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CONFIDENTIAL REPORT ON THE OBSERVATION OF THE  
BRITISH H-BOMB TEST IN THE PACIFIC ON 15th MAY 1957

Note: This statement serves as a record of a verbal report made on May 21st to the Prime Minister, the Minister of External Affairs and the Minister of Health.

INITIAL  
ARRANGEMENTS:

On the morning of seventh of May I was instructed by Dr H. Turbott, Deputy-Director of Health to arrange for the necessary clearances and inoculations and to be prepared to leave New Zealand from Auckland at 3 pm on Thursday the 9th May. I presented myself to the pilot of the weekly shuttle-service R. A. F. Hastings at Nadi Airport, Fiji, at 8 am Saturday and flew with the other New Zealand and Australian observers to Christmas Island. Although an overnight stop was made at Canton Island, crossing the Date Line brought us to Christmas at noon on Saturday local time. It had been planned originally that we would fly to Honolulu at 3 pm but the departure was delayed to allow me to see Mr Cook, the Scientific Director of the Operation.

DISCUSSION ON  
LOCAL  
RADIATION  
HAZARDS:

Mr Cook returned from an operational flight at 4 pm and he took me into a private room and introduced me to the various scientists who were directly concerned in the estimation and measurement of the radiation which may result from the tests. During the conference which lasted for seventy minutes each specialist spoke succinctly on his own work and Mr Cook concluded the meeting by linking these items into the overall scheme of protection and by mentioning briefly the multiplicity of precautions taken in the design of the operation of the weapon to ensure the minimum amount of local fall-out. The salient points are briefly listed below:

1. It is proposed to fire a maximum of four weapons.
2. Each weapon will be in the "megaton" range but as a precaution the first will be the least powerful.
3. Each explosion will be a high air burst (at a height of at 10,000 feet above the sea).
4. With a full knowledge of the materials and mode of action of the weapon the protection team were able to assure me that they were of the "clean" type.

As the explosions are to take place at such high altitudes the radioactivity generated in the bomb material will be dispersed in the high stratosphere and will disperse all around the globe before any appreciable fraction drifts down as general fall-out. Furthermore, as very little will be drawn up into the fire-ball region the neutron radioactivity of earth material will be negligible and detectable only in a few square miles about the ground (The point immediately below the burst).

5. All the tests will be made within a few miles of the ground where the installation of instruments to measure local radiation will allow the scientists to calculate the efficiency of the weapon.

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- 6. It is one of the characteristics of the "Hydrogen" nuclear weapons that one cannot make a feeble scaled-down model from the explosion of which one may deduce the effectiveness of a full-sized bomb. It is therefore necessary to make tests on the real article.
- 7. It will be realized that especially in the first test of a weapon of this type there is a possibility that it may not operate as expected. I was impressed with the care which had been put into guarding against any hazard arising from a misfire.
  - (i) Several independent measures were installed to ensure explosion at the predetermined height.
  - (ii) In the most unlikely event of all these failing, (estimated as 1 chance in 10,000) there would be an automatic reduction in the power of the bomb so that its explosion at or near ground level would give rise to no more hazard than the "kiloton" weapons which have been tested by the British in Australia and by the Americans in Nevada.
  - (iii) Using the information gathered from such ground level tests and the excellent local meteorological information available, estimations had been made of the levels of radiation which would arise from the fall-out resulting from such a mis-adventure. I was shown the worked-out details of these estimations and the worst case to be expected is described below:

The levels of equal radiation exposure would form cigar-shaped curves down-wind from the explosion point. Outside a zone measuring about 150 miles by 20 miles even an uncivilized race (implying scant clothing, with bare feet and infrequent washing) would receive less than 3r units in the first 10 weeks. This is an average of 0.3r per week and this dose is equal to the maximum permissible weekly exposure for persons who are for long periods occupationally exposed to radiation. (As the activity of "young" fall-out decrease rapidly with time, the dose received in succeeding periods would soon fall to a very small fraction of this level.)

- (iv) Extensive sea-searches were being regularly made by long range Shackleton aircraft to ensure that no person accidentally (or deliberately) subjected himself to this unlikely local radioactivity.
- (v) As an added precaution, fall-out stations had been established on several of the neighbouring islands and an organization had been set up to catch fish and to test them for any radio-activity.

OBSERVATION OF  
THE FIRST TEST:

All the observers were gathered together and briefed at Honolulu. There were three Service observers from Australia and two from Canada. The USA sent two Service representatives and two civilian scientists. New Zealand observers were Major J. Aitken, Commander B. Carey

Tuesday 14th May we were flown to Malden, a small triangular island about 5 miles. The Island is particularly flat, the highest point being no more than 25 feet above sea level. Long drought prevail in this region and the only vegetation was sparse patches of dwarf scrub and a solitary group of trees. From the landing strip we were transported by Duck through road at the side of which were small dug-outs protected on three sides by sand bags. These small cave-like shelters were used for scientific instruments which were to record the success of the thought and research which had gone into the production of the bomb. After a mile or so the Duck turned towards a small beach, through the surf and pattered out to H.M.S. Alert which lay at two hundred yards from the shore.



All observers were mustered on deck at 8.30 the next morning and were issued with white anti-flash suits, hoods, and gloves and with dark goggles. By the time these were donned and the schedule had been explained the vapour trail of the bomb-carrying Valient was in view directly above us. Two observational circuits passing over us and the target area were made and on the third run the weapon was released. At this time all observers were seated facing away from the direction of Malden Island. We were told that our position was 30 miles from ground-zero. The count down from release to detonation, which was relayed over the ship's loudspeaker system, took 55 seconds. Ten seconds after the stated explosion time the observers were permitted to stand up and turn around.

1. At that time the fire-ball was less bright than the sun and could be viewed with the unshielded eye. I estimated its diameter to be about  $1\frac{1}{2}$  miles and the distance from its lowest point to the sea to be at least 3 miles (15,000 feet).
2. Some two and a half minutes later a mild rumble of noise was heard and this period confirms that we were indeed about 30 miles from the burst.
3. No sensation of heat was felt through the double layer of "mutton-cloth" material used for the protective hood and no shock or blast wave was felt at any time.
4. After one hour the cloud had risen to great height and expanded horizontally into a 30 mile diameter disc.

RETURN TO  
CHRISTMAS  
ISLAND:

By this time the "Alert" was steaming away from Malden Island and the water hoses, which had been placed about the ship to spray it down in case of a misfire, were removed. We arrived at Port London on Christmas Island at 9 am on Friday the 17th and after being taken ashore were given a brief talk on the engineering and transport aspects of establishing the Task Force facilities on the two Islands. Motor transport took us the 12 miles to Operational Headquarters at the airstrip where we were shown the schedule for the 24 flights made on the 15th. A large number of these flights were protective in nature, involving the collection of meteorological data, and the final sea-searches to ensure that unauthorised persons were not in the fall-out area if a mishap should occur. The Valient jet-bomber, which had carried the weapon was open for inspection. We were told that this aeroplane had returned uncontaminated and I have made an estimation which indicates that it was unlikely to have been more than 12 miles from the bomb at the time of the explosion. Two Canberra aircraft which had made sampling runs up to (and probably within) the radioactive cloud were "hot" and were still undergoing decontamination.

SECOND DISCUSSION  
WITH THE  
SCIENTIFIC TEAM:

After lunch I was taken aside by Dr Adams and Dr Hicks (Mr Cook was at Malden Island) and was given the following information:

1. The test had been most successful and the whole operation had run smoothly and according to plan.

The radioactive cloud had been driven up through the "weather" layer into the stratosphere and had reached a height of about 700 feet.

A helicopter landed on Malden 1 hour after the burst and the of the records were collected. The dose rate on the Island at time was 0.2r per hour. From this I was able to calculate it would be safe for people to work on the island immediately. induced radioactivity decays very quickly to start with and by end of the first day is only one-fourth of its strength one (from production).

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I was told later that a start had been made to re-establish the camp on Malden on the day following the test.

It was confidently expected that negligible, if not undetectable fall-out would be recorded from the stations established on the neighbouring and outlying islands. Nevertheless these stations would be operated during and for some time after the tests in order to have scientific evidence of the care which was being expended to ensure that the operation was carried out with the least possible hazard to the inhabitants of the Pacific.

THE RETURN:

Mr Cook had suggested at the first meeting that it would be possible to arrange for me to stay and observe the results of the fall-out measurements but in view of the concern being expressed in New Zealand about the Tests and my satisfaction at the precaution being taken, I considered it advisable to return to New Zealand as quickly as possible.

Three days later I reported to the Prime Minister that the Tests were being made in such a fashion that the possibility of highly active local fall-out was reduced to a minimum and that it was my opinion that no person under the care of the New Zealand Government was liable to suffer radiation damage from the operation.

I am pleased to report that I was shown great kindness and co-operation by all members of the British Team. When I was leaving, Air Vice-Marshal W. E. Oulton, the Task Force Commander, said that at the completion of the tests he would come to New Zealand to personally thank the Government for the very real contribution it had made to the Operation.

*A. G. G. G.*  
Deputy Director