



UNITED NATIONS
GENERAL
ASSEMBLY



LIMITED

A/C.1/PV.774 /5
31 October 1955

ENGLISH

Tenth Session

VERBATIM RECORD OF THE SEVEN HUNDRED AND SEVENTY-FOURTH MEETING

Held at Headquarters, New York,
on Monday, 31 October 1955, at 3 p.m.

Chairman:

Sir Leslie MUNRO

(New Zealand)

Effects of atomic radiation [59] (continued)

- (a) Co-ordination of information relating to the effects of atomic radiation upon human health and safety
- (b) Dissemination of information on the effects of atomic radiation and on the effects of experimental explosions of thermo-nuclear bombs.

A statement was made by:

Mr. Krishna Menon

(India)

Note:

The Official Record of this meeting, i.e., the summary record, will appear in mimeographed form under the symbol A/C.1/SR.774. Delegations may submit corrections to the summary record for incorporation in the final version which will appear in a printed volume.

EFFECTS OF ATOMIC RADIATION [Agenda item 59]:

(a) CO-ORDINATION OF INFORMATION RELATING TO THE EFFECTS OF ATOMIC RADIATION

UPON HUMAN HEALTH AND SAFETY

(b) DISSEMINATION OF INFORMATION ON THE EFFECTS OF ATOMIC RADIATION AND ON THE

EFFECTS OF EXPERIMENTAL EXPLOSIONS OF THERMO-NUCLEAR BOMBS

Mr. Krishna MENON (India): As one of the sponsors of the item before the Committee and the sole sponsor originally of sub-item (b), my delegation has a responsibility to contribute to the opening of the debate. We have invited the Committee to consider the problem and, therefore, it behoves us to try and place before the Committee such information, such concerns, such hopes and ideas as we may have in this matter. We spent nearly three weeks discussing the peaceful uses of atomic energy, and the problems that we are about to discuss are not only closely related, but follow from the uses of atomic energy, peaceful or otherwise.

But, first, as in the previous item, the wording on the agenda enables us to treat this matter in a three-fold way. First of all, there is the main heading "Effects of atomic radiation". Here, at the very beginning of my observations, I want to make the position of my country clear. We did not say "Effects of atomic radiation on human beings". We did not say "Effects of atomic radiation", because in this unknown field of knowledge, on these uncharted seas of discovery, we do not sufficiently know what its effects are upon man's environment, and, believing as we do that man is partly a creature of his environment, it is necessary for us to take a wider view of this than merely approaching it from the point of view of human wealth and welfare.

Therefore, in the discussions that will take place in this Committee and in any contribution we make towards its decision, we will seek to widen the scope of the discussion and the conclusions to which we come.

The first part of the item deals with the co-ordination of information, and this was dealt with by my colleague from the United States this morning. We are happy that during the course of the few months that have followed since the inscription of this item on the agenda there has been much coming together of the sponsors of the two different items, and I am not without hope that it will be possible to place before this Committee a resolution or a series of conclusions which are generally acceptable.

(Mr. Krishna Menon, India)

Here we are not dealing with one of the problems of the cold war. We are indeed dealing with a fate of humanity that might result from the new discoveries of the atomic age, and I hope I will be pardoned if I once again repeat what I said before. We must be able with our hearts and minds and with our spirit to approach the problems of tomorrow in the context that things have changed radically, as radically or even more radically today from the industrial age as from the pastoral or feudal age to the industrial age. This is the background of the approach we make to this problem, and I should like to inform this Committee that our concern in this matter is nothing new. As early as 2 April last year, my Prime Minister speaking in Parliament in India made certain proposals which at that time were closely related to the experiments with the hydrogen and atomic bombs. Perhaps this is an occasion to make an initial observation, that while we would have to deal with the effects of explosions of war weapons and also the relation of the preparation of atomic wars, this item is not exhausted by that consideration. Its theme is atomic radiation, But since I cannot alter the text of the statement, I will read it out as it stood at that time.

The Prime Minister asked the world:

"... for full publicity by those principally concerned in the production of these weapons and by the United Nations of the extent of destructive power and known effects" -- that is important -- "of these weapons, and also adequate indication of the extent of the unknown but probable effects. Informed world public opinion is in our view a most effective factor in bringing about the results we desire."

He went on to say:

"The open ocean appears no longer open, except in that those who sail on it for fishing or other legitimate purposes take greater and unknown risks caused by these explosions. It is of great concern to us that Asia and her peoples appear to be always nearer those occurrences and experiments and their fearsome consequences, actual and potential.

(Mr. Krishna Menon, India)

"We do not yet fully know whether the continuing effects of these explosions are carried only by the media of air and water, or whether they subsist in other strata of nature, and how long their effects persist or whether they set up some sort of chain reaction at which some have already hinted.

"We must there endeavour with faith and hope to promote all efforts that seek to bring to a halt this drift to what appears to be the menace of total destruction."

(Mr. Krishna Menon, India)

A/C.1/PV.774
6

AM/gd

With the qualification that I made, the observations I am going to make this afternoon are not concentrated on the atomic weapon, which happens to be one of the radiation sources. I think that that is our position. A few days later, on 8 April 1954, my Government communicated to the Secretary-General, for circulation to the Disarmament Commission, the same proposals. Paragraph 5 of that communication dated 8 April 1954, document DC/44, drew attention to the following:

"The Government of India further submits with confidence that the

widespread concern the world over and the various suggestions made, should presently receive active study and consideration by the Commission."

In paragraph 5, the communication went on to say:

"The Government of India also consider informed world opinion as to

known and unknown but probable effects and particular implications of the

explosion of these weapons of mass destruction are an important and perhaps

a decisive factor in the solution of the problem to which the Commission is

addressing itself."

In July of that year, under your presidency, Mr. Chairman, we had the

opportunity to raise the matter again in another body, and from that it will be

obvious that my Government is concerned in drawing the attention of this Organization

and all its organs, at whatever reasonable and relevant opportunities, to the

consequences of atomic radiation.

In discussing the explosions in the Pacific Islands, we referred to the

consequences of these explosions and its effect upon the Japanese fishermen, Japan

being a country that is not represented here and therefore for whom we have a

double responsibility.

We said that Japanese fishing ships and their crews have been affected by this action. We noticed that twenty-eight Americans and 256 Marshall Islanders who were 175 miles away and who were thought perfectly safe, were exposed to atomic radiation.

As a matter of discussion, may I say that we know very much more about this now, thanks to the releases made by the United States Atomic Energy Commission. In this matter the opinion of the United States must be emphasized. At that time, in the Trusteeship Council, I quoted the observations made by the Senator of the United States, Mr. Mansfield, who said:

"The average person does not realize the vast power of these weapons, but the most recent tests have brought the consequences a little closer home. The 1 March hydrogen explosion of the Marshall Islands surpassed the expectations of the United States scientists who devised it. Three hundred and seventy-nine Americans, natives and Japanese fishermen were exposed to radiation in this blast. The explosion was from 600 to 700 times greater than that of the atomic bomb that killed 60,000 persons at Hiroshima in World War II."

The fourth occasion on which we brought this to your attention was on 26 October 1954 when, speaking in this Committee on the same problem, we drew attention to the consequences of atomic explosions. At that time I quoted a distinguished British scientist, Professor Adrian, who went on to say:

"We must face the possibility that repeated atomic explosions will lead to a degree of general radioactivity which no one can tolerate or escape." (A/C.1/PV.700, paragraph 70)

That is a scientific statement, and it was supported from another part of the world, the United States of America, where Professor Szilard of the University of Chicago stated that 400 one-ton deuterium-cobalt bombs would release enough radioactivity to extinguish all life on earth. A fine prospect.

This matter came up for review, as was stated this morning by the representative of Sweden, before the representatives of twenty-eight countries of the Asian and the African conference. And before that meeting my Prime Minister, in his capacity of the representative of India, made the following statement:

(Mr. Krishna Menon, India)

A/C.1/PV.774

AM/ed

(Mr. Krishna Menon, India)

"It is desirable that a full study be made about the way radioactivity from tests of nuclear and thermonuclear weapons spreads through the atmosphere and in the waters of the ocean. A proper study of this problem will require collaboration on a world-wide basis. A study, however, in the countries of the Asian and African region can be begun so as to keep a continuous watch on radioactivity at different widely dispersed places on the earth's surface.

"For this purpose, a chain of stations should be established running right across Asia from Africa and the middle eastern countries to Australia and New Zealand and to Japan. Such stations would supply very useful information. This work can be done by all the countries concerned in collaboration with each other. It might be possible for standard equipment to be supplied and some workers trained in countries in this region where there are such facilities for equipment and training."

The meeting agreed with the proposals of the Indian representative.

This Bandung statement is an indication that we were not approaching this

from the point of view of partisan agitation. We were approaching it from the

point of view of making a constructive contribution, and such limited facilities

and observation of radioactivity as we have -- which are not nearly so limited as

may be imagined -- we were prepared to place at the disposal of the countries that

were represented at that conference. But we knew at that time, and we know now,

that the observation on radioactivity, the evaluation of the results, and any

conclusion that we can come to, cannot be limited either by geographical, political,

ideological or other barriers. We are dealing with a phenomenon on this universe,

and indeed if it should be necessary to observe other planets in this universe, we

would have to do so. I am not enough of a scientist to understand this. But if

it were true that in order to observe this phenomenon we had to have contact with

or to observe other planets, we could not say: this planet has not signed the

Charter of the United Nations and therefore we will not observe them there. This

is purely an objective, scientific proposition.

Then this was followed by world-wide opinion, and here I think it is fitting

to pay tribute to Lord Russell, and to the late Professor Einstein who contributed

so much to atomic science and who at the end of his life drew the attention of

this world to the fact that it should take steps towards evaluating the consequences

of atomic radiation.

This has been followed recently by a more sustained effort, particularly in the United States of America. The National Academy of Sciences of the United States of America, on 8 April 1955, made the following statement:

"The National Academy of Sciences will undertake a broad appraisal of present knowledge about the effects of atomic radiation on living organisms and will seek to identify questions upon which further intensive research is urgently needed."

This was announced by Dr. Bronk, president of the National Academy.

Then there is a quotation concerning the statement of the Federation of

American Scientists which reads:

"A United Nations study of how much the atomic and hydrogen bomb tests may be poisoning the world's atmosphere was urged yesterday by the Federation of American Scientists. One aim would be to determine a possible safety limit for the present and the protection of the future generations.

"The United Nations might go on, the Federation suggested, to set up a continuous monitoring service" -- and I would like to repeat the phrase "The United Nations might go on, the Federation suggested, to set up a continuous monitoring service" -- "to detect bomb tests and limit the number each year or specify essential precautions.

"The Federation comprises about 2,000 scientists and engineers, more than half of whom have worked in atomic fields."

The statement concluded:

"However, it should be clear that future accelerated H-bomb test programmes by several atomic powers will ultimately reach a level which can be shown to be a serious threat to the genetic safety of all people of the world."

Professor Kemp, the head of the Copenhagen Institute of Genetics, said on 15 August of this year:

"I think it is important to do something about this as soon as possible because if you do not control this radiation the consequences may be serious."

(Mr. Krishna Menon, India)

This background of authority is required for this purpose because after all we are laymen and here is scientific authority. I want to say here and now that scientific opinion on this matter is divided not in the sense that radiation does not cause harmful effects but in the sense that some people consider that we can take it. Some scientists have one view of its consequences while others have another view. After having read a large number of papers on this subject and after having tried to understand them as best as one could -- because though it is assumed to be written in English, it is written in scientific language -- I found that the general run of this comment is that beyond a certain limit there are consequences.

So far, my observations have to a certain extent tended to be biased in the direction of the consequences of the bombs. But it would be a great mistake if the Assembly took the view that the bombs were the only concern that we had. As I said during the last debate, we are entering a new era of a technical revolution. In that technical revolution, we are going to use radioactivity. In fact, we are already using it in many fields. We are using it in the field of medicine where, unless the consequences of radiation are known, its evil effects, if they are evil effects, will be visited not only on the person receiving radiation but also on his progeny and for many generations to come.

It is not my business during the course of these observations to go into great detail about the field of medicine. We are not against the use of isotopes. We believe that to be a part of the march of progress. But when we use new techniques, it is our duty to look into the consequences and to have the necessary protection in regard to them.

Radiation has been a problem for a long time in the field of medicine ever since the X-ray began to be used. With this controversy and the attention that has been drawn to the evil effects of radiation, we are being told by scientists like Mr. Libby that the medical profession ought to take more care with regard to the exposure of individuals to X-ray radiation itself. Isotopes are used in this way and they are also used for therapy purposes. It is necessary to find out, however, if the effects of these are communicable. If they are communicable, then it is a problem that affects the race as a whole; and if it affects the race as a whole, it affects humanity as a whole.

The next field in which we are beginning to use atomic energy and its products -- and in which we hope we will use it in increasing measure -- is agriculture. There are large parts of the world where the population is growing in size. At the end of this century, the population of the world will approach the mark of four thousand millions; that is to say, if we increase only moderately, the destruction of pests and diseases will become necessary. On that scale, the use of tracers and other atomic devices in order to deal with pests would become a commonplace. That means that we would be using this energy on a wide scale far beyond the limits of our immediate control. These are not test-tube experiments any more. These are things we release into the atmosphere over which we have no control afterwards.

Similarly, we are using in agriculture atomic knowledge and devices for the better use of fertilizers, to find out how they work and also for the nourishment of plants. We are using them to study the metabolism in plants. We are also using them in animal husbandry and thereby communicating to living organisms radioactivity, the consequences of which we must be able to assess. It is a commonplace that all over the world we are trying, for example, to keep milk free from tuberculosis. If it is necessary to see that there is no contamination from tuberculosis, it is equally necessary to see that there is no contamination from radiation.

We are also using high-speed beams for various purposes in this way and in the manufacture of drugs and other medical expansion. In this connexion, an American scientist, Mr. Lapp, has said that the possibility cannot be ruled out that the radiation technique involves the possibility that the subjects may be carcinogenic, which means subject to cancer.

These are statements which are made by scientists and, like others, they may tend to be in error. But there are so many of them in the world. Fortunately, there is a certain amount of information enhanced by the position reached at Geneva so that the conflict and variety of opinion that is issued will cancel each other out. For the purposes of this debate, however, all we have to establish is a prima facie case that the consequences of these things can be far-reaching. They can be of great use to humanity and equally with that use they carry certain consequences.

(Mr. Krishna Menon, India)

(Mr. Krishna Menon, India)

Atomic energy is also used in industry. We discussed a great deal the use of atomic energy for power. In the last debate, we also referred to the use of isotopes. But it is perhaps not so much known that in the manufacture of steel and plastics and rubber, various kinds of radioactive elements -- radio-phosphorus, radio-sulphur and radio-carbon -- are used. This has certain consequences which, to a certain extent, go into the economic field. In the earlier days of the industrial revolution, after a hard struggle on the part of the working people, the efforts of philanthropists and as a consequence of the advance of knowledge, protection was very slowly introduced against industrial diseases. Even today, those provisions are very limited. If a miner suffers from silicosis or a person who works in a match factory suffers from phosphorus poisoning or a person who works in a paint factory from lead poisoning, they suffer from occupational diseases that can arise from the use of these things for industrial purposes.

No observation that I have made will be taken, I hope, in the sense that we should stop progress because there are risks and dangers. We must go along the path of progress. But part of going along the path of progress is to make provision against the evil consequences which may be by-products of the progress of events. That is a constructive part -- that is to say, we should study radiation not merely from its consequences with respect to the atomic bomb or the hydrogen bomb which, at the present moment, are possessed only by three nations in the world, we are told, These bombs are a problem which has other implications and will be dealt with in other places. But there is no doubt that we are to consider other sources of radiation here. But these other uses I have mentioned -- the medical, the industrial, the agricultural and the purely scientific ones -- they also are sources of radiation which can affect humanity.

We come to the destructive parts of this: that is, the use of atomic energy for war and for the preparation for war. Secondly, there are the accidents that arise in the use of atomic energy on this large scale or the consequences of carelessness that there may be. Here, also, our problem in this Committee is the radioactivity that is released, whether it be by experimental explosions, by atomic war, or by the carelessness of those people

MA/mlw

A/C.1/PV.774
14-15

(Mr. Krishna Menon, India)

who handle radioactive materials or by the risks that are taken. It is no secret that scientists themselves have said more than once in recent times that they have miscalculated the consequences of widespread explosions. If that is so, we have to take those consequences into account.

Finally, I should like to refer to the psychological consequences in this part of my observations. There is little doubt that in spite of the reassuring articles and statements that have been made, in spite of the horrible details that have been spread, there is on the whole, in the minds of people all over the world, a feeling that new energies are being released which may have consequences for themselves. In the absence of reassurance, in the absence of scientific pursuit of these matters and the kind of evaluation which we hope the United Nations will be able to make, the effect is to create a situation of neurosis. Whenever there is a heavy rain or storm people say that it is due to atomic radiation, but no one says on a fine day that that is also due to radiation. That is the nature of humanity. Therefore, this is also due to radiation. That is the nature of humanity. Therefore, this psychological consequence has to be taken into account and the psychologists of war and fear is as important to us as any decisions we make on the limitation of arms or anything of that character. The harmony of society arises from a comparative degree of confidence not only in each other, but also because circumstances surrounding us indicates that we will not be visited with ominous consequences. There are of great importance. The effects of radiation in these fields now have to be considered, and I will deal with the most difficult ones last. First of all, in the field of industrial expansion reference was made in the last debate to the disposal of atomic wastes. This is one of those fields where we may not perhaps accurately argue by an analogy but we can understand by an analogy. We are all familiar with the problem of oil in the seas, of how the emptying of oil wastes into the sea has become a great international problem. In every community we speak about the smoke nuisance. It is admitted that now there will be atomic and radioactive wastes. How is it to be prevented, how is it to be used, how is it to be disposed of without danger to humanity? This is one of the problems which any organization to be set up by the United Nations as a whole should consider because that disposal, just as in a more primitive community the throwing of undesirable waste on another man's field or compound is regarded as a nuisance, creates a similar problem. Now it will be a nuisance for the whole world.

(Mr. Krishna Menon, India)

I read in the one of the numerous papers that have been circulated that

there was a proposal to create burial grounds for atomic wastes, that is to say, to collect atomic wastes in containers and then bury them someplace.

I think that there is a reasonable chance ^{of} that being acceptable provided

the world decides to renounce war. But if you have large burial grounds of

atomic wastes, and we are still in a position of the world being balanced

upon the imbalance of power, then you have a situation where a burial ground

would be a reservoir of calamity. That is, these burial grounds, if they

were ever subjected to aerial attack by someone else, would at once release

sufficient radioactivity to destroy not only that part of the world but to

wherever it carries. Indeed it is conceivable that these burial grounds may,

just as factories are today, become the target of enemy attack. Factories

are the targets of enemy attack because it is thought that this will paralyse

the enemy country, both in its industrial and war efforts. Similarly,

the warlords of the time, if there was war and we were not able to renounce

it, would regard these burial grounds which are the reservoirs of these

radioactive products as targets of attack.

Then there is a second suggestion of emptying of these wastes into the sea.

As my Prime Minister said, we have heard of the open ocean, but in the present

circumstances the ocean is not nearly so open apparently because it is very

largely governed by the distribution and equilibrium of power in the world.

I think that internationally there should be some standards and some

understanding as to what radioactive wastes can be emptied into the sea because,

while the radioactivity in the sea is regarded by scientists as being very low,

as I shall point out in an abstract I will read out later, even the explosions

that have taken place have affected this radioactivity very considerably.

What we are to consider in all these matters, more than anything else,

is the prospect and the possibility of communicability. If radioactivity,

as it visits a particular individual, is communicable to another generation, then

we have set up what corresponds to a chain reaction.

This morning, my colleague from the United States, Mr. Wadsworth, quite

rightly referred to the fact that there already was radioactivity in the world.

It is quite true that radioactivity takes place in our systems. There is plenty

(Mr. Krishna Menon, India)

of radioactivity in the world arising from granite rocks, from the impact of cosmic rays especially if we are higher up. Here is something interesting. The carbon in your bodies is naturally radioactive, that is, there is enough radioactive carbon so that fifteen atoms disintegrate every minute for each gram of carbon. In this disintegration a certain amount of energy is released which can be described in R units. Similarly, the largest source of radioactivity in the human body is potassium. It gives 1,800 disintegrations per minute per gram to form calcium and 180 disintegrations per minute to form argon -- in other words 1,980 disintegrations per minute. It is quite true that there is plenty of radioactivity in the world from granite rocks, from cosmic rays, from carbon in the body and from everything else. But, if I may say so, it is very bad logic to argue that because there is radioactivity in the world we can put in more unmeasured radioactivity in the world. I was taught in school as a child that each of us carries fifteen pounds of atmospheric pressure for every square inch, so we are carrying 500 or 400 pounds of weight on our shoulders; some of us feel we may be carrying more. Because we are carrying 550 or 400 pounds of atmospheric pressure, it does not mean that it would be right for everybody to carry another 50 pounds on top of what we already carry. Thus the fact that there is a natural norm in this matter does not alter the other situation. Therefore, the argument that there is natural radioactivity in the world is of assistance to us because some of the great genetic changes are induced by this radioactivity. The action of radioactivity in the body is that it disintegrates molecules in the system. But we are now told that this disintegration itself constitutes a change, but possibly just as important is that the disintegration products themselves may have effects. Thus, it seems that the field that opens out is fantastic, that is to say, the field in which radioactive molecules in our systems are disintegrated. Scientists tell us that the end product of this disintegration may itself lead to disintegration, which sounds very much like a chain reaction. Only scientists can tell us what all this means.

(Mr. Krishna Menon, India)

A/C.1/PV.774
18

DR/dk

29

I come now to the more important aspects of this chain so far as it concerns us as a civilized race. If I may so, without being philosophical about it, the difference between a civilized community -- if you prefer, the difference between mankind -- and lower orders, so called, of creation is that a civilized community or humanity, even in its lowest levels, cares about posterity; that is to say, actions are so conditioned -- sometimes by intelligent anticipation, otherwise by various other social circumstances -- so as to provide that the race continues, and provision is made for it. Man is imaginative as compared to those who are merely moved by instinct. Therefore, in the next few minutes I should like to deal with this question of the possible genetic consequences. No one can speak on these matters with any dogmatism because scientists differ one from the other, but the differences are largely in regard to quantity and not with regard to the thing itself. First of all, therefore, let me speak a little more about the nature of radioactivity. Reference has been made in the United States to a fall-out. There is a radioactive fall-out which falls out of the atmosphere after the explosion of a nuclear weapon. I suppose there can be other kinds of fall-outs when there is vast industrial use of atomic power, even without the explosion of a nuclear weapon. I do not know. For example, we can take one of the smaller baby bombs that exploded at Hiroshima which was supposed to be equal to 20,000 tons of TNT. It covered 7,000 square miles which was made unsafe for human habitation. According to the Atomic Energy Commission of the United States, exposure to twenty-five Roentgen units over the entire body for a short time produces temporary changes in the blood. A similar exposure at the rate of 100 R units would produce radiation sickness. An exposure of 450 R is fatal to half of those who receive it. Larger doses are more often fatal. Very large doses are inevitably fatal.

(Mr. Krishna Menon, India)

In this connexion it is important for us to realize that the scientific calculations of what is fatal, or what is a medium dose or what is harmful and so on vary very much. I just read out to you the statement of the Atomic Energy Commission referring to 100 r units as being dangerous. That is this year; but five years ago the United States Atomic Energy Commission put out a publication called "The Effects of Atomic Weapons", which was prepared in co-operation with the United States Department of Defense. According to that, the lethal dose is supposed to be 600, the medium dose 400 and the moderate dose from 100 to 500. If today anybody said that 100 to 500 was a moderate dose, no scientist would accept it.

I point this out merely to show that the knowledge that we have of these things is very elementary and, therefore, as Mr. Bhabha has said to us in this Committee, it is necessary that we regard as the proper margin of safety

something in the neighbourhood of one tenth of the dose generally accepted as the margin of safety. It is interesting that, even in this 1950 table, after the third week the results of all this -- not of the first one, because the first one is a rather liberal dose -- will finish you up in the second week if you last so long, but in regard to the two others all the consequences are very much the same after the second week, finally ending in either rapid

emaciation and death or a very unlikely recovery.

I refer to the bombs, merely because data is available for them. I do not want this discussion to be tied up on the question of the rightness or wrongness of experimental explosions. That is another matter; it is a related matter, but not what I am talking about. In the ordinary atomic bomb, for the equivalent of each 27,000 tons of TNT there is about two pounds of radioactive substance, and out of this two pounds of radioactive substance there are 90 species. I mention the 90 species because we shall come to one of the unpleasant species later on. This radioactive substance is carried by the explosion into the air and is deposited and, so far as all this writing is concerned, we are told it circulates the earth, so that neither ideology nor politics nor the fact that

countries have signed the Charter will be of any assistance. It goes all around the world.

(Mr. Krishna Menon, India)

However, it would be a great mistake to console ourselves with this small quantity of two pounds, because into the stem of the explosion is drawn other material, not radioactive but surface-covered by radioactive material. Therefore, as far as the harmful effects are concerned, though the thing itself is not radioactive, it is rendered surface-radioactive, and therefore there are large quantities of radioactive material floating about in the air.

There is a tendency nowadays in some countries, when they are reproached about these problems, to point out that all this trouble arises because we explode the bombs on the surface of the earth and therefore we shall do one of two things: either we shall explode these bombs 500 feet from the surface of the earth, so that the earth's surface is not affected, or we shall go deep down into the sea. I hope some day we shall have some idea as to who should use the bottom of the sea without permission of the others, but at any rate the problem is that in any underwater explosions of this kind we have to take another factor into account.

There are inhabitants of the sea which form the food of a great number of the populations of the world. If the earth gets radioactive, so does the sea, as will soon be seen from a statement by one of the leading American scientists, to which we shall refer in a moment.

"It is difficult", says Dr. Libby, "to predict in advance exactly what fraction of the radioactivity the bomb produces will fall near the test site as compared to the fraction falling at great distances..."

"The extent to which the radioactive fall-out is spread, is determined, of course, by the winds..."

If there is one thing we are not sure of, it is the wind; it may blow in any direction. The genetic consequences of this are among the things to which we should give a great deal of attention. If the Committee will forgive me, I should like to draw its attention to two or three documents, which are not private. I am not using any document that has not been published. There are documents that have not been published which will probably throw more light on these matters. I should like the Committee's attention to be drawn briefly to documents A/CONF.8/P/234, A/CONF.8/P/235 and A/CONF.8/P/449 of the Geneva Conference on the Peaceful Uses of Atomic Energy, in case anybody wishes to follow them.

Dr. Muller, who is one of the leading authorities in the world on genetics, says:

"The changes in the genetic constitution produced by ionizing radiation may for convenience be classified into two major groups, namely, chromosome aberrations and point mutations.

"The chromosome aberrations consist of losses and additions of whole chromosomes or chromosome parts and/or alterations, called structural changes, in the alignment of chromosome parts."

From our point of view these are not so serious as the point mutations. "Structural changes are caused by the breakage of one or more chromosomes at two or more points, followed by the junction of the fragments at their broken ends, so as to form a new arrangement..."

But the real subject to which we have to give our attention is point mutations:

"Among the genetic changes induced by exposure to radiation from artificial sources the point mutations are far more frequent and significant than the chromosome aberrations." (A/CONF.8/P/234, pages 1 and 3)

I shall not tax the Committee by reading this document at great length, because it is highly scientific and very technical. What is more, a great part of the evidence is from experiments performed on flies and Drosophila and things of that kind, which are probably not applicable to human beings. As some people have said, they may be useful but they are not applicable.

I wanted therefore only to refer to some parts of the conference document A/CONF.8/P/234, referring to the Hiroshima event. It states:

"At least one induced point mutation per offspring, on the average, for each 220 r of exposure to both parents. From this it is evident that many of the children who were conceived by Hiroshima survivors at any time after their exposure must have contained one or more mutations induced by the radiation. Similarly, children conceived by parents both of whom have been exposed to the so-called 'permissible dose' ... for as long as fifteen years would on the average contain at least one induced mutation." (A/CONF.8/P/234, pages 13 and 14)

(Mr. Krishna Menon, India)

He then refers to further researches made by American scientists:

"The recent study of Macht and Lawrence gives direct evidence of genetic damage in such cases and is in this respect superior to the studies made in Japan. Moreover, studies of Moeller et al show that the population in general is already receiving" -- this is what Mr. Wadsworth said this morning -- "significant amounts of radiation from medical diagnoses. Sonnenblick finds that exposures of this kind are seldom adequately controlled." (A/CONF.8/P.234, page 14)

Finally, I should like to refer to some of the concluding paragraphs of Dr. Muller's paper which was communicated to the Conference. He says:

"All these questions need to be not only discussed but actually investigated" -- this is the plea we are making before the Committee -- "far more realistically than they have been in the past. Otherwise we may at last find ourselves, genetically, facing a parallel to already accomplished deforestation and erosion, on an even grander scale. This problem is not only one that is concerned with the possible aftermaths of atomic war. It must be faced equally by the proponents of peace if we are to have an atomic age, with its risks of prolonged 'permissible' exposures arising from industrial uses and radioactive waste products." (Ibid., pages 16 and 17)

Here I think we ought to give some attention to what Dr. Muller has said about deforestation. In my own country we have been cutting down trees for the last 4,000 years. We have made many fertile lands into deserts; we have helped to alter the climate of the world to our disadvantage. When humanity was not so civilized, we cut down these trees without considering the consequences. Now we shall be doing much the same thing, only on a different scale, if we do not use our increased wisdom and knowledge for this purpose.

But let me come to Dr. Muller's conclusion:

"This subject of protection of human beings against the genetic damage produced by radiation must, until suitable policies are established, far overshadow in its importance that of the utilization of radiation in the genetic improvement, for human purposes, of organisms potentially useful to man, or in the elimination or reduction of noxious organisms. However, these constructive uses of radiation in 'biological engineering' will come increasingly to the fore as the more menacing aspects of radiation are brought under control. There is already abundant evidence of the possibility of such beneficial applications on a considerable scale. At the same time, the dangerous mistake should not be made of considering man as a species who would himself undergo a long-term benefit from the application of radiation to his germ plasma. His own reproductive material is his most invaluable, irreplaceable possession. It is already subject to an amount of variation which, in relation to his present reproductive practices, borders on the excessive. Under these circumstances, man's first concern in dealing with radiation must be his own protection." (A/CONF.8/P/234, page 17)

No doubt there is a considerable difference of opinion on this question. In the United States and in the United Kingdom, the more or less official school of thought slants in the way of suggesting that what is now being done is not harmful. It is not the business of my delegation to suggest, even less to imply for a moment, that the scientist is not stating his opinions owing to political reasons. But I am advised by the advisors of the Government of India to make one or two points in connexion with what has been said on this question.

Sir John Cockcroft, in his statement before the British Parliament, to which reference was made this morning by the representative of Sweden, pointed out that the present effects of the explosions are negligible. He said:

"How small this is can be judged from the fact that natural sources of radiation in the ground, cosmic rays and the natural radioactivity of the human body give us each a dose of 5 r. over a generation of thirty years, and that in some parts of the world - such as Tibet - where the cosmic ray

(Mr. Krishna Menon, India)

(Mr. Krishna Menon, India)

bombardment is more intense, the dose goes up to 5 r. without any very obvious effects. So our additional dose from bombs so far exploded is something like a thousand times less than our natural dose." But Sir John Cockcroft goes on to say that: "...from the bombs exploded so far the radiation dose received by most of us, shielded by houses and offices, will be less than 0.005 r. per generation. We are therefore several thousand times below Dr. Muller's maximum level and our additional dose from bombs so far exploded is perhaps a thousand times less than the dose we received from natural sources."

I have read out statements because I think that we in the Committee ought to hear both sides of this question. The advisors of my Government first of all would like me to put forward the views which they have in their own mind in regard to this particular statement. I also want to set out alongside the statement of Sir John Cockcroft, the statement of the French scientist, Dr. Charles Noel-Martin, to the Paris Academy of Sciences. I am not sure that he is a French scientist -- he might be British. The statement reads:

"Other harmful effects of test explosions have been suggested in a recent communication by M. Charles Noel-Martin to the Paris Academy of Sciences. He suggested that a 20-megaton bomb could form 500,000 tons of nitrous oxide gas, leading to production of nitric acid and a harmful increase in the acidity of rain water. He also stated that a ground explosion of this magnitude would send up 1,000 million tons of matter and that this would appreciably diminish the transmission of solar radiation; and that enough radioactive carbon-14 might be formed to increase the natural radiocarbon content of the atmosphere by 10-50 per cent."

Sir John Cockcroft does not agree with this statement, but he does not minimize its importance. He gives us his own conclusions and the results of the experiments at Harwell, as follows:

"American figures for the production of nitric acid by explosions suggest that M. Martin's figure is about ten times too high. The amount produced by thunderstorms every day is likely to be about equal to that for one hydrogen bomb explosion, so this effect cannot be important."

(Mr. Krishna Menon, India)

We cannot stop a thunderstorm, we cannot control it, we cannot regulate it -- but these other uses of radioactivity are man made, and that is where we come into the picture. So far as the United Kingdom is concerned, therefore, Sir John Cockcroft states:

"We have experience from the Krakatos volcano explosion (1883) of a diminution of 10 per cent in the intensity of sunlight at the earth's surface due to the dust thrown into the atmosphere. This has been variously estimated at between 100 million tons and a figure 200 times higher. This great amount of dust had no effect upon the weather. Our own measurements of the amount of additional dust in the atmosphere due to nuclear explosions suggest that it is thirty times lower than M. Noel-Martin's estimates. The effect on solar radiation and weather must therefore be extremely small."

So far as the advisors of the Government of India are concerned, they have no desire to enter into any quantitative argument, except to point out the following: When Sir John Cockcroft speaks about an average of .003 μ . per generation, the assumption is that the distribution of radioactive material in the atmosphere is uniform. But there is no reason to think that that is so. In the remaining part of Sir John Cockcroft's paper reference is made to the effect of the explosion of one thousand of these bombs, which could be easily be harmful. His general conclusions are:

"The level of radioactive contamination in the world produced by all the nuclear bomb explosions and peaceful atomic energy activities is at present so low that it should not cause any anxiety."

That is to say, those are his views at the beginning of this atomic age when we are still thinking in terms of experiments when only perhaps three or four of the countries of the world have the resources with which to produce atomic radiation. Sir John Cockcroft continues:

"The radiation level which would give rise to serious harmful effects is probably at least a thousand times the present level of contamination."

I suppose that is what the people must have said when the first chimneys were put up during the industrial revolution -- "it will all escape in the air" -- and today, in some parts of the world we cannot see the land except for the chimneys. Sir John Conckcroft continues:

(Mr. Krishna Menon, India)

"We do not at present know this figure with any accuracy, and long-term

genetic studies are required to determine this."

That is the part on which to ponder. Even one who takes the view that no harm will

immediately result, basing this view on scientific analysis, states that long-term

genetic studies are required to determine this question. Sir John Cockcroft

continues:

"A committee of the Medical Research Council has been formed to investigate

these problems...."

Sir John Cockcroft, even after what he has said, still asks for investigations

to be made. It is only fair to say that all his countrymen do not share his

views. Some of these reasons are not merely scientific but are based on common

sense. I have here a paper by Professor Halane, one of the leading biologists

of the world. I shall not read the whole of his article because it is too long

and it is very technical. One part of his article states:

"Man may have become adapted to longer generations by reducing mutation-rates;

but he may also have a larger number of mutable genes. On the basis of such

arguments, I suggested that it is quite possible that radiation may account

for most human mutation'. If so, the dose of radiation needed to double the

human mutation-rates is a little more than 5 r. per generation, and not 50 r.

as Cockcroft suggests. In fact, the effect of radiation is about ten times

as serious as he believes."

We have, therefore, two respectable scientists of the same country, both

members of the Royal Society, having differences of opinion on this matter.

Professor Halane then goes on to cite a common-sense reason:

"It is also more serious for another reason. Sir John Cockcroft points

out that since most British people spend most of their time indoors, the

effective dose of radiation received by them is reduced to about a tenth of

the outdoor dose. However, about half the human race is engaged in outdoor

work, and most of the population in such countries as India live in very

flimsy houses. Allowance for this fact raises the expected effect by a

factor of two or three."

I have so far referred to the observations on genetic consequences from Mr. Muller's paper communicated to the Scientific Conference. Now has come to my hand part of an unpublished paper -- it is public property, however, since it has been printed -- in which it is said that the famous Indiana scientist flatly says: "Exposure of one parent to the so-called permissible dose of 0.3 roentgens per week for some fifteen years before reproduction will result in half of his children carrying an induced mutation. This would usually be small in effect and not identifiable, and it would tend to hamper successive descendants until it led to the extinction of its life. It is, therefore, urgently necessary to reconsider our radiation protection policies and our standards of permissible doses now before it becomes too hard to change them. It is to be hoped that military, medical, research, industrial establishments everywhere will be influenced to revise their protection standards so as to bring them into conformity with the facts of general damage." I will not read the remainder of it because there is some relation to domestic politics.

We have also the opinion of Dr. Libby of the United States Atomic Energy Commission, who, while he says that the effects of radiation by these explosions are not harmful, gives us some idea of the quantity of them and says, on 21 October

"Nuclear weapons tests have made the waters of the oceans north of the Equator ten times as radioactive as they were two years ago... But the increase is not dangerous in the slightest degree"

because, he says:

"...the starting base of radioactivity is so tiny that the tenfold increase leaves it still insignificant." (New York Times, 22 October 1955)

But, of course, from a common sense point of view, one may ask, if the radioactivity of the ocean is so low -- it is part of the equilibrium and the balance of nature -- if it is upset to that extent, what follows?

I should not like to leave this subject without going into some other observations made because, to my mind, and in the view of my delegation, far the most important consequences of this are the consequences of occupational hazards in atomic industry and also what we may unwittingly do for future generations. There is an extract somewhere which refers to the fact that it is

(Mr. Krishna Menon, India)

quite true that mutations produce men of genius, but for every man of genius it produces a hundred idiots, and the writer says: "Thumb through the pages of the Encyclopaedia Britannica and no Newtons and others have left any progeny behind". It was the Englishman Sir Ernest Rook Carling who said:

"For the benefit of the human race as a whole in the future

one mutation, which results in an Aristotle, a Leonardo, a Newton,

a Gauss, a Pasteur, or an Einstein, might well outweigh ninety-nine

that lead to mental defectives."

That is to say, one could not dismiss mutations as though they were the plague itself. It is quite true that those who stand head and shoulders above their fellow beings and who make great contributions, according to these geneticists,

are the products of these mutation changes, but here is the long-term mass

value of it to be taken, that for each one of these they might well be outweighed

by ninety-nine that lead to mental deficiencies.

In the Science Newsletter of 22 January 1955 -- again an American publication --

Dr. Sturtevant says:

"If an atomic war raises the atomic radiation around us to even

the amount considered the 'maximum permissible', there would be about

a third of a million infants born in the United States alone each year

that would carry in their germ-cells undesirable characteristics."

That is to say, when we are today discussing radiation, we can never lose sight of

the fact that we are thinking of this in terms of the world that is not disarmed,

which is relying at the present moment on the defence provided by this horrible

weapon -- on what Sir Winston Churchill called "peace by terror". And here we

are told that there will be about one-third of a million infants born in the United

States each year who will carry in their germ cells undesirable characteristics.

I presume that the number of births in the United States may be just over two

million or so, which means that a very considerable proportion of the population

are likely to inherit undesirable characteristics. These affected genes would go

on influencing heredity for generations because this goes on in progression.

Persons defective physically or mentally may result.

the entire population of the world might have significant genetic effects. Of course, it is to be remembered that such a rate is applied to plants are allowed to have a maximum tolerance exposure of 15,000 times "To orient ourselves, the workers in the Atomic Energy Commission Dr. Libby, who says:

group of people is not safe for the whole of the world. And here, again, is also to be remembered that what is regarded as safe in one place or to a selected inquiry which must be made on a basis to which I shall refer in a moment. It is in my opinion, to persuade the Committee that here is a vast field of concern and could quote, but let me say that what has been said so far is sufficient, There are more quotations which one could repeat, more authorities which one world, Dr. Sturtevant said."

germ cells a year in the United States and to about 1,800 a year for the of radiation increase due to fall-out, this would lead to about 78 mutated arises from two germ cells, one per 50,000 conceptions. At present rates mutation per 100,000 germ cells per generation, or, since each individual Dr. Sturtevant said: "It may be expected to give about one deleterious "As for radiation increase due to fall-out at current levels, The Science Newsletter adds:

should take responsibility and make provision. of the increase contained in themselves, is something for which civilization against it, what we may pass on to succeeding generations, with the possibility individual of one generation is bad enough, and society has the duty to ward And I am free to say that while the suffering that may be inflicted on an affect their descendants through genetic damage."

types of hazards, those to the exposed individuals, and those that H-bombs and the widespread use of medical X-rays. There are two "Sources of increased radiation are explosions of A-bombs and to which human populations are being subjected.

state that no hazard exists 'from increases in high-energy radiation of Technology, geneticist, who said he believed 'it is inexcusable to "This was the warning of Dr. A.H. Sturtevant, California Institute The Science Newsletter continued:

(Mr. Krishna Menon, India)

A/C.1/PV.774
33

Rw/bs

view of the United States and ourselves so far as that went at the time. with scientific objectivity and thoroughness." There was no difference in the point the data about the biological and other effects of radiation should be studied merely an aid; it is an absolute necessity... It is, therefore, essential that continuation of civilization and its further development, atomic energy is not working with them... For the attainment of full industrialization and for the "The use of these materials, however, it attended by serious hazards to the persons All we are saying is that the tool should be used in such a way as to be safe. "The use of radioactive materials has presented to the world a powerful new tool..."

It says: refer the Committee to A/2949/Add.1, which sets out our position. I wish at this stage to effects, with such material as we have for assessment. The Government of India has appointed a Commission to study these country. The Government of India has appointed a Commission to study these pretty common in the world. Some work in this field is being done in my being discussed together -- we have had in mind all this knowledge that is now very generous co-operation of the United States in considering them worthy of justify our putting forward this item for consideration -- in which we have the particular subject. Therefore, having referred to all these matters, which I am sorry to say that we have not got very much more material on that

deeply affected by radiation. response actions such as Pavlov's conditioned reflex showed that the brain was aspect. However, Mr. Lebedinsky said that Soviet experiments based on psychic affected by radiation than other body processes. Now we come to the psychological generally assumed in the Western world that the human nervous system was less A Soviet Union authority at the Geneva Conference said that it had been

and creating rocks? This is the problem which we have to face. to civilization? Are we going through the process of cutting down forests, people who may be engaged in this, but what are the consequences to the race, be seized of. We are not concerned merely with the immediate health of the word "immediate", and this is one of those things which the Committee should real hazard to immediate health. Now, the article has put in italics the The line of the argument is that the present tests do not constitute a small fraction of the population is exposed."

However, a small fraction of the population can accept such irradiation with relative safety since the chances of individuals having genes mutated in the same way, marrying, are infinitesimally small if a

(Mr. Krishna Menon, India)

(Mr. Krishna Menon, India)

There was no difference at that time between our point of view and that of the United States. In order to promote resistance to the bad uses of radiation, and in order that people may be prepared and may be enabled to reflect the march of civilization, there must be a sufficiently wide diffusion of this knowledge. A new age requires a new education, and as a child may learn that fire will burn, the human race must learn that radiation may have evil consequences.

There is a marked divergence of opinion among scientists on the long-term consequences of detonating nuclear and thermonuclear bombs for experimental purposes, in particular in regard to the possible genetic effects, but all agree that all nations in the world, and not merely those which conduct the experiments, may suffer from the after-effects of such tests. And this includes the effects from waste products, since highly industrialized countries may simply turn their wastes into the sea.

The Government of India considers that it is essential to set up immediately an international organization which will collect and co-ordinate data on the immediate and long-term consequences of radiation as well as the known effects of experimental explosions of hydrogen or nuclear bombs. That is the reason why we have placed this item on the agenda, our intervention at this stage is based upon our obligation to open the discussion of the subject, along with the United States, which did so this morning. I have said enough to indicate that there is a prima facie case for inquiry. I wish to say without any qualification that we do not desire to see the established committee which will arrive at any predetermined conclusion. We want the truth to lead us where it will. We should not be afraid of it. It is not our desire to create a philosophy or doctrine or volume of scientific opinion which will bolster one thesis or another; in this matter we must have the courage to be led wherever the facts take us. Doubts and concern are widespread, and they are more widespread in parts of the world where knowledge of modern things is comparatively undeveloped and where the media of communication are not as good as they are in other places. Therefore, when we looked at this problem we examined it from the point of view of the world's people.

(Mr. Krishna Menon, India)

I have referred to many aspects of the universal consequences of the use of atomic power and the radiation it produces. That is why we would invite the Committee, or join with anyone who invites the Committee -- as the United States hinted this morning -- to set up an international unit or agency for this purpose. I do not want to confuse the issue or to create complications by giving names, so long as results are obtained; we think that it should be of such a character that it will function and not be an ad hoc committee which will be in a state of suspended animation. It will have work to do which will require day-to-day energy, tact and wisdom, and we therefore think that in any unit which is set up the Secretary-General should have a prominent part, because otherwise there will be no co-ordinating, active agent - in other words, there will be no person who has primary responsibility and concern for it.

Secondly, while the materials collected may be from a national source or from a scientific organization, or even from some brilliant man who knows something about this matter - we dare not turn down any information -- we feel that the evaluation of the material must be international. Although one regrets to say this, our individual sense of values may be to a large extent conditioned by considerations which have no relation to the subject matter. We therefore feel that the evaluation must be such as to give us greatest amount of assurance and guarantee that it is objective. I do not mean to cast any reflection on anybody, but that means that it must be international.

When the data have been assembled and the evaluation has taken place, if there is a difference of opinion among the scientists or whoever may be evaluating the information, that also should be made known to the world. That brings me to the second stage - there should be adequate and appropriate reporting to the General Assembly. I am not suggesting that the General Assembly is a parliament of scientists or a parliament of the world, but it is, as we all know, a forum which at any rate disseminates knowledge.

We come now to the third aspect of this dissemination of information. We feel that within the field in which the new body will seek knowledge, no part of the world should be excluded, because this is not a political issue.

(Mr. Krishna Menon, India)

Bacteria and radiation make no distinction between different places, and if we have certain parts of the world excluded from sending information or certain parts in respect of which the Secretary-General cannot exercise any initiative, that will be a weak link in our chain. I do not think that this draft resolution need cause us any trouble in this matter because we are not setting up an international organization. After all, even in war time there are certain international units, such as the postal systems, which have to function in countries which are at war. We cannot tell radioactive particles that they must not cross the frontier because we do not like the people on the other side of the frontier, so whatever wording is required to ensure universality, irrespective of any other consideration, will have to be introduced.

At the proper time the appropriate committee of the United Nations will have to provide the finances to enable the Secretary-General to carry on this work. In the opinion of my delegation the establishment of this unit and the collection of the information should not be relegated to one of the specialized agencies or to some unit with less responsibility to the United Nations. We do not wish to endow the General Assembly with a function which it should not legitimately have. It is quite true, as was said this morning, that some of the specialized agencies, like the International Labour Organisation, the World Health Organization and perhaps to some extent UNESCO are concerned with the matter, and I myself would like to see the International Labour Organisation give some assessment of the consequences of the atomic revolution on the conditions of the worker in industry, because the protection of the worker is part of the protection of the work. I take the liberty of quoting again from the words of Sir John Cockcroft, who was one of the leading men in Geneva and who, according to Dr. Bhabha, summed up the results of the Conference. He said: "The still larger problem of the long term effects of raising the world wide level of radiation by the dispersal of fission products has been discussed in our biological sessions. Our knowledge of the genetic effect of radiation on human beings is at present much less than our knowledge of the effects on animals and we should press on with research on

(Mr. Krishna Menon, India)

human genetics and in the meantime adopt a cautious policy. We have some yardstick to guide us in the general background level of radiation due to cosmic rays, potassium in our blood, radium in the walls of our houses and in the ground. This gives us all a radiation dose during our reproductive period varying from about 3 Roentgens to 6 Roentgens depending on the locality. Investigations are proceeding in Britain and the United States by Committees of the Medical Research Council and National Academy of Science which should help us to decide by how much we can with confidence allow the general background level of radioactivity to increase."

and the happiness of mankind, and we hope that our wisdom will so guide us that to peaceful uses, and now we should add for purposes which would promote the welfare world would be, as we said in the discussion of the last item, devoted exclusively by the great scientists with their ability and their devotion have brought to the with the one thought that the great knowledge that humanity by its inventiveness, of the Committee the consideration of these items in a spirit of objective inquiry, Without further drawing out these observations, I commend to the attention

care of the present, the future will take revenge. We are engaged in matters in which, if we do not take a task of common exploration, because what is involved here is not power politics, Committee with all those interested we will be able in this matter to engage in Committee, and it is the hope of our delegation that in consultations outside the commend for your consideration such draft resolutions as may come before the to the Committee my photostatic knowledge of science -- for that is all I have -- I scientists of repute. With these observations, and without trying to put over picture. Practically every fact I have put before the Committee has come from I am not putting before this Committee a kind of alarmist or exaggerated undesirable.

rid of those things which will change the nature of the species into something get rid of war, to make the world safe for succeeding generations we must also get making the world safe for succeeding generations, it is not sufficient merely to with promoting the welfare of the world and of dissipating disharmonies and of factors of good and evil, and as civilized people, as an organization charged production, of economic life or social life in the world which will release new is a new force, a new energy, here is a new relationship of industry or greater knowledge or a lesser knowledge are all agreed on this problem, that here that even those who are cautious, those who are optimistic and those who have a The last point is one on which I have laid some stress. It can be seen may be safely discharged to the ocean." discharged to the atmosphere and of radioactive liquids and solids which will determine the amounts of radioactive gases which may be safely problem. We may then hope to prepare working codes of practice which "This may well be followed by international discussion of this He went on to say, and this is the point that affects the resolution:

(Mr. Krishna Menon, India)

(Mr. Krishna Menon, India)

we will warn against the evils and we will not again commit the sin against posterity of cutting down the forests and turning fertile land into desert, in this case, turning humanity into a species that is far from what we desire.

The CHAIRMAN (interpretation from French): Since there are no other speakers for this meeting, we shall now adjourn. The next meeting will be tomorrow afternoon at 3 p.m.

The meeting rose at 4.35 p.m.