Conference Paper

W. D. Rowe
Member AIEE
Sylvania Electronic Systems
Needham Heights, Mass.

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THE TECHNICAL PAPER GLUT

W. D. Rowe

SUMMARY

A critique on the present status of technical papers and conferences in the engineering field and recommendations for improvement.

(This paper represents the opinions of an individual and in no way reflects those of any organization, commercial or professional, to which he belongs.)

I. THE SITUATION

During the period between August, 1961, and June, 1962, one magazine alone, CONTROL ENGINEERING, listed 113 technical conferences of essentially national scope. The June, 1962 issue of ELECTRONIC INDUSTRIES listed 165 conferences of some relation to the electrical industry between June and December of 1962. These conferences were sponsored by 45 different professional, industry, or government organizations. These conferences ranged between 12 and 500 papers with 30 being a fair average. From additional sources, can account for nearly another 100 conferences not to mention local and sectional meetings. Therefore, in the field of electrical, electronic, and control engineering alone, considering only the United States and Canada, there were in excess of 200 technical conferences held with an estimated 6,000 papers either published or given orally.

How many of these papers contributed significantly to our technical knowledge? Although few statistics are available, I would say that the consensus would be that rather few of them represented a reporting of a significant technical or scientific advancement. Consider what major technical (not economical) breakthroughs have been reported in the engineering field in this period.

> Continuous operation of a solid-state laser,
> Manned, multiple orbit flights around the earth,
> Reflection of radio waves from the sun,
> New energy sources; biological, plasmas, fuel cells.

Relatively few significant technological developments occurred if one is to accept this short list. Then what did the 6,000 papers given cover? Doubtless, many of the papers were solid technical reports of new applications of older technical developments, new theoretical treatments, new material advances, and extensions of previously developed techniques and applications. Of the technically and professionally competent papers given, two conclusions may be drawn. Relatively few major advances are made in our technology in the period of one year, and these advances are not "breakthroughs," but the gathering and correlation of the work and reports of many investigators working in small areas. This last observation illustrates the importance of good technical reports and papers to communicate these bits and pieces to other professional investigators.

However, I feel from past experience, and through personal attendance at many meetings, that the majority of papers given do not meet the standards of "good technical papers." A large number of papers are, therefore, relatively worthless, or at least do not justify the considerable time and money spent in the reverent way they are attended.

The fault lies not only with the authors, but with the people who run conferences and publish and review papers as well. To test this last statement, C. D. Simmons and

myself decided to test the level of review of conferences. We arrived at this idea af-
ter having been thoroughly discouraged by the level of papers given at the 1962 Inter-
national Solid State Conference given in Philadelphia in February. We submitted the
following paper summary to the 1962 WESCON Meeting to be held in August of 1962:

THE LINOTRON - A PRACTICAL DEVICE FOR MAJORITY LOGIC

"The increasing usage of devices, such as the Parametron, has necessitated
new types of logic to be considered. One of these is called "majority
logic". It has extremely interesting properties when based on a best two out
of three or a best three out of five decision mechanism. By itself, it can
perform not only the majority function, but that of AND, OR, and EXCLUSIVE
OR.

A majority element is made up of two types of devices, linear input devices and a
single active unit to assure that signal loss does not occur in transmission.
The increasing importance and utilization of majority logic in logical de-
sign has necessitated the investigation and evaluation of highly linear devi-
ces and techniques.

The Linotron is a practical solid state device for implementation of the lin-
ear functionalization of majority logic. This paper will report on several
ways in which this device has been made in the laboratory, and to some extent
used in circuits for various applications. A detailed theory of operation
has been worked out and will be presented. This theoretical approach is
backed up by considerable experimental evidence using various materials for
its implementation.

Fabrication has been made using Group IV elements using both films and bulk
methods. Initial results have been to some extent limited in accuracy, but
both high accuracy and very high linearity are theoretically possible.

Operation of the circuit is based upon the motion of majority carriers which
implies that the reliability of this device should be higher than that of
most active circuits. Further, since majority carriers are the major mode of
operation, the Linotron can be used without special packaging techniques or
hermetic seals. The equivalent circuit for the device has been determined,
and the description of operation will be discussed in light of these circuits.
The equivalent circuit consists of passive devices connected in a series-
parallel arrangement with a leakage generator.

Experimental results have shown that in certain configurations the device is
sensitive to temperature variations. It is felt that in some devices a lin-
ear relationship with the temperature can be obtained, making the Linotron
useful as a thermal metering element. Some preliminary investigation in this
area has led to consideration of a systems with logical variations that are
able to adapt to their environment in a manner to optimize operation. A
change of environment essentially can be used to alter the logical operation
of the system when the Linotron is used in majority logic systems.

Various geometries have been fabricated in the laboratory. Several of these
indicate that the process can be easily adapted to mass production tech-
niques, and hopefully an extremely low cost logic element can result. Parti-
cular effort has been expended in the area of film techniques aimed at im-
plementing these devices in a manner adaptable to microelectronics and inte-
grated circuits. Configurations for low power dissipation have been investi-

gated primarily, although there is considerable evidence to indicate that devices with very large power dissipation are possible should applications arise. It is felt that this unique device will make the utilization of majority logic practical in large applications."

This paper was duly accepted for publication. However, we had proved a point and felt that it should be withdrawn. Our point was demonstrated in that our last paragraph would legitimately have to read as follows:

> Acknowledgment: We feel that the choice of a name for a device is an extremely important matter. We have devices called parametrons, cryotrons, magnetrons, and so forth. We have named this device the Linotron. We feel that this is our most important contribution since we must acknowledge previous work done in the field. We must give reference and credit to G. S. Ohm, who in 1827 named this device a resistor.

As is evident, that while this paper has described nothing else but a resistor, it is basically a hoax perpetrated by the use of sophisticated terminology. This hoax was generated in all seriousness to demonstrate the serious deficiency in the content and review of technical papers in the United States. It is not aimed at WESCON, but at all papers and conferences. WESCON was chosen only because of its timing and reputation for critical review. The fault lies not with WESCON, one of the better conferences, but with the whole glut of papers submitted to the infinitely growing number of conferences that make adequate, critical review impossible.

On the other hand, perhaps this paper glut is America's secret weapon. I've been told that the Russians translate everything we publish and circulate it throughout the Soviet Union. Perhaps we will exhaust their resources with large quantities of trivia. Further, with commercial organization procedures for paper clearance, which are most interested in patent protection, competitive position, and public relations instead of technical achievement, the papers the Russians are translating are probably one or two years behind the actual progress of work.

II. THE CAUSES

The problem with review of papers lies not with the intent of the reviewers, but with the tremendous pressure on these people built up from the large number of papers submitted and the emphasis to attend conferences and papers that have risen in the past few years from purely non-technical reasons. The purpose of a good technical paper is to report a unique technical achievement, whether it be the statement of a new problem, a new solution to a problem, an extension of previous work, or a critique on the work of others. The purpose of giving a good technical paper is to not only report the technical achievement, but to air it critically in front of one's professional peers. Good technical papers undergoing this process bring recognition on a professional level to the writer and give him an opportunity to meet other professional people working in the same field who can provide a sounding board for his ideas, and perhaps inspire new and better approaches through cross-fertilization.

However, in the past several years, it has seemed that these stated purposes of a good technical paper have become subservient to other purposes. I could perhaps list these as follows:

Journeymen

Not only do conferences at distant spots and resort areas provide a nice opportunity for people to travel, but they also provide an opportunity for people to look for

jobs through recruiting, promoted officially or unofficially in conjunction with a conference. The call for papers for a conference is often an invitation to travel.

Commercialism

Many commercial and industrial concerns have found that the technical conference is an economical way to achieve publicity on a commercial, proprietary product or application. Even more subtly, a barrage of papers have often been considered to improve a company's corporate image. While this latter may be true, when quality is present, quantity alone falls short in the long run.

Non-technical Papers

Many of the papers given under the heading of technical papers are no more than tutorials, surveys, and listings of other work, or repeats of professionally given papers. A paper once given no longer has any value as a report unless given for a specific purpose to expand communication to others unable to have access to the original reporting or for the purpose of teaching. In this case, complete acknowledgment of previous presentations is an absolute necessity.

Recognition

Many universities, government, professional, and commercial organizations use the number of papers published by an employee as a measurement of his caliber. The standard is quantity, not quality. Therefore, people tend to publish as often as possible, instead of only when they have something to publish that is really worth the effort.

Superfluous Conferences

As new areas of terminology and specialities become increasingly more important, someone invariably will say, "now we need a conference to promote the field." If there are enough technically competent papers available to hold such a meeting, it is certainly justified. This means, however, that papers of lesser caliber should not be solicited just to fill in time for the conferences as is so often done. Furthermore, a conference given one year tends to become an annual affair, whether or not there is a pressing need. Success one year through competent participation does not insure the availability of competent papers the next year. Self-preservation becomes an end in itself in this case.

Ubiquitous Papers

Certain authors have been guilty of giving the same paper time and again at different conferences. The name and the format may change, but never the technical content. For example, if I should follow this practice with the Linotron (heaven help the profession), it might be submitted at a solid state conference under the title, "Linistor — A Solid State Device Based Upon Majority Carrier Transport;" or at a reliability conference as, "A Majority Carrier Device for Highly Reliable Operation." Not only is this practice unethical, it can be damaging to an author's reputation when presented to initiated audiences. On the other hand, the uninitiated are left somewhat in awe as to the prolific ability of the author with tremendous list of titles of published papers in such a short interval.

Closed Fraternity

Some conferences can be considered closed fraternities. The conference committee and the technical program committee are self-propagating in that the same people ran the conference year after year. A certain amount of favoritism always exists since people are more aware of what is going on in their own company. Flagrant and repeated use of this favoritism is augmented if change of slates are not made periodically and

complete.

Overly ethical reviewers sometimes lean backwards to prevent this situation by not considering papers from their own company. This can lead to omission of possible quality papers.

Universality

In nearly all conferences that I have attended, papers are universally given equal stature; at least in presentation, if not in publication. Should a poor paper or a paper of less importance than a top quality paper receive as much time? Should a paper of permanent reference value be given less publication room than a paper of current interest?

Exhibits

Any exhibits that are held in conjunction with a conference are by their very nature a commercial venture. The participants have come because they feel their investment will pay dividends in advertising and increased sales. Should, then, these exhibits, so commercially oriented, be held in the very same location as a technical convention? This commercialism must rub off on a technical program. This does not aid a professional meeting.

Committeeism

Many organizations tend to hold committee meetings simultaneously with technical meetings. This arises primarily through convenience of travel. If a number of the top people are shunted off into committee meetings, discussion levels at technical sessions must thereby fall off. One of the reasons for committee meetings being held simultaneously with technical meetings may be that highly qualified people who attend conventions not only to hear papers, but also meet with their compatriots for the extension of their technical competency, have been discouraged from going to sessions because of a deluge of poor papers. The committee meeting gives them the excuse to go to the conferences without attending the papers.

Fads

The electronic industry as a whole is guilty of reacting to various fads. A certain idea becomes popular, and the literature and advertising grab it up and start to wave the flag. The result is that a subject relatively unimportant in the whole context of the industry is multiplied many times beyond its proper proportion. Time, money, and energy are wasted in a rat race to determine who can be first and biggest. The advertising claims are magnified until even the advertising people no longer believe them.

Do you recognize these fads with approximate dates of popularity?

Transistors	1953
Printed Circuits	1955
Computers	1957
Thin Films	1958
Tunnel Diodes	1959
Reliability	1960
Value Engineering	1960
Microelectronics	1961
Artificial Intelligence	1962
Maintainability	a prediction for 1963

It must be emphasized that these subjects are extremely important when confined to their areas of proper application. On the other hand, none of them are panaceas in themselves. Their limits are overlooked in the rush to get on the bandwagon.

I have attempted to cite some of the major causes why our technical meetings, which are an extremely important factor in the engineering profession, are falling short. Many steps have been taken by various groups to attempt to improve the situation. Mergers of societies into single units are evidence of very clear steps that are presently being taken. I can cite the formation of the new Institute of Electrical and Electronic Engineers through the merger of AIEE and IRE, and the proposed merger of the Institute of Aerospace Sciences and the American Rocket Society. There are certainly many other reasons which affect the caliber of conferences which are more technical in nature such as the method of organization of conferences, the ability of speakers to present papers, visual aids and other facilities. These are primarily technical problems inherent in the running of a conference, and many have contributed to lack of attendance at sessions, but it is the more subtle ones listed above which I am attempting to emphasize in this paper.

III. OBJECTIVES

Good technical papers and conferences perform a valuable function in the engineering profession, but it is important that these be of top caliber to properly provide value. The objectives of a technical paper have been uniquely expressed by G. L. Hollander in a paper entitled, "Guidelines for Paper Reviews," for AIEE technical reviewers. I will quote directly from the paper.

"The primary purpose of a paper is to advance the art and its practitioners by teaching; teaching through original disclosures, tutorial expositions, and state-of-the-art reviews. Original disclosures consist not only of major innovations, but also corroborative and contradictory evidence to disclosures of others. A second purpose of our publication is to allow the author to test his ideas among peers."

In one respect, I completely disagree with Mr. Hollander in that the purpose of a paper is to report, not to teach. The survey and tutorial papers are directed to teaching. Technical papers are directed at reporting technical achievements. If we substitute the word reporting for teaching in Mr. Hollander's statement, I think this would serve as a concise description of the purpose of a technical paper.

In his paper Mr. Hollander describes the duties of a reviewer. Since adequate critical review is the essence of judging the quality of a paper, I am including Mr. Hollander's comments in full as they are a basic objective to be sought. I feel that these are excellent guides, and I could do little to improve upon them.

"The reviewer plays the role of friendly critic. One of his main functions is to protect the author's reputation from premature and ill-advised publication. His other function is to act as a filter against inferior work, to conserve the time of the readers and the funds of the Institute members. The duties of the reviewer can be classified in four steps:

(1) Establish competence.
(2) Thoroughly understand content.
(3) Decide on publication status.
(4) Comment frankly and objectively.

Competence. A reviewer must be competent to judge the material. While a committee Paper Chairman attempts to send the paper to the most qualified members, he can make mistakes and he cannot foretell when a member is too busy to do justice to the paper. If a competent reviewer cannot understand

the paper, this is valid reason for rejection. If he considers himself incompetent to review the paper, he should either pass it along to someone in his organization whom he knows to be competent or should immediately return it to the committee Paper Chairman.

Understand Contents. The next step is a thorough reading of the paper for correctness, conciseness, clarity and completeness. All available references cited by the author should be scanned. Every equation and diagram should be scanned. Every equation and diagram should be verified. In many cases, steps in a derivation or a lengthy explanation can be referenced to prior publications or taken for granted. On the other hand, the paper must contain enough material so that someone skilled in the field can follow the reasoning and arrive at the same conclusion. Finally, absence of commercialism either by tone or by extensive listing of catalog-type information should be ensured.

The author should show, or the reader (in this case, the reviewer) should be able to establish perspective of this paper in relation to the entire field. Is it clear why one approach has been preferred to another? Are the alternate approaches listed?

Decision. The decision on publication status must be based on the content of the paper and its relation to the field. CPs* and TPs* fill different needs. General guidelines for differentiating between CPs and TPs can be found on the (AIEE) review form. A sloppy TP is not necessarily a satisfactory CP. The CP cannot be used as a compromise when the true value of the paper is in doubt. Particularly difficult decisions concerning paper status should be discussed at subcommittee meetings. This provides a forum for questioning ideas and educates new subcommittee members in the reviewing process.

Comments. Finally, the reviewer must give the author frank and objective criticism. He should be positive where possible, but frank above all. This is not the place to vent pent-up emotions on a pet subject. If the material is controversial, this may be pointed out, but should not keep a paper from publication.

Errors, redundancy, and other publications in the field should be cited in detail to enable the author to make meaningful improvements. General comments like, "the author hasn't grasped the topic," or "too long," are not as helpful as specific references to what portions should be condensed or included by reference only."

Review of papers actually occurs in two ways: review of the paper prior to publication by reviewers and review of the paper by the author's professional peers subsequent to the paper being published or presented. Every effort must be expended to make sure that the review by peers takes place. The feedback from such review, if honestly critical, provides him with a measurement of the technical adequacy of his work, it provides him with new ideas and ways of looking at his problems, and it may also tell him he has been misguided in his efforts.

The mechanism for review subsequent to publication consists of formalized discussion, preferably in print. A question session does not provide review, although it does serve a purpose of teaching members of the audience. Inadequacies in presentation ought to be documented so that feedback of this information can be critically used by

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* AIEE Terms; CP – Conference Paper, TP – Transactions Paper

the author. The undertaking of such a program will certainly be painful to many authors at first, but would soon cause the quality of papers to rise. I wish to emphasize the quality that I am referring to is of technical content, not the mechanisms of how the paper is given or written. These mechanisms are important, but come as a part of good technical presentation.

IV. POSSIBLE SOLUTIONS

It is easy to sit back and criticize. However, this is not healthy unless there are alternate solutions proposed to enable some definitive action or recommendations to take place. For this purpose, I offer these possible steps for consideration.

1. Categorization of Types of Papers

Different types of papers serve different purposes. They should, therefore, be separated since they do not mix well, and given different emphasis. I offer the following list:

a.) Technical Paper

A technical paper is one which reports a significant advance through original disclosure, corroborative and contradictory evidence to previous work, and statements of new problems and possible solutions. Included in the paper must be descriptions of the problems, the general situation of which the problem is a part, alternative solutions, and the detailed technical presentation of the problem and solutions. It must represent a definite contribution to the permanent references of engineering knowledge.

b.) Technical Note

A technical note should be the simple disclosure of a new idea, a new way of looking at an old idea, comments upon work of others or extended work of the author. It should be technical in content, but briefly state the facts with no embellishment. The Correspondence of the Proceedings of the IRE is an excellent example of what I call a technical note. Yet the technical note is still a report of new technical material.

c.) Technical Report

A technical report is essentially identical in content to a technical paper, but it is primarily of current interest value as opposed to permanent reference value. It is more than a technical note, but less than a technical paper as far as work is considered.

d.) Survey or Tutorial Papers

In our complex technological set-up, it is impossible that every engineer be non-specialized. Therefore, a teaching method is required to keep specialized engineers aware of progress of theory and application in other engineering fields. This is accomplished through survey and tutorial papers. These are not technical papers, nor are they technical notes; yet they serve an extremely important purpose; namely, that of teaching.

e.) Commercial Paper

Many of the papers we see today are really descriptions written around a new product of a company, or descriptions of a particular application aimed at implementing a company corporate image. Although these may be interesting and informative, they are not technical papers. I am not saying that these should be eliminated, but simply that they be given a different category and handled in a different manner from technical papers and technical notes.

f.) Application Note

Many of the papers given today simply discuss particular applications of more general principles. Although the methods of applying these principles are unique to a particular situation, they are by no means of universal interest. They are not, therefore, in the same category as technical papers or notes.

g.) Non-technical Papers and Notes

Papers which do not fall into the category described above, because they are essentially commentaries, fall into a classification of non-technical material. This particular paper, for example, would fall under this category. Included in here would be philosophical commentaries, new methods, standards, future predictions, bibliographies, and so forth.

By designating papers in the category to which they are applicable, a reviewer could judge a paper upon the requirements of each level. When a paper is turned in for review, the author should so note in which category he is aiming the paper. The paper would be judged solely upon the requirement of that category.

2. Tools for Reviewers

Reviewers, no matter how competent, cannot anticipate the author. It is up to the author to let these reviewers know of previous publications and similar work done in the field. A technical paper or technical note must exhibit originality. Therefore, the author must communicate to the reviewer related facts about the paper.

a.) Originality

The author must cite that this paper is an original work. He must reference similar work of other authors for the benefit of the reviewers.

b.) Addition to Previous Work

If the paper is an addition to previous work published by the author, the original reference and associate references should be cited.

c.) Commentary

If the paper is a commentary or note or an addition to the work of other people, the original reference must be cited.

d.) Previously Published

If the paper has been published previously as a whole or in any part, the previous reference must be cited for full consideration of the reviewers.

These categorizations are ones that any ethical author now automatically reports. However, failure to acknowledge the non-originality of work can be disastrous. I feel that a standard form should be submitted with all technical papers describing the type of paper and its originality as attested to by the author. A possible form is shown in Figure 1 for illustrative purposes. Any failure to ethically meet the standards so described should be sufficient for rejection of the paper.

3. Methods of Presentation

The various types of papers do not warrant presentation on equal status. Technical papers and sessions should be separated from tutorial sessions. Separate conferences or sessions should also be held for commercial papers and for application notes. Non-technical notes and commentaries can be saved for after dinner speeches or opening addresses.

In handling the presentation of technical papers, I would recommend one possible method of approach. Similar to the American Physical Society, all contributed papers should be scheduled for ten minutes of presentation. In this time, only the pertinent facts about a paper can be described, and no time is left for philosophical wanderings. Should particular listeners feel that they require more details, they can then go to the original papers in their published form or go directly to the author for more information and discussion. The author would probably welcome this concrete evidence of interest in his paper.

Upon review, if a certain number of qualified technical papers look as though they are of top caliber and represent tremendous technical value, they should be invited to be given in an enlarged versions. The invited paper is first submitted as though it were a contributed paper, but its significance can be determined during review. Perhaps less than 10% of technical papers submitted might be invited to have, perhaps, one-half hour presentation.

Survey-tutorial sessions could certainly consist solely of invited papers. Sessions which hold commercial papers could be held at the same location as exhibits or other commercial ventures and should be somewhat separated from the scheme of things at a technical conference. Commercial sessions were held effectively at the AFIPS, 1962 Spring Joint Computer Conference. Application notes are interesting to technical conferences, but they should be put in sessions listed as applications or even better held at conferences particularly oriented toward applications, commercial or military.

Conferences should be divided, then, into three classifications, technical, applications, and commercial. The different classifications should not be mixed at a single conference. Advance publicity, as well as conference proceedings should make clear the particular nature of the conference, i.e., technical, applications, etc.

4. Running the Conference

Professional and industry group committee meetings should not be held concurrent with a technical conference. No distractions from the technical content of the conference should be allowed. This includes inspection trips, exhibits, and tutorial sessions. These can be held, but must be scheduled so as not to interfere with the technical content of the meeting. Tutorial sessions and open discussions can be held in the evening, or if a conference is on a specialized subject, a tutorial session to teach the state-of-the-art to uninformed attendees should be held the day before the conference or be given with the opening ceremonial activities.

The technical content of the meeting would consist in the large part of ten-minute papers, allowing ten minutes for presentation and five minutes for discussion, and a small number of invited papers with twenty to twenty-five minutes allotted for presentation, and ten minutes for discussion. A session might consist of one or two invited papers and eight or more contributed papers lasting about three hours.

The objective of this procedure is to bring the prime focus of a conference back to technical content as opposed to other distractions. In order to gather the information present in a technical conference, one must attend it steadfastedly. Attendance purely on technical reasons will upgrade papers through critical review and discussion by an author's peers. The mechanism is such to insure that his peers will be present. Attendance at technical conferences of this type is sure to fall off, as the fringe area people either lack interest or can no longer justify their presence. The remaining conference would certainly be one of high professional level. Attendance at conferences would be smaller, but participants would be dedicated. The excuse, that exhibits and large attendance of conferences pays the way, simply gives the technical paper and technical portion of a conference the stigma of a kept woman.

V. METHODS OF PUBLICATION

Papers of permanent reference value certainly should be published in full. However, such a paper must meet certain minimum qualifications. It must be original, and it must be complete with problems and solutions treated in detail. It must be factual, and it must not be embroidered with philosophical overtones of future applications. Any paper falling short of meeting these criteria could be classified as a Technical Note or Report, as far as technical subjects are concerned. The Proceedings of the IRE make just this distinction. It has both technical contributions (papers) and correspondence. The latter is effectively a gathering of technical notes. I have heard from various people that the material in the technical contributions of the Proceedings of the IRE is of little interest because of its detailed nature in specialized subjects. On the other hand, this is just what I am proposing should be published since less detailed material as tutorial papers, applications, and philosophical comments could be left for other non-technical volumes such as ELECTRICAL ENGINEERING. No one should be expected to have interest in every technical paper published in such a technical publication vehicle. It is essentially a permanent reference medium where the distribution of articles in specialized fields should be determined by the publishers to provide a normal equilibrium.

The publication of a technical note or report should be given full professional credit. In this manner, biographies of authors could show long lists of contributions. The effort involved in preparing a technical note will only be apparent in the quality of the note itself and its corresponding reference. Technical papers will of course receive a greater acknowledgment since they represent a greater effort.

Publication of technical papers, reports and notes should, therefore, be reserved to one type of publication, preferably without advertising. This would make it similar in content to the Physical Review, expensive perhaps, but certainly of professional value. Tutorials, application notes, and philosophical treatises, not directly applicable to technical content, should be left for a second publication vehicle which could certainly have advertising as an aid to paying its way. Commercial papers should be left to the many commercial publications, many of them quite good, but so dutifully bound to the commercial aspect.

VI. CONFERENCE ORGANIZATION

When should a conference be held? Annually, only if there is material available to justify it; on a new subject, only if there are sufficient papers of high quality available along with surveys to provide a professional undertaking.

With the forthcoming merger of IRE and AIEE, paper handling in the combined societies will be immense, and will probably represent a major percentage of engineering papers given in this country. It may be possible on this level to establish a paper pool where papers on various subjects can be filed until sufficient numbers are available to justify either a conference or a session at a conference. The papers should be contributed; and the call for papers eliminated.

The drawback with this method is, of course, that if no papers on the subject could be gathered in a short period, the paper could be delayed almost indefinitely before presentation. Periodically, general sessions could be held to prevent papers from becoming stagnant and to be sure that papers are kept current. On the other hand, when papers on a particular subject become abundant, it may then be possible to schedule a technical conference or a group of sessions. There would be no harm listing subjects in which papers are desired for special emphasis, but this would not be in the same category as the call for papers. A paper may or may not be used at a particular conference.

Geographies for holding a conference should remain relatively constant. Conferences should be held if possible in a professional atmosphere either in a large city hotel or at a university. Attendance should be enticed through technical quality, not environment.

Social affairs are an extremely important part of a conference. It gives participants an opportunity to get together informally to talk shop or otherwise. These should not be eliminated, but scheduled to prevent any conflict with technical activities.

Funds lost through elimination of exhibits and smaller attendance can be made up through higher registration fees. The "pure" technical conference is much more valuable to an employer sending a participant.

The employment agencies and personnel recruiters should be barred from the strictly technical conference. Commercially oriented conferences may put up with them.

VII. REVIEW AND RATINGS

Reviewers of a paper can often do an excellent job in making critical review on the technical content and organization of a paper. They can do little to predetermine its manner of presentation and its impact upon the profession. For this reason, the review is only a preliminary filter. The final feedback on a paper must come from the critical considerations of the technical peers of the author. This can occur formally in two ways. First, every attendee at a conference could be handed a grading card for each paper such as shown in Figure 2 for illustrative purposes. A grading system could be established for both the mechanics of a presentation and also for its technical content. These could then be gathered at every session along with questions on the paper and submitted to the author and other interested parties. This would then provide the necessary feedback for assuring that each author would have a critical, unbiased review of his paper. Further, people with interests in the subject similar to his would have a formal means of contacting him for further discussion and questions. Such a procedure would be easy to enact and maintain, and would serve as a final review after the fact. Its presence would cause many an author to take required action before the fact. Secondly, formal discussion after the presentation of papers can be secured. At the end of every paper, discussion could be precipitated by a panel of experts who have listened to the paper, as well as questions from the floor. This approach has been tried successfully at WESCON. Technical discussion in this manner could also be precipitated by mailing copies of a paper or abstract to other people working in the field prior to presentation. This would assure to some extent prepared contributions and discussion by other knowledgable people. There is no better way to make a session interesting than a good donnybrook on a technical level.

The quality of papers can never increase unless there is a possible means of measurement and feedback of information for authors. Only in this manner can the proper setting be established to allow technical paper requirements adapt their own levels of acceptability.

VIII. PRESENTATION AND PUBLICATION

In order to assure proper discussion of a technical paper, it must be given both orally and in print. Formal discussion can then be also followed in a formal manner. On the other hand, technical reports, technical notes, and survey papers should not receive the same degree of treatment.

As has been mentioned previously, orally presented papers should be divided into contributed papers and invited papers. I feel that five vehicles are required to give due justice to publication of these papers.

a. <u>Transactions</u>

All technical papers, but nothing else, should be published in a vehicle that might be called Transactions. It will contain no advertising or other material than editorial.

b. <u>Notes</u>

All technical notes should be published together in a manner similar to the correspondence in the PROCEEDINGS OF THE IRE. If recommendations, as put forth in this paper are followed, the volume of technical notes would greatly increase. This might warrant a volume called Technical Notes that would stand on its own, or it could be a separate section in the Transactions described above.

c. <u>Abstracts</u>

Papers to be presented at a conference should be grouped in a special conference volume in the form of abstracts of 500 to 1,000 words. Similar to the bulletin of the American Physical Society, these could be sent to all members of an organization participating in the conference prior to the meeting. With a little extra effort, these abstracts could also be given in groupings and headings and printed on a single-side only to fit 3 x 5 or 5 x 8 index cards for establishing a direct reference file.

d. <u>Reprints</u>

Technical reports, which are not published in the Notes or Transactions, could be published in the form of single reprints and made available similarly to Conference Papers of the AIEE.

e. <u>Proceedings</u>

For want of a better name, the word Proceedings is used in reference to a vehicle such as ELECTRICAL ENGINEERING in AIEE. This would be a vehicle for survey papers, papers of current interest, advertising matters, institute and committee news, etc.

One special way of handling these different types of papers is shown in Figure 3. This is a table listing the different types of papers and the manner in which they may be presented orally and in print. It is intended that all checks in a single horizontal line be mandatory, not optional.

There are other important vehicles such as groupings of papers by subject to form special reference volumes, as has successfully been done by the Computing Devices Committee of AIEE in their publication of Gigacycle Computers and Logic and Switching Circuit Theory. These would of course require special treatment.

<div align="center">SUMMARY</div>

The technical paper is the very basis of communication in a wide spread scientific and professional community. A prime purpose of a technical conference is to circumvent the delay incorporated in publishing a paper. Quick adequate review is therefore necessary to assure timeliness of communication by both methods of presentation. My plea here is not for the elimination of these means of communication, but for maintaining technical quality and preventing publicity aspects from becoming overpowering. I have certainly not been complete in my criticism and recommendations on papers and conferences. I have, to some extent, overemphasized the flagrant misuse of the non-professional aspects of professional publication. There are a tremendous number of high quality papers given and published. These are to be given their due credit. They must, however, be separated from the chaff that tends to obscure them.

My criticism is against the waste of professional time and energy. My solution is

to strip non-professional aspects from the technical conference and paper. By making the technical content the incentive for attending the technical conference and for subscribing to the technical publication, order and quality be obtained. My recommendations are by no means unique or complete, but simply possible suggestions to illustrate the kinds of steps that must be taken. I feel that sweeping reforms are required. A drastic situation requires drastic action. Effort must be made to educate not only the authors and reviewers, but audiences as well. This can be accomplished primarily through audience participation in review and discussion. Only when a definite level of technical competency is established, can authors have a standard to strive for.

It is hoped that the hoax submitted to WESCON and this critique will demonstrate the need for drastic action. Professionalism and technical competency must be encouraged and maintained. For this objective I am outspoken.

PAPER SUBMISSION FORM

Figure 1

I am submitting the paper:

_____

_____

for _____ publication _____ presentation. It should be reviewed as a:

_____ Technical Paper

_____ Technical Report

_____ Technical Note

_____ Survey or Tutorial Paper

_____ Commercial Paper

_____ Application Note

_____ Non-Technical Paper

The paper and its content represents:

_____ Original Work

_____ Addition to Previous Work

_____ Commentary on Work of Others

_____ Previously published material in Whole or Part

Cited References: _____

_____

Preferred meeting for Presentation: _____

_____

_____   _____   _____
Author   Date   Address

_____   _____   _____
Author   Date   Address

AUDIENCE REVIEW CARD

Figure 2

PAPER REVIEW GRADING CARD

Paper Number _____   Author _____

       Content   _____

       Originality _____

       Presentation _____

       Interest   _____

       General
       Consideration   _____

Weak Points _____

           _____

Strong Points _____

           _____

A Superior
B Good
C Average
D Below Average
E Non-professional

A POSSIBLE METHOD OF HANDLING PRESENTATION AND PUBLICATION OF DIFFERENT TYPES OF PAPERS

Figure 3

TYPE OF PAPER			ORAL PRESENTATION		PUBLISHING VEHICLE				
Type		Significance	Invited	Contrib.	Trans-actions	Notes	Abstracts	Reprints	Proceed's
Technical Paper	TP A	Permanent Ref. Value Top Caliber	X		X		X		
	TP B	Permanent Ref. Value Good Paper		X	X		X	X	
Technical Report	TR	Current Interest		X			X		
Technical Note	TN A	Orally presented		X			X		
	TN B	Published Only				X			
Survey	S		X						X