electronics fields.

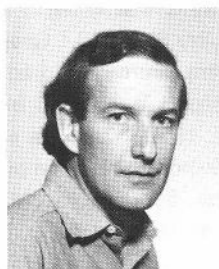
Mr. Fox has served on a number of IEEE technical and conference committees. He was an Associate Editor of the IEEE Journal of Quantum Electronics from 1965 to 1970, and served as its Editor until 1977. He was made a Fellow of the IRE in 1956 for his microwave contributions, and in 1977 was elected a Fellow of the Optical Society of America. In 1978 he was the recipient of the first Quantum Electronics Award given by the IEEE Quantum Electronics and Applications Society.



NATIONAL LECTURE (CONT.)

His awards include being a Fellow of the IEEE, a member of Sigma Xi, Tau Beta Pi, and Eta Kappa Nu, and receiving the 1975 IEEE Outstanding Engineer of the Year citation for Region 3 (Southeastern U.S.). He is listed in American Men and Women of Science, Who's Who in Engineering, Who's Who in the South and Southwest, Dictionary of International Biography, and Men of Achievement.

MICROWAVE PRIZE



Anthony R. Kerr



Daniel N. Held

For papers "Conversion Loss and Noise of Microwave and Millimeter-Wave Mixers: Part I — Theory, Part II — Experiment", MTT-26 #2, February, 1978, pp. 49-50.

Anthony R. Kerr (S'64-A'66-SM'78) was born in England on August 30, 1941. He received the B.E., M.Eng.Sc., and Ph.D. degrees from the University of Melbourne, Australia, in 1964, 1967, and 1969 respectively.

In 1969 he joined the Commonwealth Scientific and Industrial Research Organization, Sydney, Australia, to develop low-noise receivers for radio astronomy. From 1971 to 1974 he worked on low-noise cryogenic receivers for millimeter-wave astronomy with the National Radio Astronomy Observatory, Charlottesville, VA. He is presently with the NASA/Goddard Institute for Space Studies, New York, NY, developing low-noise receivers for millimeter and submillimeter wavelengths.

Dr. Kerr is a member of URSI Commission J and the Astronomical Society of Australia.

Daniel N. Held received the B.S., M.S. and Sc.D. degrees from Columbia University in 1968, 1971, and 1977 respectively. From 1968 to 1971 he was with Bendix Corporation's Navigation and Control Division, where his responsibilities included electro-optics and star tracker system design. From 1971 to 1973 he was with the Columbia Astrophysics Laboratory where he was involved in nuclear electronics and satellite system design. In 1973 he joined the Goddard Institute for Space Studies, where he supervised the design, development and implementation of a millimeter-wave radiotelescope and he did research of millimeter-wave mixers. Dr. Held is at present a Supervisor of Planetary Synthetic Aperture radar Systems Group at Jet Propulsion Laboratories, where he has been working since 1977. He is participating in the design of several new SAR missions, including the Venus Orbital Imaging Radars.

HIGHLIGHTS OF ADCOM MEETING

OCTOBER 5 & 6
WASHINGTON, D.C.



by Don Parker

Elections & Awards

The fall ADCOM meeting is always an exciting meeting because elections are held for new members of ADCOM and the recipients of various awards given by the society are selected. Bert Berson, Hewlett-Packard, and Robert Hicks, Collins Division of Rockwell International were elected as new members of ADCOM. Robert has served as secretary to ADCOM and Bert has been co-chairman of MIT-7 Technical Committee on Microwave and Millimeter-wave Solid State Devices. We welcome these new members to ADCOM, express our gratitude for their willingness to serve, and look forward to working with them.

J. Degenford, Harlan Howe, D. Parker, and F. J. Rosenbaum were reelected for an additional three-year term. G. Oltman was reelected for an additional two-year term. Congratulations are extended to each of them and appreciation expressed for their past contributions to the society. For 1979 D. Parker was elected as President and S. Adam as Vice President of the MTT-S.

The Microwave Prize was awarded to D. N. Held and A. R. Kerr for their paper "Conversion Loss and Noise of Microwave and Millimeter-Wave Mixers: Part I — Theory, Part II — Experiment," which was published in the February 1978 issue of the transactions. Dale H. Claxton of TRW was selected as the recipient of the Microwave Applications Award for the development of microwave Si and GaAs microwave analog and digital integrated circuits. A. Gardner Fox was selected to receive the Microwave Career Award for contributions to waveguides, antennas, and non-reciprocal and laser devices. It is a pleasure to recognize these gentlemen for their technical contributions.

In response to a recommendation from the Washington Chapter, the ADCOM has been considering the election of new ADCOM members by popular election of the MTT membership rather than by ADCOM. In the last issue of the Newsletter, a survey form was included for the membership to indicate their feelings on this subject. It is planned to report the results of this survey in the NEWSLETTER. The results of this survey will be used to provide guidance to ADCOM in making any possible changes in the Bylaws.

In order to assure that more new members are elected to ADCOM, it was decided to consider limiting the number of consecutive terms that a person can serve. A change in the Bylaws wherein an individual cannot be elected for more than three consecutive full terms will be drawn up for the next meeting in January 1979. (Continued on page 6)



HIGHLIGHTS OF ADCOM MEETING (CONT.)

Registration of Engineers

IEEE proposed policies 7.4 and 7.100 relative to the registration of IEEE members as professional Engineers were discussed. The IEEE Board of Directors proposes to adopt these policy statements at their December 1978 meeting. They have asked all groups and societies to express their reaction to the proposed policy statements prior to the meeting. The MTTS ADCOM was against these policy statements for two principle reasons. Firstly, these statements imply that the IEEE (and therefore the membership) is obligated to protect the health, welfare, and safety of the public. Although ADCOM recognizes the need for engineers to be ethical and concerned with the welfare of the public, the IEEE may possibly be taking on potential legal obligation or responsibility without deriving any benefits by issuing these policy statements. Secondly, ADCOM felt that most members who favor registration of engineers do so primarily as a means to enhance the professional stature and socio-economic position of engineers. ADCOM felt the IEEE Board in proposing policy statements 7.4 and 7.100 was not addressing the issues of primary concern to the membership.

Financial Status

G. Oltman, Finance Chairman, reported that the financial status of the society is the strongest it has ever been. As a result of the financial success of the last few symposia and an increase in the number of exhibitions, the society has accumulated a substantial surplus. Approximately \$30,000 of this surplus has been allocated to print a 25 year cumulative index of the MTT Transactions. Included will be a brief history of the Transactions. The index will be sent free of charge to all members of MTTS in April 1979 as a service by ADCOM. Also, the page budget for the Transactions for 1978 has been increased by 200 pages from 1000 to 1200. Ways to provide additional services to the membership are being considered by ADCOM. For example, inclusion of invited tutorial papers in the Transaction, or publishing the proceedings from special topical conferences are two suggestions. ADCOM would welcome additional ideas from the membership and especially from the Chapter Chairman.

Barry Spielman, Assistant Chairman Finance Committee, has prepared a plan and procedure for handling the finances associated with organizing meetings and symposia by chapters. In view of the large sums of money that is sometimes involved employing proper procedures is very important. Copies of the procedures can be obtained from Barry (NRL, Washington, D.C.) or from the IEEE publications "How to Organize an IEEE Conference" available from IEEE Headquarters.

Symposia

Plans are moving rapidly ahead on the 1979 International Symposium to be held April 30 through May 2 in

Orlando, Florida. The final call for papers has been issued and the Technical Program Committee will select papers from those submitted on January 8, 1979. Over 750 attendees are expected at the Symposium and in addition to the three days of technical papers, there will be over eighty exhibits. As of October 6, 1978, 53 of the exhibit booths had been sold. Several workshops have been planned for the two days following the Symposium. MTT is sponsoring a two day conference on High Speed Logic and there will be a two day meeting of ARFTG (Automated Radio Frequency Testing Group). Workshops include Filter Techniques, Solid State Amplifiers and Microwave Parasitics.

L. R. Whicker, General Chairman, 1980 MTT Symposium reported that plans for the 1980 Symposium to be held in Washington, D.C. are moving as per scheduled. The various Committees are organized and functioning. The theme will be "Technology Growth for the 80's". The Washington Chapter includes many capable members of MTT and has sponsored some outstanding activities. We look forward to a successful Symposium in Washington in 1980.

Transactions

Lamar Allen, Editor of the Transactions, reported that 270 papers had been received since June 1977. Only 58 papers are presently in the review cycle. Excluding special issues, since June 1977, 132 papers have been accepted and 97 rejected. Presently page charges have been paid by the authors organization on over 60 percent of the pages published. This percentage is much better than what has been experienced in previous years. The greater the return on page charges the more pages it will be possible to publish in the Transactions. In addition to the several special Issues already planned for the Transactions, a joint issue with Sonics and Ultrasonics and MTT is being worked out by the two editors.



REPORT OF THE DIRECTOR, DIVISION IV

Number 6, September 29, 1978

by Dick Damon

The IEEE Board of Directors met in Vancouver, B.C., Canada on August 28-29. Prior to the Board meeting, I attended meetings of TAB Op Com, TAB, Executive Committee and Audit Committee during the period August 24-27.

A major part of the BoD meeting was devoted to 1979 budget planning. The final budget proposal shows a planned \$520K deficit for the General Fund, but it has been determined that there will be no dues increase. It may be recalled that the 1978 budget also projected a deficit, but the present expectation is for a 1978 surplus. IEEE is very good at meeting its expense budget, but income is quite unpredictable and we have had unexpected income in 1978. Nevertheless, there must be a plan to meet this 1979 budget, and TAB agreed to fund \$60K of the deficit and to fund the deficit of the Standards Board exceeding its budgeted \$35K expenses. Several Societies/Groups have voluntarily agreed to commit funds to support this TAB position; about \$25K has already been committed and other AdComs have the topic on their agenda. It is hoped that the entire \$60K can be obtained by such voluntary pledges.

The Board of Directors accepted the report on registration of engineers and referred it to the major Boards for comment and criticism. Copies have been sent to all members of TAB. The report will also be published in *The Institute* so that all members will have an opportunity to respond. In view of this planned dissemination, I shall not review the issues here. Your response is desired, however, in time for the anticipated Board action in December.

Other Board actions of interest include a revised policy on patent rights and a new policy on compensation of employed engineers. Both of these were passed in a form approved by TAB prior to the BoD meeting.

TAB established an Ad Hoc Committee on Staff Support which will meet at IEEE Headquarters on October 13. The objective is to explore the level of services provided by TAB to the G/S/C and whether there should be any change in the level of funding, including direct funding by some G/S/C for special services. Several Societies and Groups in Div. IV are expected to participate in the work of this Committee.

The TAB Manual is in the process of being re-written in order to update the information and improve the presentation. I am Chairman of the committee responsible for this task. The proposed TAB Manual will be reviewed at the December TAB meeting.

At its meeting in June, COMAR decided that it did not wish to expand its field of interest to include ionizing radiation. A study is in progress, headed by Director Gowen, to determine the proper role for IEEE and the appropriate vehicle for involvement in the field of ionizing radiation.

In the same vein, a joint TAB/USAB committee is studying appropriate means for IEEE to prepare position papers. The chairman of the TAB committee is Director Brereton.

TAB is actively seeking to have a representative seated on the Awards Board. In addition, discussions are in progress on the suggestion that TAB should be responsible for the IEEE Field Awards, while the Awards Board would retain responsibility for the six major Medals. Under this proposal, the Field Awards would be assigned to appropriate Societies, making suitable accommodation for existing Society awards. It is expected that the Chairman of the Awards Board will attend the December TAB meeting for discussion of these issues.

While on the topic of awards, let me urge each Society or Group to begin now the process of seeking out and nominating candidates for the various awards and for the Fellow grade. Suitable candidates are generally best known by their professional peers and qualified members should be honored by appropriate awards.

The Audit Committee has been investigating the Headquarters method of entering new members and getting them on the mailing list for publications. Some changes have been instituted which we hope will improve the service. Please inform me if you are aware of other problems in membership records and mailing lists. These will be investigated by the Audit Committee, provided enough information is available to track down the problem. Other activities of the Audit Committee have been concerned largely with electioneering issues, including some real infractions of IEEE policy and some perceived infractions which are called to our attention by "injured" candidates. Fortunately the election in Division IV has had no such problems.



REPORT FROM DIVISION IV PAC CHAIRMAN

by Faith Lee

The National PAC Workshop held in Los Angeles, 10-11 September 1978 was well attended and continued in the vein that was started at previous meetings this year. The two issues of wage busting and pension reform were originally not on the agenda. Dr. Weinschel restored the topic of wage busting to the program after discussion.

The eight work groups at the workshops were reported on as follows:

1. Manpower Activities: Robert Rivers leader: We should stabilize the supply of engineers and push for registration. There is no shortage of engineers and particularly of B.S.E.T. graduates. Professional schools of engineering are recommended.
2. Employment Guidelines: Esther Mayfield leader: The guidelines should be disseminated widely, although they are very mild. A more practical outline for employment practices was proposed as an attachment by Mayfield. It is included herewith. Also attached is a proposal by Gary Lee for rating companies. This group also recommended professional engineering schools.
3. Ethics: James Fairman leader: There should be curbs on local publicity in ethics cases while in test.
4. Technical issues: Bruno Weinschel leader: We need to get venture capital for small business. Task forces were set up to study the effects of limiting control by foreign investors, and to study the transfer of high technology outside the U.S. by multi-national companies.
5. Age Discrimination: Richard Weis leader: Portable benefits and affirmative action are necessary.
6. Legislative Action and Advisory: Gerald Goldenstein leader: It was suggested that the head of the group register as a lobbyist and that work be continued and expanded to regional level.
7. Communications: Herb Heller leader: Number one problem is to get the news to the rank and file that USAB is doing something. Also take note that 70% of all engineers are positive on USAB but that only 19% of our leaders are.
8. Service Contracts (Wage Busting): John Alexander leader: John reported his many attempts to contact Dr. Weinschel, the withdrawal of USAB's support of Congressman Corman's HR314 and the disastrous results. USAB workers must keep track of the results of the procurement regulations changes and keep 314 on tap. We must also work through local NSPE groups.

DIVISION IV PAC

PAC COORDINATOR: Dr. L. R. Whicker
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Naval Research Laboratory
Washington, DC 20375
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History of MTT

by Ted Saad

ADCOM VI July 1, 1957 through June 30, 1958

Administrative Committee:

W. L. Pritchard, Chairman

T. S. Saad, Vice-Chairman

R. D. Wengenroth/P. D. Strum, Secretary-Treasurer

T. N. Anderson	H. F. Engelmann	R. F. Schwartz
R. E. Beam	Henry Magnuski	George Sinclair
A. C. Beck	W. W. Mumford	G. C. Southworth
A. G. Clavier	A. A. Oliner	Kiyo Tomiyasu
S. B. Cohn	S. D. Robertson	Ernest Wantuch
		H. A. Wheeler

The Chairman of the sixth ADCOM was Bill Pritchard, the Vice-Chairman was Ted Saad and Pete Strum eventually became the Secretary-Treasurer. Kiyo Tomiyasu continued as Editor of the Transactions and Bob Wengenroth remained Newsletter editor.

The annual meeting held during the term of the previous ADCOM was such a success, a group in the San Francisco area reporting through Kiyo Tomiyasu indicated a strong desire to hold an annual meeting at Stanford University. They had already obtained the approval of the San Francisco section. It was intended that the meeting would be a broad one, covering all the subjects in the field of PGMTT. The ADCOM approved the proposal and the meeting was held at Stanford University May 5, 6, and 7, 1958.

Because the last two meetings had been on ferrites, the remainder of the interests of PGMTT were emphasized although ferrite papers were not discriminated against. The Chairman of that first bona fide national Symposium was Dr. A. L. Aden, and Kiyo Tomiyasu was made the Chairman of the Technical Program Committee. At that annual meeting, a new tradition was established of having a banquet at which time the "Microwave Prize" would be awarded for the best paper published in the Transactions.

Attendance at the Symposium was 439, 180 of whom were within driving distance. The meeting established benchmarks of organization, quality and interest for subsequent annual meetings. Many of the policies and procedures established for that meeting have been followed in varying degrees by most of the annual Symposia committees. The meeting was both a technical and financial success.

In view of that success, the possibility of holding the annual meeting in alternate years in various locations on the East and West coast, preferably in different cities, was proposed by the Los Angeles Chapter in a letter from Dean Anderson, their Chairman.

The chapters continued to grow in numbers and activity. The 16 local chapters sponsored a total of 83 meetings plus National Symposium. Some of the chapters were scheduling lecture series. Although ferrites were still of greatest interest, the list of subjects began to grow and spread to solid state, strip line, low temperature phenomena and surface wave phenomena.

Since advertising was now permitted in the Transactions, Tore Andersen agreed to accept the responsibility of acting as advertising manager. Total advertising revenue for the fiscal year was \$10,830, primarily due to Tore's efforts. In a letter from the ADCOM Chairman to L. G. Cumming, the ADCOM went on record in favor of continued advertising, but indicated that a reduction in rates should be considered at a later date.

It was agreed at an ADCOM meeting that the Annual Review of Advances in Microwave Theory and Techniques would be extended to include French, German, Russian, and Japanese journals.

At the IRE National Convention, PGMTT was allotted 3-1/2 sessions. In addition, based on an invitation from Ernest Weber, it was agreed that PGMTT would co-sponsor the Symposium on Electronic Waveguides to be held by Polytechnic Institute of Brooklyn at the Engineering Societies Building in New York, April 8, 9, and 10, 1958. PGMTT also participated as a co-sponsor to the URSI Spring Meeting held in Washington, D.C. April 24, 25, and 26, 1958.

At the May 5, 1958 meeting of the ADCOM, Dr. George Southworth was unanimously elected to Honorary Life Membership on the Administrative Committee.

The Microwave Prize was awarded to Dr. Harold Seidel of Ball Labs for his paper entitled "Synthesis of a Class of Microwave Filters", which appeared in the April, 1957 Transactions.

Membership as of February 28, 1958 was up to 3,816. The balance in the treasury on the same date was \$2,230.10. The PGMTT finished the period in good financial condition due largely to the advertising revenue from the Transactions. As a result of the improved finances there was some discussion about using the money in some fashion such as establishing a scholarship fund, but no conclusion was reached.



BOOK REVIEW

Review of the book, *Electromagnetic Waves and Curved Structures*, by L. Lewin, D. C. Chang and E. F. Kuester, published by Peter Peregrinus Ltd., Southgate House, Stevenage, Herts., England.

The advent of low loss optical fibers created renewed interest in dielectric waveguide structures. Among many problems associated with these waveguides, effects of curvature are important for practical application. A considerable amount of effort has been made for the curvature problems. However, to date, important information is scattered over various publications. The book reviewed here is, therefore, a timely addition to literature available to academic and industrial communities.

The authors presumably intended that this book be useful for those who have familiarity with relatively sophisticated mathematical tools used for waveguiding phenomena. However, there are a number of places in which the authors emphasize the physical meaning of the mathematical conclusions and, hence, which are useful for more practical-minded readers.

Eleven chapters in the book may be classified into four groups. Chapters 1 through 3 are introductions. Chapters 4 through 6 are concerned with curved closed (metal-walled) waveguides. A number of classical but important formulas and results are given. Review of these chapters is a good preparation for the more complicated open waveguide cases. Chapters 7 through 9 deal with curved open (such as dielectric) waveguides. Finally Chapters 10 and 11 treat the problems of the junction between straight and curved open waveguides. Contents of each chapter are summarized below.

Chapter 1 describes means to express general three-dimensional curved structures in terms of an orthogonal coordinate system. In Chapter 2, derivations of the wave equations for curved waveguides are given by using the bi-complex combinations of field components. Chapter 3 treats a perturbation type solution for the rectangular metal waveguide twisted along its axis.

Chapter 4 describes perturbation solutions for E- and H-bends of rectangular waveguides. Chapter 5 is on the scattering at the junction between a straight and a curved rectangular waveguide. A method to obtain solutions accurate up to the order of square inverse of the radius of curvature is given. In Chapter 6, the method in Chapter 2 is applied to find field solutions in curved circular waveguide. Due to the degeneracy of TE_{01} and TM_{11} modes, the propagation in the curved circular waveguide is quite different from that in the curved rectangular waveguide, and the modal field is no longer a small perturbation of the dominant mode. These facts are explained by way of comprehensive perturbation treatment of the problem.

The principal difference between curved closed and open waveguides lies in the fact that the latter supports radiation phenomena. Although knowledge on curved closed waveguides is essential the analysis of open structures is usually much more involved. Perhaps Chapter 7 is the most important in this book and is, in this reviewer's opinion, the best-written one. Radiation from general curved structures is the topic of the chapter. The authors clearly explain how the radiation phenomena are related to the field description by means of the "local radiation condition." Two alternative methods are presented. One is based on the Debye's expressions for cylindrical field quantities. However, another method in Section 7.7 is much easier to comprehend for more physics and intuition oriented scientists and engineers. Using the WKB method, the authors are very successful in explaining why there exists inherent radiation in curved sections. Due to the nature of the WKB method, the mathematical treatment is more clearly related to equivalent radial transmission line approach familiar to most microwave engineers. Considering the excellence of this section, the reviewer wonders why the authors did not start Chapter 7 with this approach rather than the one based on Debye's formula.

Investigation of a curved slab (two-dimensional structure) provides a certain basic nature of more common three-dimensional structures such as fiber. This is the topic in Chapter 8. Perturbation solutions for both symmetric and nonsymmetric slabs are treated and physical meanings thereof are given. The attenuation due to radiation is calculated. Discontinuity effects at the junction between a straight and a curved slab waveguide may be classified into two categories. The first is due to the change of curvature and the second is concerned with higher order modes generated at the junction. The first effect is discussed in this chapter whereas the second is treated later in Chapter 11.

Chapter 9 is concerned with radiation from curved cylindrical structures. The analysis developed in Chapter 7 is applied to circular fibers. Fibers with arbitrary cross sections are treated by a perturbation method and the curvature effects are found from the knowledge of fields in the corresponding straight guides. The change of phase constant and the attenuation due to radiation are clearly identified.

Chapter 10 is the prelude to Chapter 11 and discusses the field structures near the general curved reactive surface. The straight reactance surface has been used in many analyses as a model for practical open waveguides. The authors describe the modal field in both convex and concave reactive surfaces. The quasi-modes called creeping waves for the convex case and the whispering gallery modes for the concave structure are explained systematically with the help of complex planes in which locations of poles and branches are identified.

In Chapter 11, the problem of scattering at the junction between the straight and curved reactive surfaces is treated. The main concern here is the effect of higher-order modes.

In addition, there are ten Appendices. All but one are on detailed mathematics useful in understanding the text. The last Appendix is on the tuned windows in a rectangular waveguide and has no direct connection with the rest of the book. However, as the authors explained, this Appendix is included here simply because the material, which was first published in 1951, has long since been out of print and continued request for access to the material justified its inclusion.

The authors of this book have been active in analyzing electromagnetic fields and waves and have published a number of articles. Their problem solving attitude is toward analytical treatment rather than numerical data. This attitude is believed to be the contributing factor of their success in explaining physical phenomena associated with the curved structures in spite of use of rather involved mathematics, especially in Chapter 7. As optical communication has already become reality, more and more microwave engineers will be involved with fiber and other dielectric waveguides. This book may be used as a dictionary for a number of problems on these structures. In addition, this is a good reference book for graduate students interested in related topics.

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AWARDS: IEEE plans to award three Congressional Fellowships for the 1979-1980 term. One Fellowship will be sponsored by the Electron Devices Society, and it is planned that one of these fellowships will be awarded to an applicant whose technical competence is in the field of electron devices.

APPLICATION: Further information and application forms can be obtained by calling W. Thomas Suttle (202) 785-0017 at the IEEE Washington, D.C. Office or by writing:

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