

(c) the measures adopted by Government to fill up the reserved quota?

The Deputy Minister of Defence (Shri Raghuramiah): (a) Nil.

(b) Nil.

(c) Direct recruitment to the Gazetted grades in the Ordnance Factories Organisation is made through the Union Public Service Commission. At the time of sending requisition for such recruitment, indication is given as to the posts reserved *inter alia* for Scheduled Castes. Due to non-availability of suitable personnel, the UPSC were not in a position to recommend suitable candidates belonging to the Scheduled Caste for recruitment to man the posts reserved for them. No special measures can be taken by this Ministry, as recruitment is required to be made on the recommendations of the UPSC.

12.00 hrs.

PAPERS LAID ON THE TABLE

AMENDMENTS TO CENTRAL EXCISE RULES

The Deputy Minister of Finance (Shri B. R. Bhagat): Sir, I beg to lay on the Table, under Section 38 of the Central Excises and Salt Act, 1944, a copy of each of the following Notifications making certain further amendments to the Central Excise Rules, 1944:—

- (1) G.S.R. No. 159, dated the 22nd March, 1958.
- (2) G.S.R. No. 197, dated the 28th March, 1958.

[Placed in the Library. See No. LT651/58].

NOTIFICATIONS ISSUED UNDER SEA CUSTOMS ACT AND CENTRAL EXCISES AND SALT ACT

Shri B. R. Bhagat: Sir, I beg to lay on the Table, under sub-section (4) of

Section 43B of the Sea Customs Act, 1878, and Section 38 of the Central Excises and Salt Act, 1944, a copy of each of the following Notifications:—

- (1) G.S.R. No. 98, dated the 4th March, 1958, containing the Customs and Excise Duties Drawback (Trailers) Rules, 1958.
- (2) G.S.R. No. 99, dated the 4th March, 1958, containing the customs and Excise Duties Drawback (Bus Body) Rules, 1958.
- (3) G.S.R. No. 100, dated the 4th March, 1958, containing the Customs and Excise Duties Drawback (Crown Cork) Rules, 1958.

[Placed in the Library. See No. LT 652/58].

NOTIFICATION ISSUED UNDER SEA CUSTOMS ACT,

Shri B. R. Bhagat: Sir, I beg to lay on the Table, under sub-section (4) of Section 43B of the Sea Customs Act, 1878, a copy of each of the following Notifications:—

- (1) G.S.R. No. 101, dated the 4th March, 1958.
- (2) G.S.R. No. 102, dated the 4th March, 1958.
- (3) G.S.R. No. 103, dated the 4th March, 1958.

[Placed in the Library. See No. LT 653/58].

DEMANDS FOR GRANTS*—contd.

DEPARTMENT OF ATOMIC ENERGY

Mr. Speaker: The House will now take up discussion and voting on Demands Nos. 99, 100 and 137 relating to the Department of Atomic Energy for which two hours have been allotted. Hon. Members desirous of moving cut motions may hand over at the Table within 15 minutes the numbers of the selected cut motions.

*Moved with the recommendation of the President.

We are commencing now at 12 o'clock. When will the hon. Prime Minister reply?

The Prime Minister and Minister of External Affairs (Shri Jawaharlal Nehru): I think, possibly, it may not be necessary for me to reply at all unless it is to answer questions, one or two. I should like to make a statement to begin with and would take about ten minutes or so in the end. I will not take too much time of the House.

Mr. Speaker: I will decide later on if the hon. Minister wants some time. The hon. Members are already aware of the time limit for speeches. We have only two hours. The time limit would be proportionate. We had 15 minutes when it was 5 hours. For two hours, it will be one-third—five minutes—subject to enlargement of course.

Motion moved:

DEMAND NO. 89—DEPARTMENT OF ATOMIC ENERGY

"That a sum not exceeding Rs. 8,32,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Department of Atomic Energy'."

DEMAND NO. 100—ATOMIC ENERGY RESEARCH

"That a sum not exceeding Rs. 3,03,23,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Atomic Energy Research'."

DEMAND NO. 137—CAPITAL OUTLAY OF THE DEPARTMENT OF ATOMIC ENERGY

"That a sum not exceeding Rs. 4,75,75,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of pay-

ment during the year ending the 31st day of March, 1959, in respect of 'Capital Outlay of the Department of Atomic Energy'."

Shri Jawaharlal Nehru: Mr. Speaker, I have been the Minister in charge of this Department of Atomic Energy for some years and I have tried to understand and follow its development. But as a layman, I cannot pretend to know much about the scientific side of it or about the highly complicated and intricate work that is being done in connection with it. I see from the numerous cut motions that some hon. Members have tabled numerous proposals and suggestions which presumably flow from some intimate knowledge of atomic energy and how it should be worked. I confess I cannot meet them at this particular level of personal knowledge and have to rely, therefore, on scientific colleagues and advisers.

Fortunately, we have some very eminent scientists connected with our energy establishment and they have done good work and shown good results which have attracted attention in other parts of the world. Anyhow, I welcome the great interest taken by the hon. Members in this development of the atomic energy in this country.

It is many years ago when we first formed the Atomic Energy Department—before that it was called something else—because we realised even at that early stage the importance of this. Normally speaking, the development of atomic energy has taken place in the countries which are industrially advanced. They have the resources for it. It is somewhat unusual for a country like India which is on the threshold of industrial advance and is struggling to bring about what might be called the industrial revolution here which took place a hundred or more years ago elsewhere it is rather unusual for a country in this position to launch out into an atomic energy programme. We did so not because we wanted to show off that we have got something big—that would have been foolish—but because

[Shri Jawaharlal Nehru]

of the definite realisation that this was of the highest importance looking at the future. We were on the threshold of the atomic age in the world. For us, this had overlapped, if I may say so, with our being on the threshold of the industrial age in India. But it is impossible for us to go through the slow processes of the industrial age, having arrived at somewhere far behind, while the other countries have gone on to the atomic age. So, we thought that we must give thought to this matter.

Fortunately, we had able nuclear scientists. Otherwise we could not have done it. It is not a question of money. Money is the least part of it. Indeed in anything worthwhile that has been done in the country, let us remember that, though money is important, it is of the least importance compared to trained men. That is the real thing. It is they who produce things and money.

But there was another aspect of this question which led us to think in terms of atomic energy development and this was the question of power supply. It is well known that you can almost judge of a country's progress by seeing how much power it produced and consumed. Our sources of power, thermal, and hydro-electric, are there of course, but the principal source of power in India still continues to be cow dung. It is well to remember this. People do not realise it. I forget the exact figure but probably 80 per cent of the power—or maybe, more—used in India comes from cow dung. That is of course the primitive state of our economy.

The other day, my colleague who was then the Minister of Irrigation and Power, spoke about the untapped sources of power in India. Of course there are untapped sources, very big sources. But I think he was somewhat optimistic about those untapped sources. Not that he was not justified in being optimistic. You can take either view.

For instance, one source was the river Brahmaputra, more especially at the place where it takes the turn to India from Tibet. It is a potential source of enormous power.... (Interruptions.) I agree. I did not hear what the hon. Members said.

Shri Hem Barua (Gauhati): Five million k.w.s.

Shri Jawaharlal Nehru: It may be so. But in order to reach that turn of the Brahmaputra there, it would require enormous efforts on our part. It is relatively easier perhaps for the Tibetan authorities and the Chinese Government to reach there: It is more in their territories than ours. Anyhow, it is difficult to get there and having got there, it is difficult to get out of there, I mean—to get out the power that you produce there.

But apart from that, the normal calculations about the coal and hydro-electric power depend upon how much we use and at what rate we consume. For instance, if we consume this power at the present rate—which is of course a very low rate—it may last us 200 or 300 years or more. But if we consume at the rate of the U.S.A. today then all the potential power will last us 30 years and not more—maybe 31 or 40 years. Of course we are not going to consume at the rate at which the U.S.A. consumes because we cannot. We may arrive at some middle figure between this and that.

But the point is that we have not got inexhaustible supplies of power in India and that was one reason among many others which forced us to consider the possibility of using atomic energy in future as power for civil purposes.

This was mentioned for the first time, I think, by the Chairman of our Commission, Dr. Bhabha, who has been speaking at some length about this subject. He spoke, I think, last year at Dublin at the British Association meeting too, working out the figures. People are somewhat doubtful and credulous about the feasibility,

about the economic aspect of it. He showed even then that in places far removed from the coal fields or the places where hydro-electric power is produced, this was a feasible proposition. It was not feasible in the economic sense right in the coal field because coal was cheap there.

But ever since he made that calculation other developments are taking place which indicate the probability of this power being produced from atomic energy in a cheaper way, and it seems now quite a feasible proposition in most places. I have no doubt that further advances will make it more feasible still.

In a country like India whose power sources are very limited at the present moment, it is of the highest importance to get something like that. The use of atomic energy for peaceful purposes is far more important for India than, let us say, for the United States of America because they have got tremendous other sources of power, and cheap power. So, not only for the obvious reason that we are on the new source of energy which is going, probably, to transform world conditions in the future and therefore we should know about it,—not know it by reading text books from other countries, but we ourselves, our scientists, discoverers and research workers should know about it; that is important—but, apart from this, it is important because we hunger for more power in this country. Hon. Members are making demands for electricity there an delectricity here, which are completely legitimate and understandable. You can really measure the advance of any part of the country by the electric power available there. Because of that too, and looking into the future we thought it desirable to carry this work on.

What is this atomic power? This is a part of nuclear physics. Nuclear physics is and should be a part of the basic training in physics in any university. But, if we want every university in India to take up this atomic energy work in detail, well,

they just have not got the equipment or the personnel, and we will spread out our very limited resources in trained men as well as equipment with the result that there will be no result at all—just spread out fine lectures delivered here and there. Therefore, we have to concentrate our available talent, our available equipment which is exceedingly expensive,—these reactors—in this Atomic Energy Establishment that we have got, expecting that the universities will do a good job of work in teaching nuclear physics and thus supply people from there to these specialised agencies of the Atomic Energy Establishment where they can do higher work, and that specialised agency again supplying their trained men for work in the universities, for teaching work and the rest.

I am laying stress on this because, first of all, it is very important that our universities should have up-to-date teaching and equipment for nuclear physics. That is the basis out of which every other thing will come. And, they have not got it today. They are ambitious—some of them—and want to do atomic energy work. I like their ambition, but they have not got the facilities for it. They make demands on the Atomic Energy Commission: "Give us this equipment; give us that; give us lakhs and lakhs of money." I want to make it clear that we cannot, financially or in terms of personnel, spread ourselves all over India in regard to higher atomic energy work. But what we do is for special research projects. The Department gives money and, maybe, supplies some equipment too if necessary.

So far as the study of nuclear physics is concerned, which we should like all universities in India to have in an adequate degree, that is not the function of the Atomic Energy Department as such. The University Grants Commission should look into it and do it. We must not get mixed up in the two because that may mean lack of success at both ends.

[Shri Jawaharlal Nehru]

Now, in this Atomic Energy Establishment, may I say—of course, it does not need saying, perhaps, but I should like to repeat it—that we are not in the slightest interested in atomic bombs and the like, except in so far as we wish to avoid them and not be targets for them? Anyhow, all our work on atomic energy is for the peaceful use.

We have drawn up some kind of a long range plan, which is not complete, in regard to the development of atomic energy. Even during the last year the programme has expanded rapidly. The scientific and technical staff of the Atomic Energy Establishment, which is the heart of the research and development activities of the Department, now exceeds 600. A year ago it was 320. These figures only include graduate scientists and engineers and those with higher qualifications. It is expected that this number will increase by another 300 during the current year—that is, it will come to 900 senior scientists.

To feed this recruitment, the Department has started a training programme from last August, admission to which was made after a very rigorous selection by interview. The total number of applicants exceeded 7,000. On these, 1,400 were called for interview, and over 1,100 actually appeared. The number selected was about 200 of whom about 176 will finish their course. These trainees are given not only courses in basic physics, chemistry and mathematics to fit them for the more advanced courses which come later in the year; there are tutorial classes for small groups of students. This training, I should like the House to note, is necessary chiefly because the training received in the universities was found not to be adequate, and it is our desire that the preliminary training should be made adequate in every university, instead of some universities having inadequate training there and wanting to do some direct atomic energy work also, which also will necessarily be inadequate.

Now, so far as the scientific work of the Trombay Establishment is concerned, this has also increased in breadth, variety and intensity. Our first reactor, the House may remember, is called Apsara—the Water Nymph.

श्री स्वामी: (देहरादून) : क्या वह अप्सरा जो ऋषियों के लिए हुआ करती थी ?

श्री जवाहरलाल नेहरू : जी हां वही ।

श्री स्वामी : वह आप के साथ लग गई ।

(हँसः)

श्री बबराज सिंह (फिरोजाबाद) : किस ऋषि के लिए है ।

Shri Jawaharlal Nehru: It is a suitable name because it is called, I think, "Water Cooled Reactor". This Apsara reached critically, as the phrase goes, for the first time on the 4th August, 1956. It was worked at very low power levels till the end of January, 1957, so as to check its operations. Since then its utilization has increased rapidly. Demand on the use of the reactor becomes so great that it is worked on two shifts a day, and it is expected shortly to go into three shifts operation. Requests for irradiation of biological specimens and radio isotopes from various centres in India have been met to a large extent, and an Isotope Division has been established for which special facilities are under construction. This is expected to produce radio-active iodine, radio-active phosphorus and certain other isotopes required for biological and medical investigations. When the Canada-India reactor goes into operation, the full range of radio-active isotopes including radio cobalt will be produced. A new radio chemistry laboratory has been constructed which is designed to deal with radio-active substances like plutonium and the fission products. Some of these substances like plutonium are so toxic that the maximum permissible dose for ingestion into the system is much less than ten-millionth part of a gram. More of it will be dangerous. Therefore, extremely drastic precautions

have to be taken in handling such substances. Most of the work with plutonium is done in glove boxes which are now being made at Trombay. These glove boxes—the hands never touch them. The gloves are inside and manipulated by hands from outside.

This work with radio-active substances requires a constant watch to ensure that the workers are not exposed to dangerous radiation levels. All the necessary instruments for health protection are now being made by the Health Physics Instrumentation Division. Indeed, most of the electronic instrumentation used in the Trombay establishment or the Atomic Minerals Division is now made in the Establishment, especially in the Electronics Instruments Section. This saves us a good deal of foreign exchange.

The Health Physics Section has organised a Film Badge Service for the workers not only in Trombay but elsewhere in India. Each person wears a film badge and this film in the badge is processed weekly and a record kept of the radiation dose received by each worker. This service is available to hospitals in the country where radium and X-rays are used at a nominal charge and it is being availed of by a large number of hospitals and other institutions not connected with atomic energy.

Now, the construction of the Canada-India reactor made progress during the year though difficulties were encountered with the steel shell. The top of the steel shell is a hemisphere, some 140 feet in diameter, and is one of the largest containment vessels in the world. It is now expected that the Canada-India reactor will be ready towards the end of 1959. When this reactor goes into operation, India will possess one of the best isotope producers in the world, with which it will be possible to produce all neutron-induced isotopes including radio cobalt.

A storage block for the used fuel elements—there is a cut motion on used fuel element and therefore I am

mentioning it—is being designed so that the intense radiation emitted by them can be used for studies on the effects of radiation on the preservation of food and other biological experiments. Studies are also being made on the use of radiation for killing weevils, insects and other organisms which lead to the destruction of foodgrains in storage. The construction of the uranium plant for producing uranium metal of atomic purity was undertaken during the current year, and the building is nearly complete. A laboratory plant for converting this uranium metal into fuel elements for the Canada-India reactor and other natural uranium reactors is also under construction at Trombay. This will have the necessary facilities for canning the fuel elements in aluminium cans and other minerals such as beryllium and zirconium. The Department is in close touch with, and carefully follows, all developments in this rapidly advancing field all over the world.

The scientific personnel of the Department have attended scientific conferences, visited laboratories and atomic installations and established contacts with scientists in other countries. The Department has friendly co-operation with similar organisations in all those countries which are most advanced in this field. A number of distinguished scientists and mathematicians from Canada, France, Japan, Poland, Soviet Union, the United Kingdom, the United States of America, Yugoslavia and other countries have spent varying periods at the Trombay establishment and the Tata Institute of Fundamental Research, giving seminars and lectures.

The House knows that we propose to produce our own heavy water, to begin with, in connection with the fertiliser plant at Nangal. Some time ago I made a statement in the House in regard to the constitution of the Atomic Energy Commission. It has been constituted by a resolution of the Government of India. About two years and a half ago, in August, 1955, there was the first great conference on the peaceful uses of atomic energy in

[Shri Jawaharlal Nehru]

Geneva. It was rather a remarkable conference on this new subject and a very successful one. It was presided over by our own eminent scientist, Dr. Bhabha. Now, a second conference is going to take place in September this year at Geneva. Meanwhile, the International Atomic Energy Agency has been established. This came into force in July 1957. There are 62 member-States in it. The first general conference of the Agency was held in Vienna in October 1957.

This, Sir, is an attempt to give an account to the House of the various activities we are indulging in. It is difficult for me, and perhaps for the House also, to go into the details of this intricate business, but I hope that what I have said and the pamphlet we have placed before the hon. Members of the House will give them a broad idea of our activities.

Shri V. P. Nayar (Quilon): Mr. Speaker, I am afraid that unless we release some atomic energy through speeches, in five minutes we cannot do any justice to the number of subjects which are covered in this Demand. I do not propose to enter into any discussions of a technical nature for fear that I may invite the Prime Minister's sarcasm once again, but there are many subjects which we ordinary men can understand and in which we can certainly offer our opinion.

First of all, I must say that the report to which the Prime Minister just now referred, that is, the annual report, does not help us in understanding the exact position of the working of the Atomic Energy Department. We know that this is a new department, a department dealing with several new subjects which we do not know, and a department through the activities of which a very wide vista will be opened. In such a report we expected that Government will give us some more information than what is usually given by way of routine in the matter of the administration of some other departments. I would very much request

the Prime Minister to give us some more details.

I shall come to some of the points which have been referred to by the Prime Minister himself. Let us take in brief the report on the Isotopes Division. Here we are told that they have succeeded in experiments in making the radio phosphorus and radio sulphur. We want to know what further uses to which they are to be put and what efforts have been made to co-ordinate the activities of the other Ministries if there are any. We know that some of these radio-active isotopes are used in modern medicine. We know also that the Health Ministry,—if we ask them to give us information—has precious little information about them. Therefore, when we are told that an electron defraction unit has been completed and the equipment is now being set up, we are interested to know and are also entitled to know, although we are laymen and although we do not have any claims to have equal knowledge with the Prime Minister, as to what further uses it will be put. I shall again refer to the report on the Biology, Medical and Health Group and the research made in respect of it. Here I find that four subjects are listed. No doubt all the four are important. Here we do not know what is India's position today in the application of the therapy in which radio-active isotopes are used in medicine. These subjects do not give us any indication, nor do we get idea as to which institutions are being tried for the use of these isotopes. Maybe it is a very difficult process, but when we know for certain that such killing diseases like cancer or malignant tumour can be cured or at least cures can be attempted by the use of radio-active isotopes, we must be told in the annual report about it. It must not be of a routine character and we should be told that these are the works which have been done.

Taking the report as a whole, just now the Prime Minister said that we are having about 600 scientists. I was

trying to find out before he spoke how many scientists are there. I am glad that he has at least given the information. But in regard to this very important matter of survey and prospecting for atomic minerals as they are called, we find that a very brief survey has been made. The report says:

".....a brief exploration of the submarine deposits near the Kerala coast and the lake bottom deposits in the adjacent terrain was undertaken. This preliminary survey has indicated additional resources of valuable minerals in the same assemblage as present in the beach sands."

For a long time, we know that at a particular place in Kerala they have these beach sands being washed at regular intervals by tidal flow. It must be that somewhere in the Indian Ocean there must be deposits; I do not know. But considering the importance of that, and when we are told that a very brief exploration has already revealed that there are other deposits of these minerals, is it not also necessary for us to know the character of the brief exploration which has already been made? Could we not be taken into confidence and told that these are the indications? Like that, there are several other points which I will not have the time to discuss here.

But I want to make one point and that is about one of the organisations under the administrative control of the atomic energy department dealing with the mineral sands industry. Here the Prime Minister who answered some of my questions earlier in the session has given us some information which is very revealing. You know that in order to develop the activities in this direction, that Government of India in partnership with the Government of the then State of Travancore-Cochin floated a private limited company. From one of the answers of the Prime Minister, I find that in the first eight months of the new company functioning under the aegis of the Government of India, the production has gone down. The production of

ilmenite, for example, in the eight months in the year preceding the year in which the Government of India took over, was 80,000 tons while in the eight months of the year of the Government of India's taking over, the production came down to 52,000 tons.

Not merely that. We also find that production in respect of monazite was confined to one plant. It happens to be in my constituency and even if I do not have any intimate knowledge of the working of the atomic energy establishment, I must claim that I have some intimate knowledge of the working of these factories. There in the Travancore Minerals Plants No. 1 and No. 2, I am very sorry that the Prime Minister was made to say in answer to a question of mine that the production of monazite has been dispensed with in one plant because it is not situated at an advantageous position. These two production units are not even half a mile apart and the sands are from the same source. Yet the Prime Minister was made to say that. As reported in the Press, the Prime Minister is expected to go to Kerala some time this month and he is visiting an establishment within a mile of this place. I would very much like him to see this factory. He is made to say that because of the particular locational situation of the factory, they are not recovering Monazite which is wrong. I shall be glad if he will make some enquiry into this matter.

There is another thing which is very revealing. I find from the report that the Government of India are considering the production of Zirconium. There is a scheme for that. I do not know whether the site has been decided upon, but I find at page 10 it is said:

"The question of setting up a plant for large scale production of Zirconium is under consideration."

From an analysis of the beach sands as given by the Prime Minister himself in answer to a question of mine on 11th February this year, I find that Ilmenite is 60 to 75 per cent and Monazite is 3 to 4 per cent. This is the composition of the beach sands of

[Shri V. P. Nayar]

Kerala: Ilmenite 60-75 per cent; Monazite 3-4 per cent; Zircon 3 per cent; Rutile 5-5 per cent; Silliminite 7 per cent and Garnet 1/3 per cent. This is the result of the analysis. We know that Rutile is not now being taken to the capacity of the plant and in regard to Zirconium there has been no attempt. When we consider the setting up of a production unit for Zirconium, as I find from the report, I very earnestly request the Prime Minister to consider whether it is not advantageous to have the factory along with the Travancore Mineral Concern, for the simple reason that we may not have to go in for producing Zirconium from unknown sources. It may be a by-product in the factory which takes Monazite and Ilmenite and which also takes them from sands which consist of about 3 per cent of Zirconium. So, I would earnestly request the Prime Minister to consider whether the factory could not be located there.

I want to say that my visits to the factory have given me the impression that all is not well with the management of the factory. I am very sorry to say that I do not know how a private limited company owned by Government could keep the proceedings of the directors' meeting as a secret even from this House, because I have been told that this is probably offending one of the sections of the company law. Even then, when two Governments come into partnership with no private agency with them, I feel that in a matter like the recovery of atomic minerals, even such information ought to be given to the House. I do not know how the Chief Administrative Officer has been appointed. I do not know what experience he has had in managing such factories. If I may be permitted to say to the House, my experience with him, I am very sorry to say, is that he has had little knowledge of any of these factories. It is natural also. But this officer and the other officers, when they are appointed on better considerations; not

merely on some experience in some factories. When this a very technical matter, I find that the entire management of the factories has been left to him by the orders of the Board of Directors.

Therefore, I would like the hon. Prime Minister to look into this aspect also and give us some idea. We have been told at the time when this company was constituted that the Government of India have plans for their development. But what we have known from actual experience of at least the first year of its working is, or what it would suggest to us is, that the working has not shown any efficiency. On the other hand, the production, may be owing to many reasons, has definitely gone down and the same system of trading in Ilmenite continues. I have been told that the ordinary price which is now realised for Monazite is about £ 4-10-0 to £ 5. I do not know whether this is a competitive price or not, because I find that throughout the world, our Ilmenite is bought only by two firms, namely, du Pont and National Lead. One year the du Pont buys it and the National Lead keeps away; the next year the National Lead buys it and du Pont keeps away. There seems to be some monopoly over the purchase of our Ilmenite. I do not know whether this is the proper price. It will help not merely the Government of India, but it will also help the Kerala Government if we can find a better price for this.

Also, in the matter of surveys I would request the Government of India to kindly let us know some more details. I do not want to take the time of the House any further by discussing the prospect of power being produced from atomic energy. I think that such subjects will have to be reserved for a future occasion. I would also request you that at least from next year in the matter of discussing this very important subject the House should be given some more time so that some of us who are interested, although we are laymen, could give some more suggestions.

however valueless they may be; from among them Government will certainly get one or two suggestions.

Shri Viswanatha Reddy (Rajampet): The Prime Minister, while making his statement this morning has adequately answered some of the critics who still hold the view that India need not have embarked on this programme of atomic energy utilisation.

Shri Naushir Bharucha (East Khadesh): Who holds that view?

Shri Viswanatha Reddy: I will certainly tell you. It will certainly be interesting to reveal that only a few weeks back when I was having a private conversation with one of the foreign diplomats in Delhi, he confronted me with a rather amusing question whether it is not a costly luxury for India to embark upon this atomic energy programme. There are certain other people in our country too, although not in this House, who hold similar views. The answer to these people is two-fold. Firstly, we are not embarking on a programme of building weapons of destruction by atomic energy. Secondly, we realise that atomic energy has got a great future, the peaceful utilisation of atomic energy has got a great future. This realisation has been expressed in the resolution of the Government on scientific policy. If I may be allowed to quote that particular sentence in this resolution, on page 2 of the resolution, it is stated:

"Science has developed at an ever-increasing pace since the beginning of the century so that the gap between the advanced and backward countries has widened more and more. It is only by adopting the most vigorous measures and by putting forward our utmost effort into the development of science that we can bridge the gap. It is an inherent obligation of a great country like India with its traditions of scholarship and original thinking and its great cultural heritage to participate fully in the march of science, which is probably mankind's greatest enterprise today."

This statement will particularly apply to the utilisation of atomic energy. Therefore, I need not elaborate on this point much longer. Suffice it to say that those who hold the view that atomic energy need not be pursued in this country will find themselves in a hopeless minority, at least in our country.

Shri Nayar has said something about the utilisation of isotopes and other articles that are produced by the reactors. I need not go into the details within the limited time allotted to me. I would confine my remarks to the power potential through atomic energy. Before I do so, I should like to express my very great appreciation and complete agreement with what the Prime Minister told us this morning, namely, that it is of utmost importance for us to build up a scientific base by way of training technical personnel, by way of doing fundamental research in atomic energy and so on, before we embark on a particular programme of development or utilisation of this power.

In this connection, may I submit to the House the procedure that is followed in the United Kingdom for the purpose of training the scientists in atomic energy. Here I might also say that the organisational set-up of our Atomic Energy Commission is almost similar to that of the United Kingdom. I think that is a very good arrangement and I should think that in respect of the establishment or institution for the training of scientists also, the arrangement found in U.K. should be followed here.

In U.K. in Harwell there is what is called a reactor school. In this school are taken students from Universities. Engineers and science graduates are taken and given intensive training for a period of fourteen weeks, not only in theory but also in the practical application of the theoretical knowledge that they have acquired. Also, in Calder Hall, where the first atomic power station was set up, there is a school which gives training to these youngmen sent from

[Shri Viswanatha Heddy]

industries, universities, hospitals and so on. Such a system should be followed in our Trombay establishment. There should be a school which is capable of giving intensive training for a short period to scientists who have got a theoretical background of atomic energy.

Now we find from the Report that has been given to us that there has been an increasing utilisation of the products of the reactor, both by the industry, medicine, agriculture, biology and so on. It is very gratifying to know that we are obliged to have a third shift also in our reactor Apsara in order to meet the demands that are made on this reactor. Shortly we are going to have two more reactors, which would be useful in doing fundamental research and also in producing certain products. These reactors should be fully utilized by having a training establishment attached to this reactor and I hope before long the Atomic Energy Commission would take a decision to pursue this procedure with some vigour.

I was making a reference to the production of power through atomic energy. I was hoping that the Prime Minister would announce to this House this morning that a decision has been taken regarding the setting up of a power station at Trombay or at some other place. In the Report we are told that the Government is still considering this question and they have not yet been able to come to a decision. We have read also what Dr. Bhabha had to say about the atomic power stations. He has made a statement in Dublin recently. He gave us a very interesting talk on the subject in the Central Hall here where he conclusively proved the utility of power stations in our country, with particular reference to the conditions in our country. Since those arguments are very valid and convincing, I do not see why there should be so much of delay in taking a decision. Dr. Bhabha told us that if we take a decision today, we might in five years' time be able to set up a power station. Therefore, the time

lag is quite considerable between the decision and the actual setting up of the power station. I hope Government will be able to come to a decision very soon.

I would like to refer again to the position in the United Kingdom with regard to the development of power through atomic energy. As I have submitted to the House already, Calder Hall power station was the first atomic power station in the world. The experience of the Calder Hall power station has shown one thing to the authorities in the United Kingdom. It has proved conclusively that although this particular power station at that time was supposed to have been a very efficiently designed one, within these eighteen months it has already become out of date with the result that they are already constructing a power station in the U.K. on the northern coast of Scotland at a place called Dounreay where the efficiency of operation of the power station is supposed to be hundred times more than that of Calder Hall, i.e., whereas in Calder Hall one ton of uranium fuel produces heat equivalent to ten thousand tons of coal, this other power station at Dounreay with one ton of uranium fuel will produce heat equivalent to one million tons of coal. Already within a period of eighteen months there has been a great deal of development and improvement in the designing of these power stations. I am sure by the time we are able to set up our first power station, it is quite possible that other developments might take place and a more efficient design of power stations would have been discovered. Even so, it is not a loss for us to take an early decision and set up a power station.

According to the U.K. Report on the peaceful uses of atomic energy, they have programmed to set up nineteen power stations by 1985. They hope to produce nearly 15% of the power consumption in 1985 through atomic power stations, i.e., the U.K. Commission has very well realised the importance of these atomic power stations.

We have only to follow suit and we should make a very vigorous attempt with regard to these power stations.

I would like to say one word again about these power stations. The designing of these power stations and reactors should be based on our own experience although we might take the experience of other countries also into account. The experience of our own reactors constitutes the fundamental side of our research in this direction. Each country has to design its own reactor taking into account the availability of atomic fuel, the availability of a particular type of moderator and also the heat exchangers and so on. I am sure that in our Trombay establishment research in this direction is taking place keeping in view the availability of raw materials etc. in our own country. Before long, I am sure, through the efforts of our young scientists we would have designed a particular reactor which should be most suitable to our country.

In the U.K. already the ZETA reactor, which is based on the fusion of the nucleus, is being experimented upon. It is expected that before very long a power station may be built based on this principle of fusion. Now if this becomes successful—and they expect to succeed in the matter of five or six years or at the most ten years—then the amount of power that can be produced, and cheap power at that, is enormous and we would have been well on our way to produce power which would be cheaper than the power produced even in the conventional stations.

While speaking on power I might make another submission also. It might be that in the beginning the cost of power produced in atomic power stations might be much higher than in the conventional stations. In that case, we can equalise the rates on the basis of supply of this power to the national grid system. We can equalise the rate by an increase in the rates of power available in the hydro-electric and other power stations and a decrease in the

rate of power from these atomic power stations. That is the principle adopted in Andhra State where a complete grid between hydro-electric stations and thermal power stations has been formed and, as you know, thermal power is much costlier than hydro-electric power. The Andhra Government thought of reducing the rates of thermal-electric power and slightly increasing the rates of hydro-electric power, i.e., equalise the rate all over the State.

Shri Ranga (Tenali): We can subsidise it from national resources also.

Shri Viswanatha Reddy: But this is a much easier thing to do because the burden placed on hydro-electric power is very much less. I do not know. I am just making this suggestion for whatever it is worth and I hope it should be pursued.

Now I would like to make a reference to the liaison committees that are formed in the U.K. We do not have any such committee in our country. The Government, in its Scientific Policy Resolution, has again stated in the concluding paragraph the necessity of associating scientists in policy making. I may quote these words:

"The Government of India have decided to pursue and accomplish these aims by offering good conditions of service to scientists and according them an honoured position, by associating scientists with the formulation of policies, and by taking such other measures as may be deemed necessary from time to time."

I think so far no practical shape has been given to this declaration. I might make a reference again to the position as it exists today in the United Kingdom, where there is a committee consisting of scientists as well as policy-makers so that the scientists may give their experiences to the policy-makers and the policy-makers may also understand the point of view of the scientists. This committee has been in existence in England since 1939. It has been

[Shri Viswanatha Reddy]

reconstituted again and made more broadbased in 1956.

"Membership in 1956 comprised 173 Members of Parliament and representatives of 100 scientific and technological institutions. The aims and objects of the committee are:

- (1) To provide Members of Parliament with authoritative scientific information from time to time in connection with the debates;
- (2) To bring to the notice of Members of Parliament and Government Departments the results of scientific research and technical development which bear upon questions of current public interest;
- (3) To arrange for suitable action through parliamentary channels wherever necessary to ensure that proper regard is had for the scientific point of view; etc. etc."

I need not go into further details of this proposition. Such a committee, if established here which would consist of Members of Parliament as well as scientists and also people belonging to the universities and other scientific institutions, would be a very good base for the propagation of scientific ideas in our country and also for the shaping of proper policy with particular reference to atomic energy. Also in industry England is in a very fortunate position, naturally because it is very much advanced in industry. Today in England industry is in a position to manufacture not only reactors but also atomic power plants and supply to any country in the world which is prepared to pay for it. In our country such a possibility might be only a very distant possibility. However, to whatever uses the tracers and the isotopes can be put in industry can be made available to the industry. They are made available but the difficulty of the industry is that the liaison between the Trombay establishment and the industry is, I think, not well planned.

I think some efforts should also be made in that direction to create liaison between the industry and the Trombay establishment.

Finally, may I say with gratification that during last year's debate on this subject several hon. Members, particularly Shri S. V. Ramaswami, who was then a private Member, made a suggestion that private prospectors should be encouraged in trying to find atomic minerals. This year's report reveals a very good development in this direction. Several facilities are given to private prospectors in discovering atomic minerals, analysis of ores etc., and I am sure these facilities will continue to be given to these private prospectors, so that our available resources of atomic minerals might be discovered at a very early date and we may be in a position to set up a large number of power stations in a short period.

Mr. Speaker: Shri Goray. I also propose to call Shri Naushir Bharucha and Dr. Sushila Nayar.

Shri Goray (Poona): Mr. Speaker, Sir, those of us who have read the history of the last War written by Churchill and recollect that how on a particular night in 1945, Sir Winston was called away from a Potsdam dinner and was shown a communication from President Truman saying that the baby was born safely, would agree with me that this baby was not an ordinary human baby, but was a force, a new energy of incredible and incalculable potentialities.

The world as it were was thrust on to a threshold of a new era, an era perhaps of total and terrible destruction, or of reconstruction of the whole world. So far as the other nations who were foremost in the use of atomic weapons are concerned, nations like Russia, U.S.A., U.K. and France, they have not as yet eachways the use of atom for purposes of

But India certainly has committed herself to a policy of peace, because, as this report says, when our Prime Minister inaugurated the Atomic Energy establishment at Trombay in 1957 he had said that whatever might happen, whatever the circumstances, we shall never use atomic energy for evil purposes. With this commitment in view, let us try to understand what we have been doing for the last ten years.

In 1948 we had made a small beginning, and after a lapse of ten years we have constituted an Atomic Energy Commission. The immediate tasks that confront this Commission are to devise ways and means by which the fuel shortage in this country can be made up. Sir, this fuel shortage was mentioned by the late Dr. Saha in words that are pregnant with meaning. He said that India is facing along with other countries an energy famine. Now it is worthwhile trying to understand what the Atomic Energy Commission is doing to relieve us of this energy famine.

A few days back we had a very illuminating talk by Dr. Bhaba and in this talk he told us that though we are inclined to think that we have enough of coal, enough of oil and enough of hydro-electric power, the facts were the other way about. The same note was struck by Dr. Bhaba when he spoke in 1957 in Dublin. Sir, the shortage of electricity is so acute that we find our plans to electrify the railways from Calcutta to the stations near about the centres of the core of our Plan stalled and perhaps after all in spite of our efforts to save the core of the Plan, it will be very difficult for us to provide transport. Therefore, it becomes necessary to find out ways and means of overcoming this shortage.

In the United Kingdom we find that they have fixed a target of 5 million K.W. of energy in the next ten years. I have no figures from the U.S.A. and other countries, but I am quite sure that aware as they are of the rapidly depleting resources of power which according to their scientists will be

completely exhausted within the next one hundred or one hundred and fifty years, they also must be making great efforts in that direction. Here in this report we find that all that we have succeeded in doing so far is to set up one small reactor in Trombay. The other reactor, the Canada-India reactor, is lagging behind schedule; the third reactor the Zerlina is in the stage of blue-prints. I think that is not a very encouraging picture.

Of course, the first reactor that we have in Bombay bears a very romantic name, Apsara, and I hope the other two reactors also will be given names equally romantic. But what we are concerned with is that we should aim at the early achievement of some target which will give us hope that if we run short of other sources of energy, of fuel, of electricity or coal, we will have something to fall back on. Therefore I would urge upon the Government and upon the Atomic Energy Commission to make the best possible efforts, maximum efforts, to find out ways and means of producing electricity and power with a view to relieving us of this famine of energy.

Sir, in this report I find that so many other uses of atomic energy have been mentioned. But beyond mentioning these uses nothing concrete has been told to us. We have been told that atomic energy is useful in agriculture, in metallurgy, in medicine and in so many other fields. But how far we have proceeded along those lines, how far we have been successful in making use of atomic energy, we are not told. I agree with the Prime Minister when he says that we are all laymen, but even laymen should be told what is happening. Some of us may eventually gather sufficient knowledge and information to participate in these debates with more information, with more knowledge, with more insight and interest.

Sir, I think that while we are launching on a big programme of atomic energy, it will be worth-while to chalk out some policy even now as regards the relations that would exist

[Shri Goray]

in days to come between the private industry and the Atomic Energy Commission.

I have got a report of the hearings before the Joint Committee of the Congress in the U.S.A. You will find that they have had detailed discussions about the relations that should exist between the Atomic Energy Commission and private industry. They have said that up to December 1955, about 802 private enterprises had asked for access to information and they were given access permits. Of course, in our country where industry is still in its infancy, there will not be many firms or many enterprises which would be in a position to make use of this knowledge. But, I suppose that we should have some policy laid down just now. We should anticipate what will happen after five or ten years. From now on, we should be alert in laying down some policy that would govern our relations with the private or public sectors.

In the Constitution of the Atomic Energy Commission, defining the powers of the Chairman, it is said in clause (b) that the Chairman shall have power to overrule the other Members of the Commission except that the Member of Finance and Administration shall have the right to ask that any financial matter in which he does not agree with the Chairman, be referred to the Prime Minister and the Finance Minister. I somehow feel that too much power is being given to the Chairman. Why should he have the power to overrule the other Members of the Commission, I fail to understand. Because, the Members of the Commission, I suppose, will be people who have knowledge, who have efficiency and who have been appointed Members because they deserve to be members. Therefore, I think that clause (b) of section 6 concentrates too much power in the hands of the Chairman and though at present we have a brilliant scientist like Dr. Bhabha in the Chair, I do not think that for all time

to come, this sort of a clause should be there.

In his talk to the Members of Parliament, the late Dr. Saha had pointed out that in the United States Atomic Energy Act, section 22 (b) lays down that no Member of the Commission shall engage in any business, vocation or employment other than that of serving as a Member of the Commission. Dr. Saha went on to remark that it is well known that none of the Members of the Indian Atomic Energy Commission has been a whole-time man and each one of them has at least one whole-time job in addition to other part-time jobs of a serious nature. I do not know how far the same is true today. But, I think this is a good warning. If this Constitution of the Atomic Energy Commission is going to be followed by an Act, I would submit that some provision of this nature should be made a part of that Act.

Shri Joachim Alva: (Kanara): What is the remedy when the Chairman disagrees with the other Members of the Commission? Whose voice prevails? Is it like the Cabinet?

Shri Goray: The majority voice should prevail.

The last point that I would like to dwell on is this. In this report, it has been said with some pride, which of course, is understandable, that when Dr. Bhabha addressed the world Atomic Energy conference in Geneva in August, 1955, he made a public reference to the possibility of obtaining power for peaceful purposes from fusion reaction. This is something for which we should be proud. But, what Dr. Bhabha pointed out, most probably, was taken up by the U.K. and as my hon. friend just now pointed out and not by us. It is U.K. which is going ahead with fusion reaction. We are sticking to fission reaction. If Dr. Bhabhar has understood how fusion reaction also could be harnessed, we should not lag behind other countries in harnessing that power. How far that is possible at the stage at which we are working today, I do not know. But, when a

problem has been understood and grasped and he had the courage to state it, I suppose, we in our country also should make every attempt to take advantage of that.

I thank the Atomic Energy Commission and the Minister in-charge of that for keeping India abreast of modern times. One of our drawbacks throughout the ages has been that we have always been negligent so far as science was concerned, whether it was pure science or applied science. I hope that, with the creation of the Atomic Energy Commission, we shall never again lag behind other countries.

Mention was made of China. In China, I do not know what they are doing about atomic energy. They seem to be silent over it. So far as China is concerned, it is known that their coal resources are about 25 times our coal resources. While we have got 60 million tons of coal, they have got 1500 billion tons of coal. Situated as they are, with that peculiar political system being there, I won't be surprised if China were to announce to the world that they have manufactured an atom bomb. That is not impossible. Therefore, let us not feel that we are the only nation amongst the undeveloped nations of the world to have progressed so far as atomic energy is concerned. There may be other nations, we do not know. Therefore, the best policy would be to catch time by the forelock and go ahead not only with energy from fission reaction, but also energy from fusion reaction.

Mr. Speaker: Shri P. R. Ramakrishnan. I will call hon. Members in the following order: Dr. Sushila Nayar, thereafter Shri Naushir Bharucha.

Shri P. R. Ramakrishnan (Pollachi): Sir, at the outset, I would like to congratulate the hon. Prime Minister for taking directly under him the responsibility of promoting atomic energy research and thus providing the scientists an inspiration.

There were three approaches that were possible for atomic energy development. First, we could have adopted the crash programme as it is called, that was announced by the U.K. in 1955. That involves an effort over the next ten years to achieve a position in which the incremental additional nuclear power plants would constitute a substantial portion of the new generating capacity. The next approach we could have adopted was a passive one, just wait for other countries to develop atomic energy and afterwards follow them. That would only mean that we defer investment of any substantial nature in atomic power development. There is a third approach, which we have adopted, an approach, may I call, the pilot plant phased development. We have taken only pilot plant development before we commit our resources to any full scale reactor programme. This was necessary and I must really congratulate the Prime Minister for the policy decision that he has taken in this regard, because, power development through atomic energy is a very costly business and we could not afford the crash programme that was adopted by the U.K. The hon. Member said that we have lagged behind, and, because of the shortage of power supply in the country we should have gone ahead with the power development as they have done in the United Kingdom, but I think we have made a wise decision in keeping ourselves to the pilot plant scheme.

I must also congratulate the hon. Prime Minister on another policy decision he has made regarding the development of this nuclear energy and keeping this nuclear energy only for peaceful purposes. He made this

[Shri P. R. Ramakrishnan]

remark: "Whatever might happen, whatever the circumstances, we shall never use atomic energy for evil purposes." This is an attitude morally sound, and I hope in future we will, by our moral stature, show the world a way of life that everybody will come to appreciate.

The scientists have painted a rather gloomy picture about the depletion of the fossil fuel in the whole world. In the United States the *per capita* consumption of fuel is about nine tons per annum, and at this rate of consumption it is estimated that within a foreseeable time there will be a depletion of the fossil resources of the whole world. So it has become necessary to develop this atomic energy resources not only to provide power for the power-hungry world, but also to keep up the power civilisation in which we are today.

The coal resources of our country are meagre. It is estimated that 40,000 million tons of coal is available in India. That means about 100 tons per head of the population. Also, our hydro-electric power is very limited. It is estimated that 40 million K.W. only could be generated. That means about 120 million tons of coal, according to Dr. Bhabha. That means only one-third ton *per capita* per annum. Now, he has also made a remark which I shall quote here:

"We, therefore, come to the inescapable conclusion that the reserves of hydro-electric power and conventional fuels in India are insufficient to enable it to reach a high standard of living comparable even with the present standard of the industrially advanced countries."

So, we have taken up this pilot project in which we have made considerable advance. We should be justifiably proud of the achievement of the first reactor that was built in Asia—the Apsara. It was engineered in the country and it was designed and built

with the collaboration of our industry. We can be very proud of the achievement because at the time this development was taken up, we were not given sufficient knowledge from the outside world and in no way had we been helped in the development of this nuclear reactor.

Just to produce all the materials required for the full atomic programme, we have taken up intensive development of pilot projects. I would like to mention a few. A plant at Alwaye has been designed to produce rare earths of thorium and uranium cakes. A plant has been designed and built to convert uranium salt into reactor grade uranium metal. Also, a small plant has been constructed for the fabrication of fuel elements. A plant for the production of beryllium oxide has also been constructed. So, this is by no means a small achievement, because it is very easy to talk but it is very difficult to promote this work and to see it through.

We have also taken, a policy decision to produce, as the Prime Minister has said, heavy water at Nangal. According to Dr. Bhabha it will be ten to twenty tons per annum. He also adds that the cost of production of this heavy water at Nangal would be probably the lowest in the world—about 20 dollars per pound.

We have also undertaken to produce graphite that could be used probably as a moderator in the refinery in Assam. We have also undertaken to produce zirconium oxide which can be used as a canning material. I do not agree with the hon. Members who say that nothing has been done and that our progress has been very slow.

Shri V. P. Nayar: Who said that? Nobody said that. Why imagine?

Shri P. R. Ramakrishnan: I had the impression from the hon. Member that we could have gone with the same rapid speed of development as the United Kingdom and that we have failed to achieve that rapid development.

In regard to providing technical personnel for the development of the atomic energy scheme, I perfectly agree with the hon. Prime Minister when he said that we should not dissipate our energies by charging the universities with the responsibility of producing results. We have a broad base which we have contemplated at Trombay, and we are doing our best to get all the personnel needed. But I also feel that even though there is a broad-based research base, we should also have feeder bases outside, feeder channels for this atomic power development. For this I would like to suggest that in the colleges where nuclear physics is being taught, some scholarships may be provided for doctorate and post-doctorate degrees. They could have access to Trombay, they could come there and could get whatever information or facilities they would like to get to do this kind of research. They should have access to do this kind of research. I think this would be a very good scheme for getting future scientists, a sort of scout scheme, because our country is very vast, we have very good universities spread out throughout the country and we shall be able to get scientists from all over India instead of trying to recruit them through the U.P.S.C.

There is a policy decision now going to be made about the size of these power units that are going to be built. Because our country is too large, if we could undertake a smaller type of power unit with a capacity of 20 to 30 megawatts, I think it would be most suitable for our country. Of course, in other parts of the world, where industry has advanced to a great extent and where there is tremendous concentration in one particular area, they could think of 200 or 300 megawatt units, but in our country it is necessary that we should develop smaller units, because if we develop bigger units, then we will have to spend a lot of money for the grid system for carrying power to distant areas. So, I think in the

development of these power units we should concentrate on smaller units than on larger units.

I would like to conclude my speech with the remark that Dr. Bhabha has made during one of his speeches that the energy problem of the world would be solved if fission is replaced by fusion.

Dr. Sushila Nayar (Jhansi): I would like to join the other hon. Members in paying a compliment to the Prime Minister for the lead that he has given in encouraging scientific research in the country. And it is in line with that approach that he has taken up the responsibility for atomic research, which is very fortunate for the Atomic Energy Commission and for the furtherance of research in this field. He made mention of the fact that a number of people are being trained, and an elaborate method of selection was followed to select the candidates for such training.

I would like to bring to his attention the fact that for proper training in atomic physics we have to do a good deal to strengthen the basic training in general physics, which at the moment is not what it can be and what it should be. I am sure he is conscious of this as he is the chairman of the Indian Council for Scientific Research also, but I do hope that while efforts are being made for promoting research and training in atomic energy, we will not forget the need for improving the facilities and the training in physics in all our universities, which is the basis on which any further advanced research in atomic energy can be built.

In this connection, I would also like to mention that I was very glad to meet a large number of our Indian students who were being trained in different parts of the world, quite a number in the United States of America in nuclear physics. I do hope that the Prime Minister and the Atomic Energy Commission have given sufficient thought to advanced planning so that as soon as these trainees return to India, their services can be immediately utilised, and they do not suffer

[Dr. Sushila Nayar]

the fate which many other trainees of ours seem to be suffering on their return from advanced training in various fields such as medicine, chemistry and so on; for months and months, they are not able to get a job, and when they get a job, very often, it is not particularly fitted to make use of the specialised training that they had. This is a very specialised subject and a very specialised training that these people are having, and I, for one, would like to say a word of gratitude to all those countries who are taking pains to train these students of ours, and I do hope that we shall make full use of the training that they will come back with.

Mention was made of the radio-active isotopes. I had really stood up to say a word or two on the medical aspects of atomic energy and these radio-active isotopes. Now, it is well known that these radio-active isotopes have revolutionized certain fields of medical research and medical treatment. For instance, in cancer of the thyroid, even when that cancer has spread to other parts of the body in the form of secondary growths, radio-active iodine can reach them and can cure the person of that disease. Similarly, other isotopes have also a very important role to play in diagnosis as well as in certain special treatments, into the details of which I am not going for lack of time and also because it would not be proper.

I want to bring one thing to the notice of the Prime Minister, and that is that it is very necessary that these isotopes are made available and that all the facilities for scientific research and their proper use are made available in suitable medical centres on a regional basis. I hope that if these facilities are made available on a regional basis, they will benefit the people, that is, the patients, as well as they will lead to advancement throughout the country in the field of medical research.

The next point that I would like to mention is the disposal of radio-active waste. The Prime Minister had made it very clear, and we are very happy about it, that India is not at all interested in the destructive uses of atomic energy. However, the fact remains that the disposal of these atomic research plants, that is, the disposal from Trombay is radio-active. I was asked in several countries last year how we were making the discharge from the Trombay works harmless before discharging it into the sea. This is a problem that is facing scientists throughout the world, and I do not know if anybody has found a satisfactory solution. It is, therefore, very important for us to be aware of this fact that at the moment it seems almost impossible to deal with this discharge and remove the harmful effects of the radio-activity that are there. The Prime Minister mentioned something about certain uses that are made, but even after making those uses for certain purposes, for destruction of weevils and so on, the ultimate discharge that is being let into the sea has got sufficient amount of radio-activity, and indeed, to prove harmful and to prove dangerous. And it is in the interests of humanity that so long as we are not able to find a satisfactory way of dealing with the discharge of atomic research plants, even the researches and experiments for peaceful purposes in the field of atomic research should be restricted as far as possible.

Everybody knows the harmful effects of radio-activity. Not only the present generations, but the future generations are mortgaged as a result of the radio-activity. It is, therefore, extremely necessary that we do give utmost attention to research in this field, as to how we can mitigate and counteract the harmful effects of the radio-activity of these discharges in India; and of course, if we are successful, it will no doubt help other people in other parts of the world also.

Shri Banga (Tenali): But have any scientists stated that it is likely to cause such bad effects?

Dr. Sushila Nayar: Of course there are books and books written on it. There is a beautiful book which the hon. Member might refer to, and that is called *No Place to Hide*. It just describes how after you have done research and made use of this atomic energy in any shape or form, it becomes like one of those proverbial *rakshasas*; you just do not know how to get away from it, how to deal with it, how to destroy it, and how to do anything with it.

An Hon. Member: Frankenstein.

Dr. Sushila Nayar: Therefore, the scientists are worried about finding an effective protection against this monster of radio-activity.

We have ourselves made a strong plea against the experimental blowing up of atomic bombs, and we are all very happy that Russia has taken the first step in declaring that they are not going to have these nuclear tests. And we hope the others will follow suit. Why did we do that? We did that because the fall-out from these nuclear tests was filled with radioactive material which was considered dangerous for humanity. Similarly, I wish to point out that the discharges from these research plants are equally dangerous, and equally harmful for the present generation and for the future generations. The Prime Minister has great humanity in his heart. In the name of that humanity, I plead that he takes sufficient care that we do not go ahead increasing atomic research till such time as we have found an effective way to deal with the waste of atomic plants which is today dangerously radio-active.

Shri Naushir Bharucha (East Khandesh): I think by now the House is agreed on the point that on account of the very meagre resources in fuel which this country possesses, it is very necessary to develop the nuclear form of energy. It is also appreciated that if it were possible to exploit one ton of uranium fully—I

emphasise the word 'fully'—it will be equivalent to 2½ million tons of coal. Under the Five Year Plan, we want to have 60 million tons. It would mean that the same work could be done by nearly 25 tons of uranium. Virtually it means from the point of view of the conveyance capacity of railways that you could do the work with one wagon what would otherwise require 3 million wagons.

Therefore, so far as the economics of the production of atomic power is concerned, I do not think there can be two opinions. The hon. Prime Minister has recognised the importance of this subject and has constituted an Atomic Energy Commission. I am of the opinion that in order to emphasise the importance of this subject, it is necessary to have a separate Ministry of Nuclear Energy. Unless we have a separate Ministry of Nuclear Energy, I do not think we will be in a position to take decisions quickly, promptly and on a higher level.

The hon. Prime Minister has referred to some of the cut motions which I have tabled. Perhaps in dealing with a technical subject, one cannot avoid cut motions containing technical terms. But it is very necessary to understand at least the part of the work that the Atomic Energy Establishment is doing, particularly in the physics group, if we are to direct the resources, the very meagre resources, in talent as well as money, that we have placed at the disposal of the Atomic Energy Establishment in the manner most desirable. So far as the physics group is concerned, there are four broad divisions, namely, theoretical physics and applied mathematics, nuclear physics, reactor control division, air monitoring, health physics and electronics division. Just examine in detail—though they are broadly stated terms—the subjects which are being dealt with. What I fear is that our experiment resources are being diffused at a time when it is necessary to rationalise our experiments, to contain them and to focus them on our immediate requirements.

(Shri Naushir Bharucha)

For instance, so far as the reactor physics section is concerned, we are dealing with several subjects like study of the types of reactor, damage to material by radiation, inter-action of neutrons with solids and behaviour of elementary particles. In the case of the neutron physics section, we are dealing with behaviour of neutrons in moderating material, inter-action of low energy neutrons on matter. In nuclear spectroscopy, we are dealing with disintegration of nuclei by beta and gamma emission and study of the emergent spectrum of neutrons from different moderators.

These terms may frighten a layman. But when you examine them, what is it that emerges out of them? I shall presently explain it. First, for instance, the Establishment is studying different types of reactor. If we decide upon a particular type of power reactor, then we must necessarily limit our experimentation with different types of reactors. How many different types there are? May be over a hundred, and we cannot afford to sequester our energy in experimenting with any and every type of reactor. Surely, it is time, therefore, that we must confine our experiments only to certain few types which are immediately necessary for our requirements.

Then take the question of damage to material by radiation and inter-action of neutrons with solids. There are tens of thousands of solids and materials. If we start experimenting with them, there will be a vast field that will be before us and we will be lost in that vast field. We will keep on experimenting and we will not arrive at some practical results.

Take, again, the question of behaviour of neutrons on moderating materials. There are various moderating materials and if we keep on experimenting with them. What will happen is that we will branch out and fan out into various types of experiments without being able to concentrate, focus and pinpoint our experi-

ments to the immediate requirements.

Take also the question of disintegration of nuclei by beta and gamma emission. This is a vast subject in itself—nucleonics. How are you going to experiment with all these things? Of course, so far as the Administration Report is concerned, it simply mentions these vague terms. We do not exactly know what is being done under these heads. If I may say it without meaning any disrespect to the Atomic Energy Department which prepares the Report, it has managed to compress the maximum of words into the minimum of thought. It has said so many things and conveyed so little. What I say is that we require certain specific information. Probably the Prime Minister may think that we are entering into technical details. I can assure you that what I speak here is only with a nodding acquaintance with the science. An average science student knows much more than what I am speaking here. But I think it is due not only to this House and to the hon. Prime Minister, but also to our brilliant band of scientists who are trying to transform our economic condition that one speaks here with more than a nodding acquaintance with this subject.

The point I am making is this—and I want an assurance from the Prime Minister that this point is being looked into—that unless our experiments are focussed and concentrated on particular issues, the tendency in the scientist is to get away and run off at a tangent with experiments. I shall give you a historical illustration on this subject. During World War I, when Mr. Lloyd George wanted a better type of explosive, he set scientists to work on it. And do you think that the scientists produced a better type of explosive? No. They simply fanned out into various experiments on subjects interesting in themselves but not at all connected with the technique of a better explosive, until Dr. Weizman did it and we had the T.N.T.

Therefore, it is no use telling us: 'Do not scientists, who do this work know what they have got to do?' I say it is an inherent tendency in the scientists to run off at a tangent. They are simply so much absorbed in knowledge that they even accumulate a lot of useless knowledge which, for practical purposes, is not quite required at the moment. Therefore, I say that there is need for having rationalisation of experiments and some method whereby we 'contain' experiments and restrict them to our immediate requirements.

I emphasise the fact that we must have a flexible long-term Master Plan. I have looked into the Administration Report and all that we are told is that our objective is the development of atomic energy as a source of atomic power and to promote its use in agriculture, industry, medicine and biology. This is very vague. I shall presently explain why I say so. For instance, if we start in the field of experimentation of radiation on biology subject, we will launch ourselves immediately into the vast field of nuclear medicine. It is such a vast field that all our energy will be dissipated and we will fail to produce what is immediately required. The same thing can be about industry.

Therefore, I would ask the Prime Minister to consider this point. Let us have a long-term Master Plan, a flexible Master Plan, with emphasis on the word 'flexible'. What should that be? Our purpose should be very precisely defined. What has been stated in the Report is not the purpose; this is merely a statement of broad objectives. The purpose and ingredients of the Master Plan should be that we should have atomic energy power stations—I am coming to that in a little more detail presently—then use of nuclear energy for irradiation of seeds and preservation of food by sterilisation with radiation. Then we should have extremely limited uses of radio-isotopes in industry and we must drastically limit our field of research in biology. What is the

reason? The reason is that today our requirement is food. A big quantity of food is wasted in storage and, therefore, if we can use microscopic doses of radiation to sterilise the food so that it is preserved longer, that will be an immediate practical contribution. Therefore, rather have experiments in biology with the objective of finding out how radiation is causing mutations in genes, I would ask the Prime Minister to concentrate on this. I would ask the Prime Minister to concentrate all the energy on irradiation of seeds, seeds which produce better quality of crop which is our immediate requirement. The thing is still in its infancy. Concentrate all your experimental power, your personnel, your finance, all these on these things and you will have immediate results.

With regard to radio-isotopes in industry, of course, there are important uses, neglected for the present. Our industry is very crude too, very elementary; our industrialisation stage is small and you do not require these things right now. Do not waste your energy on this.

Dr. Sushila Nayar mentioned the use of radio-iodine in medicine. Of course, to a certain extent, you may have to experiment on this. But the vast field that opens up nuclear medicine has got to be set aside and postponed until we have satisfied our immediate requirements.

So, I will give one other illustration. We are spending lakhs of rupees in building high altitude cosmic rays research station at Gulmarg. Why? Because at higher altitudes, you get the cosmic rays in more or less their pristine purity. The atmosphere of the earth prevents the cosmic rays from coming to the earth in their pristine purity. As a result, you cannot study them effectively.

Now, very probably, the plan for high altitude Cosmic Ray Research Station was developed at a time when the Sputniks were not thought of. The principle is that the higher you go, the intensity of cosmic rays in-

[Shri Naushir Bharucha]

creases sharply, it also changes with the magnetic latitudes. But, apart from that, today's Sputniks and Explorers will give you such important and full data on cosmic rays that 20 of your stations at Gulmarg will not give. Therefore, I am asking whether it is worthwhile going full force ahead with your Cosmic Ray Research Station at high altitudes because what is the altitude at Ka-hmir? It is only 12,000 ft. In balloons experiments have been carried out at 30 kilometers where the cosmic radiation is 100 times more powerful. What you are going to get is only 3 or 5 times more powerful at 12,000 ft. And the detailed data that you will get from the Sputniks and Explorers will be still more instructive. Therefore, the question is whether you should not rationalise our programme.

I am not blaming the scientists for that because nobody can foresee technical developments which suddenly make certain things out of date. But, now that we have seen it, should we not lay emphasis on exchange of information rather than on experimenting and finding out for ourselves by trial and error method and at the expense of so much money? I think these are points which require to be closely looked into.

I am also aware of the fact that before we take to electricity generated by atomic energy, we have got to take certain decisions on policy. I do not know whether the Atomic Energy Commission has taken them. For instance, in a power reactor, you have got to think of the fuel, the core, the moderator, the control rods, the coolants and the shield. The important thing is about the type of fuel you have got to use; whether you have to use the thorium-based fuel. Has the Atomic Energy Commission considered whether we shall go in for Thorium and adopt Thorium—U 233 cycle or whether you are going in for U 238—Plutonium cycle. The idea is: are we going to make use of the material we have in hand. I wish a decision

on the type of fuel we are going to use is soon taken. That is necessary because until that is done, you cannot design the reactor for electricity generation. Similarly, once that is decided, you have to decide upon the moderator, the type of moderator you are going to have and the type of control rod material you are going to use; and experiments must be confined to these few types only. What I am objecting to is fanning out all over the field of sciences trying to get a knowledge of everything and attempting to having a comprehensive, integrated plan. That should not be. Our requirements are specific and our resources small.

The last thing is that while we are having our atomic power plants, let us not design them by the dozens. It simply cannot be done because I will tell you why. By the time we have our first power plant, it will be nearly 1962. And the experiments that are being conducted at Harwell on ZETA—Zero Energy Thermonuclear Assembly—have proceeded so far that the prophecy of Dr. Bhabha that it will take 20 years to get power from controlled fusion will to an extent be shortened—I would not be surprised if it is by 5 years. U.K. has been experimenting on it for the last 10 years already. Probably, Russia has been experimenting since 1952. It is conceivable that the remaining 10 years may be compressed into 5 so that by the time we have our first reactor on fission basis, it would be out-of-date. Therefore, we have to think of this point whether we are going to have too many reactors or what. Our policy must be definite. Therefore, I said that our Master-Plan should be flexible. (Interruption.)

There are many more matters on which I wanted to speak. But, I would like to conclude as my time is up, by telling the hon. Prime Minister that the cut motions have been tabled, not with the object of censuring any Department because we are convinced

that the work that is being done is being done under circumstances in which only brilliant scientists can function; but it is to focus the attention of Government and focus the attention of the Atomic Energy Commission to the fact that these are the points which exercise our mind (*Interruption*).

I hope, Sir, these points will be taken under consideration.

Shri Jawaharlal Nehru: Mr. Speaker, I shall endeavour to reply in brief the points raised. The last speaker made a suggestion that there should be a separate Ministry for Nuclear Research, so that decisions may be taken quickly and at a higher level. Broadly speaking, I do not know any higher level here than Government and the Prime Minister and I do not know how the creation of a Ministry would expedite any decision or make working more easy. As a matter of fact, it was with this very purpose—that the work of this Atomic Energy Department should not get tied up in the normal routine of Government that the Prime Minister here, and sometimes in other countries also, has directly taken charge of this. So, I can assure Shri Bharucha that whatever other failings may be there in this Department, it does not suffer, as other Ministries often suffer from delay. Things are done pretty fast.

Secondly, Shri Bharucha laid great stress on not wasting our energy in collecting useless knowledge or in experimenting about all manner of things, but said that we should rather concentrate on special objects of enquiry which might prove useful.

To begin with we do necessarily concentrate; we cannot help it. But, when Shri Bharucha refers to useless knowledge, I think, he is on some dangerous ground. There is always the same argument usually between scientists and non-scientists, industrialists and others as to what is useless knowledge and what is not, what is pure science and what is applied

science. Everything in applied science would normally come out with some research in pure science. You cannot divide these. Anyhow the fact is that we do concentrate on specific things.

But some of the matters he referred to are research in biology or medicine or other things. That type of research is not primarily the work of the Atomic Energy Department. The Atomic Energy Department produces the isotopes, equipment etc. for it. And, this research should take place in a hundred establishments in India wherever it can be, in hospitals, in agricultural institutions etc. So, that is the place.

I entirely agree with Shri Bharcha that tremendous field for research is open and should take place. The Atomic Energy Department will help in supplying the isotopes and the equipment which they are making. But, I may add that in addition to this, although it is not in a sense the primary work of the Atomic Energy Establishments, as a matter of fact they do research work in these very fields which Shri Bharucha mentioned, whether it is agriculture or biology. They do it and they will continue to do the same but they cannot spread themselves out over all this. It should really be done by a host of people all over the country in other establishments. Now someone asked—was it Shri Nayar, I do not know—about the Government taking a policy decision about the construction of power station. In a sense, the Government has taken a policy decision but it is naturally subject to two or three factors: the feasibility of it and the finances. It is not that we shall do this on this particular date. We have taken this decision and we intend to do it and will certainly do it. The exact date, the location, the feasibility have all to be considered in terms of other factors.

Dr. Sushila Nayar warned us about the disposal of waste. I want to assure her that so far as Trombay is concerned, there is no waste of that type.

[Shri Jawaharlal Nehru]

The criteria laid down for the future are so strict that I am informed that there will not be the slightest risk. Indeed one tends rather to take extra measures of safety. I am told that the water that comes out of this after all this is so treated that it is, broadly speaking, less radio-active than the normal amount of radio-activity in the water we drink. The amount of precautions taken is very great indeed. It is said that the workers engaged in nuclear research work and such other industries are better protected than probably in any other industry in the world.

One of the hon. Members said something about the scholarships. No doubt, the Atomic Energy Establishment is thinking of providing scholarships for nuclear engineering at the Roorkee University. This might be done elsewhere too later on.

We have at present in Trombay a group working on the design of a power reactor of 10-20 M.W. with beryllium oxide as a moderator. We are also considering making a strong effort on research for fusion reaction. We have not quite started on it but this will depend on a number of factors and if we feel that from researches on this we are likely to get fruitful results, we may take it up.

Then there were many suggestions made about consulting others. Our Atomic Energy Establishment is connected, or its chief scientists are connected with a large number of establishments in India. There are many liaison committees and the like. They are connected with the universities. I shall certainly be happy if this connection grows.

An hon. Member suggested, I think, some kind of a Committee of Members of Parliament. Well, I am not myself quite sure of what a Committee of Members of Parliament as such will do in this matter. But I can assure the House that any Member of Parliament who wants to dis-

cuss this matter alone or in a group can certainly do so. We shall be very happy to arrange for this whenever an occasion offers.

Secondly, a complaint has been made that enough information has not been supplied. It is rather difficult to know what type of information might be supplied. I may inform the House that Dr. Bhabha and I were discussing this very subject as to what should be put in this pamphlet for the House. We had to draw the line somewhere in the sense that it should not be too technical. Some hon. Members of the House may certainly understand all the technical implications but it was not meant for an isolated Member but to every one. I told Dr. Bhabha: "Please do not make it too technical. Otherwise it will be above the knowledge of many Members." Even the Member in-charge might get into difficulties. It is not because one wants to keep anything secret. There is no secret about it so far as we are concerned. But there is the difficulty about the technical aspect. Shri Bharucha, having made some special study, no doubt understands much more than many others. Anyhow, I shall be very happy to provide any kind of information that is in our power.

Shri Nayar said something about the production having gone down in the plants in Kerala. Apart from the fact that the previous production was of all the three plants, the third plant is still not functioning. There has been much difficulty because of this. A bit of the old Madras State went to Kerala and that bit of old Madras had one of these plants. Even now, after a year's effort, there is no full agreement between the Madras and Kerala. The Madras Government, the Kerala Government and the Atomic Energy Establishment about the new set-up, as to who should provide the additional director and what should be the shares of each Government. I think that we are now on our way to an agree-

ment. Dr. Bhabha visited Trivandrum for this purpose. So, this has created some difficulties in settling down. I believe that sometime in the past there was also a strike which made a difference.

Previously it was in the old Travancore-Cochin State. One part having gone to Madras, that Government naturally wants its own share in this thing, in the directorate and in the finances.

There is one thing more which I may mention. The recent developments have shown the cost of producing power.

I am informed that in view of these developments it is expected that the cost of power from atomic stations would be round-about 2.6 nP per unit of electricity, which, I believe, is much lower than the cost of generation of electricity from thermal stations in most parts of India not near the coal fields. If we are to take part in these developments in future, I think it is necessary to set up at least one atomic power station, to begin with, working on natural uranium. After that we can go on to other processes. It is expected, if we start soon, that the first atomic power station might go into operation in 1962.

Mr. Speaker: The hon. Members have desired that all cut motions, except cut motion No. 956 should be treated as moved. I shall treat all the cut motions except cut motion No. 956 as moved subject to their being otherwise admissible. The numbers are:

1517, 1518, 1519, 1520, 1521,
1522, 1523, 1524, 1525, 1526, 1532,
1533, 1534, 1535, 1536, 1537, 506,
507.

Need to furnish fuller information to Parliament regarding International Atomic Energy Agency.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to "contain" and rationalise research programme relating to reactor physics, neutron physics, nuclear spectroscopy, health physics, etc.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to go slow with High Altitude Cosmic Rays Research Station at Gulmarg in view of fuller data likely to be available from Sputniks and Explorers.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Disposal of nuclear "wastes" from the Apsara.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to construct or procure from abroad a cyclotron for research and training at Trombay.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Delay in the construction of Canada-India N.R.X. Reactor.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to lay basis of a sound indigenous electronics industry.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need for expediting Heavy Water Projects.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to organise research on the lines of "ZETA" (Zero Energy Thermo-nuclear Assembly) Experiments at Harwell, U.K.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to expedite construction and to procure basic requirements of an Atomic Power Plant.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to place Atomic Energy Commission on a statutory basis.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need for comprehensive legislation for regulation, development and control of radio-active minerals and use of radio-isotopes.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need for preparation of a flexible long-range Master Plan on development of nuclear energy.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need to place exploration and prospecting of radio-active minerals on broader basis.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need for preparing documentary films, explaining atomic structure, fission, reactors, uses of radio isotopes, etc.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Need for fuller information in the Administrative Report of the Atomic Energy Department for the Year 1957-58.

Shri Naushir Bharucha: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Absence of co-ordination in the atomic research works of different institutions.

Shri Ghosal: I beg to move:

That the demand under the head Department of Atomic Energy Research be reduced by Rs. 100.

Need to provide necessary expense to modernise and, run the nuclear research work in the Science College at Calcutta.

Shri Ghosal: I beg to move:

That the demand under the head Department of Atomic Energy be reduced by Rs. 100.

Mr. Speaker: Now, I shall put all the cut motions to the vote of the House.

The cut motions were put and negatived.

Mr. Speaker: The question is:

"That the respective sums not exceeding the amounts shown in the fourth column of the Order Paper, be granted to the President, to complete the sums necessary to defray the charges that will come in course of payment during the year ending the 31st day of March, 1959, in respect of the heads of demands entered in the second column thereof against Demand Nos.—99, 100 and 137 relating to the Department of Atomic Energy.

The motion was adopted.

(The Motions for Demands for Grants which were adopted by the Lok Sabha are reproduced below—Ed.)

DEMAND NO. 99—DEPARTMENT OF ATOMIC ENERGY

"That a sum not exceeding Rs. 8,32,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Department of Atomic Energy'".

DEMAND NO. 100—ATOMIC ENERGY RESEARCH

"That a sum not exceeding Rs. 3,03,23,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Atomic Energy Research'".

DEMAND NO. 137—CAPITAL OUTLAY OF THE DEPARTMENT OF ATOMIC ENERGY

"That a sum not exceeding Rs. 4,75,75,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Capital Outlay of the Department of Atomic Energy'".

MINISTRY OF REHABILITATION

Mr. Speaker: The House will now take up discussion and voting on Demands Nos. 78, 79 and 127 relating to the Ministry of Rehabilitation for which 5 hours have been allotted.

Hon. Members desirous of moving cut motions may hand over at the Table within 15 minutes the numbers of the selected cut motions.

Hon. Members are already aware of the time-limit for speeches.

Motion moved:—

DEMAND NO. 78—MINISTRY OF REHABILITATION

"That a sum not exceeding Rs. 37,08,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Ministry of Rehabilitation'".

DEMAND NO. 79—EXPENDITURE ON DISPLACED PERSONS AND MINORITIES

"That a sum not exceeding Rs. 18,77,56,000 be granted to the President to complete the sum necessary to defray the charges which will come in course of payment during the year ending the 31st day of March, 1959, in respect of 'Expenditure on Displaced Persons and Minorities'".