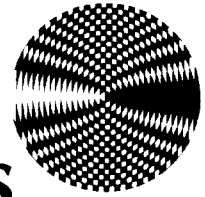




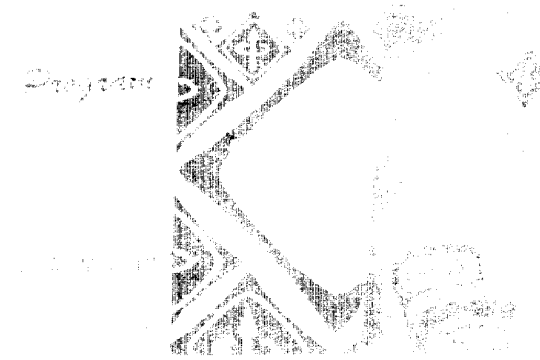
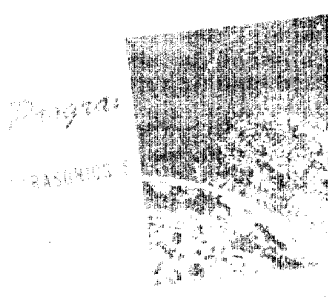
IEEE



# SONICS AND ULTRASONICS GROUP NEWSLETTER

NUMBER 51 - SEPTEMBER 1981

EDITOR: FRED S. HICKERNELL



# 1981 ULTRASONICS SYMPOSIUM

## Chicago, Illinois October 14 - 16

1980  
ULTRASONICS SYMPOSIUM



STATLER HILTO  
NEW YORK  
SEPT. 25-27

Chase Park Plaza  
St. Louis, Miss  
Sept. 24-26, 1


Sponsored by  
Group on Sonics and  
of the  
Institute of Electrical and Elec

OCTOBER 26 - 28, 1977




THE TOWNEHouses  
PHOENIX, ARIZONA

SEPTEMBER 29-31



The TowneHous  
Phoenix, Arizona




1974 IEEE ULTRASONICS SYMPOSIUM  
NOVEMBER 11-13, PFIESTER HOTEL, MILWAUKEE, WISCONSIN

# 1981 Ultrasonics Symposium

Technical Program: The 1981 IEEE Ultrasonics Symposium will be held at the McCormick Inn, 23rd and Lake Shore Drive, Chicago, Illinois 60616, (312) 791-1900. Contributed and invited papers on discoveries, recent advances, new devices, new techniques and applications in the following areas of sonics and ultrasonics are planned:

Acoustic Emission  
Acoustic Microscopy  
Acousto-Electric Effects and Devices  
Acousto-Optic Effects and Devices  
Acousto-Optic Signal Processing  
Arrays and Beam Steering  
Bioeffects and Biophysics  
Bulk Wave Effects and Devices  
Consumer Ultrasonics  
Defect and Material Characterization  
Ferroelectrics  
Industrial Ultrasonics  
Magnetostatic Waves and Devices  
Medical Ultrasonics  
Nondestructive Evaluation  
Photoacoustic Spectroscopy  
Physical Acoustics  
SAW Filters and Transducers  
SAW Materials and Propagation  
SAW Resonators and Oscillators  
SAW Signal Processing  
SAW System Application  
Thin Film Acoustic Technology  
Tissue Characterization

The following invited speakers will be participating in the technical program:

Presidential Speaker:

J. L. FLANAGAN, Bell Laboratories -- Synthesis and Recognition of Speech: Voice Communication Between Humans and Machines,

Invited Speakers:

R. A. BANJAVIC and P. L. CARSON, University of Colorado -- Hydrophones For Ultrasonic Dosimetry.

M. A. BREAZEALE, University of Tennessee -- Relation Of The Third Order Elastic Constants To Other Non-Linear Quantities,

L. J. BUSSE, Battelle-Pacific Northwest Lab -- A Comparison Of Phase Sensitive And Phase Insensitive Detection In The Near Field Of Inhomogeneous Material.

F. DUNN, University of Illinois -- Non-Linear Ultrasonic Wave Propagation In Biological Material.

H. GAUTIER, Thomas CSF -- Digital Processors Using SAW Devices.

M. HAMILTON, U.S. Air Force Avionics Lab -- Acousto-Optic Spectrum Analysis For Electronic Warfare Applications.

J. A. KUSTERS, Hewlett-Packard -- The SC-Cut Crystal -- An Overview.

J. D. LARSON, Hewlett-Packard -- Non-Ideal Radiators In Phased Array Transducers.

M. LEE, Jet Propulsion Laboratory -- Application Of An Ultrasonic Focusing Radiator For Acoustic Levitation Of Submillimeter Samples.

R. A. MOORE, Westinghouse Electric Company -- High Overtone Bulk Resonator Stabilizer Microwave Source.

W. H. SACHSE, Cornell University -- Studies With Simulated And Real Acoustic Emission Signals.

Transportation: Chicago's O'Hare International Airport, located approximately 18 miles (~40 minutes) from downtown, is served by virtually every major domestic and international airline. Limousine service is available to the McCormick Inn. For those driving, the hotel is directly across from McCormick Place at 23rd and Lake Shore Drive.

Social Function: A cocktail party is planned for the first night of the Symposium, Wednesday, October 4, 1981. Spouses and friends are welcome.

Spouses Program: A spouses program is planned and includes a complimentary "get acquainted" breakfast Wednesday and various types of tours of Chicago.

Points of Interest: The McCormick Inn is year the Field Museum of Natural History, Shedd Aquarium, Adler Planetarium, Art Institute of Chicago, Museum of Science and History, Soldier Field, the Loop and the Magnificent Mile with its famous shops, galleries and restaurants.

## FUTURE ULTRASONIC SYMPOSIUM MEETINGS

1982 SAN DIEGO - October 27, 28 and 29 at the Town and Country Hotel

For further information, contact:

B. R. McAvoy  
Westinghouse R&D Center  
1310 Beulah Road  
Pittsburgh, PA 15235  
(412) 256-7267 or 3595

1983 ATLANTA - October 31, November 1 and 2 at the Marriott Hotel

For further information, contact:

M. Levy  
Department of Physics  
University of Wisconsin  
Milwaukee, WI 53201  
(414) 963-4474

## Meet Your Symposium Committee



LARRY KESSLER  
Co-Chairman

Lawrence W. Kessler earned his B.S.E.E. degree from Purdue University in 1964 and the Ph.D. in Electrical Engineering from the University of Illinois in 1968. Through 1973 Dr. Kessler was employed by Zenith Radio Corporation where he was involved with the development of ultrasonic imaging systems and their applications. In 1974 he founded Sonoscan, Inc. (formerly Sonoscope, Inc.), a high technology based company that is involved with acoustic microscopy; he is President of the company.

Professional activities have played an important part in Dr. Kessler's career. He served a three year term on a Statutory Advisory Committee of the FDA and held the offices of Secretary, Treasurer and President of the IEEE Sonics and Ultrasonics Group. He has been an active member of the "Ultrasonics Symposium" program committee since 1969, was Program Chairman for the 1974 Symposium and is Co-Chairman of the 1981 meeting. He organized the Seventh International Symposium on Acoustical Imaging and Holography in 1976.

Dr. Kessler is listed in "Who's Who in the Midwest" and "American Men and Women of Science." He is adjunct Professor of Information Engineering at the University of Illinois, Chicago Circle. Dr. Kessler has authored over 50 technical publications and he holds four patents.



W. D. O'BRIEN, JR.  
Co-Chairman

Bill is an Associate Professor at the University of Illinois. He received the B.S., M.S. and Ph.D. degrees from Illinois in 1966, 1968 and 1970, respectively. He teaches graduate and undergraduate courses in electrical engineering, bioengineering, and biophysics, and is a member of the Radiation Oncology Faculty. He is currently involved in research projects concerning the understanding and application of acoustic microscopy to biological materials and their associated problems, the understanding of ultrasound computer-assisted tomography in the clinical practice of medicine - an analog to X-ray CAT scanning, but using ultrasound as the energy form, the development of an ultrasound dosimetric model, a continuing concern from FDA, the identification and understanding of any potential problems from the use of ultrasound in the clinical practice of medicine, especially as it relates to imaging the human fetus.

In his spare time, Bill teaches Maxwell's Equations to his son Danny, and (with more success) he teaches cardiopulmonary resuscitation (CPR) through the Illinois Heart Association. He is a member of the Champaign-Urbana Kiwanis Club, secretary of his bowling league, and stays active with jogging and racquetball. His best time in the 10km is 42 minutes. The O'Brien's also enjoy camping and skiing.

## Symposium Committee



BOB GUNSHOR  
PUBLICITY

Robert L. Gunshor obtained the B.S.E.E. degree from New York University in 1958 and joined the staff of Microwave Associates where he worked in millimeter wave magnetron development and YIG microwave filter research. He obtained the M.S.E. degree from Union College in 1962 on a special program with the General Electric Microwave Power Tube Department, and the Ph.D. degree from the Rensselaer Polytechnic Institute in 1965 for research contributions involving electron plasma waves.

Since 1965 he has held faculty appointments at Cornell, Rensselaer, and Purdue where his research activity has included plasma waves and instabilities, lasers, active microwave solid state devices, and surface acoustic wave devices and phenomena.

Professor Gunshor, currently Professor of Electrical Engineering at Purdue University, is a consultant for government and industry on SAW and microwave devices. He is on the Editorial Advisory Board of Solid State Electronics, and is a member of the Ultrasonics Symposium Technical Program Committee. He is a member of the IEEE, the American Physical Society, and Sigma Xi.



BRUCE McAVOY  
PROCEEDINGS EDITOR

Bruce McAvoy has been the Editor and formerly the Co-editor with John de Klerk of the Ultrasonics Symposium Proceedings since 1976. He is currently the group leader of Microwave Acoustics at the Westinghouse R&D Center in Pittsburgh, PA, having been active in the area of SAW and bulk mode devices since 1972. He has published over 30 papers in the microwave field concerning effects in bulk and junction semiconductors in addition to microwave acoustics. Currently his work includes new designs and processing techniques for microwave bulk mode delay lines, high overtone bulk mode resonators and a study of the effects of magnetostrictive films on SAW propagation for device applications.

Bruce has served as the Meetings Chairman of the Group from 1975 to 1981 and is also Chairman of the Pittsburgh Section on Sonics and Ultrasonics. This year he joined the Meetings Committee of the Technical Activities Board of the IEEE as Division IV representative. If asked what job he likes the best we think his reply would be The Proceedings.

MEMBERSHIP



MIEKE M. DeVRIES  
SPOUSES PROGRAM

Mieke M. DeVries, wife of Dr. Adrian J. DeVries, is in charge of the Spouses Program of the 1981 Ultrasonics Symposium in Chicago. She has been living in the Chicago area with her family for over 25 years and is well acquainted with the city. After raising her daughter and her son, she went back to her old profession of nursery school teacher. Currently she is the assistant director of a day care center for preschool children in a northwest suburb.

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NOMINATIONS WELCOMED

The various committees of the G-SU welcome suggestions from our membership for AdCom members, national lecturer and awards. If you would like to serve as a member of AdCom or know of someone you would like to have as a representative, please send this information to the nominating committee chairman, Moises Levy, Dept. of Physics, University of Wisconsin - Milwaukee, Milwaukee, WI 53201. Suggestions for national lecturer may be sent to R. A. Moore, Westinghouse Defense and Electronics Systems Center, P.O. Box 1521, MS 3608 Baltimore, MD 21203. Our Awards Chairman is R. Adler, Extel Corp., 3005 MacArthur Blvd., Northbrook, IL 60062.

The Sonics and Ultrasonics Group, which currently has approximately 2000 members, is the leading international organization devoted to the study and application of ultrasound. Through the yearly Ultrasonic Symposium, the IEEE Transactions on Sonics and Ultrasonics, regional group meetings, and this newsletter members have the opportunity to learn, to share new knowledge, and to maintain a continuing and fruitful interaction with others sharing similar interests. To encourage interested persons to join this group, we shall offer a one year group membership free of charge at our forthcoming symposium to be held in Chicago this October. Application forms and other membership information will be available at the symposium registration desk. For further information on the SU group, or if you have comments or suggestions concerning group activities, please contact one of the group officers or the Membership Chairman, Bill Tanski (617-369-4000).

W. J. Tanski  
Membership Chairman

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10TH EDITION OF ULTRASONICS  
SYMPOSIUM PROCEEDINGS

The 1981 Ultrasonics Symposium Proceedings will be the tenth regularly published by the group. The first Symposium publication was in 1970 and contained invited papers only. No Proceedings was issued in 1971. In 1972 the first volume appeared in virtually the same format it has today. It had 494 pages of text compared to 1086 pages for the 1980 Proceedings. Some little known facts about the 1980 Proceedings:

Over half a ton was sent by air freight overseas.

About 2½ tons were shipped to the IEEE Service Center for distribution.

Two sets were airmailed to Tokyo at a cost of \$62.58.

In addition you might like to know that the IEEE catalog number for the 1981 Proceedings is 81CH1689-9 and the Library of Congress Catalog Card Number is 73-641406 and the International Standard Serial Number is ISSN009-5607. The list price of the 1972 Proceedings was \$10.

B.R. McAvoy  
Proceedings Editor

## Ad Com Briefs

The G-SU Ad Com met on March 17, 1981 in Chicago, IL, presided over by T.W. Bristol. B.R. Tittmann was introduced as a new member of the Ad Com, completing F.S. Welsh's term which runs until 12/31/82. Also introduced were A.D. Ballato as new Chairman of the Technical Activities Committee, and A.C. Schell as Division IV Director for 1981 and 1982.

H. van de Vaart (Secr.-Treas. G-SU) reported that the reserves as of 1/1/81 were \$90.2K, down \$9.9K from a year ago. The decrease was primarily due to expenses incurred in the second printing of the Collected Symposia Papers, for which the revenue has not been credited to our account. Overall, the financial position of the G-SU remains healthy.

The 1980 Transactions had a total of 434 pages. This was down from the originally planned 512 pages, due to the delay of the Special Issue on "Saw Applications." This special issue was planned for November 1980, but was delayed until May 1981. S. Wanuga (Transactions Editor) reported that a future special issue on Acousto-Optic Interactions is under consideration, as well as a cumulative index covering the years 1959-1981. He also reported that the IEEE Publications Board had approved the publication of a new Transactions on Medical Imaging, sponsored by the Engineering in Medicine and Biology Society, the Nuclear and Plasma Sciences Society, and the Group on Sonics and Ultrasonics. The G-SU representative for these Transactions will be D.E. Yuhas.

A final report was presented on the 1980 Ultrasonics Symposium, held in Boston, MA. The Symposium was a great success. The total attendance was 555, far larger than ever before. (The previous record attendance was 452 in Phoenix in 1977.) A check of addresses showed that 95 had eastern Massachusetts or Rhode Island addresses, indicating that 460 came from elsewhere and that the large local population of ultrasonics researchers was only a partial factor in generating a large attendance. The planning for the 1981 Symposium in Chicago is well under way; the co-chairmen are W.D. O'Brien and L.W. Kessler. Future symposia will be held in San Diego, CA (1982), Atlanta, GA (1983), and Dallas/Ft. Worth, TX (1984). Under consideration are San Francisco or Anaheim, CA (1985), Williamsburgh, VA (1986), Orlando, FL or one of the major eastern cities in Canada (1987), and either Boston, MA, Las Vegas, NV or Denver, CO (1988). B.R. McAvoy (Proceedings Editor) reported that 1200 copies of the 1980 Ultrasonics Symposium Proceedings were printed, which is 10% more than in 1979. 600 copies will be sold to IEEE under the bookbroker program.

R.A. Moore (Chapters Chairman) presented a report written by R.C. Williamson on his experiences as the first Ultrasonics National

Lecturer. Williamson presented his talk "Surface Acoustic Wave Signal Processing in a Digital Age" about 20 times before local chapters, universities and commercial firms. The number of invitations from universities was surprisingly large. Their audiences are large and attentive, and to reach so many students was especially worthwhile. The Ad Com voted to increase the allowable travel expenses for the National Lecturer, because the originally budgeted amount turned out to be wholly inadequate.

Four local SU chapters are now active. These are Boston, MA, Pittsburgh, PA, Washington, DC and Santa Clara Valley, CA. Two new chapters are in the process of being formed: Long Island, NY and Los Angeles, CA area.

M. Levy (Chairman, Nominations Committee) presented a slate of six candidates for the three elected positions on the G-SU Ad Com to serve from January 1, 1982 to December 31, 1984.

W.J. Tanski (Membership Chairman) reported that the total G-SU membership is 2112, with 32% residing outside U.S./Canada. All mailing lists are presently being reviewed and updated.

T.W. Bristol discussed several IEEE matters. These included the IEEE 9th Annual Competition for 1981-82 Congressional Fellowships, the IEEE Center for the History of Electrical Engineering, and a new organization started by the Power Engineering Society called the Energy for the Eighties Foundation. He also touched on the subject of a proposed name change for the IEEE, which was universally opposed by the Ad Com. S.K. Kurtz discussed the Ultrasonic Industry Association (UIA), which is a non-profit organization whose members are persons, firms, corporate entities, divisions or subdivisions engaged in an activity related to ultrasonics. It was noted that closer cooperation between the G-SU and the UIA might be beneficial to both groups.

A.C. Schell (Director, Division IV) briefly touched on several subjects regarding IEEE. These included the proposal to increase the number of Divisions to 10, with each division having about 20,000 members, and the discussion going on how to allocate G&A expenses to the various groups, societies and councils. Of interest to future Symposium organizers is a new rule that requires submitting an interim financial report within 90 days after the conference, and a final report within one year.

The next Ad Com meeting is scheduled for October 13, 1981, on the eve of the 1981 Ultrasonics Symposium.

H. van de Vaart  
G-SU Secretary-Treasurer

# Chapter Activities Reports

## BALTIMORE/WASHINGTON/NORTHERN VIRGINIA

The Baltimore, Washington, and Northern Virginia Chapter of SU convened three joint meetings this past year. With Acoustics, Speech and Signal Processing we met at Adaptronics in Virginia. Tony Mucciardi presented a very interesting lecture on acoustic methods of finding faults in pipes (before the power plant fails!). As he put it, "Who would have thought pipes were so interesting." The national lecturer, Dr. Richard Williamson, gave our second talk comparing SAW processing techniques with digital techniques. The more sophisticated devices exceed digital techniques substantially in size, power consumption and processing speed. Finally, Dr. Edward Titlebaum of University of Rochester gave his famous lecture on echolocation systems in Nature (Bats, Dolphins and Humans). After an authentic 10-course Chinese dinner and with spouses in attendance, we heard his recordings of the remarkable sounds of sea creatures and bats (slowed down from 40 KHz). This joint meeting with Antennas and Propagation was a grand finish for a successful year.

The newly elected chairman of our chapter is Christopher Vale of Westinghouse. The Vice-Chairman is Zygmund Tursky of Litton Industries and Secretary-Treasurer is Gerry Blessing of NBS.

Christopher Vale  
Chairman

## SANTA CLARA VALLEY

The program for the Santa Clara Valley Chapter reflects the varied interests of the ultrasonic community in this area. Dr. James Havlice of Diasonics Inc. started this year with a talk on September 16, entitled "Medical Ultrasonic Imaging Using Short Fluid Path Technology." Additional talks on the application of ultrasound to medicine are planned for next spring. Dr. Richard Popp of the Stanford Medical School will discuss acoustic imaging from the user's point of view on March 17, and Dr. Jon Taenzer of SRI International will speak on Doppler ultrasound in medicine on April 21.

Acoustic microscopy will be the subject of a talk by Robert Gilmore of General Electric (Schenectady) on November 18 and a talk by Dr. Lawrence Kessler of Sonoscan, Inc., (this year's Sonics and Ultrasonics National Lecturer) on February 17. The program committee is also planning talks in the areas of surface waves, commercial ultrasound and guided waves.

The chapter officers and program committee for this year are Dr. David Hecht of Xerox, Chairman, Dr. William Shreve of Hewlett-Packard, Vice-Chairman, and Dr. John Larson, of Hewlett-Packard, Secretary-Treasurer.

William R. Shreve  
Chapter Vice-Chairman

## BOSTON

In '80-'81 the Boston Chapter held five meetings as well as hosted the very successful 1980 IEEE Ultrasonics Symposium. The '81-'82 schedule is off to a strong start, with two meetings being held during September. Richard Williamson of Lincoln Laboratory, Lexington, MA, described "SAW Signal Processing Techniques" at a joint meeting with Acoustics, Speech and Signal Processing. Hugh Larsen and others of Hewlett Packard, North Andover, MA, discussed "Development of Commercial Medical Imaging Instrumentation" at a meeting jointly sponsored with Engineering in Medicine and Biology. Two speakers for '82 have been scheduled to date. On February 10, Lawrence Kessler of Sonoscan, Bensenville, IL, will deliver the SU National Lecture, entitled "Acoustic Microscopy: Methods, Applications, Outlook" at a joint meeting with Engineering in Medicine and Biology. On April 14, James Sethares of Rome Air Development Center, Hanscom AFB, MA, will describe "Magnetostatic Wave Time Delays for Phased Array Technology" at a meeting co-sponsored by Antennas and Propagation. The remaining '81-'82 Wednesday meeting dates are set for 18 November, 13 January, 10 March, and 12 May.

The SU Boston Chapter officers look forward to wide participation in all of the scheduled meetings. For further information, or to make suggestions for topics and speakers please contact:

Richard Ralston, Chairman  
MIT Lincoln Laboratory (617) 862-5500,  
ext. 358

Thomas Parker, Vice Chairman  
Raytheon Research (617) 889-8400 ext. 2475

James Sethares, Secretary-Treasurer  
RADC/EEA (617) 861-4663

Richard W. Ralston  
Chapter Chairman

REPORT FROM THE DIVISION IV DIRECTOR

The rapid rise in number and size of electronics shows and conventions has also raised a number of questions about their operation and control. In part as a response to some scheduling conflicts and in part over concerns of management control, the Board of Directors has established an ad hoc committee on conferences and conventions. Chaired by Bob Lucky, the executive vice president, the committee is charged with developing a unified policy on 1) Institute level participation and management control of conferences and conventions, 2) financial aspects, 3) establishment of new conferences, 4) schedule conflicts, 5) roles of volunteers and paid staff, 6) Section-Society participation, and 7) incorporation. This ambitious menu is to be digested at the December meeting of the Board of Directors. While the focus of many of these issues is the large regional show, the technical meetings of the Societies are also under study. For example, the relationship between the Steering committee or board of a meeting and the Society Adcom is felt to need strengthening in some instances. One concern that I share with other members of this ad hoc committee is that the enthusiasm and effort of those who run successful conferences should not be dampened and hobbled by unnecessary rules and restraints. The conferences and conventions are among the Institute's more valuable resources, and what is working well may not need a lot of fixing.

A position paper on the topic of human exposure to electromagnetic fields has been prepared by the Committee on Man and Radiation (COMAR). A draft of the paper was discussed at the June meeting of TAB. After commenting on the need for balance to the presentation and the possible inclusion of footnotes, TAB approved the paper in principle. The COMAR Chairman, Dr. Om Gandhi, has circulated a revised draft to the Society presidents for their further review and comment.

Perhaps the most important program the IEEE plans to undertake in the next year is the accreditation of nuclear testing laboratories. Acting on a request of the Nuclear Regulatory Commission, an IEEE ad hoc committee has developed a plan to assess the capabilities

of laboratories that test and certify safety-related nuclear plant equipment. Fees charged to the laboratories will fund the program. I and several other directors have been concerned with the possible exposure of the Institute to lawsuit, and the ad hoc committee is addressing this issue by obtaining an additional opinion from a legal firm that is skilled in this area. Another topic of concern is the need for separation of the standards development from the accreditation groups. The Board of Directors has approved the implementation of the accreditation program, subject to review at the December meeting.

An unresolved issue is the allocation of accounting and administrative services provided to the Societies that are presently borne by the IEEE general fund. It is Institute policy that each entity should be charged for the services it uses, the TAB Opcom has been concerned with how these costs are allocated. A candidate set of rates has been developed, consisting of a pre-member charge for records and payment processing, a per-report charge for accounting and tax services, a charge per society for audits, and a per employee charge for each budget employee who is assigned full-time to a Society. At the June meeting these rates did not receive much attention, but ultimately TAB must decide on the equity of this or any alternative formula. No one is eager to pay, but there seems to be a consensus to accept a fairly apportioned share of the costs. This impacts the determination of the general dues schedule, which confronts the Board of Directors at the August meeting.

The Quantum Electronics and Applications Society, in cooperation with the Optical Society of America, has formed a committee to study the feasibility of a journal covering optical fiber communications and integrated optics. Interested parties are encouraged to provide inputs to the Chairman, Lawrence Anderson, whose address is Bell Laboratories, 555 Union Blvd., Allentown, PA 18103. The committee plans to report its findings to the December 1981 TAB meeting.

Allan C. Schell  
Division IV Director

\* \* \* \* \*

The INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS, Inc.  
445 Hoes Lane . Piscataway, N.J. 08854

