

Speech by Dr. Bhabha at the
Foundation Stone Laying Ceremony.

Dr. Bhabha:

Mr. President, Mr. Prime Minister, Mr. Tata, Ladies and Gentlemen, may I first just say a few words about this Institute? Much has already been said and I don't want to duplicate it. It was in 1943 when I was working at the Indian Institute of Science of Bangalore that I was impressed by the circumstances that Indian science had been hampered by the lack of adequate financial support. I therefore put forward my proposal and it was accepted by the Tata Trust because they considered it a pioneering venture. The Bombay Government as you have just heard were quick to join this Project and the Institute was founded on the 1st June 1945 jointly by the Tata Trust and the Government of Bombay. But, I would mention that this was in fact - the decision to found the Institute was taken over a year before the atomic bomb exploded over Hiroshima and this subject unfortunately became notorious and captured the public imagination in a wrong way. It is also incidentally founded some two years before the 1st of our chain of National Laboratories about which we have justly been so proud. But the Government of India was very soon in the picture. Hardly a few months after the foundation, the Council of Scientific & Industrial Research gave under the patronageship of Sir Ardeshir Dalal a grant to the Institute and thereafter Government share in this Institute has increased continuously. Now by far the largest financial support comes to-day from the Government of India, not only in the Atomic Energy Commission but thus in the Ministry of Natural Resources & Scientific Research and Council of Scientific and Industrial Research. The Government of Bombay originally made a very valuable plot of land available to us in the New Declaration. But it soon became apparent that this project had increased to such a size that the piece of land would be inadequate. We therefore were troubled to search for a suitable site. After much searching this site was located in this area because among other factors it was near the University. Contact with students is a revitalizing factor for the research worker and conversely we feel that the presence of the Institute here will be of some advantage to the University. This site was made available to us by the Defence Ministry and the Government of India but through the personal interest that the Prime Minister has in this project. But for this, I doubt very much whether we could have secured such a suitable and admirable site. I would also like to record here my appreciation of the tireless efforts made by my colleague, Dr. Bhatnagar, in securing this site and it is, thanks to this, and all the help he has given that we are today in a position to lay the foundation stone.

Having now undergone the throes of organising one such function I now realize the Herculean efforts that he must have put through to establish no less than 11 laboratories, I think the number is more in that they have multiplied so fast one cannot tackle them - 14 laboratories. Any way I now appreciate more than ever the tireless energy which characterises him.

The Institute appointed for its architect a well-known American firm, Holabird, Root & Burgee because to-day they have designed several laboratories including one for the U.S. Atomic Energy Commission and have some experience of tropical housing in South America. We have associated with them as executing architects, the well-known firm of Master, Satho & Bhuta who built the National Chemical and the National Physical Laboratories and with them we have also associated Mr. Kanvinde of the Council of Scientific and Industrial Research for working out the details. Photographs of the buildings are here and after the function perhaps you will be able to get a closer look at them. The designing of the buildings was done with great care. There was constant talk between the architect and the scientists in the designing and at the last stage the architect actually asked the scientific workers to mark on the plans every piece of major equipment and even the furniture that was going into each place so that the areas and the rooms and the buildings should be very intimately correlated. Indeed, this is one example of what Le Corbusier described, "A house for a building is a machine to live and work in" and I think this indeed has been designed as a machine in that sense. The foundation stone is being laid today 8¹/₂ years after the Institute was founded. This is perhaps as it should not quite happen - it should be but to some extent that it should be because real things that matters is the work that is done. I remember when the Institute was opened the Chairman of the Council in his speech said, "We have not in the usual way waited for the completion of new buildings before commencing our research activities, but have, so to speak, plunged 'in media res'. I regard this as a happy augury for the future because,

in creative work of this kind, what matters most is the enthusiasm of those concerned with it."

May I now say a word about the work of the Institute. The work of the Institute is fundamental research. What is fundamental research? Fundamental research, I would say, is research into the fundamental properties of nature on which the phenomena that you observe ordinarily are based. For example, the fundamental laws of the motion of electrons are responsible for, for example, the blueness of the sky and the myriad of other manifestations that you observe in everyday life. Correspondingly, the large amount of energy which is locked in the nucleus of the atoms is not of the fundamental law of nature. But the fundamental laws are the laws that govern the motions of the elementary particles from which the atomic nucleus is made and upon which that immense energy depends. Today, fundamental work, as the workers in this field are studying, is about the properties of the newer elementary particles which do not exist normally but come into existence in high energy phenomena. But although they are so reducive they probably have a very deep significance and role in explaining the structure of matter as it is and the forces that stabilise matter. In this field the Institute has made some considerable contribution since its foundation. Papers on the theory of elementary particles have been published since the foundation of the Institute and have made their modest contribution to the progress of the subject. I remember immediately after the war when scientists returned to their normal work Professor Oliphant wrote to me saying that it has now become possible as a result of the new technique that has been developed to build accelerators of a 1000 million volt.

What research has been done with these accelerators in several parts of the world but all the results that we have obtained and they are quite epoch-making some of them, still far more remains to be done. We are probably on the verge of very important new discovery. Then, may I now say a word on the subject of accelerators, of the Cascade Generator which is housed here in a temporary building. This is an example of the collaboration between the Atomic Energy Commission and

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the Institute. The Cascade Generator belongs to the Atomic Energy Commission of the Government of India and was set up for it by the Institute and is now functioning. After the laying of the foundation stone, the Prime Minister and his party will go round and see the Cascade Generator and those of you who are interested are welcome to do so, after about 15 minutes. Now the accelerators are extremely costly things. For example, one may cost as much as the Flagship 'Delhi'. This would normally put them outside the scope of what we in India would do with limited finance. However, thanks to nature we have cosmic radiation which provides us with particles which are even more energetic than can be provided with any other accelerator. These can be used for studying the same phenomena. Much good experimental work is being done in the Institute which I have no time to mention but I will mention the nuclear emulsion group which is perhaps the second largest in the world and has done some very important work in this subject. This is reported at the weekly Conference in France and was referred to as the sensation of the Conference. But the scope of the Institute is not restricted to nuclear physics or physics. We have a very strong school of pure mathematics which has built for itself an international reputation. The reason why we are so interested in pure mathematics is that it is only with the help of mathematics that one can understand to-day the complicated and subtle phenomena which nature reveals. On the other hand I feel equally that mathematicians must gain much from contact with physicists. What we call logic and mathematical thought are not reflexible things as the Greek philosophers imagined but they changed gradually with time, they changed and developed with our understanding of a physical world. In this sense, I think Karl Marx was righter than the Greek philosophers in that he pointed out that what we consider as logic and mathematical thought in its vigour developed with the knowledge and understanding of the physical world. May I now say just one word about the atmosphere? Fundamental Research requires for its performance a free atmosphere. The scientists must be free to think of what they like and to exchange their ideas with scientists in other parts of the world and it must be possible for the scientists themselves to move and to interchange between one country and another. Therefore, the fundamental research cannot be done satisfactorily

in an atmosphere with secrecy regulations as for example are found in commercial or strategic undertakings and it is for these reasons that the Atomic Energy Commission has to separate to some extent its fundamental research activities from its other more technological activities which may perhaps be restricted by other considerations. In this institution, any way there will be no secrecy at least in normal time except in times of emergency and everything will be free so that those who are genuinely interested can come and see what is being done and scientists from other parts of the world can come and work here and whatever we do will be published. Finally may I say this one word more that there is another important way in which freedom is important for the scientist. He must be free to think and put forward whatever ideas he considers right. Universities and research institutions have in the past turned out many ideas good and bad, right and wrong. The good ideas cannot be suppressed even by violence. We have to recall the famous story of Galileo to see what happened in this famous example. Bad ideas or wrong ideas die a natural death. They are merely ancillary to the production of right ideas upon which this mass of humanity depends.

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