

PRESS INFORMATION BUREAU (DEFENCE WING)  
GOVERNMENT OF INDIA

ATOMIC RESOURCES IN INDIA  
MOST ENCOURAGING

-----  
Dr. Bhabha's Address to Defence  
Science Conference

NEW DELHI, April 4, 1958.

Addressing the third Defence Science Conference here yesterday, Dr. H. J. Bhabha, Chairman of the Atomic Energy Commission, pointed out that the atomic resources in India were most encouraging.

Dr. Bhabha was speaking on the economics of atomic power in India, which, he said, would be more favourable five years hence. He gave detailed statistics of the conventional sources of power, namely coal, hydro-electric and oil potentialities, and said that immense saving would be effected in all directions if atomic power was made available for industrial and domestic purposes.

Though the initial investment for an atomic power station, he said, would certainly be much higher than a conventional power station, the low running cost of the former would make the cost of electricity per unit very competitive. If the prospects of atomic fuel were taken into consideration, the cost of atomic power per unit would go down by at least 50 per cent. of the present estimated cost.

With the help of slides, Dr. Bhabha described the constructional features of 'Apsara' and the Canada-India reactor, which is now nearing completion in Bombay.

Earlier, in a paper read before the Conference, Dr. D. S. Kothari, Scientific Adviser to the Defence Minister, referred to the research effort being made in the country during the last few years which, he said, had been largely devoted to ballistics and explosives, environmental physiology and operational research. He, in particular, referred to the work on the structure of explosives and the mechanics of detonation carried out by the Institute of Armament Studies, Kirkee, as also the work on shaped or hollow-charge, largely conducted at the Defence Science Laboratory, New Delhi.

The hollow-charge principle, Dr. Kothari pointed out, provided perhaps the simplest and most effective method for armour penetration, and their work in this direction had led to some rather exciting results. It had given them some new understanding into the physics of the formation of these exceedingly high-velocity jets. A shaped-charge produced a fine jet of liquid metal, moving with an extremely high-speed of some 10 miles per second.

MICROSCOPIC SPUTNIKS

It was thus, Dr. Kothari said, "within our reach to inject into the upper atmosphere tiny particles of metal, or any other material, and such

experiments...

experiments are likely to be of considerable meteorological interest". This, he said, could be done without much serious difficulty if the hollow-charge technique and the balloon technique, so splendidly worked out at Dr. Bhabha's institute, were linked together. In fact, in this way, one could even project microscopic particles into the outer space beyond the reaches of the world, reminding some of microscopic sputniks -- "the emphasis, I must add, is on the word microscopic". It had sometime been suggested that the hollow-charge principle might also have some relevance with regard to the detonating mechanism of the hydrogen bomb; "but it is obviously only a speculation -- we know so little about it".

Dr. Kothari added, "The greatest and the most portentous problem of our times is the problem of nuclear weapons and ballistic missiles. For the first time in man's history, there is now a weapon with an area of destruction of thousands of square miles and a range comparable with the long distances on the surface of the earth.

Dr. Kothari pointed out that it was of the utmost importance that scientists and Servicemen should work jointly and in the closest collaboration. An effective partnership between scientists and soldiers, he said, was an essential condition for fruitful defence research work. Generally speaking, he said, the object of defence research and development were two-fold, namely to enable the Armed Forces to make the best operational use of their existing weapons and equipment, and continuously to seek improvement in weapons.

#### PRODUCTION OF WEAPONS

Speaking on the problem of production of weapons, Maj.-Gen. Pratap Narain, Controller-General of Defence Production, emphasised the need of standardisation and inter-Services co-operation.

It was the scientist who was the ideal man for giving them the original thought necessary for the development of new weapons, working in conjunction with the Servicemen, he said. As no line could be drawn between a scientist and a Serviceman, similarly there was no possibility of dividing the development and production organisations into water-tight compartments. There must be perfect co-ordination between those who produced a design and those who produced weapons in the factory.

Urging a change in "our attitude of mind", Maj.-Gen. Pratap Narain said whatever they could produce in the country must be produced. Whatever could be produced, he added, must never be imported, and whatever was not capable of being produced today must be produced in the near future. In case they had to import, it must be done on the basis of indigenous production as soon as possible. He pointed out that research and development was a continuous process -- it both stimulated demand and was stimulated by demand.

OPERATIONAL RESEARCH

The afternoon session of the Conference was devoted to the seminar on operational research held with Prof.P.C.Mahalanobis, Statistical Adviser to the Cabinet, in the chair.

Dr.Kothari traced the history of operational research as a tool for the solution of problems connected with military operations. He explained the definite relationship between the efficiency of equipment and the number of personnel engaged in the operation. He further stated how operational research helped in increasing the effectiveness of the weapon-system.

Brig.B.D.Kapur, Chief Controller, Research and Development Organisation, amplified many of the points already mentioned by Dr.Kothari and enumerated certain specific points for the solution of which he drew the attention of scientists. Dr.R.S.Verma, Officer-in-Charge of the Defence Science Laboratory, explained how certain recent mathematical techniques could be utilised for selecting the optimum weapon-system out of a number of weapon-systems.

This technical session was then opened for discussion and among the participants were Lt.-Gen.B.Chaudhuri, Director-General of Armed Forces Medical Services, and Maj.-Gen.S.D.Verma, Chief of the General Staff. Maj.-Gen.Verma stressed the need of forecasting the country's production potentialities in respect of defence equipment. To achieve this, he emphasised the necessity of close co-operation between the scientist and the soldier in the field of defence research and development.

Concluding the seminar, Prof.Mahalanobis explained the need for mutual understanding between ~~soldiers and scientists~~ for operational research work. The scientist, he said, should be given the opportunity to be intimately acquainted with the operational problems of the Services. Perhaps operational research study could be carried out to evaluate the requirements of the Armed Forces on a long-term basis. He suggested that defence planning should form part of national planning.

---

BPM/SM  
4-4-58

PRM

240/4.4.58/12.45/3115.