

Dick: This is original version, which Fred changed substantially before presenting at the banquet.

DGF

IEEE - "IMPOSSIBLE - EXCEPT FOR ELECTRICAL ENGINEERS"

Remarks by Dr. Frederick E. Terman, Vice President and
Provost, Stanford University

at the IEEE Annual Banquet
Waldorf-Astoria Hotel, New York
March 27, 1963

Mr. President, honored guests, fellow members of IEEE ---

*My first
Exp. Forum*

The President of Eta Kappa Nu, Professor Lyon, recently remarked that the initials of our newly merged Institute might well be translated to mean "Impossible - Except for Electrical Engineers." The laughter that greeted that remark reflected the mixed feelings of doubt and confidence shared by many thoughtful members of our profession when they were first confronted with the question "to merge or not to merge?" The question has been resolved by a vote of over 75,000 IRE and AIEE members, with 87 percent in favor. The die is now cast and IEEE is, tonight, 86 days young, drawing its sustenance from the traditions of 78 years in AIEE and 50 years in IRE.

The early returns from the new organization, as I have learned from Dr. Weber tonight, are auspicious. Within the first two months, a new Professional Technical Group on Aerospace ^{was} ~~has been~~ set up, directly as a result of the merger, making 30 Groups in all. Returns from the local Sections show that nearly all Section activity will be merged by July 1 of this year. The consolidation and relocation of the Headquarters staff is complete, and the policy-making machinery of the Board and the

This is of course a tribute to the fine work of the section and regional officers.

Executive Committee is running smoothly. *end of (2)* Several rough spots have appeared, but these appear to be resolvable within the existing framework of the new Constitution and Bylaws.

Despite these favorable omens, Professor Lyons' quip prompts us to ask, "Does the 'I' in IEEE suggest 'Impossible' in the sense that we are embarked on a perilous uphill course? If, indeed, there are dangers ahead, we must ask how these are to be avoided. *A*

We may well ask,
What were the special strengths of AIEE and IRE which give us confidence that, as the IEEE, we can hold together 30 or more autonomous groups of specialists, can conduct technical conferences at the rate of two per week, can manage a technical committee structure which now numbers over 8000 committee members, can provide mutual support among the hitherto separate interests of electric power and electronics? This heightened pace and enlarged scope of the new organization inevitably bring new stresses and strains not faced in the same degree by IRE and AIEE as separate societies. *3*

What, indeed, is the nature of the cement that will hold together an organization of 160,000 members, embracing so many communities of interest that the technical vocabulary of many members is literally a foreign language to the others. *We may also ask whether* Is, in fact, the concept of a unified profession of Electrical and Electronics Engineering ^{is} a valid one in today's world? I hasten to say that I believe that this concept is valid. *4*
But I would be less than frank if I did not also state my conviction that

putting this concept to work in a technical society is ^{a difficult} ~~one of the toughest~~
assignments ever undertaken in the history of engineering organizations.
~~Difficult~~ ^{difficult} ~~though,~~ not in the sense that disaster is imminent, but ^{difficult} ~~though~~ in the sense
that we ^{will have to work to the limit of our capacity to} ~~may ultimately find that we must settle for less than the full~~ ^{attain}
measure of the ambitious plan on which IEEE is now embarked.

To attain this full measure of success will require not only new
flexibility of ideas and actions, but also a more general understanding of
what motivates the members of a profession, individually and collectively.
The distinction between a profession as a collection of individuals and
a profession as an institution with responsibilities is, in fact, one of the
major questions raised in my mind by the ~~decision to merge~~ ^{IRE} IRE and AIEE.

The two Institutes have had somewhat different traditions in this respect,
^{and these very differences are helpful in deciding how to}
~~differences which must be carefully resolved if the two organizations are to~~
^{make an IEEE which is more effective than either of}
~~pull together effectively in the harness of IEEE.~~ ^{its predecessors,}

Lest I appear to dwell unduly on the differences ~~between IRE and~~
~~AIEE~~ ^{AIEE and IRE have}, let me first mention several areas in which ~~they~~ seemed to me to
be very much alike as I have observed them, as a member of both, ~~over~~
~~the past 40 years.~~ The local Sections, numbering over 100 in each society,
have operated in much the same spirit and with equal success. This no
doubt explains why Section mergers are proceeding so smoothly. The
two Institutes have maintained many Joint Student Branches, and in recent
years there has been so little to choose between IRE and AIEE that students
and faculty have repeatedly asked "Why two societies?" a question now neatly
answered by the merger. In the writing of Standards, somewhat different
procedures have been used, but with the same result: Excellent coverage

good preparation, little duplication of effort. Both societies have generated excellent programs for technical conferences and have sponsored them jointly in many areas of common interest. In these and many other activities, such as recognition of outstanding accomplishments through the award of the grade of Fellow and presentation of prizes and awards, IRE and AIEE have had similar programs of ^{each great} equal merit.

The differences I would point to, admittedly, differences of degree, reside in the relative emphasis on the interests of the individual member on the one hand and on organization to serve the profession on the other. Any truly great technical society must, of course, serve in both capacities and it is certainly true that both IRE and AIEE have done so. But there have been different degrees of emphasis.

Let me illustrate my point by contrasting the IRE Professional Groups with the AIEE Technical Operations Department. These have had, in their respective societies, the primary responsibility for generation, presentation and publication of technical papers, one of the most important functions of a technical society. Now that they are brothers in the same house, how will they behave one to the other?

The IRE Professional Groups have been primarily a grass-roots phenomenon. Almost entirely autonomous in operation, each Group arose more or less spontaneously, by the petition of a group of a few hundred interested members who desired to organize a sub-society around their technical or administrative interests. Many groups started without well oriented scientific and technical objectives. Some started on a high

technical plane and grew in professional stature. Others have not been so fortunate. But, and here is the important point --- even those Groups who make few pretenses, continue to serve the needs of their members and they remain, therefore, healthy campfires, if not shining beacons over the technological sea.

The Professional Groups have been, in other words, an outlet for the individual, for individual enthusiasm, individual expertness, backed up by a small Administrative Committee, an Editor, and a Review Board to do the collective work. The Professional Group System has not aspired to uniform coverage of the whole spectrum of electronics engineering. This could hardly be expected in view of their spontaneous formation. Nor have the Groups attempted a uniform standard of technical excellence. Being autonomous, they have been free to pursue their course within limits set, not only by the state of development of their technology, but by the wishes of the Group membership. The freedom to manage their affairs without interference from above has been one of the most jealously prized possessions of the PG members. It has also been, in my opinion, the principal reason for IRE's success in containing its exploding technology without splitting into fragments.

5

The AIEE Technical Operations Department is quite a different animal. It has been, it seems to me, an outstanding and successful example of organization to cover the full spectrum of a profession with as

W. C.

nearly uniform a standard of excellence as possible. Few would venture to call the TOD, as it was affectionately known in AIEE, a grass-roots organization. Technical Committees and Subcommittees were frequently formed from within through the suggestion of individuals, with individual enthusiasms. But it was not a spontaneously formed body. It had been carefully planned from the top to cover the whole field of electrical engineering and its affairs have been administrated with care through six technical Divisions.

I am told that the Technical Operations Department, at the time of the merger, had ~~96~~⁷⁵ Technical Committees and a total Committee and Subcommittee membership of nearly 7000. These Technical Committees were in fact AIEE's primary outlet for professional affiliation of specialists in given fields. The Committees took responsibility for soliciting papers for technical conferences and conventions, and for passing on the value of these papers as reference material. Papers simply did not find their way into the AIEE Transactions without scrutiny and formal passage by some part of the TOD. The TOD was, in other words, set up as the technical conscience of AIEE.

Within IRE there has been no comparable operation. The IRE Technical Committees have covered a wide range, but they have been active, with a few exceptions, only in the writing of Standards.

Now, as I have said, these two organizations are brothers in the same house. How are they to behave, one to the other?

It requires no psychiatrist to note that the inhabitants of the two systems, Professional Groups and Technical Operations, are doubtful and suspicious of each other. It is easy for the TOC man to point to the gaps in the PTG system and its uneven pattern of technical refinement. The PTG man, on the other hand, worries over the Divisional hierarchy that separates the individual expert in the Technical Committees from the corridors of final authority.

One says to the other, "You're untidy;" and the reply is "You're too tidy." Obviously, this sort of mutual distrust is not in the best interests of IEEE. The two organisms of IEEE must get to know one another, must exorcise semantic differences, and must find ways of working together.

Results are already forthcoming. The IRE Professional Group on Broadcasting and the AIEE Technical Committee on Broadcasting found themselves peopled largely by the same individuals and working for almost identical objectives. So they petitioned to merge. More of this will come.

The Professional Groups provide the flexibility to hold together 160,000 members, many of whom cannot understand the jargon of the others. But if we, at the same time, ask the Groups to act as the technical conscience of the Institute, forcing the formation of new Groups to complete a pattern, whether or not there is grass-roots enthusiasm and desire for identity, then one of the most precious strengths of IEEE will wane.

The overall responsibility of the Institute to serve the profession rests, of course, with the Board of Directors. The Board cannot delegate this responsibility to the Professional Groups despite the fact that many Groups are capable of acquitting that responsibility in their special fields of competence. The Technical Operations Committee, under the direction of the Board, has the tradition and organization to serve as the technical conscience of the Institute. It can so serve, provided that it acknowledges the Groups as allies, rather than as competitors.

Those close to the new Institute's inner workings tell me that mutually satisfactory working out of these respective duties, by what Dr. Weber has termed "interdiffusion", is indeed one of the most critical tasks ahead. I am also told that nowhere in the IEEE are more men of ability and good will at work. These are, we may be thankful, exceptional electrical and electronics engineers. Their work must be backed up by a realization on the part of the entire membership that new ways of handling the new job are at hand.

Thank you very much.