



B. R. BATRA
CHIEF ENGINEER, POSTS & TELEGRAPHS

PRESIDENTIAL ADDRESS

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MR. VICE-PRESIDENT, DISTINGUISHED GUESTS, LADIES & GENTLEMEN:

THE sponsors of the Institution of Telecommunication Engineers have done me a great honour by electing me as their first President; simultaneously they have thrown on me a mantle of responsibility the weight of which, as I was ruminating over the address I have to deliver this morning, became more and more felt. But there are already indications — from the good wishes extended and sentiments expressed by friends and colleagues in the profession — that their active co-operation in, and sincere devotion to, the cause of bringing up this young baby, will be freely forthcoming. I express my grateful thanks to all those who have expressed their confidence in me and elected me to this high and responsible office.

The inspiring inaugural address you have just heard from the lips of one of the greatest philosophers of the world, Dr. Sarvapalli Radhakrishnan, Vice-President of India, marks the birth of another of those national institutions which have dawned on the horizon of this land of ours during the last few years, under the august leadership and active encouragement of our beloved Prime Minister. This Institution, which is to be known as the Institution of Telecommunication Engineers, is devoted, as its name implies, to the advancement of one of the most vital branches of knowledge that human history, during the last decades, has taught us to look upon with awe and respect. For, has it not been truly claimed that the last World War was fought and won by the winner in the race for supremacy in telecommunications, electronics and the host of allied technological advancements?; for, has not the Central or Federal Government of every country considered communications as one of the triumvirate that represents power and prestige and that determines the basis

and extent of sovereignty of the country, viz. Defence, Communications and Finance?; for, is not communications one of the basic factors in the economic advancement of every country?

Telecommunications is a generic term whose internationally accepted definition runs as follows: "Any transmission, emission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, visual or other electromagnetic systems".

Such a comprehensive and all-inclusive means of exchange of human thought and intelligence was only one of the many branches or aspects of applied physics twenty-five years ago. In less than three decades it has passed through kaleidoscopic changes in its status among the sciences. It was an adjunct of electrical engineering for some time. The phenomenal developments that took place with remarkable rapidity during the last decade in the science, technique and engineering of telecommunications, resulted in this branch of knowledge growing up into a major branch of engineering. It has now grown powerful limbs — each a specialized field — such as line telegraphy, line telephony, carrier current telegraphy, carrier current telephony, cable communications, radio communications, radio-location, radio navigation, broadcasting, acoustics, sound engineering, television, industrial electronics, etc.

Yesterday we started the centenary celebrations of the "Electric Telegraphs" in India. It was a great occasion in 1850 when a signal that originated at Calcutta could be heard and received at Diamond Harbour, 18 miles away, by means of electricity. Telephony was not even thought of as a possibility. If someone had told the people then, that some day we could talk from one end of

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the country to the other, and he heard as if the persons at the distant ends were in front of each other, serious doubts about his mental equilibrium would have been expressed. In 1912, radio telephony was but a dream and broadcasting an elusive idea. Such terms as klystrons, magnetrons, orthicon, frequency modulation, single-side-band-system, multi-channel carriers, voice frequency telegraphs, etc., with which even our junior technicians are familiar today, were not heard of twenty years ago. The developments have been so rapid and fundamental that before the thermionic vacuum tube, familiarly called the radio valve, celebrates its golden jubilee of its birth in a couple of years, it is threatened with total annihilation by tiny specks of germanium crystals called transistors which detect, amplify and oscillate with far more efficiency than the radio valve. This new tool of science will widen the usefulness of electronics by spreading its applications into many fields which the electron tube has not been able to serve. This challenging art is continuously putting human ingenuity to test.

We are reminded by a British philosopher that science, as a dominant feature in determining the beliefs of educated men, has existed for only about 300 years, and as a source of economic technique for about 150 years. As telecommunication engineers we, therefore, belong to a relatively young profession which the philosopher describes as "an incredibly powerful revolutionary force". Through our work, we can change living habits, expand knowledge, speed commerce, strengthen national security, disseminate education, improve standards of living and add to the health, comforts and pleasures of our fellow-men.

While the potentialities of this branch of engineering are there, and are facing us squarely in the light of its achievements in other countries, it would be useful to review the position in India *vis-à-vis* the role that this Institution hopes to play in the years to come. Eminent thinkers have stated that the wealth of a country is not measured in terms of the tons of gold that lie buried under the ground; for, in the ultimate analysis it is human labour — that brings out the gold and puts it into circulation — that is wealth. Estimated on this basis our "wealth" in telecommunication is only a small fraction of our requirements for the

execution of the Five-Year Plan and even for the execution of the next five-year or ten-year plan.

In recent months the engineering manpower commission under the auspices of the Engineers' Joint Council, U.S.A., has lamented in its report that "the annual output of engineering graduates will fall short of national requirements for many years to come". This may seem ironical to us by contrast with conditions in this country. While there have been spasmodic and feeble efforts at imparting theoretical education in telecommunication techniques and engineering at high school and university levels, there has been little scope for industrial training and less scope for professional practical training of these partially educated young men.

It seems to be the fashion nowadays to blame the Government for this sad state of affairs and, having blamed, rest content expecting Government to rectify matters. The sponsors of this Institution have, however, felt that it is the duty of the senior members of the profession, as experts in the field, to organize themselves for the co-operative efforts of laying down the educational standards, setting up professional examining bodies, and arrange for facilities by co-operative voluntary effort and service to fill the gap in the matter of practical and professional training. For, it is realized that the engineering student of today will be the professional engineer of tomorrow. In the minds and hands of the students rests the future of technological development and accomplishment. Every wise step taken by engineering institutes to assist the student engineer in his educational activities and to help him prepare for his future career is, therefore, literally, a contribution to the welfare of the nation.

It would, therefore, be our endeavour as a practical concrete step, as members of this Institution, to develop the "natural resources" or "raw materials" of our profession, viz. the "budding engineer". We must, as individuals and as an Institution, assist in guiding potential engineering talent into the branch or subdivision of the profession where it will be most effective, most useful and, above all, most happy. Reliable, factual engineering guidance information in high schools is needed to help the student reach an intelligent decision whether or not

he should prepare himself for an engineering career. It is just as important to show an unqualified student why he should not enter engineering, as it is to guide a student with engineering talent into his proper place in the profession. This guidance is expected to take the form of arranging for extension lectures to the final year high school and intermediate students, wherein brief talks detailing the requirements and qualities for a successful engineering career, the nature of work involved in such a career, the prospects of employment in each branch, the cost involved, etc., would be given. Questions will be answered and doubts cleared.

The next step would be for the Institution to prescribe and conduct standard professional examinations in telecommunications, at the graduate level to enable those who, by their own self-study supplemented by such apprentice courses, may get a recognized hall-mark in the profession. Thus, the Institution hopes to set up national standards for the different levels of professional engineers in the field of telecommunications.

As a concomitant measure, naturally, the Institution will have to take steps to provide the necessary facilities for such advancement in the profession, such as building up a comprehensive library; publishing a journal, for the student engineers, containing simple articles describing developments in the field, and questions and model answers for the different examinations of the Institution and problems for home work by the students in the different branches of telecommunications; publishing a journal, for professional engineers, of an advanced standard and providing a forum for discussion of problems in the fields of original research or applied research; arranging for lectures, symposia demonstrations, etc. Thus, the Institution will develop itself into a national body of experts in telecommunications who will be rendering the much required national service, and whose experience and advice can be drawn by the Government and public whenever required. The achievement of all the aims and objects of this Institution and the execution of the practical plans, we have placed before ourselves as detailed above, requires the active co-operation of every one of you and the personal services of every engineer. One may well ask "what do I get out of this Institution?" To the junior, budding engineers and engineering students, I have

given the answer—they have a body of experts to guide them and help them in making them professional engineers in order that they may in turn become experts and serve the country with efficiency and initiative. To the senior engineers, I wish to say, it is not what you *get* out of the Institution that is important; it is what you *put* into the Institution that is important. It is our contribution to national service, to the building up of a welfare State, to the future of our children and grandchildren in this land of ours.

We are starting now with a founder membership of over 1,600 senior, junior and student members. This is no small start. The Institute of Radio Engineers, of which we have several senior members in our midst today, and of which Shri Shankar Rao Kantebet, the Director General of our Overseas Communication Service, is one of the Fellows and a Vice-President—the first Indian to be invited to fill this high office—started in 1912 with only 109 members at its annual banquet, and has now on its rolls today over 33,000 members from all over the world. Many other professional institutions have had more modest beginnings. We have started rather late, but we have been singularly fortunate in making a good start, thanks to the untiring efforts and selfless devotion of those sponsors who have given the best of their experience and services, and who have little to gain themselves from this Institution, except the joy of service in the cause of their profession; we have also been singularly fortunate in making that start under such happy auspices as that of receiving the blessings of such an eminent intellectual of international fame as Vice-President, Dr. Radhakrishnan.

Engineering progress is built on the firm foundation of the knowledge derived from scientific research. As we progress in the profession, the need for additional knowledge of a fundamental nature becomes increasingly apparent. For example, the modern complicated radio valve operates according to the same fundamental principles that governed its operation years ago, but the vastly improved performance and its accurate and complicated functioning has been made possible by the application of new knowledge derived from research. Fortunately for us a number of national laboratories have already been built and the necessary applied research into equipment, development and

system engineering, which will form a liaison between the fundamental research and the professional engineer, is being organized at Delhi and possibly at Pilani in a short while. On the manufacturing side of telecommunication equipment, we have already two factories taking rapid strides towards self-sufficiency — the Indian Telephone Industries Ltd. and the Hindustan Cables Ltd. — both nationalized. There are also a few factories established and projected by private enterprise, for producing essential components. The picture will be completed with the establishment of the electronic industry. These factories will produce the equipment required by the engineers, who will use the equipment and by collecting operating data point out the defects and improvements required, the applied research wing will tackle the problems of the engineer, with the help of the data produced by the scientist, and then evolve new prototypes which will be sent to the factory for mass production; and the cycle will go on in spirals marking mile-stones in the progress of the nation in the field of telecommunications. In all these activities, our Institution has a vital part to play.

In recent months the so-called unemployment problem has been engaging the attention of our leaders and public men. On the one hand, there appears to be a lot of young men remaining unemployed and, on the other, many of the services are short of man-power. This apparent anomaly can be explained if we analyse the problem further and discover that there is not so much of unemployment as unemployability. In every field of development work we have felt the inadequacy of the training, experience and technical accomplishment of the available men. They are not employable — usefully or efficiently. The long-term solution, therefore, appears to lie in providing suitable and adequate technical training. In specialized fields such as ours, this problem can be tackled successfully and effectively only by a body of experts. It is hoped that this Institution will play this role so far as telecommunications is concerned.

Before concluding it seems appropriate to share another thought with you. It is of more general interest, and I venture to invite your serious attention to it. One of the solutions suggested recently for reducing, if not solving, the unemployment problem is to

restrict admission to universities. This will reduce only educated unemployment, but will increase uneducated unemployment which is a greater problem. Similarly, it has been suggested in the larger field that since apparently the humanistic, sociological and political accomplishments of mankind have not kept pace with scientific achievements, the scientists should take a holiday to allow non-scientists to gain control of the situation.

Many of us engineers entered the study of engineering because we found the laws of nature more satisfying to deal with than our fellow beings; nature is less capricious, her actions follow laws that appear to be understood, and there is none of the strife of human dealings. Perhaps for this reason, the engineer has been contented to place the responsibility for the conduct of human affairs upon his non-technical colleague, even to the applications and uses of the developments he makes. This long feud, if I may say so, between those who advocate the study of the humanities and those who advocate the study of technical subjects seems pointless; because fundamentally the humanities are concerned with the experiences of mankind and lessons that history has taught. Surely these concern everyone.

Thus, therefore, while the engineers are experts in their own field, they are at the same time citizens with adequate education and a scientific training that has impressed on them the importance of thinking clearly, of discarding the irrelevant, of deciding questions of means only with reference to their effect on the cost of reaching the intended end; it perhaps has also made them better citizens. One may ask, therefore, "should the engineer take active interest in the life of the community, his State and his nation?" Of course, he should and on two separate planes. He should serve as expert in his field, and, even more importantly, he should serve as a serious and intellectually able citizen joining with his fellow citizens in selecting the achievements to be aimed at. Have we not before us a dynamic contemporary, illustrious example of such a dual role being so successfully played? I refer to Dr. S. S. Bhatnagar, Fellow of the Royal Society, and to his visible and potential achievements in the short period of a few years — years during which the country had many problems and only a fraction of our

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attention could be given to constructive work. The visible achievements stand out prominently in the shape of fourteen magnificent national laboratories sprinkled all over this country. The potential achievements of these temples of research will be apparent to every thinking person. Though primarily a scientist, Dr. Bhatnagar has brought to bear on his keen administrative acumen, the scientific outlook that has enabled his vision to be extended beyond the visible horizon and thus achieve practical permanent results. In this dual role, the engineer and scientist can obviously have a more scientific approach to the humanities, and perhaps the engineer and scientist can aid this in making up the disparity between scientific and technological accomplishments

and the humanities, if he is more closely associated in the humanistic administrative fields instead of being used merely as a tool, an expert. Administrative wisdom, I venture to suggest, would lie in making fuller use of his talents in the dual role mentioned above, if we are to march forward with the times and implement our five-year plan and its possible successors with efficiency and expedition. Mobilizing monetary resources alone is insufficient; and it can stand repetition to say that mobilization of technical man-power is vitally essential. Partial utilization is partial wastage and it is, therefore, avoidable. Sir, the Institution you have so kindly inaugurated this morning is now ready at your service, at the service of the Government and the people.