

INSTITUTE OF ELECTRICAL  
AND ELECTRONICS ENGINEERS  
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OPENING REMARKS

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BOWEN C. DEES: "....are vast and the means for their solution must be of corresponding magnitude. Our problems in solving them so far has been but small. The region of the unknown is infinitely greater than the known and there is no fear of there not being work for the world's scientists and engineers for centuries to come. As to the practical applications which (inaudible) us the telephone, television and the computer are but child's play to what the world will see in the future."

I'm Bowen Dees and it is my delightful duty to welcome you to this joint convocation. I do so most heartily. The words I have just read you with a few small changes were first spoken in another Franklin Institute Building 100 years ago. (Undistinguishable) of a distinguished Johns Hopkins Professor, Dr. Henry Roland, who was then serving as President of the National Conference of Electricians. Those words were spoken on September 8, 1884 as he opened that Conference, and officially sanctioned international meeting, authorized by Congressional action but held here in Philadelphia at the International Electrical Exhibition Building which the Franklin Institute built especially for the exhibition.

One of the American participants was Nathaniel Keith, Secretary of a newly formed Professional Society. On the last day of the Conference, he pointed out that, and I again read from the proceedings of that Conference, "Early last spring this exhibition being contemplated and it being desired that the electricians should assemble themselves together in an organized body, some gentlemen in New York issued circulars to various electricians and professional men throughout the country with the stated object of forming a society. Such a society was formed last May and will meet here in Philadelphia on the 7th, 8th and 9th of October. It is called the American Institute of Electrical Engineers."

Thus, the Franklin Institute played a role as a catalyst in the establishment of what has become IEEE. As it did also, by the way, for several other organizations.

I could spend much time telling you of the Franklin Institute's various contributions to the regions and the countries' progress. It was no accident that the Institute received the first Federal grant for research or that its journal was for many years the

. journal of choice for scientists and engineers working in many fields. Its exhibitions, initiated in 1824, were of great importance to the industrial development of a young nation. The electrical exhibition was only one of some twenty such exhibitions the institute mounted in the 19th Century.

To our IEEE friends I say, your being here, in the building which houses the national memorial to Benjamin Franklin, is most appropriate for Franklin could be considered IEEE's patron's saint as well as the Franklin Institute's. Cal Tech's, Robert Milligan, speaking in this hall, nearly 50 years ago, argued that Dr. Franklin belonged in the select group of 14 most influential scientists who had lived since the (inaudible) and up to the beginning of this Century. In justification of his giving Franklin such a high place he said in part, "Franklin, without any previous training whatever, in either the technique or the history of physics, within two years of the time of his first experiment, had acquired a keener insight into the fundamental nature of electrical phenomena, not nearly . than anyone had acquired up to his time, but even than

any of his successors acquired for the next 150 years when about 1900 the scientific world returned essentially to Franklin's views."

I end as I began by quoting Professor Roland, after remarking on the contributions basic research can make, he adds, "The engineer seeks to increase the power of our bodies. It is the engineer that increases the wealth of the world and thus allows those so disposed to cultivate their tastes and to elevate themselves above the savages. The progress of the world depends upon his inventions."

I look forward as this convocation continues to hearing of some of the possibilities foreseen by Professor Roland as IEEE's second century begins.

It is now my privilege to bring to this rostrum the President of IEEE who certainly needs no introduction to this group, Dr. Richard Gowen.

(Applause)

RICHARD J. GOWEN: Thank you, Mr. Dees, President Nalle, distinguished dignitaries and convocation participants, members of the Franklin Institute, IEEE President Elect Bill Eldon, Past Presidents of the

• Institute, Vice Presidents, Directors and members of the IEEE, ladies and gentlemen. We are convened today to commemorate the very special role the Franklin Institute has had in the founding of the Institute of Electrical Electronics Engineers. And as has recently been mentioned, 100 years ago the leaders of the newly formed American Institute of Electrical Engineers, the AIEE, came to Philadelphia, to a sight less than a half of mile from where we sit today, to hold their first technical meeting. The occasion was the closing week of the International Electrical Exhibition sponsored by the Franklin Institute. This important exhibition attracted visitors from not only throughout America but from abroad as well. The few that witnessed the marvels of electricity. During the planning of the exhibition, the United States Government agreed to sponsor a competition of scientists and electricians to address the important issues of that day. Additionally, the American Association for the Advancement of Science, chosed to hold its annual meeting for the year 1884 at the Exhibition. There were numerous

• exhibitions and demonstrations on the use of electricity.

• The value of the telegraph to the world of business was emphasized. The marvels of electricity in the equipment for generating electric current and the equipment for electrifying America was prominently featured throughout the Exhibition. The telephone was demonstrated but the full recognition of its value to our future was yet to come.

But in a corner of the Exhibition Hall a table contained the unusual lamp constructed by Edison that had an extra plate in it. This plate, while not connected to the filament, demonstrated that current could flow from the filament. It was the harbinger of the future of the electronics that bring us together today.

It is against this background and activity that the inventors, the electricians, the manufacturers, the scientists of America decided to form an American organization to represent the newly emerging profession of electrical engineering. The founders of the American Institute of Electrical Engineers felt the need for new organization, to be present at the Franklin Institute • Exhibition. In addition to those who would be present

• from the government sponsorship and those from the triple (inaudible).

As the corporation of leaders of the Franklin Institute, this new American Institute of Electrical Engineers convened its first technical convocation in Philadelphia as part of the International Exhibition on October 7 and 8, 1884. The technical papers presented addressed the problems of that day. The problems of transmitting power underneath the streets of our cities, the problems of generating electricity in an efficient manner and, of course, the new discovery, the Edison effect. This first technical meeting was an outstanding success and the leaders of the AIEE chosed to continue their new organization. Joined together with the IRE in 1963, the IEEE has continued the proud heritage of open technical discussion and the sharing of the basic technical knowledge that is so vital to the development of electrical technology.

There are now 250,000 members of the IEEE, living in 128 countries, served by 251 sections, we publish over 120,000 technical pages a year and we • have over 250 technical meetings and I am pleased to say

• have over 500 student branches. (Inaudible) is recognized worldwide as the foremost organization in the field of the science and engineering of electrical technology.

Therefore it is especially appropriate that we commemorate the first technical meeting of the Institute by the dedication of a Commemorative Plaque to be located in the Franklin Institute. I ask, if you will please, unveil the plaque. If you'll permit me I would like to read the citation that will be on the plaque that will reside in the Franklin Institute. The plaque you see here is the plaque that will reside in New York City at the United Engineering Center. The plaque for the Franklin Institute reads, "A Century of Electrical Progress. The International Electrical Exhibition held at the Franklin Institute September 2 to October 11, 1884, prompted the founding of the American Institute of Electrical Engineers. On May 13 of that year it was the sight of the first AIEE Technical Meeting on October 17, 1884. A century later, on October 8-9, 1984, the Institute of Electrical Electronics Engineers formed through the merger of the AIEE and the Institute of Radio

Engineers again joined with the Franklin Institute to hold the IEEE Franklin Institute Centennial Technical Convocation. On this historic occasion, as the second century begins, the IEEE pays tribute to the Franklin Institute and the pioneers of both organizations whose vision launched a century of electrical progress." Presented by the Institute of Electrical and Electronics Engineers.

President Nalle, would it be so kind to ask you sir to join me at the plaque so we may commemorate this plaque to the Franklin Institute.

(Applause)

RICHARD T. NALLE, JR.: Thank you very much, Dr. Gowen. I have asked Nat Cohn to join me here because Nat has been the Past Chairman of the Franklin Institute and he's a member of the Centennial Task Force of the IEEE, he has formed the bridge between us and you and more than that he has been a tiredless worker for the success of this convocation and together we accept this plaque with a great feeling of pride in the role that the Franklin Institute has played in the long history of your fine organization. We will display this with pride. Thank you.

(Applause)

MR. DEES: I have the permission of the speakers this afternoon to make sure that we have as much time as possible for their presentations to refer you to the program notes for their bio-data. I therefore am not going to spend precious time in going through the very lengthy materials that have been provide me with respect to each of these speakers. I'll simply say they are all most distinguished. They are the first of a very distinguished group of speakers for this entire convocation. I think we all know that the Chairman of the Program Committee, Dr. Ed David, did a magnificent job in pulling together this set of speakers. With that said therefore I simply now will introduce to you as our first speaker, Dr. Bill Hittinger of RCA. Dr. Hittinger.

(Applause)

WILLIAM C. HITTINGER: Thank you very much, Dr. Dees and good afternoon ladies and gentlemen. It's indeed a pleasure to join you today in this very auspicious event and to have a particular honor to address this convocation on the occasion of the centennial of this great institute. I must say, however, that the

• occasion is a (inaudible) one given the number of distinguished people present here today it seems to me that I should be out in front listening rather than speaking but I suspect our Chairman wouldn't take that too kindly at this late hour.

But it is, as we've heard, 100 years to the day that what constitutes the IEEE today held its first meeting. Out of curiosity, I had someone look up the headlines that appeared on the front pages of the New York Times this same day in 1884. Here's a very abbreviated list. The new story reported on proposed financial reforms in Egypt. Another reporter....that the City of New York had to pay a Million and a half dollars for unused water meters, probably nothing new in these stories. However, we have such stories as, Lord Litton's Love Letters, the eloping of the Boston drummer, killed by a pumpkin and my favorite for the day's news on October 8, 1884, How New Jersey Snakes Get Milked.

(Laughter)

The Institute's first meeting did not make  
• the front pages of the Times and in many respects this

. Institute is a later comer to the field of technology. We've been proceeded by many years of such professions as mechanical engineering, work done by the (inaudible), civil engineering metalurgy, chemistry and military engineering but I think we've come along in a rapid fashion after that late start. The century has seen the taming of the electron and the burst of the age of information.

Alvin Toffler, who I understand is here today, calls this new age the Third Wave.

Throughout the history of the Institute the emphasis quite rightly was on science and engineering and the exchange of knowledge, ideas and concepts. The focus was on the technical. As scientists and engineers we tend to leave the political arena to others. Some of us may even regard the art of politics as lacking the objectivity and knowledge of science.

As we look to the next century and the challenges that we will face, we must examine the notion that public policy issues have scientific and engineering implications, more than every before. If this is . so, it means that we as scientists and as engineers must

. take a greater role in how these ideas are resolved.

This is not a new concept, of course. The precedent for such a major change in the direction of this Institute goes back to the days that the republic's founding fathers, who often combined their interests in science and politics. Benjamin Franklin and Thomas Jefferson are two examples that come to mind.

Politics and science are, to borrow C. P. Snow's phrase, two cultures that are more often than not considered separate entities unto themselves. In fact, science and politics are truly inseparable. It is just that those who practice science and politics tend to see themselves as citizens of different cultures. There are many examples throughout history but one, although obscured, illustrates my point. In the 19th Century there was an economist and political scientist, Henry Charles Kerry, who was credited with introducing the experimental method into the social sciences. Karl Marx called Kerry, who incidentally was a Philadelphian, the only American economist of note. I don't know whether that's a plus or a minus.

. (Laughter)

Prior to the Civil War, Kerry wrote to Lincoln, calling for the industrialization of the south. Once industrialized, Kerry believed, the south would no longer depend on selling its cotton on the English market or in buying English manufactured goods. In his view the ensuing prosperity would bring increased economic benefits to both planter and slave and soon lead to emancipation. Kerry pressed Lincoln to build a great highway across the south, linking it to the north and thereby establishing closer economic relations between the two regions. From a perspective of hindsight, which is always, of course, 20-20, it's easy to see how different our history might have been if Kerry's advice had been taken. Of course, this does not mean that Lincoln was wrong. His concern was preservation of the Union and the rights of man, political issues. Kerry's vision bridged the scientific and the political. It is this vision that is needed today.

We are already in the midst of the age of information and crusting on Mr. Toffler's Third Wave. This new age brings with it new opportunities for human progress but it also poses (inaudible) political challenges.

It has been said that up to the middle ages, power attracted money. From the Renaissance on money attracted power. I believe that in this new age, information will attract power. How this power will be used is a political concern and a proper issue for public policy debate. It also seems to me that as scientists and engineers we are at the leading edge of this new age and therefore should have more than a passing interest in how the instruments we create are to be used.

Daniel (inaudible), the Public Opinion Researcher, writing in the Fall issue of Science and Technology notes, as follows: "Science in its institutional forms, the professional associations, faculties, and academies can also join the debate as social, political entities concerned with the health of the larger society. There are a handful of pressure points where the disparity between scientific accomplishment and social arrangements are most accute. As a second strategy, official science may wish to gain a better understanding of these pressure points and help to formulate action to relieve them, even though they involve

. knowledge that (inaudible) scientific competence in the narrow sense."

The pressure points in the new age of information that impact our areas of concern involve education, industry and government. In education, a central question, it seems to me, is how to provide literacy in the age of information. We already have seen the slide rule replaced by the personal computer. Our children and grandchildren are beginning to use computers in grammar school. At the Univeristy level, the concern is with, of course, content, not only in engineering but also how to organize art, science and engineering in the University structure. Then there is the challenge of providing self renewal and training for all their individuals.

Continuing the growth of service industries will accelerate as we move to the information society. As a consequence of mechanization, there is reduced labor content for unit of production in many fields, certainly manufacturing, agriculture, transportation and commerce. This will continue. At the same time, . newer industrial societies, particularly in the Pacific

. Basin, are becoming more competitive. Manufacturing certainly will not disappear from the U.S. scene but we will be more hardpressed than ever with worldwide competition.

Another aspect of this change is the concern that we will legitimately have overall balance of trade. One wonders what we will trade as we move more and more toward information rather than hardware. An interesting problem I think for all of us and our government in particular to be concerned about.

The age of information will create new products and services and will continue to grow. Its new business opportunities and its risk of failure will be greater than ever before.

How do we deal with these new issues and the pressure points that they create?

It seems to me that their scope is beyond the capability of any one organization or segment of our society. There is a definite need for combining various elements in government, industry and academia, to leverage their talents and resources in shaping public policy on these issues. The agenda for such a concertina might

. include such subjects as supporting basic research, devising ways to improve the investment climate, sorting out the fair trade issue and addressing the issue for the need for a national industrial policy.

Let me take a few of these issues and outline how I view them.

In basic research we have to stress that basic commercial research is just as important to the national interest as basic defense research. As you know, half of all basic research in this country is defense related. Industry has not and probably cannot devote the necessary investment to basic research because the payoffs are too remote and highly risky. There are some exceptions to this, of course, the Bell Labs Model being one known to all of us.

The continued role of our economy in terms of employment and income may well depend on the advances created in our great industrial and university laboratories.

R&D is the seed core of our economy and this is essentially true in the age of information. Within . this context the subject of the national industrial

• policy is currently a very hot issue. I suppose we can consider an industrial policy comparable to the industrial policy of Japan or of France. Following those examples, we could set up certain national goals, certain national energy goals, certain national housing goals, certain national trading goals, by example. More and more talk is coming out of rather unexpected quarters about this kind of thing. Lee Iococca, for example, has talked and written articles about a national industrial policy. Felix (inaudible) has written some brilliant articles about it. Henry Ford has talked about cooperation between government and industry in the style of the Japanese or perhaps the French.

Now this is an argument that could go on forever and I know each of you has a different view of it. My point of view is that a national industrial policy probably could not come to pass in the U.S. even it were desirable. The conditions of the past and our concept of the marketplace are too deeply ingrained. I don't think these perceptions could change in time to help us recreate industry and thereby recreate wealth

• in the U.S. Given the complexities of this issue, what should the role of IEEE be as it moves into its second century.

I believe that the Institute should continue its role both as a source of education for all its members and to the nation in addressing technical issues. I also believe that the resources of the Institute could be used as a major technical forum in effect to become a meeting of the United States. Mitte, the Administrator of International Trade and Industry in Japan, by itself is probably not the sole reason, perhaps not even a major reason, for Japan's economic success. Mitte's forte seems to be its ability to bring divergent points of view together in creating national policies that are generally accepted in its society. Its effectiveness is not measured by the size of its budget but by the web of communications and the close coordination it has established with the private sector. This coordination and communication tends to set priorities and to focus resources. What is done in this country in an individualistic, haphazard way, is done in a rational, systematic way in theirs. I believe that the IEEE should

. examine medias and models and to evaluate it as an instrument that could make significant economic and technological contributions to the nation. I know that the course of action I suggest is a difficult one fraught with controversy. It represents a major course change in the traditional role for an institute with a century of heritage behind it. Yet, if we are to embark on a second century, a century that will undoubtedly see unprecedented technological and social change.

My suggestion is offered primarily to stimulate debate and dialog in the formal and informal sessions of this convocation and others to follow. We have some of the greatest scientific and engineering minds in this country here today and I look forward to perhaps some stimulating discussions on this issue.

Thank you very much.

MR. DEES: Thank you very much. Mr. Hittinger.

(Applause)