[Shri Khardekar]

Now, we find there is a clause in the Bill that if one of the parties is an idiot or of unsound mind, it can lead to severance of the marriage or separation and so on. This is rather strange. Many of us are idiots. The dictionary meaning of the word "idiot" is certain deficiency in mind and lack of reason. How would you certify any husband to be an idiot? I do not know. Personally, I want to ask who is an idiot? An idiot is one whose reason is being rather conquered and subordinated by his emotion and who for a time loses his intellectual balance. Again, I would say that women as a rule would love idiots, because no self-respecting woman would like her husband to be more intelligent, more clever than her and so on. Because, a woman likes to mother and smother the husband, because she has always that feeling of superiority.

Then, I have one or two other suggestions to make. Venereal disease has been stated as one of the grounds. First of all, we are living in a scientific age, and venereal disease is something that can be completely cured. That is the expert opinion, but the other thing is we seem to have that moral sort of feeling and we do not seem to get over it. There can be persons suffering from venereal diseasc in spite of the fact that they are entirely innocent. The infection may be caused without their having done any mischief whatsoever. It may have been caused through drinking from a glass which has been used by some syphilitic person suffering in the worse possible manner, or by using the clothes used by a patient suffering from these diseases. Therefore, my suggestion is that this should not be a ground for divorce or separation.

Then, we hear that three years after marriage are to elapse before you can send a petition. This way, four or five years will probably elapse before one can get separation and get remarried. When feelings are against each other and they are not likely to live as husband and wife, although they may be forced to live in the same house, this sort of enforced celibacy is a very great danger to society, and therefore, my submission is that some of these clauses may be looked into and removed or suitably altered.

On the whole, as I said, I accept this particular measure. I do not think it in any way goes against the spirit of Hindu religion or Hindu culture. Take my own case to see what Hindu religion has done for me. It has given peace to me. It has brought about harmony, and it has introduced a sense of justice. Apart from that, if Hindu culture has a distinct meaning, it looks to certain higher values, we look more to spiritual matters and lay less emphasis on material things. Looking at this Bill, I do not know in what way it comes in the way of your religion or your spiritual values.

Shri D. C. Sharma (Hoshiarpur): I think this Bill makes a happy marriage between reform and mild orthodoxy. It is a liberal measure, and I must say that most of its provisions are based on a spirit of moderation, on a spirit of compromise.

Mr. Deputy-Speaker: The hon. Member may continue later, another time.

PEACEFUL USES OF ATOMIC ENERGY

Mr. Deputy-Speaker: The House will now take up the discussion on peaceful uses of atomic energy. The time allowed for the entire discussion is two hours. How much time will the hon. Prime Minister take?

The Prime Minister and Minister of External Affairs and Defence (Shi Jawaharlal Nehru): Certainly not more than half an hour: possibly less.

Mr. Deputy-Speaker: What about the hon. Member, Shri Saha?

Shri Meghnad Saha (Calcutta—North-West): Half an hour.

Mr. Deputy-Speaker: So, for the other Members, there is an hour. I will allow ten minutes to each of them. Of course, only those who have already sent me chits will be called. I have got a list of them.

The Deputy Minister of Natural Resources and Scientific Research (Shri K. D. Malaviya) *rose* —

The Minister of Parliamentary Affairs (Shri Satya Narayan Sinha): He may also be allowed to speak.

Mr. Deputy-Speaker: Have you sent a chit?

Shri K. D. Malaviya: I have not yet sent one.

Mr Deputy-Speaker: You may send one.

Shri Meghnad Saha: I have ventured to raise this debate in the hope that the representatives of the people who guide the destinies of our nation may take a more braver and enduring interest in the development of atomic energy in this country, for, its peaceful application, if properly done, is going to change human life very profoundly. What is atomic energy? Atomic energy is a kind of new fire. It will give us energy in a way which is very different from the older forms of energy. It will give us a source of inexhaustible energy which can be transported to any locality, deserts, mountains, oceans, not excepted, and it can transform human life. It can, if properly applied, revolutionise the arts sciences and industry, and it will cause as great a revolution in human life as the discovery of fire nearly six thousand years ago which raised mankind above the animal level. But at the present time, we are not very much aware of the beneficial aspects of the utilization of atomic energy. We think more or less about its evil effects. The two atom bombs which were dropped on the two Japanese cities nearly nine years ago have produced unfortunately a great tension in the international life. This tension is growing daily. We know that this tension is due to the atomic armament race on the part of the great powers of the world. The United States of America which was the first in the field had developed since 1942 an extensive and elaborate atomic energy programme. They cost nearly two billion dollars annually. It is a little more than the whole budget of India and the States combined, and it amounts to about two per cent of their national budget. The USSR started late, but their development since 1948 on atomic energy, and programme, the details of which are not very much known, is supposed to vie in dimension with the American programme. Unfortunately, this stock-piling of fissile material has produced very great unrest in the world. There was about 200 years ago a great King, Louis XIV. He got a new gun manufactured, which was better than those existing those days. Then he inscribed on the new gun the words, "logic of peace." With that logic, he tried to bring into subservience the other countries of the world. We know what was the effect. The same kind of atomic laws are being applied by certain nations of the world now to coerce the less fortunate nations into subservience. I think the effect of this logic too will be no better than that of Louis XIV. It is now estimated that the United States has got enough fissile material for the making of 6,000 bombs. Each one of them, if properly dropped on centres of population, could wipe out almost the entire cities. It is not known how much Soviet Russia has got, but it is supposed to be 300, by authorities who claim to know the inner facts. But the rate of production of Soviet Russia is said to be higher than that of America. That is not exactly the point now, but the very stockpiling of this dangerous material has produced alarm throughout the whole world. The question which is uppermost in the minds of the people is this: Is any of the great powers using this dangerous material to end civilization, or, will better sense prevail and the different nations will utilise this stock-pile of

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material for peaceful purposes? It has been pointed out by great authorities that the development of atomic bomb by two rival groups has somewhat obviated the dangers. The situation is similar to that of gas warfare at the end of the first world war. Gas warfare was perfected during the second world war, but people knew that if any party used gas warfare, the retaliation would be so swift and so great, that both the belligerent parties refrained from using gas warfare. We therefore think that no atomic warfare is probable in the near future. We can therefore ask ourselves what will be the peaceful application of atomic energy which will transform human life? We are aware that a good deal of our backwardness is due to the fact that we have not been able to utilise energy. We have not been able to produce much power which we can apply to develop the resources of this country and increase the productivity in every field.

I shall just give an example. This country, like the countries in mediaeval times, still depends upon manpower and animal power. We use about 90 units per head and as regards electrical and steam power, probably our total *per capita* production is about 60 or 70 units at the present time. So, our total *per capita* energy will not be more than 40 or 150 units. Compared to this, the great countries of the west like Soviet Russia, and above all, the United States of America, produce every year about two to three thousand units of energy *per capita*. That is the reason why those countries have achieved so much economic prosperity. The *per capita* income of India is about Rs. 260; that of America is about twenty or thirty times higher than this. The income of other countries falls in between these two. So, if we have to solve this problem of poverty, problem of malnutrition, the problem of giving plenty to all our brothers and sisters, the Government must have a plan for the development of energy in this country and for utilisation of that energy, to develop the natural resources of the country. Unfortunately, our power is not so great. We have very limited supplies of coal and if we utilise all the coal in the way that America does, it will not last more than a few decades. Our hydro-electric power is also very limited, and excepting a few parts of India—the eastern parts, the Himalayan regions, Mysore and to a certain extent, Travancore-Cochin—the remaining parts of India are power-hungry. It is very difficult to develop the natural resources of this country. There are five iron ores in the Salem district of Madras but these cannot be developed because we have no power. There are great mineral deposits in Rajputana. They cannot be developed because there is no hydro-electric power there. Whatever can be developed from the Chambal is very small and coal has to be hauled over long distances and it does no become a paying proposition. In all these parts, if atomic energy can be developed it will prove a great blessing.

Every country in the world has become conscious of this great fact and every counry is trying to develop atomic enegry, each in its own way. But, there has been a very great difficulty. America has been first in the field and, taking advantage of her great position, she has tried to corner all the raw materials —uranium and thorium and the moderating minerals like purified graphite, beryllium and heavy water. Unfortunately, very few countries of the world have got these resources. And, as a mattter of fact, after the termination of the war, America parted company with her former friends like the United Kingdom, France and other countries and put a ban on the export of atomic materials, on the export of knowledge. You know what has happened as a consequence.

The other countries of the world have been at a great disadvantage to utilise atomic energy. Let us take the example of England itself. England's great prosperity is due to her possession of coal deposits. But, she feels that, at the present rate of consumption, her coal deposits would be exhausted after about a hundred years. Therefore, they made very great attempts to explore the possibilities of atomic power and they have succeeded to a large extent. They say that without American aid, depending upon their own expert knowledge, they have developed atomic energy plants and they think that in a few years power would be provided by atomic reactors. But, other countries have not been fortunate like England. England has got a great Empire—even minus India—and she has been able to discover large deposits of uranium in different parts of that Empire. She has taken all this uranium to her own country. They have erected very huge plants and have been able to have a stock-pile of uranium out of which they have been able to set up numerous reactors, which are the first stage for the development of atomic energy. They confidently claim that in a few years they will have economic atomic energy plants. I may say that atomic energy plants are at present nowhere economic propositions, just as the steam engine, when it was discovered, was not an economic proposition at all. To produce one unit of power, one unit of energy one had to spend nearly ten lbs. of coal. Now, it has been reduced to one lb. Similarly, atomic energy electricity will cost about 10 or 20 times more than ordinary electricity. But, experiments are in progress, in England and America, which will goratly bring down this margin. At the present time, atomic energy can only be used in those regions where cost is of no account, for example, in making an atom bomb or in running submarines or even aeroplanes. Though England has been successful in solving her atomic energy problems to a great extent, this has not been the case with other countries. For example take France. It is a long way behind, though after a terrible effort extending over a period of six or seven years, they now say that, without the aid of America or any other country who would not sell uranium for any amount of money or other atomic materials for any amount of money, they have been able to get everything within their own Empire and have been able to set up three or four reactors. They now say that they have achieved atomic autonomy and it will be possible for them to run their industries with the aid of atomic energy in ten or twenty years. This is very great importance to France because France had been handicapped on account of her poor resources of energy. She has no coal practically and she depends only on hydro-electric power. Though she has got the finest iron ores in the Lorraine region, she has to depend upon German coal for the development of her iron and steel industry.

The other European countries are in a very bad condition. I was in Sweden in 1946-47. I talked with some of my Swedish friends. They were all alive to the possibilities of atomic energy but they said they could not get uranium for any amount of money. They tried to explore their own uranium ores, which contained only a very small part, scarcely 0·1 or 0·2 per cent. We find that by this time Sweden has not been able to put up an atomic reactor.

The only other European country which has been able to do so, is a joint enterprise by Holland and Norway. Holland had a great Empire and she could scrape sufficient uranium before she quitted Indonesia, and she had enough uranium for a nuclear reactor. On the other hand, Norway had not uranium but she had the moderating material, chiefly heavy water. They have combined and been able to have a nuclear reactor.

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Other countries, the Latin-American countries are still a long way behind. Therefore, we see that most of the countries of the world are not able to take advantage of this discovery.

In this debate, I wish to invite the attention of the House to the excellent suggestions which have been made out by President Eisenhower on December 8th, before the General Assembly of the United Nations Organisation in a meeting which was presided over by Shrimati Vijaya Lakshmi Pandit. In this debate she made a suggestion for easing war tension by making a very generous gesture. We have got a stockpile of this dangerous material. It is not our intention to utilise it for war purposes. She formulated four points. I have put them in a different form.

(1) Opening of a new channel for peaceful discussion and to initiate at least a new approach to the many different problems that must be solved in both private and public conversation if the world is to shake off the inertia imposed by fear and is to make positive progress towards peace. This is in general terms.

The second is also like that. To allow all people, of all nations to see that in this enlightened age, the Great Powers of the earth both of the East and of the West are interested in human aspirations first rather than in building up the armaments of war. This is also in general terms.

But the more pointed and concrete proposals are given in the next resolution. To begin to diminish the potential destructive power of the world's atomic stockpile. I have just now told you that America has got a stock-pile for about 6000 atom bombs and Russia has got a stockpile of probably lesser amount. Britain's stockpile is probably far inferior to that possessed by these two nations. We have been told that the hydrogen bomb is far more dangerous. It may, in fact, be made nearly 600 times more dangerous. But no hydrogen bomb can work without the atom bomb. When the atom bomb acts as a detonator, it sends the hydrogen bomb into action. Some stockpile of uranium is a fundamental thing which we require; the other things are not very difficult. If this stockpile, which is already there, is made for peaceful purposes, it can solve the power requirements of the world for a few years and that will be a great blessing. President Eisenhower's third proposal is to begin to diminish the potential destructive power of the world's atomic stockpiling. Then, the fourth resolution is to encourage worldwide investigations into the most effective peacetime uses of fissionable material and with the certainty that they had all the material needed for the conduct of all experiments that were appropriate. These two were the main proposals. He has also told us how to take advantage of the proposals. He makes the proposal that "the Governments principally involved, to the extent permitted by elementary prudence, to begin now and continue to make joint contributions from their stockpiles of normal uranium and fissionable material in an international atomic energy agency. We would expect that such an agency would be set up under the aegis of the United Nations. The ratios of contribution, the procedures and other details would probably be within the scope of private conversations I have referred to earlier." This is a proposal for making an international pool where uranium and other materials would be contributed by the U.S.A. and by Russia, and out of this the other countries should be allowed to take such amount of material as will be necessary for their own experiments. For example, India has got an Atomic Energy Commission and five years ago we had announced that we were going to set up nuclear reactor within five years. This is 1954 and nuclear reactor has not been set up. We are in the same

condition as Sweden. Though we have got thorium, we have not got sufficient stocks of uranium and we have not been able to get together 30 tons of uranium and about 100 tons of pure graphite, which are necessary for setting up a nuclear reactor. I do not know how long it will take us to make good this proposal. It may take us years to set up a nuclear reactor, but if there is an international pool like this from which we can draw up the necessary material, it will be possible for us to set up a nuclear reactor within a very short time. We all welcome the creation of the international pool of fissionable materials. It will enable small nations as well as backward nations like ourselves and China to draw upon this international pool and set up a reactor and set on these experiments which will be necessary before atomic energy becomes a practical proposition. I hope that our Government will weigh the proposals of President Eisenhower very carefully and will lend to it all its support. I have talked with several of the political groups and it may be that they smell something very rotten in these proposals, but I do not see why we should take a very gloomy view from the very beginning. Even if we get a gift of fissionable materials, is it possible for us to utilise them properly for the good of the country? If atomic energy is really to be useful, we cannot depend upon foreign countries. You know they would not part with their knowledge. You have read of the prosecutions of spies and so on. We have to develop all the knowledge in this country; we have to develop our own personnel. Have we got a proper organisation for all that? We have not got. I would insist upon our Government that they make our atomic energy work more broad-based, they spend more money upon it and train up a band of personnel which will be able to take advantage of this offer by the United States and other countries, if it comes at all. If this international agency does not come into existence, we have to depend upon our own efforts and I do not think it is impossible for us to develop atomic energy if we harness all the talents in the country and spend a sufficient amount of money for the development of atomic energy. I would just remind the House that this new discovery is almost like the discovery of knowledge of ancient classics which brought on the renaissance in Europe, and if we have to take advantage of this discovery, we must make sufficient efforts. As I have told you, America spends about two billion dollars; England spends about one-tenth of that, and it is said that France, which has got no weapon development in its programme, spends one-tenth of that. While America spends one dollar, England spends 10 cents, and France spends about one cent. The French expenditure would be from Rs. 10 to Rs. 20 crores. If we have to develop atomic energy in this country, we have to spend about Rs. 10 crores to start with, and this is worth spending on account of the great promise which it holds for solving the problems of poverty, malnutrition and disease in this country. At the present time, we are spending about Rs. 3 crores on scientific research. If this organisation is to come into existence, we must have a bigger organisation than the present Council of Scientific and Industrial Research has got. Therefore, the Atomic Energy Commission, which you have got now, has to be scrapped and we must start our work on a broad basis. First of all, there should be no secrecy. If you read our Atomic Energy Act, you find that it does not tell us what to do, but it simply tells us what is not to be done. We shall not export neptunium, we shall not do this, we shall not do that and so on. I would ask our hon. friends on the Treasury Bench to read the Atomic Energy Acts of England and America and see how broad-based they are. They, of course, have secrecy, but the Act deals with how work has to be organised properly and how the money, which will be devoted for this purpose, has to be

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spent judiciously, how the efforts of the scientific talents of the country have to be harnessed in one scientific effort. There is a common prejudice that atomic scientists are a special class by themselves. It is a great fallacy; it is an illusion. There has been no atomic scientist to start with. The atomic scientists have been ordinary chemists, ordinary physicists, biologists and others. When this great discovery came, they turned their minds to the discovery and tried to find out how to utilise that for the different purposes. So, the atomic energy scientist is not a new race that has come into existence. But if we utilise the scientific talents available in this country, then we can have an atomic energy organisation which will be as fruitful, which can develop atomic energy as sucessfully as any other country in the world. We have got raw materials scattered all over the country; we have got unravelled deposits of thorium in Travancore; we have got uranium here and there; but we have got a very poor prospecting organisation. I think we are utilising the services only of 40 or 50 men and all of them are not geologists. Prof. Julie Curie, who was Chairman of the Atomic Energy Commission in France, and started the work, told me that he had employed about two hundred fully qualified geologists and under them he had trained another about four or five thousand men to explore not only all the regions of France, but also French colonies like Madagascar, Morocco, and the result of this great effort is found in the French success in building up three or four nuclear reactors. I think if we have to get all the uranium in our country and process them, we must make as big and mighty effort as this.

I would therefore, suggest, that Government should convene a meeting of the selected persons of this country who are conversant with and interested in the latest developments of atomic energy to advise them as to how to draft a reply to the President's proposals. This meeting should also advice Government on this point:

How far the scientists of this country engaged in fundamental investigations of nuclear physics, chemistry, biology and medicine would be benefited if the President of the United States' wishes were to be accepted in a practical form by the United Nations Organisation; second how far the industrialisation of India would be accelerated if one or two atomic energy power plants of about half to one million capacity were to be established in the power-hungry areas of India like the South, except Mysore, parts of Rajasthan and Central India.

I think, Sir, I have spoken sufficiently about the way in which the organisation has to be set up and we should reply to President Eisenhower's proposal. Let me conclude by saying that development of atomic energy in this country holds out a very great future and as far as I know our scientific colleagues of this country are capable of shouldering this great task. It now is for the Government and our youngmen—I have spent one generation and a half in training younger generations to undertake this work, and I know that if our young scientists are entrusted with this great task they can deliver the goods. I would, therefore, request Government to make our atomic energy establishment more broad-based than it has been so far and to expel all ideas of secrecy from the new Atomic Energy Act.

Shri H. N. Mukerjee (Calcutta North-East): Mr. Deputy-Speaker, this is an unusual but a very significant debate. It goes without saying, Sir, that all possible efforts should be made in our country and elsewhere to secure the peaceful use of atomic energy and thereby harness a marvel of scientific achievement to the task

of furthering the happiness of people all over the world.

I was very interested to hear the extremely illuminating speech with which Dr. Saha introduced the subject, but I fear, Sir, that for the Eisenhower statement of the 8th of December last he has come to conceive what I should say is for an objectively-minded scientist a somewhat immoderate and un-realistic appreciation. Basically, Sir, it is not far different from the earlier Baruch Plan which was shown to be the fake—it was by Prof. Blackett in his *Political and Military consequences of atomic energy*. But, of course, I certainly concede that it shows a change of emphasis in the United States policy, a kind of realisation that with the balance of atomic power appearing sometimes to be tilting back against the West, demands which were conceived when the United States had ultimate atomic superiority could not continue to be pressed.

Actually it would be a serious error to imagine that the Eisenhower speech of the 8th of December was a great gesture of peace and self-abnegation, for the simple reason that it was not so and it cannot be so unfortunately as long as the United States foreign policy does not undergo a change. I say this, Sir, because I find from the *New York Times* of the 23rd of December that the new United States Defence Budget places more reliance on atomic weapons than the earlier ones. I find the Secretary of the Treasury, Humphreys, repeatedly demanding the Defence Department ceased planning for different kinds of war, but to concentrate on preparation for atomic war. As long as this mentality persists, the kind of proposal which President Eisenhower has made will not go very far.

But, Sir, it is a very good sign of the times that after all it is an attempt to negotiate things and that is why the Soviets have not by any means condemned the Eisenhower proposal out of hand. On the 21st December they sent a reply, a reply to President Eisenhower's address, and the statement of the Soviet Govt. was issued as a supplement to "News" dated January 1, 1954, which is available in the Parliament Library. There have been also discussions between Monsr. Molotov and Mr. Dulles on the 30th of January 1954 and 13th of February 1954, according to press reports. Now, Sir, as far as the Soviet reaction to Eisenhower's statement is concerned, the Soviets pointed out that they are ready and willing to discuss the question of the peaceful use of atomic energy on an international basis, but they propose that all, and not a small proportion of fissionable material, be used for this purpose. And that is why they reiterate their call for a formal renunciation of the use of atomic weapons and of all other weapons of mass extermination. Now that is brought out in the answer of the Soviet Government to the proposal of President Eisenhower.

This statement makes it clear that Eisenhower proposes that from the available and newly created stockpile of atomic materials, only "some" (it is a quotation from the statement of President Eisenhower) or a small part will be contributed for peaceful purposes. Hence it follows that the main bulk of atomic materials as hitherto will go for the production of new atomic and hydrogen bombs and there remains the full possibility of further stock-piling of atomic weapons and developing new types. Secondly, Sir, President Eisenhower's proposal does not in the least limit the very possibility of using atomic weapons. The adoption of this proposal in no way restricts the aggressor as regards the use of atomic weapons for any purposes and at any time. Therefore, Sir, this is not by any means a satisfactory matter. I am sure, Sir, just as a bench on the river bank cannot be a substitute for a bridge, so Eisenhower's uranium pool cannot be a substitute for an international agreement which prohibits,

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totally and unconditionally, the employment of atomic and other weapons of mass destruction. This point has been hammered over and over again by the Soviet Government, since 1946 I think, in the United Nations and its various agencies. Beginning from June 1946, the Soviet Government has stated, times without number, that there should be a total and immediate ban on the atomic, hydrogen and other kinds of mass destructive weapons which are now at the disposal of mankind. Peaceful utilisation of atomic energy is a very important matter and it is very interesting to find that from Soviet material which again is circulated in this country and sent out to all sorts of people, I find in the News and Views from the Soviet Union dated May 8, 1954, and distributed by Tass agency an article on atomic energy at the service of the national economy. It says that in the Soviet Union they have already started utilising atomic energy for peaceful purposes. I find also a speech made by M. Malenkov in the Soviet Parliament on 26th April 1954 and there he says: "the people of our country take pride in the achievements of Soviet science which opens new possibilities for technical progress and for the evergrowing use of atomic energy in the interests of safeguarding the security of our homeland and for peaceful industrial purposes." This is concrete evidence of the service which is being rendered now by the Soviet scientists. Utilisation for peaceful industrial purpose has started there already and that is why in this article we find all kinds of references which, I, as a layman, do not very well understand but it says very clearly that atomic energy is being used in a variety of ways in order to develop the power potential of their country. "One k. g. of any substance contains a potential supply of atomic energy equal to the chemical energy of 2.7 million tons of coal or 25 thousand million k. w. of electric energy. This is 2:5 times as much energy as will be produced in a year by the Kuibyshev hydro-electric station which is the biggest in the world." This is the way in which we find the Soviet Government utilising atomic energy. Certainly we would like to see that something should be done in our country about it. There must be concentration on the point that the horrors of war are going to be of fantastic dimensions—they are fantastic but they are by no means unreal—because of the knowledge at the disposal of mankind. War is no earthquake or tornado; it is a man-made evil and man can certainly prevent it. That is why there must be concentration on the demand for an immediate ban on all these methods of mass destruction.

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I will refer, in this connection, to a statement made on the 17th April 1954 by Vyshinsky at a meeting of the United Nations Disarmament Commission where this matter and other cognate matters were gone into. He was speaking on a British draft resolution which said that there should be a sub-committee on disarmament consisting of representatives of Britain, the United States, the Soviet Union, France and Canada. He moved an amendment to this resolution suggesting that they should add India, China and Czechoslovakia. He was defeated. Our friends of the Commonwealth—we all go together—said that India has no right to be there. In this speech on the 24th April, he said and explained how India should be there. I feel that India should make her voice felt as she is making her voice felt on so many international issues, today. As far as our own internal position regarding our capacity to utilise atomic energy for peaceful purposes is concerned, I cannot say very much but I shall only say this that we have found out from the questions asked in this House that monazite is sent out. It is very likely—more likely than not—that

when it is sent out, it goes to the wrong place. Anyhow, we are in favour of an immediate and total ban on all these methods of mass extermination and that is why we should raise our voice against such horrors. We should do all we can in order to promote the peaceful utilisation of atomic energy since I am sure, we have got our eminent scientists, we have got the technical personnel, and the spirit and the idealism too, I hope, with which we can go forward. Let us try to build our own house in the way we wish to do and at the same time, let us try to bring about an international climate where it will not be possible for people to go on holding out the threat of atomic and hydrogen weapons, whatsoever. This is a very important matter. President Eisenhower has made an effort; it is good as far as it goes but it does not go anywhere near because it bases itself on the United States of America being entitled to use atomic and other weapons of mass extermination at its pleasure. That is the point and we must raise our voice against this when we are discussing the enormous possibilities of peaceful utlization of atomic energy.

Shri K. D. Malaviya: I rise to take part in this discussion strictly in my personal capacity, as the House knows, the subject-matter of atomic energy is entirely controlled by the Prime Minister as head of the Atomic Energy Commission. I am sure he will deal with all the points connected with policies of Govt. in this connection and the exploitation of Atomic energy for peaceful purposes and also suggestions which have been put forward by my hon. friends. I am only concerned with saying something to my friend, Dr Saha who has just now offered certain suggestions with regard to exploitation of atomic energy and pursuing other work in this connection. My submission is that however great the organisational effort of the Government may be, it is mostly the initiative of the scientists and their zeal and earnestness which could fill up the gap that unfortunately exists today between what we know about atomic energy and fissionable elements and what we do not in our country. If the scientists change their profession and become politicians then I am afraid this work will surely be delayed. I was thinking of many politicians giving up their politics and becoming scientists, I never thought it advisable of scientists taking to politics and indulging in political controversies.

I would like to submit very briefly some problems that face the solution of this question of filling up of this gap. As the House is aware, there is an organisation set up by the Government, known as the Atomic Energy Commission. It is tackling the problem in a particular way. There are three main problems which face this Commission. One is metallurgical, processing and purification of the materials that are used for generating and modifying atomic energy. The other is to perfect and produce all those engineering mechanism which will be used for fissioning or splitting the radio active material and the third is to know fundamentals about the inside of the atom—the physics and the energy behaviour of the radio-active elements, the way in which it emanates from inside and its utilisation for peaceful purposes. As you know Sir, whether it is uranium ore or thorium ore they have got to be processed and converted into pure elements. Apart from this, as the hon. Member has mentioned there is the moderator. We all know what a moderator is. When an atom is fissioned, or split the vast amount of erergy which emanates from it, must be harnessed and controlled. Otherwise, it will burn up before its use. Therefore, the function of a moderator is to control the terrific energy and its high velocity which is created immediately after the emanation of that energy. That is why we require

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moderators which are called graphites or Beryllium or heavy water. Then they have also got not only to be pure but very pure. In order to get the purest type of uranium and thorium, to convert it from uranium oxide and thorium oxide to uranium and thorium and also purified graphite, and to get the purest type of beryllium from the beryllium ore of Rajasthan, and to manufacture heavy water—all this needs metallurgical and processing knowledge which cannot be obtained by mere governmental organisation, or by policy level discussions, or party factions, but which can be contributed only by scientists. It is the job of scientists. I might humbly remind Dr. Saha that the history of the atom is as short and swift as was the history of the last war. It began in 1939. I will not talk about 1898 since when Curie and others discovered radio activity from radium and uranium. The history is short from 1939 to 1945. In 1939 it was the American scientists, not the Government, the refugee scientists who organised themselves to find out the secret which was already known to the Germans. Because, as you know, the Germans were the first to split the atom those days. When this information of achievment of atom splitting was conveyed to America, the scientists there also tried, feverishly their level best, and in a few days,—not by governmental efforts but by the scientists' efforts, they also succeeded in splitting the atom. So if my suggestion to eminent scientists like Dr. Saha is considered favourably we can perhaps go a long way in solving problems connected with getting energy from the atom.

The organisation of the Atom Energy Commission is at present doing this work to the best of its capacity. All the three items of work which I have enumerated above are being tackled by the Commission. They are setting up new experimental laboratories, they have already set up some. They are shifting some of them to more suitable places. They are engaged in pilot scale efforts so that purification methods can be learnt and known by us by which we can later on convert ores into pure uranium and also thorium from the thorium-uranium cake of Travancore-Cochin.

A nuclear reactor group has already been created, as my friend must be knowing from the Ministry's documents.

Shri Meghnad Saha: These ought to have been done in 1948. Please read the first statement of the Atomic Energy Commission, that we are going to have a nuclear reactor in five years. That was in 1948. Why has the group been formed five years afterwards?

Shri K. D. Malaviya: I am just mentioning what has been done by the Commission. It is for Dr. Saha to assess whether it is slow or otherwise. I myself know why it is slow and that is why I suggested that eminent scientists like Dr. Saha should be more energetic and should contribute to the knowledge we are trying to gain.

This group has already been created and they have sent their scientists' parties outside to learn about the new designs of the Commission's first nuclear reactor. They will see things for themselves and on return try to design their own reactor.

So we are not silent on this work which is as important as the purification of uranium, thorium and moderators.

Then there is the Physics Division which is engaged in the fundamental research work and is also pursuing in some of the work that will have to be faced when the reactor is ready. There is the Nuclear Physics Group. The cascade generator has already

been set up to study various experiments of high velocity nuclear bombardment so that by the time our nuclear reactor is ready we will be able to take the assistance of scientists who have gained experience on this Lithium-Helium conversion project.

What I mean to say Sir, is that if we go on harnessing all the efforts of the scientists we can expedite the creation of an efficient training centre also. We can expedite the work on all fronts.

Dr. Saha mentioned prospecting of radio-active mineral ores. This requires certain delicate and costly instruments. We have got some like the geiger counters. We ought to have more powerful ones like scintillometers. It is for the scientists to give us a scintillo-meter. If we do not have more delicate instruments which will give us knowledge of the uranium underground by more systematic air survey then of course we have to wait for some time either till we get it from outside or till the day when we can get it from the scientists.

My hon. friend Shri Mukerjee says that monazite is sent out. Of course monazite is sent out, but only a very little percentage of it. The major part of it remains here and is separated by magnetic separator which is used by our own factories to be subsequently processed into uranium and thorium.

Shri Nambiar (Mayuram): Why should we send it out at all?

Shri Jawaharlal Nehru: Because we get something more valuable instead.

Shri H. N. Mukerjee: Could we know whom we send it to?

Shri Jawaharlal Nehru: To half a dozen or eight countries.

Shri K. D. Malaviya: Lastly, Sir, I will refer to the Slogan of Dr. Gordon Dean, outgoing Chairman of the Atomic Energy Commission of U.S.A. "Uranium is where you find it." There is not much uranium in America, as my friend Dr. Saha knows. It is more in the Belgian Congo, Bohemia and Russia. There is not much in U.S.A. But they have found sufficient quantity of uranium by giving such a slogan to the young scientists. In thousands they go out into jungles with delicate instruments. They have an organisation in which scientists and university professors take a lot of interest. They spend a lot of money but also take a lot of initiative. There is the dovetailing of efforts between the Government and the scientists. They are not diverting their energies from the main test set before them.

Shri K. K. Basu (Diamond Harbour): Have you given that slogan here?

Shri K. D. Malaviya: Well, it is for you to take it.

I have nothing more to say except that Dr. Saha is my old professor. I have been an old student of his. I know he was very obstinate. He is very good and useful when he is not obstinate, but not as good when he is obstinate. His sticking to politics, Sir, I think, is one of those occasions.

Shri Raghuramaiah (Tenali): I think it is high time we realise that when we discuss a matter like this we should forget not only politics but also international politics. It is very unfortunate that in this debate references to the Soviet Union and United States and their power politics are brought up, because it warps our judgement. And one major reason why we have been pleading for the banning of the atomic bomb and the hydrogen bomb is that human attention is now diverted more to the destructive side of this energy than to the constructive side. I may mention that I have studied this subject only to a slight extent. But from what little I have studied it seems to me that we are on the dawn of a great era of human existence, more potential than that of the Industrial era. The nations that have

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come up in the industrial field have taken advantage of the invention of steam power. How many people in this country know the great potentiality of atomic energy? When we compare one pound of atomic fuel with one pound of coal, we will find that the fire produced by atomic fuel is about 260,000 times more than that produced by coal. It can equal, given a certain quantity, solar energy. The capabilities of that can be imagined. It is not as though this is not being used even now, for locomotive purposes. I am told that in the USA, this atomic power is actually harnessed and is being used for submarines. These submarines are able to go round the world over and over again without halting anywhere for picking up oil, etc. The power is so vast that one can go round the world any number of times without refuelling.

There are of course certain difficulties at the moment. For instance, it is found that in order to prevent the radio activity which emanates from this fission, a certain covering is necessary. Only cement, heavy material like lead and water are found suitable for the purpose. This is a handicap. For instance, in the case of aeroplanes, if you have to encase these atomic machines, with lead, it becomes too heavy. But, as some of the authorities on atomic energy said, we are still children gathering pebbles in the beach of the vast ocean of atomic knowledge. Within a decade or so, it is expected that we may be able to discover those substances which will be able to encase the atomic machines and which may be even lighter than air. This country is very fortunate in one respect. It is true that we have not got much of uranium 235 which is considered the most natural substance for atomic fission. But, we have thorium, one of the substances which can be potentially used for the production of atomic energy. I was very happy to find from a statement by Mr. Gordon Dean, one of the previous Chairmen of the Atomic Energy Commission that we have very great resources of thorium. Referring to the thorium capacity of this country, he says:

> "Of possible great future significance is the fact that India has probably the world's richest deposits of monazite, a sand containing thorium."

Incidentally, I might point out especially to those that say that this Government is sleeping about this, what this former Chairman of the USA Atomic Energy Commission has to say about our own work in this field. He says:

> "Among the nations of Asia, India has the largest and most advanced atomic energy programme. It is a peaceful programme directed towards exploiting the atom as a source of power, and it is carried out under the control and supervision of the Indian Atomic Energy Commission which was set up in 1948 when the Atomic Energy Act was adopted."

He has also complimented us on our efforts to utilise this new knowledge for medical purposes. Our research stations are *inter alia* concentrating on the diagnosis and the cure of cancer and other diseases. We have certainly not lagged behind. That does not mean, of course, that we have not to hurry up with this matter. There is a great deal to be done. As I said, our present knowledge is so very limited. It is quite possible that humanity may conquer space and time as a result of this new knowledge—space, of course, is obvious, because you can annihilate distance by means of atomic machines. Take, for instance an aeroplane. If you can only find a lighter substance which can encase the atomic power, it can go round and round the globe hundreds of times without any refueling, and—we do not know—some day

in something like a rocket we may be able to go one fine morning for breakfast to the stars or the moon. It may have such potentialities. People would have laughed in the middle ages if somebody told them about aeroplanes, X-rays, about telephones and wireless and so on. So, today it is quite possible we may laugh in our ignorance at the great possibilities. As I said at the very beginning it is very necessary for us to forget for a while the bomb that smashed Hiroshima or the hydrogen bomb that has destroyed some millions of fish in the Pacific Ocean. It is this bomb aspect that is warping our attitude and blinding us to the great possibilities of utilisation of atomic energy for peaceful purposes.

There is only one solution for it. As our Prime Minister said the other day, there should be a ban on the hydrogen and other bombs. There should be not only a temporary stoppage, but a complete ban so that human attention may be diverted more and more to the peaceful uses of atomic energy. We are certainly on the dawn of a great era and I would earnestly endorse the suggestion made here this morning that this matter should be dealt with on an international level. The quantity of uranium is so very limited that once you leave it to the nations to exploit it as they like, there is the great danger of it being utilized for the production of destructive weapons which will destroy human civilisation. Once you bring the whole of this raw material into an international pool, then it will be used for the best purposes for which human nature is willing to adopt it, and the new era of human civilisation would have dawned. I would therefore, most earnestly endorse the suggestion that there should be an international pooling, international control, of this atomic energy, that there should be a complete ban on all atomic weapons of destruction. I do hope our Government will do their very best towards the achievement of this object.

Shri Jawaharlal Nehru: I am glad of this discussion and grateful to Shri Meghnad Saha for having initiated it, though I feel that he has perhaps done less than justice to the work done so far by our Atomic Energy Commission.

Of Course, it is quite possible and it may be perfectly justified to say that the work may have been, ought to have been bigger, vaster, speedier. That can always be said about any work that we undertake, but quite a large number of fairly competent critics, not very friendly critics either, from abroad have testified to the very considerable work done by our Atomic Energy Commission and have indicated that India has laid the basis for fairly rapid advance in the future.

Naturally, our pace and rate of work is determined by so many factors. Shri Meghnad Saha mentioned that the United States of America spend one thousand crores of, presumably, rupees a year on this, that the United Kingdom spends a hundred crores and other countries spend less. Well, it is perfectly true that our average rate of expenditure as exists is Rs. 1 crore. Now, it is possible, of course, to increase the sum and also increase the other thing, facilities for doing this work. That is a matter of right priorities and giving more importance to some aspects. For my part, I should like to increase very rapidly to the very full the geological and like surveys of India. Of course, we have got a geological survey but not that type of geological and mineral survey and other survey which would require hundreds and hundreds of people, competent people, to do it. I confess that I am not satisfied at the rate at which we do these things. Anyhow, I would submit that we have made progress even comparatively speaking—leaving for the moment some half a dozen big nations of the world who have far greater resources and who started much earlier than us. Right at the beginning, may I say that I welcome Dr. Saha's suggestion that specialists in this field, that selected scientists

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who are interested directly or even indirectly in this work, should meet together and gather at a conference or a symposium,—whatever you like to call it—to discuss this matter and to make suggestions as to how to make greater progress and what new lines to take up? I entirely agree with him that it is a very desirable step to take. But when Dr. Saha goes on to say that this meeting of scientists should take place to draft a reply to President Eisenhower, I was amazed,—to draft a reply to the speech of President Eisenhower delivered before the United Nations, a speech which is worthy of our respect and careful attention. But for a number of scientists to sit down and draft a reply to President Eisenhower does appear to me somewhat astounding.

Shri Meghnad Saha: I meant this: it is to advise our Government in drafting a reply.

Shri Jawaharlal Nehru: It comes to the same thing. First of all, I do not quite see why even the Government of India should sit down to draft and send a reply to the speech delivered by the President of the United States to the United Nations. I am not aware of any other Government having drafted a reply and sent it. President Eisenhower's speech was, if I may say so with all respect, a fine speech, with generous sentiments and with a proposal which deserves our attention. But the proposal was a vague proposal; it is a vague indication of which way one should look; not exactly a specific proposal. If you want to know what proposals there are, go to the Disarmament Conference or to the Commission dealing with atomic energy matters. You can see there the proposals of the different countries, and then you can consider them. Anyhow, I am glad of this discussion and I would like this discussion, as far as possible, to be separated from the purely political aspects. I know it is difficult to do that. Hon. Members opposite and those on this side talked about banning these weapons. Well, we feel that we should ban or control all these terrible weapons. But it is not quite clear to me how our sentiments in this matter are going to result in that ban, or how a strong speech in this House can result in banning them. Ultimately, sometime or other, they will have to be controlled, if not put an end to. Well, from a good deal of what we know of this world, if one is all the time talking about banning this, who is to bell the cat? It might have been possible if there had been no conflict or collision in this respect—each afraid of the other. Nobody is going to be controlled till he is quite certain that the other is controlled; and nobody is going to be certain till there is much more confidence in each other than there is at present. Each will think: 'oh, there is some public protestation; secretly, this will not be given effect to.' I am not going into that matter. As I said, it it obviously necessary to control these weapons. But how to control them? How to ban them? That is again another matter of great difficulty. It is all very well to say, control or ban them. Who is to ban them? Who is to control them? International law, as is well known, is rather a feeble instrument even yet. So, let us discuss this question apart from its political aspect although it is intimately tied up with it. One cannot dissociate it; nevertheless, let us consider it apart from politics.

Further, in this twentieth century, in the last generation or two, we have come up against certain explorations of the remotest frontiers of human knowledge and they are leading us to all manner of strange discoveries and strange consequences. Max Planck's quantum theory and, later on, Albert Einstein's theory of relativity, changed the whole conception of the universe. Most people may not realise it even now though they changed the whole conception of the universe and the world. All other

things followed. The atom bomb struck us because of the tremendous power to kill. Vast changes in human conception had taken place as my friend Mr. K. D. Malaviya suggested. This only came on the scene in 1939 when some German scientist did something, split the atom or whatever they say rather crudely. Soon after, the Americans did it. In America, it was in fact a migrant scientist who did it and in 1942 something else happened and a chain of reactions was established by Italian scientists. By August 1945, Hiroshima fell, as the result of the work from 1939 to 1945.

Since then, of course tremendous progress has been made in this and the world has been struck by it because it is a terrible thing. Now, therefore, the human mind and human efforts are unleashing tremendous powers without quite knowing how to control them. You will not control these by a mere demand to ban this or to ban that. Nobody can really control the human mind from going on unleashing new things; they will go on doing that. How to approach this problem of control which is of vital conseqence is one of the political problems of the day. Behind that lies some measure of lessening the tension in the world, some measure of confidence in each other by the great nations, some agreement to live and let live and not to try to destroy others, to allow each country to live its own life. Unless that approach is made, the only other approach is of conflict and if the idea of conflict is in the minds of nations, then the atom bomb will undoubtedly remain; it doesn't matter your going on talking about banning it or not.

Now, let us consider these possible issues. It is perfectly clear that atomic energy can be used for peaceful purposes, to the tremendous advantage of humanity. Probably, it may take some years, may be five years or may be ten years, but not too long, before it can be used more or less economically. I should like the House to remember one thing. The use of atomic energy for peaceful purposes is far more important for a country like India, that is to say, in a country whose power resources are limited, than for a country like France, an industrially advanced country. Take the United States of America, which has already tremendous power resources in other ways. It is not so much for them to have an additional source of power like atomic energy. No doubt they can use it; it is not so important. It is important for a power-starved or a power-hungry country like India or like most of the other countries in Asia and Africa. I say that because it may be to the advantage of the countries who have adequate power resources to restrain and restrict the use of atomic energy because they do not want that power. It would be to the disadvantage of a country like India if that is restricted or stopped. It is a very important factor to remember from the point of view of this so-called international control. It is probably loose talk, this talk of control. Who is to control it internationally? Who are the international nations who are going to control it? One may say, the United Nations. Obviously, there is no other organisation approaching the United Nations in its international scope. And yet, the House knows, the United Nations even now does not include in its scope even the big nations of the world. Some of the biggest are kept out of its scope. The United Nations can only control itself. It cannot control any nation which is not in it, which it refuses to admit and with which it would not have anything to do, so that the result will be that you control a great part of the world, but still there is a part of the world which is not controlled by it. That part, over which there is no control, makes all the mischief. You do not control it; it is not, in fact, recognised by you; you treat it as if it did not exist. It will go its own way and upset the apple-cart. Therefore, the question of international control becomes difficult. Reference has been made in President Eisenhower's

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speech to this international control. We all agree with the proposition that if it can be so organised, there should be proper international control and proper use made of the stock of fissile materials, so that all countries can use them for research work or for proper purposes. Well and good. But how is this to be done? There the difficulty comes in, President Eisenhower refers to some agency of the United Nations. That organisation appears reasonable, but then, let us go back and see what the actual proposals are before us in regard the atomic energy of various countries. These are the latest proposals, at the beginning of this year, of the United States:

"An international control agency shall be set up by the United Nations. It shall hereafter be an independent body outside the control of the Security Council and of the United Nations." The United Nations is merely supposed to set it up and wash its hands away. It becomes an independent organisation. So it is a very important matter as to what an independent organisation is. This organisation will, of course, have an unlimited right of inspection. Agreed. "It shall have the right to maintain its own guards on the territory of any foreign State, licenced to engage in any of the processes of the production of or research in atomic energy." It becomes a super-State atomic energy body, maintaining its own guards, armies or small armies, or whatever you like. Then again, "it shall own and control"—mark these words—"the raw materials mined, the plants in which the ore is processed, and all plants which deal with production of atomic energy wherever they may be situated in any country of the world." This is a very far-reaching provision, namely, that all our raw materials and our mines are owned and controlled by that independent body, which is even independent of the United Nations after it is created. It means tremendous power being concentrated in the hands of a select body. "It shall decide if, when and where and to what extent the various processes may be carried out and in which parts of the world atomic energy plants may be established"—and there are limitations also—"and it shall have authority to issue or withhold licences from countries, institutions or enterprises engaged in any activities relating to the production of atomic energy," and so on.

I read to you some of them and there are one or two others also. This tremendous and vast power is being given to a body which is even independent of the United Nations, which has sponsored it or started it. Who will be in this body? That is an important factor. Either you make the body as big as the United Nations with all the countries represented, or it will be some relatively small body, inevitably with the Great Powers sitting in it, and lording over it, and I say with all respect to them that they will have a grip of all the atomic energy areas and raw materials in every country. Now, in a country like India is it a desirable prospect?

Some Hon. Members: No.

Shri Jawaharlal Nehru: When hon. Members talk so much of international control, let us understand, without using vague phrases and language, what it means. There should be international control and inspection, but it is not such an easy matter as it seems. Certainly, we would be entitled to object to any kind of control which is not exercised to our advantage. We are prepared in this, as in any other matter, even to limit, in common with other countries, our independence of action for the common good of the world we are prepared to do that, provided we are assured that is for the common good of the world and not exercised in a partial way, not dominated over by certain countries, however good their motives might be. These are the difficulties that arise in this matter.

In President Eisenhower's speech these details are not gone into, but he says that what he calls "normal uranium" should be controlled. I could have understood even control of fissile materials. But President Eisenhower refers to "normal uranium". It is not clear what he means by "normal uranium". Presumably he means uranium ores. So, again we get back to the raw materials. So that, there is this difficulty. We want international control of this; we want fair use of it for peaceful purposes. This is common ground, not a matter for argument. But when we come to how it is to be done, we immediately get into difficulties. I submit it would not be right to agree to any plan which hands over even our raw materials and mines, etc., to any external authority. I would again beg the House to remember this major fact that atomic energy for peaceful purposes is far more important to the under-developed countries of the world than to the developed ones. And, if the developed countries have all the powers they may well stop the use of atomic energy everywhere, including in their own countries, because they do not need it so much, and we suffer.

We welcome the entire approach of President Eisenhower in this matter. Since he delivered his speech this question has been discussed by representatives of other Great Powers chiefly concerned, and if they find out any suitable method for creating this international pool, we will be very happy, —subject to what I have said, to share with, and give what we can to it.

Dr. Saha drew a rather dismal picture of our pitiable state in this matter. He referred to our coal supplies running out. Now, my own information, derived from our best geologists is contrary to what Dr. Saha said. I believe there is a dispute between Dr. Saha and our geologists, but with all my respect for him, I would take our geologists' word in this matter. Dr. Saha is an eminent physicist, but our geologists are expected to knew more about coal than Dr. Saha.

Here I may say what our geologists' estimate of our coal reserve is.

Total reserves of coal in the Indian rock-formations, upto a depth of 2,000 feet—60,000 million tons.

Total reserves of available coal, of all grades, which are considered workable by present methods—20,000 million tons.

Reserves of first grade coal, workable—5,000 million tons.

Reserves of coking coal suitable for metallurgical use—1,750 to 2,000 million tons.

Present-day annual consumption of coal in India, of all grades —35 million tons.

Annual consumption of metallurgical grade coal (coking coal used both for metallurgical and non-metallurgical purposes)—About 8 to 12 million tons.

Consumption of coking coal purely for metallurgical purposes —About 3 million tons.

As is well known we are wasting our best coal by using it in our railways, where it is not necessary. Attempts are being made in our railways not to use our best coal. Consumption of coking coal purely for metallurgical purposes is about 3 million tons, while our annual consumption of metallurgical grade coal both for metallurgical and non-metallurgical purposes is about 8 to 12 million tons, This is chiefly because our railways and some of our factories use this high grade coal, because it is easily available. We should curb this down, because our best coal should not be wasted in this way, while other coal is available.

Recent experiments conducted in India by the Fuel Research Institute and private industrial concerns, like Tatas go to show that our second-grade coal is capable of improvement

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to first-grade by coal-washing and blending methods. Large scale trials for (I regret I do not wholly understand the meaning of the word which I am going to read) "beneficiation"—making it better, I suppose—of low-grade coal give promise that India's coal resources will prove adequate for all her present as well as future needs.

According to the above summary, assuming that correct methods of mining are employed and waste is eliminated, we have reserves of 2,000 million tons of high-grade and coking coal which should last (if the consumption were restricted to use in iron and steel and other metal manufacturing industries alone) for a period of about 650 years. But India is using coking coal today for ordinary furnace and railway purposes, for domestic fuel, and some industrial uses to the extent of about ten to twelve million tons per annum. At this rate the life of coking coal reserves will be reduced to 160 years only.

The position, however, is different in respect of non-coking coal of food and medium quality, the supply of which is such as would last for several hundred years, allowing the present rate of consumption plus a progressively increasing rate for future industrial expansion.

Of course, India's resources in coal are much less than those of the United States or the U. S. S. R.

Shri Meghnad Saha: May I interrupt? If our industrial power is increased ten times, its life time would be 650 divided by 10 which is 65 years. It is a very dismal prospect.

Shri Jawaharlal Nehru: The hon. Member is thinking of metallurgical coal. The other coal, even if the industrial capacity is increased tremendously, is enough to last for several hundred years.

Dr. Saha put a question, directly or indirectly, as to whether we have the necessary scientific personnel or requisite competence to set up a nuclear reactor. He mentioned that five years ago, we had stated that it would be set up. He is perfectly justified in pointing out that it has not been set up. It is true there has been delay. It was delayed due to certain factors—factors outside our control. We are setting it up. We have obviously to get some equipment from abroad. We have to get heavy water which we do not produce yet. It was a little difficult to get this heavy water but I believe things are in good shape about the starting of this moderate size reactor.

As for our scientific personnel, we cannot compare ourselves with the great countries but leaving out some of the big countries, we are supposed to be rather good in our scientific personnel even now. We can put up a reactor even if fissile materials are not available from the common pool as President Eisenhower has indicated. It is not that we are entirely depending upon some common pool. Even if some help may not be forthcoming, even if the fissile materials and the modulators do not become readily available, I think we can do it. We have sent several teams abroad and people are being trained both in India and abroad for this purpose. I think we are justified in assuming that this would produce results very soon.

The Atomic Energy Commission has also a small team which is gaining experience in the use of radio-active isotopes which will become available when the reactor starts functioning, for biological and other research and for medical treatment.

Now, the main purpose in putting up the reactor is to acquire the necessary technical experience which will help us later on to put up power plants for peaceful purposes. Therefore, some of the workers are engaged in gaining experience in some of the technical processes like heat transfer which will be needed at some later stages. The reactor will also help us to produce some of the radio-active isotopes. At present radio-active isotopes are used in biological research

for study of metabolism of various elements. For medical treatment radio-active isotopes and special radio-active iodine are used. These are much weaker in intensity of radiation and can be easily controlled. But they have a short life. Their effect disappears soon after. It is also used for metallurgical purposes, to follow the progress of certain reactions. All of these can be purchased from abroad even now for peaceful purposes, but they are so short-lived that even in the course of transit they lose some activity. It is obviously more advantageous to produce them here. We have got, of course, a major Division dealing with prospecting for ores and raw materials. Two new Divisions have been started, a Medical and Health Division which deals with the protection of workers against the effects of radiation and with research and associated problems, and a Biology Division which conducts investigations on the biological effects of radiation.

Now, hon. Members have mentioned something about our sending some part of the monazite sands or something else abroad. We have sent them abroad, a little of them. Some five or six years ago they were sent abroad without limit; anybody could come and take shiploads of them. We stopped that. I believe even now there is some theft going on occasionally from the coast. We try to stop that by posting guards and in other ways. But we have not considered the question of monazite as a money-making proposition, although it is a money making thing. But we used it always to give it in exchange for something that we lack for atomic energy development. For naturally we lack things. Naturally, we want something which we can get easily from other countries. So that, we use it as a valuable exchange material. We are in some contact with some foreign Atomic Energy Commissions, notably France and England, chiefly these two countries. I think it first started with the French Atomic Energy Commission, and later England. I do not say intimate contact, but we do help each other. We have therefore supplied them. We have occasionally supplied some things to the United States of America, to some other countries too—I do not know at the present moment, I have not got the list here. But generally speaking, what we have supplied is relatively small in quantity. As a matter of fact we do not want to supply these sands as far as possible. We now supply the processed material. We have put up a factory in Travancore-Cochin for processing that material, and it is much more advantageous for us to supply the processed material than the sands. At Trombay near Bombay we are also putting up a factory. A good deal of work is being done in these matters.

Dr. Meghnad Saha said that there should be no secrecy. I entirely agree with him and so far as we are concerned, we want no secrecy. Our difficulty has been that when we deal with another country, whether it is France or England, when they give us any process or any information, they insist on secrecy for their part and we have to agree because it is their custom. We have to take something from them; we cannot get it otherwise; we have to give that assurance. Therefore, we have to keep that assurance. Otherwise, so far as we are concerned, there is no secrecy. It is obvious that in this matter, we are in the first stages of atomic energy work and not so advanced as the Soviet Union or America or England. So, we have really nothing to hide so far as we are concerned.

Dr. Meghnad Saha suggested that our Atomic Energy Act came in the way and so it should be scrapped. We have no objection to scrapping it or what is more probably desirable, amending it if necessary. We may come to this House for amending the Act. Let us consider the matter right from the beginning. We are perfectly agreeable to consulting or having a conference of eminent scientists and discussing these matters with them. If they make any suggestions for the

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improvement of the Act or for the improvement of the work, we shall certainly accept and adopt them. Even now, as a matter of fact, within the compass of this Act, we are trying to improve and expand our work. I might mention that in some way we ourselves have felt that perhaps the Act is not quite adequate and slightly comes in the way occasionally. But, the difficulty is of adding to the legislation that will come up this session or the next session. Finally we decided not to trouble Parliament at this stage till we are forced to do it and to try to expand our work within the scope of the Act, if we can, to some extent. I can promise this House and Dr. Meghnad Saha that we shall gladly pay every respect and attention to all the suggestions that are made individually or jointly.

Shri N. Sreekantan Nair (Quilon *cum* Mavelikkara): My first complaint about the Atomic Energy Commission is that it has indulged in tall talk immoderately. Secondly, it is more or less controlled by the Tatas, and it has functioned more in the interests of the Tatas than in the interests of the nation.

As regards the first point, you have heard how the Commission had made a claim that in five years, they would be able to utilise the atomic energy. That has not materialised. Very recently, a very important member of the Commission went to Japan and made a very sonorous and spurious claim that within three years, we may be utilising atomic energy for peaceful purposes. When the setting up of a nuclear reactor remains only a cherished objective, which cannot be immediately realised, I do not know how we could utilise it.

Then, there is the question of secrecy to which Shri Meghnad Saha referred and which was also referred to by the Prime Minister. That secrecy is standing in the way of scientists and people interested in this, co-operating with the Atomic Energy Commission. If I may say so, this secrecy is intended to screen the inefficiency, waste and perhaps the shady transactions of the Atomic Energy Commission. In my speech on the Budget Demands for 1951-52, I pointed out that the Union Government is robbing the Travancore-Cochin State of their legitimate share in the price of monazite. The Union Government was paying only £25 per ton whereas the world market price was ten times higher. We would not have minded it so much if it really benefited the Union Government. As a matter of fact, the Central Government is handing it over to the Tatas at £120 per ton and the Tatas go off with a lion's share of the profits. So, they are robbing Paul to pay Peter. That is why we object to it. It is the Tatas, naturally, with their agents in all the key positions in the Government of India that benefit by these transactions. I am one who does not object to monazite being processed because I come from that district where it is refined. My workers, my unions are interested in it, and I do want that it should be refined and it should be sent out as far as possible in the interests of the nation. It must be sent directly by the Government so that whatever benefit we get must go to the country and not to private agencies.

1 P.M.

The hon. Prime Minister referred to the factory in Alwaye. It is more than a hundred miles away from Chavara, and 200 miles away from Manavalakurichi. Even in Alwaye, the processing done is very insignificant. Then, we have got a duplicating process. New factories are set up in Bombay, and the most important processing work is done there. This duplication of processing, and multiplication of factories result in waste. The raw material is transported from one place to another, and from there to a third place. All this costs us very heavily and for no purpose at all. And the material processed in all this is so little that even with the amount of monazite exported, the

over-all demand does not come to even 5 per cent. of the total capacity of the factories in Chavara.

Out of the five factories in my State, only the smallest unit has set up a few tables to extract monazite. The surplus in this factory as well as the entire production of the monazite middlings of the other factories are now being dumped into the sea as waste. Precious material worth crores of rupees is dumped into the sea as waste because these cannot be refined by any of the other factories, and the Atomic Energy Commission does not allow them to keep a stock of the middlings. Thus, crores and crores of rupees are wasted. This money would have helped us not only to set up an atomic reactor, but also helped us in our Five Year Plan, but it is being wasted now.

Even in the processing of ilmenite, the Atomic Energy Commission comes in and says there should be a specification of 0·1 per cent. of monazite fractions in the ilmenite shipments made That means only 1/1000 monazite should be in ilmenite shipments. That has taken away the work of the factories and brought it down to one half. That means the Travancore-Cochin Government and the workers are losing about Rs. 50 to Rs. 60 lakhs every year by way of these ilmenite shipments being held up. That is producing more unemployment. I do not think any harm will be done if the specification limit is raised to 0·25 per cent., or 1/400.

Shri K. D. Malaviya: Does the hon. Member want that higher percentage of monazite should continue to be exported to give employment to thirty or forty thousand people? I do not think there are so many people employed, but even if it be so does he want that the higher percentage exported previously should continue to be exported?

Shri N. Sreekantan Nair: I was now dealing with ilmenite, but with regard to monazite I say the capacity of the factories must be utilized to the full. It must be refined and sent out in exchange for fissionable materials, or even for money because our country wants money. Our workers want work and wages.

Shri K. D. Malaviya: We are setting up the factory at Trombay for purifying the uranium and thorium from the cake which we will get from Alwaye.

Shri N. Sreekantan Nair: I was pointing out that we are using only 5 per cent. of the capacity and the rest is thrown into the sea.

The percentage of monazite in ilmenite cannot be avoided completely, but now it is fixed at 0·1 per cent. Even if it is made 0·25 per cent. no country that buys it can process it on an economic basis.

Shri K. D. Malaviya: That is not correct.

Shri N. Sreekantan Nair: As a matter of fact, I know what the process of getting monazite is. It takes so much labour that no country that buys it can process for the content of 0·25 per cent. of monazite in ilmenite. That is what I said. It cannot be worked out as an economic proposition. But anyhow, the Commission gives suggestions: 'do not do this'. That means 50 per cent. of the workers lose their wages, and the Travancore-Cochin Government loses Rs. 50 lakhs every year. Apart from the thorium contents, it has been admitted that the Travancore-Cochin sands contain uranium. If the scientists in the laboratories in India have been allowed to process this uranium that is found in Travancore sands, they would have done it even though it might cost them some economic loss, because it is for experimentation purposes. But now the secrecy imposed is so great that they are not allowed to conduct experiments so much so that the Commission is following a dog in the manger policy in not allowing anybody else to come

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in. Even scientists like Shri Saha cannot get thorium and do some experiments with it.

Shri K. D. Malaviya: He knows that he is free to carry out experiments.

Shri N. Sreekantan Nair: I say that we can produce 60,000 tons of monazite every year. If that quantity is utilised, we will get a minimum of Rs. 20 crores worth of fissionable material and moderating materials. With that, we can set up a reactor, and we can work that atomic reactor very effectively and perhaps a portion of that money may also be utilised for building up our natural resources. So I say that monazite should be processed to the fullest capacity so that the workers in the factory and the Travancore-Cochin Government can get enough wages and revenue respectively. This is a very important matter. We have been cheated out of our legitimate share of the monazite. We were only getting 25 sovereigns...

Shri K. D. Malaviya: Is it not necessary that in order to process monazite into thorium nitrate and thorium carbonate, we must have a market also? If we start producing a million tons of thorium nitrate and thorium carbonate, there must be someone to purchase them. That is why the production capacity is limited now. The question is one of selling in the market.

Shri N. Sreekantan Nair: Am I to understand that there is no world demand for thorium? I think there is demand. I myself know that there have been offers by companies saying that they are prepared to take lakhs and lakhs of tons of thorium. It is a valuable material. Let us use it. I do not think we can directly process monazite and use it for atomic bomb, because till now that process has not been developed. Thorium is mainly used for mantle and other purposes which are not specifically injurious and harmful to life. I say that we must produce and process this monazite well and exchange it for fissionable material. I also suggest that this red-tape as well as inefficiency of the Atomic Energy Commission should be controlled and say that the Commission should work more for the interests of the nation than for the interests of some private agency.

Shri Joachim Alva (Kanara): The House is indebted to the hon. Prime Minister for the realistic touch that he brought to the discussion on the subject before the House. Without his presence—physical and political presence—at the round table conferences of the United Nations, there can be no peace. You cannot have the U.N. control of atomic energy without all these powers being in it—especially the powers of Asia. Sir, let us understand first things first. We Indians, to whatever race or community we belong, do not believe in destroying our enemy. We shall not destroy even our worst enemy either by the fire or by the sword. These are the principles we learnt from the highest idealism of Hinduism, Buddhism and also Christianity which has got a foothold in this country, though it is not practised as much in the west where it has so great a foothold.

There is one point which I want to impress on the House. What about this 1943 pact in regard to the atom bomb which was arrived at between the United States and Britain? The provisions of that pact have been revealed recently. Both Britain and America believe in atomic energy and these are the terms of that famous pact which has been revealed recently. I do not know whether even the Government of India have information on this. If this had been extended to include Russia, I do not think we would have witnessed this race for armaments and the battle between all the Great Powers today. The trouble is that this Pact was between the U.S.A. and Britain entered into with

the object of keeping out Russia. It was a secret Pact. I shall read the terms of the Pact.

Firstly, that we will never use this agency against each other.

Secondly, we will not use it against third parties without each other's consent.

Thirdly, we will not either of us communicate any information about this tube-well oil—that is the expression they used for atomic energy—to third parties except by mutual consent.

Fourthly, that in view of the heavy burden falling upon the United States as a result of her intervention in the war, its industrial or commercial character shall be dealt with as between the United States and Great Britain only on the terms specified in this agreement. This agreement was arrived at in the Quebec Conference of 1943 and signed on August 19th of that year by President Roosevelt and Mr. Churchill. If perhaps the terms of that agreement had also been extended to Russia also, one of the Allies in the war, we might not have had such a race for armaments.

Sir, we in India are perhaps going at a snail's pace. We perhaps are going at the speed of a tortoise but, surely, in the long run, perhaps we might catch up, at least in the peaceful utilisation of atomic energy, and thereby perhaps prove to the world that we are going slowly. We have been overwhelmed by our refugee problem for the last five years and we did not set up plants even for the peaceful utilisation of atomic energy.

President Truman was warned by great scientists who met at Chicago that he shall not utilise the atom bomb. This advice was tendered barely three months before the atom bomb fell on Hiroshima. The United States was frightened that Hitler might use it. Whether Hitler committed suicide or not the bomb was dropped on the Japanese. It is a well-known fact that the Japanese were sending out peace feelers through the Vatican, but rejecting the peace feelers sent through the Vatican the Americans laid the atom bomb on Japan, a coloured country, with disastrous effect. Today the Japanese do not want the American scientists and doctors to touch or investigate the conditions of the Japanese victims—the fishermen who have been victims of the effect of the bombing in Bikini. The scientists, headed by Dr. Frank at Chicago, warned President Truman as follows:

> (i) It is impossible for the U.S.A. to maintain a monopoly in the manufacture of the bombs;
>
> (ii) since the technique could not be kept a secret from competing nations since the principles of making the bomb were already known, it would not be possible to avoid an arms race;
>
> (iii) Russia and China are the only two countries that can survive the nuclear attack.

In the face of these, they warned the President against the use of the atom bomb.

In the face of such important and valuable advice given by the scientists, America went ahead and bombed the Japanese city. Today, as I mentioned, the Japanese are so touchy that even American scientists and doctors are not allowed to come near the patients for medical examination.

Field Marshal Montgomery has warned that in the event of war both sides will use atomic weapons ruthlessly. He said that the safest place for people would be nearest the aggressor, for the aggressor will not be able to utilise these bombs for destroying his own people. In such a situation, it is beholden to us to see whether it is possible for us to put our heads together, whether we can

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call all the scientists of the earth together to have a separate group and find out what are the peaceful uses of atomic energy, and thereby perhaps usher more light in this great darkness that is overhanging the world.

The other day, in the House of Lords, Lord Jowitt warned that while he was satisfied that the United States had taken every possible step open to them to avoid any possible danger, the fact that the area which might be affected was so enormous posed the problem that ships on their lawful occupations might be going through those waters and there was, he presumed, no right under international law, to warn people off.

The Marquess of Salisbury agreed that a single nation could not exercise, as it were, sovereignty in waters which were not national waters.

Mr. Deputy-Speaker: It is already 1-15.

Shri Joachim Alva: I will finish in a minute. America says, 'we shall have control'; Russia says, 'there shall be no more production'. Between these two conflicting views, we are to arrive at a *via media*. One Power shall not have the right to use what is being produced to its own advantage to destroy others and to destroy its own name.

The House then adjourned till a Quarter Past Eight of the Clock on Tuesday, the 11th May, 1954.