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ROYAL COMMISSION INTO BRITISH

NUCLEAR TESTS IN AUSTRALIA

Somers

MR JUSTICE J.R. McCLELLAND, President
MRS J. FITCH, Commissioner
DR W.J. JONAS, Commissioner

TRANSCRIPT OF PROCEEDINGS

AT SYDNEY ON THURSDAY, 30 MAY 1985, AT 12.07 PM

Continued from 28.5.85

Secretary to the Commission

Mr John Atkinson
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MR McCLELLAN: I call Dr Somers, if your Honour pleases.

THE PRESIDENT: Yes.

RONALD LAWRENCE SOMERS, sworn:

THE PRESIDENT: Sit down, Dr Somers.

MR McCLELLAN: Doctor, I think your full name is Ronald something Somers?---Lawrence.

Lawrence; and I think you are an epidemiologist employed by the South Australian Health Commission; do you have any title with the commission?---My title is epidemiologist.

I see; and I think that in short you trained as an undergraduate in psychology and I think a description known as pre-medical studies; what did that involve?---That involved biology, chemistry, physics, mainly.

Where did you undertake that training?---University of California, Los Angeles.

And it led to a - - -?---Bachelors degree.

Bachelors degree in?---In psychology.

Psychology; and I think following that you undertook graduate training and you hold a master's degree in public health, is that correct?---That is correct.

Obtained from where?---Also the University of California, Los Angeles.

I think that you also obtained later a PhD in public health? ---That is correct.

Where did you obtain that from?---The same institution.

I think that you have worked in epidemiology, certainly in Australia, but before you came to Australia what was the nature of your epidemiological experience? ---Well, I have worked professionally in the United States and in Denmark as an epidemiologist.

For government authorities or in private practice?---Both for private organizations and for public agencies.

I think you came to Australia in more recent times?---1982.

In Australia who have you worked for?---I have worked for the National Health and Medical Research Council, Road Accident Research Unit at the University of Adelaide

and, more recently, for the Health Commission - South Australian Health Commission.

I think you were first employed by the South Australian Health Commission at about the time that the Royal Commission sought the assistance of the South Australian body in some of the problems which we faced?---That is correct.

And I think that you are the person primarily responsible for the report which is entitled "The Feasibility of Demonstrating Potential Long Term Somatic and Hereditary Health Effects of Ionizing Radiation on Local Aboriginal Populations"?---That is correct.

And when I say that you were the primary - or you bear primary responsibility, is the whole report your document, or have others contributed to it?---Others have contributed to it.

Could you name the others?---I think the single most significant contributor other than myself is my director - director of the epidemiology branch of the South Australian Health Commission whose name is Dr David Roder.

Is there anyone else who provided a significant contribution?
---No.

Your Honour, I tender the report, if I may. It can be marked RC - RC, we do not know.

THE PRESIDENT: Do you have any copies, Mr McClellan? Do you have any copies of the report?

MR McCLELLAN: There should be, your Honour. 536 - - -

THE PRESIDENT: It is all right, we have it.

MR McCLELLAN: 536 we think the number is.

Doctor, as I indicated to you, I want to take you briefly to the report in order that we make sure we understand what it is that you have done and also to highlight some of the conclusions that you have come to. You provided us with what you have entitled an executive summary in which you indicate that the report was prepared at the request of the Royal Commission to advise on the long term health effects which can be caused by ionizing radiation and the feasibility of demonstrating any such effects among aborigines using standard epidemiological methods. Now, I think it should be said at the outset that you do not have any formal experiences, as it were, in radiation health matters?---That is correct.

No doubt on the way through your training you learnt about some aspects of those sorts of health problems and I think the position is that over the last six months you have read a fair bit of the literature in relation to these problems as a result of your task in this study?---That is correct.

So, I do not think you could claim in any way independent expertise in relation to those?---No.

You have indicated then that the potential for immediate physical health effects of the nuclear tests, as well as any short and long term psychological effects, was not considered in the report, since it was understood that those issues would be canvassed in the submissions of other persons and institutions to the commission. The general conclusion was that it was unlikely that the successful application of standard epidemiological techniques to the problem would be feasible. The size of the aboriginal population potentially at risk is too small relative to the frequency of the expected health effects; and thus you say, statistical techniques of analysis would be of limited use. None of the expected health effects, you say, can be linked with certainty to radiation exposure, as each can arise from different causes. And you say, also, there is a problem with the historical records of illness, medical care, births and deaths and so on. You have also indicated, apparently, that there is the possibility of some other techniques, which you indicate might be available, which might show, that selected aboriginal groups were exposed to unusually high levels of ionizing radiation at some time in the past and you say, a study based on chromosomal aberration seems feasible although it would take about one year to complete, and I think you deal with that in greater detail in the body of the report. You say, in addition a study to detect internal radioactive substances may be feasible, and in that respect I think you have drawn attention to a submission made, I think, in 1981 or at some earlier period of time which I think you have just looked at and incorporated by way of comment into the report, is that right? I am sorry?---Well, I have not incorporated the document you are referring to in the report, but I have mentioned that document.

You have referred to it, yes. Now, you say a review of the records into South Australian Central Cancer Registry identified a number of aboriginal cancer cases diagnosed after 1976; how long has the cancer registry been in operation for?---Only since 1976.

From your examination of it, is it a detailed registry in the sense that one could place, from your perspective, reliability in the recordings that are made within it?---I think the South Australian Cancer Registry is acknowledged to be, perhaps, the best in Australia and it is so good that it has an international reputation; but by that I do not necessarily mean to infer that information regarding aboriginal cases of cancer is beyond reproach.

You are saying: _____

Cancers identified among aborigines
for earlier time periods
. the nuclear test sites.

This analysis does not constitute proof, you say, that aboriginal health has not suffered as a result of the nuclear tests. You then look at the feasibility of basing studies on several non-cancer conditions, and you say that feasibility is doubtful. And then further down the page you say:

It is further suggested in the context
of the inquiry
of risk of exposure.

And I think you discuss that concept also in the report?---Yes, in the conclusion.

I think it should be said that you, of course, have written this report after discussions with myself, Dr Jonas and Mrs Fitch, and as you indicate on the following page that you have not had the opportunity, of course, of hearing or, indeed, understanding the nature of the evidence which the commission has now been able to collect from various people?---That is correct.

I think it should be said that the last time you and I spoke was before the commission went to the United Kingdom?
---Yes.

No doubt you have been able to read newspaper stories and various articles. Well, on the following page, you provide a statement of the background and objectives of the study and you discuss the meetings that led to the study being undertaken and you have set out there the - if you like - the specifications for the study being seven in all that you were asked to look at. In particular you draw attention to item 4, which is entitled "Marker surveys" and you say that was interpreted as involving medical tests to detect biological effects of ionizing radiation; and it was agreed at that meeting, as you indicate on page 2, that three matters would not be addressed by the study: firstly, the effect on persons other than

aborigines; secondly, any immediate somatic effects of the tests; and, thirdly, any short and long term psychological effects; and so you discarded those from consideration, I think. You then provided us with a short discussion of the nature of epidemiology and the assistance which it can be in circumstances such as the present, and you draw attention to the fact that the science is based, of course, entirely upon the availability of effective records, and without those records, as I understand it, the assistance which the epidemiologist can give can often be very limited?---That is correct.

At the bottom of page 4 you address the assumptions. You say for the purposes of this study two important assumptions were made. Firstly:

That considerable radioactive
contamination
exposed to ionizing radiation.

You detailed why it was that those assumptions were made and I think you provide a short exposition of your understanding of the nature of the testing programme, and I think in part that it was drawn from discussions which you had with myself and the two commissioners last year?---That is correct.

Last year. You have also referred to the fact that allegations have been made of exposure of aborigines to radiation and, I think, you have drawn attention to the fact that plutonium has been found near or about the range at Maralinga. On page 6, you look at expectations and you indicate that if the assumptions are valid, one would expect health effects among aborigines. The extent and nature of those effects would depend on the total amount of radiation absorbed, that is, on the dose, and on the speed with which it was absorbed, being the dose rate, and you draw attention to the fact that under conditions of sufficient dose and dose rate, other human populations exposed to the products of atomic explosions have shown an elevated occurrence of cancer, cataracts, thyroid hyperfunction, birth defects, infertility, and sometimes growth deficiencies. You also say that, in addition, exposure to radiation can lead to chromosomal aberrations, and I think, they can occur without any obvious other health effects?--- That is correct.

And you say the significance of chromosomal aberrations - this is on the top of page 7:

As a precursor of disease
. will be
explored - - -

You say, further. And then, in the following paragraph, you say:

Cancer is probably the most
. to
fall-out.

And you name them. Whereabouts have you drawn that list from? I think, the scientific community sometimes debates whether or not one can separate out particular types of cancer. Are you satisfied that that is an adequate list having regard to where you drew it from?---Yes, that was drawn from the entirety of the literature listed under the reference section of the report but most specifically from the Japanese experience. I should add that there are several types of cancer, which one expects will soon appear on the list, which have not come out in publication yet. As time goes on, the Japanese experience tends to add types of cancer to this list.

So, at the moment, what we can say is you are satisfied from the literature that, at least, these types are cancer related in some cases?---Yes.

I am sorry, radiation related. On page 8, you refer to the fact that there is a latency period present for all cancers that can vary, apparently, from as little as two to four years for leukaemia and typically 15 to 30 years for thyroid cancer. By contrasting the thyroid with the leukaemia, were you meaning to infer that the 30 year period for thyroid cancer is the longest period or are there other cancers which could take as long, or indeed, longer? ---I think that there are other cancers that could take as long.

Are there any other cancers, which would come close to the two to four year period for leukaemia?---None that I can think of off hand. I think you - typically we are talking about the longer range, as being characteristic of cancer.

That would be, what, 15 years plus?---Yes.

You say in the following paragraph:

There is no doubt that
.
considered dangerous.

And, I think, that is a subject which the commission has already looked at in part. You probably are aware of that, and there seems, no doubt, that there is great scientific debate in relation to it.
You say:

That health effects
.
radiation.

You say:

Estimates of a number of
.
highly conjectural.

What do you mean by the term, vital rates?---Vital rates is a technical term in public health, and simply refers to the birth and death rates.

Right. You say:

Numerical estimates of
disease
of this exposure.

And you say, at the end of that paragraph, you conclude:

It is in the small population
. nuclear
tests.

You then look at hypothesis and, I think, you have indicated that the - what you call the testable hypothesis are referred to on page 10, and there are three, I think, which you generated. Firstly, that:

Compared with aborigines
.
per capita.

Secondly:

Aborigines who have had
.
been so affected.

And thirdly:

Aborigines reporting special
exposure
exposure circumstances.

Would your Honour just pardon me a moment?

You then look at research strategies and you say that:

A basic consideration
.
at issue.

You say:

This report concerns
.
nuclear tests.

You then looked apparently at old files from the Aborigines Protection Board and you say they:

Provide the following
.
in each year.

And you have drawn the figures for Ernabella, Koonibba. Can you tell me where Koonibba is? ---I can look on the map, just a moment. It is just north of Ceduna.

Just north of Ceduna? Yes, I think we probably have a recollection of that.

THE PRESIDENT: I think we saw something yesterday, I think?

MR McCLELLAND: Yes. The population increased from - - -

THE PRESIDENT: Very close to Ceduna.

MR McCLELLAND: Yes. Fell in Ceduna.

Yalata and Oodnadatta. It would seem that throughout the period of interest the greatest population was present in Oodnadatta, according to these figures. From your research, are you able to give us any estimate of likely reliability of those figures?---I can only give a subjective estimate because I was able to read the reports upon which these figures were based and, I think, that the reports were not particularly precise so that these estimates are not particularly precise and some of the numbers being to the nearest hundred, as you see there, would be an indication of that.

Right. And when it said that the estimate was for aborigines on reserves, does that mean aborigines who were, as it were, residents of the particular reserve or people who considered themselves as such? How did they go about establishing the figure?---I think that the person who was in charge of the reserve had a mental picture of the residents, permanent and transient, and in most cases they included everyone that had any contact with the reserve, whether or not they resided there on a full - full year basis or not.

So, in terms of the number of aboriginal people who might have been affected by the testing programme, did you treat these figures as a fairly good indication of those who might have been located in any relevant area?---In my calculations I tended to inflate the figures somewhat, and later in the report, you will note that I use the figure 1400.

As being a global figure - of being a conservative, I suppose, estimate of the number of people?---Well, conservative from our point of view, meaning to say a probable over estimate.

Over the page you have indicated in the fourth last line of the paragraph:

Whatever the true number of
aborigines potentially at risk
it is certain - - -

You say:

That many of them
. have experienced.

You then look at prospective studies, and I think your discussion there probably does not need further elaboration until the last paragraph on page 12. I should just indicate that you have drawn attention to the fact there that in 1980 - this at the top of page 12:

The South Australian Health
. of
the tests.

And you have included a report of this effort as appendix 1, and the commission also obtained a copy of that via the South Australian government's submission. You have drawn attention to the difficulties encountered and you say that:

Given the difficulties
.
have occurred.

I think that is, in summary, dealing with the prospect that was put, I think, in discussion that maybe, although one could not go back into the past, there might be value in monitoring from this day forward, as it were, the aborigines who could now be identified as having been affected?
---Yes.

Potentially by radiation, and what you are saying is, I think, that from your perspective there would not be value in that task being undertaken?---That is correct.

And, I think, you have expanded that over the page, and I think that you have dealt with it statistically to pages 13 and 14 with the examples through on to page 15. I think that on page 16, you have drawn attention to the Japanese data when seeking to examine the question of reasonable relative risk, which is the necessary assumption, from the point of view of such a study, and I think that you recorded there what, at the moment, is the accepted statistical analysis of the Japanese data, and I think you are conscious of the fact that that data, at the moment, is being reworked by a number of people as the - or as part of the major research programme?---Yes.

You conclude about the middle of that paragraph that:

Under these conditions - - -

As you say:

At least, 1389 exposed
. sample size - - -

You say:

Is close to the total aboriginal
. does not
seem feasible - - -

You say:

To launch a five year
. shorter duration - - -

You say:

Would require an even larger sample
size.

You say:

If a five year prospective study is not feasible due to limitations in sample size, how long a period of follow-up would be necessary, given the maximum number of aborigines still alive today who could be considered at risk?

To answer this question you say:

One needs to estimate what this maximum number might be.

And you then draw attention to some of the work of Dr Len Smith, and you look at the assumption - as you say, conservative assumption - that there were 1400 people living at the time. There would be about 700 today; and you conclude that if one follows through, given the size of the population, in an attempt to understand whether one would ever get a statistically sensible - or be likely to get - a statistically sensible conclusion, your conclusion is that that would not arrive as the cost of the prospective study is not feasible?---That is not exactly what I have written there. What I have said is that one would have to wait about nine years.

You indicate on page 18, apparently you made an attempt to locate records of births - this is the middle of the page - in remote aboriginal communities surrounding the test sites. Appropriate records for the years before and after the commencements of the tests were difficult to find; and you have isolated the factors that frustrated that effort. You also apparently made approaches to the South Australian office of the Commonwealth Department of Aboriginal Affairs; and I think you also had conversations with various key personnel. You draw attention to the fact that the annual report to the Aborigines Protection Board for the years '46 to '62 did not contain systematic information on births to the Aboriginal missions; and reserves adjacent to the test sites. You conclude that you were unable to obtain any relevant information from the birth book even at Ernabella in time for the present report. What was difficulty with the birth book at Ernabella?---The only difficulty from our point of view is that we were not forwarded a copy of it.

Would it be relatively easy to obtain, one would think, or not?
---I understand now that it is available.

Do you think that any of the conclusions that you expressed in the report would be affected by the availability of the Ernabella birth book?---I expect not, but I cannot say for sure. That is to say, I have had no other opportunity to examine trends in fertility. That is of interest to us, because one of the effects of radiation is to reduce fertility.

Do you think there is point in my perhaps asking you to, now that the book is available, have a look at it and provide us with a short statement as to whether or not anything would change because of its availability? ---I would be happy to look at it and I do not expect anything would change because of its availability.

Perhaps you might do that and just send me a note, if you would not mind?---If I can get it.

Well, can the commission help you to get it, or is there - - -? ---I cannot answer that.

MR COLLETT: We can ensure that it is passed on. Arrangements have already been set in train.

MR McCLELLAN: Thank you.

You then looked at retrospective case control studies. You say the assessment of past experiences which distinguish individuals suffering from diseases potentially caused by radiation, and you say of this hypothesis that it requires a case control study, which is fundamentally different in design from that discussed in relation to the first hypothesis. You say:

A prospective study
diseased individuals -

and you say the historical exposure of the cases are compared with those of controlled subjects. You go on to discuss what would be involved and you discuss the limitation in using living cases and you contrast with the use or the possibility of using historical records, which might include deceased cases; and I think what you have said is that a proxy measure of exposure, area of residence in the state at the time of diagnosis or death could be used on the perhaps, you say, poor assumption that this address reflects historic proximity, or lack of proximity, to the test sites:

Such a study has been conducted
. Registry Unit.

The Cancer Registry data, you say, included all invasive cancer cases. What is an invasive cancer case?---When a case of cancer is reported to the South Australian Cancer Registry Unit, a notation is made as to the stage of development of the tumour at the time of diagnosis. An invasive tumour would be one that is further developed, as opposed to an in situ tumour, which is localised.

Does it denote anything in relation to the likelihood of the cancer being fatal?---Yes, typically we would see that in situ cancers would progress to an invasive stage and would then metastasize and become fatal.

And you say that the registry data include all the invasive cancer cases, living and dead, notified between January '77 and November '84. You say:

The earlier study has identified
. non-radiational
group.

Then you say:

Figure 1 presents
. last known address.

You say:

South Australia is arbitrarily
divided
in the table.

If we look on page 22, we can see, I think, your map identifying Emu and Maralinga, and I think the large numbers represent cancer types which could be linked to ionising radiation; and the smaller numbers are those which could not, at least on current expectations. What we find on page 23 is the results tabulated, and we find that closer - the people living closer than 360 kilometres to the sites produced 14 potentially radiation related tumours and 11 non; and for those outside that area, 16 and 10 are the figures, based on this study. You say:

Among aborigines who lived
. radiation related.

The difference, you say, does not approach statistical significance:

Clearly the analysis should not
. nuclear tests -

and I take it the opposite would also be true?---Yes, quite so.

You go on to discuss in detail the limitations of that finding; and then, on page 25, you discuss briefly cross sectional studies; and you look in particular at chromosomal aberrations, at the bottom of page 25, and you discuss shortly what the relevant chromosomal aberration may be. On page 26 you develop that, and you say in the second paragraph on that page:

One particular type of cell
. chromosomal
aberrations.

And you discuss the laboratory methodology involved in analysis of the lymphocyte cell. You say, on the top of page 27:

Chromosomal aberrations
. dose of radiation involved.
Experts -

you say -

appear to have been
. exposure to x-rays -

and you say -

The conclusions also are applied
to groups rather than individuals.

Now, when you say there, "The dose, it is thought, needs to be relatively large," what order of dose are we talking about?---Theoretically, I do not think that we need to say that the dose has to be large. That is to say, in a theoretical vein, any small dose of radiation can - and I think does - produce chromosomal aberrations. But the problem is, in making a statistical case in a practical way, it is a very involved and expensive procedure, so that it only makes sense to embark on such a study if we feel that we have a fair chance to complete the work in a reasonable amount of time and for a reasonable amount of money; and if the dose is quite small, the expense involved and the time involved quickly becomes almost astronomical. So theoretically there is no lower limit, but in a practical sense there is a lower limit, and we felt, in our calculations of sample size - and these appear on page 30 - that in a practical vein we would not recommend as feasible a study that was based on the assumption of a relative risk of exposed, as compared to unexposed, people less than 2. We felt that a relative risk of 2 was as low as we could go for practical reasons. I sent telegrams

to two of the five experts that are listed later on in the report. One of them replied, a Japanese cytogeneticist whose surname is spelt A-w-a - I will just pronounce it as Awa - he was very kind and replied quickly and in his reply he cabled that the doubling dose, or the dose necessary to double chromosomal aberrations, was in his estimation on the order of 25 to 50 rads; and that if we were talking about assessing chromosomal aberrations soon after the exposure, that we could go as low as 25; and he did not state, but I take his meaning that we would prefer to be up around the 50 rad mark if we were going to make our assessment long after the exposure.

I think you included in appendix three to your report the letter from him dated 14 March this year?---Yes, I was referring just now to a cable, although he was kind enough to send a letter as well but not on this particular point.

Was the cable included in the report?---No, it is not but I have a copy with me today.

I wonder perhaps if the secretary might take that and have it copied. We will include it as part of the exhibit. I think you indicated towards the conclusion of that paragraph, you say:

In the case of any aborigines
who were
from local experts

You say:

Most experts expressed cautiously
pessimistic
cells damaged would survive

I take it, it is from that starting point that you draw upon the - or that you take - which leads you to a conclusion that you would need a high number of cells for study before it would be conceivable that you might get some realistic conclusion?---That is not the thrust of the argument per se, although your statement is true in the sense that we do need a large number of cells to examine. The thrust of the argument on page 28 is that we might focus our attention on certain sorts of aberrations which, unlike the dicentrics, for example, do not diminish with time. These would be called in the jargon, stable aberrations, and these have been used in previous studies and that is the thrust of the argument in these pages.

I think that you then discussed them and on page 32 I think you have expressed some conclusions in relation to it. About the sixth line I think you say:

For this reason the use of chromosomal
aberrations is
probably not feasible

Further down the page you say:

Taking into consideration the recent
. which would have
to be examined

And you then discuss, I think, some further studies. Page 33 you say:

Performing of blood tests on some
. for about one
year

And I think later on in your report you indicated
that that process probably could not be speeded up?
---That is correct.

Tell me, one stage, and I am not sure whether it was discussed
with you, but I think it probably was, there was a
suggestion that perhaps in relation to an individual
person or perhaps one or two people a cytogenetic
study might be undertaken to determine whether or not
such a person might have suffered a radiation exposure.
Would it be feasible from your perspective to
suggest such a study of one or two people?---From
the practical point of view that is certainly
feasible. What we would probably aim for would be
an examination of, say, 200 cells and the laboratory
which I mentioned here at the bottom of page 33 does
that sort of analysis routinely so I could not see any
practical difficulties but I do think that there
would be some difficulties in drawing a conclusion
if a positive finding resulted from the study. If
we take an individual and we say that this person has
a seemingly large number of aberrations we do not,
unfortunately, have anything to compare that to so
we would not be certain in concluding that it really
is, what should we say, a statistically significant
increase over expectation and furthermore we would not
be certain in attributing an apparent excess to
ionising radiation of the type being discussed by the
commission. It could have resulted as well from an
experience of medical x-rays some years previously.

So, would this be the position that if you examine such an
individual who, by other evidence had told us that he
was at a location where it is reasonable to assume
that he may have suffered an exposure to ionising
radiation, to undertake the cytogenetic work now
could do no more than suggest that what he has told
us is probably correct, would that be right or would
it not even go that far?---In my estimation it would
not be useful in that sense and the main reason being
that we have nothing to compare it to.

In order to obtain an adequate comparison you have to have a
control group comprising how many people?---We have
calculated that in the report. We have not expressed
it in the first instance in the number of people
required but the number of cells to be examined and
later on we said if we went on the ratio of 200 cells
per person that we could then talk about some 20 people
in a control group.

So even if you were looking at one person as having, perhaps, been affected you would still need a control group of 20?---Yes, and I think that would be particularly true of an aboriginal person because there are variations in the baseline or natural rate of chromosomal aberrations between groups of people and I am quite certain that no one has studied this problem among aborigines.

Tell me this: assuming one could set up such a study and one had the resources to undertake it, would the study afford any opportunity to calculate the likely dose that such a person had received? You assume that you have got a positive result, does it tell you anything about the dose that he might have received? ---Yes, yes.

What does it tell you?---We know from a very extensive Japanese study done in 1978 which I cite in the paper that as dose increases the frequency of abnormal chromosomes increases and certainly in a rough sense we could rely on that very massive Japanese data to make an estimate from aberration frequency back to dose.

What order of dose are we considering for that purpose, about 50 rads again?---Well, again, the 50 rad mark, in my opinion, is a matter of practical significance rather than theoretical significance. Certainly there were survivors of the Japanese experience who later participated in the cytogenetic studies who had received much higher doses than that.

You conclude on page 34, in summary you say:

An assessment of chromosomal
aberrations
particularly feasible

You then emphasise three points: firstly, the time could not be reduced; secondly, if such a study were carried out and it did not show differences between the exposed and unexposed this would not prove that aborigines had not been exposed, thirdly; you say at this point in time one cannot say that the chromosomal aberrations in somatic cells adversely affect the person's health or incline a person to future disease. Such aberrations do co-relate with radiation exposure, however, radiation exposure, you say, has been linked to disease. You say:

At best then it seems that an
assessment
suspected radiation exposure

You then look at radionuclides and it is here that you refer, I think, to the work of Dr Thomas, who

is the head of the department of physics in the Queensland Institute of Technology. I think it was he who undertook the study of options in the detection of radionuclides for the Pit council people and reported in November 1983. I think that the technique there involved would present some problems in practical terms and I think in particular there was a urine analysis prospect which would be, no doubt, a very complicated process to carry out effectively? ---Yes, if I may interrupt and make a comment at that point. Since writing this report I have been able to gather more evidence on the state of the art of these tests and to be fair I think that some of the problems with the urinalysis could be overcome with a sampling device so that the sheer bulk of specimen required could be substantially reduced. I do not have the details of this sampling device with me but I could refer the commission to someone who is supposed to know something about it.

Who is that person?---That person who comes to me referred second-hand is Dr John Potter.

P-o-t-t-e-r?---Yes, who works with the CSIRO division of human nutrition in Adelaide. His supervisor indicated that he may have - that John Potter may have some information on this sampling device. It has also come to my attention that the whole body counter might, in fact, be a better way to go and that there are some very sensitive machines available but I have no personal expertise in this area.

THE PRESIDENT: Mr McClellan, do you wish to go on or could we adjourn?

MR McCLELLAN: I think so, your Honour. I do not know that my friends will take a great length of time.

MR COLEETT: I will be about 20 minutes.

THE PRESIDENT: That will be about it. I think we better adjourn. We will adjourn until 2 o'clock.

LUNCHEON ADJOURNMENT

THE PRESIDENT: Yes, Mr McClellan.

MR McCLELLAN: Thank you, your Honour. Doctor, I think we are on page 36 of your report. You deal finally with material under the heading, The Feasibility of Investigating Non-Cancer Health Effects: you refer there to growth deficiencies, birth defects, cataracts and I think thyroid problems. You say:

The exclusion of these topics
. or
retarded individuals upon whom
a study could be based.

With respect to cataracts in the next paragraph, you say that they have been linked to radiation exposure of the eyes.

The dose-response relationship
. large proportion
of the people exposed.

You say for this reason cataracts do not seem to you to be a particularly likely candidate for your type of survey. On the following page you look at thyroid abnormalities. You say they:

May offer the most feasible
alternative among the expected
non-cancer health effects.

You say further down the paragraph:

If aborigines were exposed to
fallout
routinely with a small blood
sample -

and you say:

It is therefore suggested
that this test
. . . could be used to plan an
epidemiological investigation.

Now, would it be true to say that the blood sampling that could lead to an evaluation of any thyroid conditions could be done as part of the normal health care for aboriginal people?---Yes.

So that, to put it loosely, one method of approach would be to

ensure that the doctors and nurses who might be involved in aboriginal health care were conscious and should take procedural steps to ensure that the thyroid conditions of any relevant persons could be checked?---Yes, that is correct.

Then your conclusions on page 39: you say:

In reaching conclusions from the facts response that now should be made -

and:

Compensation to victims and to families arise from many different agents and conditions.

You say:

It seems, therefore, that not only would frank health damage issue than risk of damage -

and I think you then express your views in relation to a social perspective on that question of risk. Of course that question, as you appreciate, is a question about which the commission has obtained evidence in other ways dealing with the issue rather than from the medical perspective but from the analysis of the events as they occurred at the time. It remains, your Honour, if I may, to add the cable that Dr Somers referred to before the adjournment - I think we all now have a copy of it. I will add that to the exhibit and incorporate it into exhibit 536. That concludes the questions I have of Dr Somers.

THE PRESIDENT: Yes, Mr Collett?

MR COLLETT: Thank you, sir.

Dr Somers, if I can just start by congratulating you on, firstly, evincing the intention which you did on, I think, page 2 of your report to write your report to the fullest extent possible so as to facilitate interpretation by non-epidemiologists. I think you have succeeded and as a non-epidemiologist I am very grateful. I have the impression from the whole

of your report that you really tried very hard to cover the field as to every possible indicator of any link between health effects and radiation?
---That was our brief.

I had the further impression that in a way you are a bit disappointed that you could not find anything that you could subsequently get your teeth into and follow up, is that the case?---That is the case. It was frustrating from that point of view.

Did you, on balance, feel that the lymphocyte assessment was in some ways the most attractive all round possible study?---I think it would have been more attractive had we been able to base a study on observed health outcomes because I think in the end that is the important point. Chromosomal aberrations will not tell us very much about health effects because they are not, as far as we know at this point, directly related to health effects: but given that we cannot base the study, or do not think it is feasible to base a study, on observable, clinical manifestations of disease, then I think the next best option among those available may well be the study of chromosomal aberrations.

Can I just ask you about inferences that can be drawn, and indeed have been drawn, from the one epidemiological study in this area; can I refer you to the 1981 study of your health commission. Obviously, from your own report, you are full aware of the research difficulties and problems with data encountered by the author of that report, and can I take it that you agree that those difficulties were extensive, if not monumental?---The earlier report was prepared on the basis of a number of field visits to evaluate the quality of data. In my work I made no field visits so I have no first hand knowledge of the state of information available in the field but from what I could see at a more centralized level, the data are indeed very much lacking.

I take it you do not disagree with the assessment in the 1981 report of the difficulties they had in obtaining populations, and in fact obtaining reliable data?
---No, the information related in the report seems quite reasonable to me.

In fact on page 12 of your report I think you summarize difficulties that were encountered in the 1981 study?
---Yes.

Can I take you to the conclusion of the 1981 study which is annexed to your report and which appears at page 15 of the 1981 study. I would like to ask you, given what you know about that study, whether you would agree with the wording of the conclusion. As you may recall conclusion A reads:

Notwithstanding the poor quality
. linked with
exposure to radiation.

Can I take it that you are familiar with the whole of the 81 survey?---Yes.

And what I want to ask you is whether the conclusion just expressed is the appropriate conclusion or whether, in fact, the conclusion should have been something to this effect, that given the research difficulties and given the doubts of the author about the quality of data that it is not possible to make any conclusion about the relationship between the health of the aboriginal people and radiation exposure?---I would absolutely agree with your last statement and I suspect that it is to that same end that this statement was written although it perhaps was written in a more technical sense than might have been best considered the wide readership of the report.

Well, I would like just to follow through with you what happens to those words, no clear indication of trends in diseases, as they - if you like - go up the line from the author of the report to what was said upon its release by the Minister of Health. Can I show you some documents from attachment 22, this is the South Australian government health submission which is in evidence. Firstly, can I ask you to look at a minute by the Assistant Commissioner of Health Services to the Minister of Health dated 9 March 1981. You will see the underlined portion on the first page, he says; commenting on the draft of the 1981 report:

As a result of this numerous
errors
used by the anti-uranium
movement.

It goes on to detail how Dr McCoy arranged for further inquiries to be made at Yalata although I think the file indicates that those inquiries were made by telephone. Then, can I refer you to what happened subsequently when I think we can assume the final report got to the then Minister of

Health and she released it. I think this was in fact a news release which came to the attention of Sir Ernest Titterton, amongst others, about which he may have given evidence. In particular, I would like you to have a look at the first sentence where the minister in her news release says:

There was no evidence that
aborigines
conducted at Maralinga in the 1950s -

and she goes on to quote parts of the report. In particular in the third bottom paragraph she says:

Notwithstanding these difficulties -

the difficulties that were enumerated in the report,

every attempt was made to discern
any abnormality in disease
patterns.

Now, could I just ask you whether, as one who was in the discipline of writing and interpreting epidemiological reports, whether it is a fair description of this 1981 study and its findings to say that it found, or indicated, there was no evidence that aborigines living in remote areas of South Australia were suffering radiation induced illness?---That is typically the way that a scientific report would be concluded. That is to say a report would put forward hypotheses and the conclusion might well be that those hypotheses were not borne out by the evidence gathered during the conduct of the study. So, in a strictly scientific way, that is not an unusual wording.

The wording that no evidence constitutes words that have come before us in relation to other reports in this area, is it the type of wording that you would apply to the conclusions of the 1981 South Australian report?---Well, I think it is the type of wording we apply to the conclusions in our more recent report; the only difference being that we tried very consciously to add just under - everytime we mention this sort of sentiment - that this was not proof that there was nothing to be found.

In fact, this was the point I want to take you to. You appeared at pains to point that out in your present report on a number of occasions. For example at page 4 of your report, you say about point five:

In summary it is important to bear in mind epidemiological evidence.

Again at page 9, you say, at about point 7:

In a small population
. . . . by the nuclear test.

What I am asking is whether your reiteration of that in the report and there are a number of other incidences, I think, are to ensure that the wrong conclusion is not drawn from an inconclusive finding? ---Yes, well it is quite right that we have experienced problems where in the past we conduct a study with limited resources and we failed to turn up anything of significance and our failure to turn that up is then turned into suggested proof that there was nothing to turn up in the first place.

THE PRESIDENT: Well, would not a fair way of putting what is put in this statement be to say something like this, there is a dearth of evidence which would enable a conclusion to be drawn either way as to whether aborigines living in remote areas of South Australia suffered any radiation illnesses as a result of the nuclear tests?---I think that would be quite fair, your Honour.

MR COLLETT: In relation to that, Mr McClellan read to you one of your conclusions at page 39, where you say at about point nine:

It seems, therefore, that not only
. aboriginal
community as a whole.

Do I take it that where you say, would be impossible to prove, you are also saying, or disprove?
---Yes, definitely.

Can I ask you about some of the particular studies that and firstly in particular, your test for chromosomal aberrations by way of assessment of lymphocytes. As you went through it with Mr McClellan, you listed some of the potential difficulties or drawbacks of that report at page - of that test at page 27, namely, that there now has been a delay of 30 years, the size of exposures - is unknown and that certain types of aberrations diminished with time?---I wonder if I might interrupt and add another potential drawback here which I think it is important for the commission to bear in mind. Our calculations of the required sample size expressed by the number of lymphocytes that would need to be examined on page 30, are all based on an assumption about the level of aberrations in lymphocytes which is natural or background. Now, we do not know what that level is among aborigines, we have precious little information about what it is in any population. What I have done here is take - is to make an assumption that the level of the natural rate of aberrations among aborigines would be comparable to that found among the Japanese who participated in the 1978 Japanese study. If we are wrong there and in fact aborigines exhibit a much lower rate - a much lower natural rate of aberrations, then all of these figures required sample size, are too low, and if they are too low it means that the study becomes all the less feasible.

Because you need more samples and probably more people?
---Well, instead of a year it becomes two years.

Yes. I take it that one of the reasons why a control group is included in your experimental design, would be to attempt to allow for a variation then of natural background of aborigines and others?
---Not exactly. The point would be that with a control group we could establish what the base line is and then we would have some measure by which to compare the level in the presumed exposed group.

I will come back to the control group. You say at page 32 of your conclusions, that the use of chromosomal aberrations would seek low doses of radiation especially low doses which occurred about 30 years ago, are probably not feasible. You

discussed the - to some extent the dose which may be detectable and you did that with Mr McClellan this morning. You have given to us the telegram from Dr Awa, and kindly also annexed his letters. Can I take it that from your report and from what Dr Awa says in his letters, that really a mean exposure of 50 rads is probably regarded as the lowest that is detectable after this period of time?---Again, I have to repeat what I said earlier. I do not think that there is any theoretical law upon which we can - upon which we fear going below, it is all a matter of practicality.

Yes, I meant it in the practical sense?---In a practical sense, from what I can gather in the correspondence and the things I have read, 50 rads would probably be as low as would be feasible.

So that is an obvious practical obstacle to testing chromosome abnormalities to a group whose meanings may have been lower than 50 rads, if that was the case?---Yes. And the main point is we are at a disadvantage because of the time delay in conducting the tests.

Can I ask you about some practical features of the design you have suggested for the assessment of lymphocytes? Firstly, in relation to a necessity of a control group and the way that one would select it. It appears from the letters which you have annexed to your report, that all researchers say that (a) a control group is essential and (b) that a control group must be very carefully picked?---Yes, that is correct.

As I understand it, the control group is a group which is used to, if you like, give some indication of the normal, it is used in such a way as to attempt to rule out the interference of other extraneous factors?---Both things are correct, yes.

For example, rather like the way you might grant peers in the House of Parliament to absent parliamentarians. What factors would you seek to control for in your selection of a control group for this experiment? ---Well, we are worried primarily about any factor which itself can cause chromosomal aberrations or which is related to something else which in turn causes chromosomal aberrations. In writing to the international experts, I tried to ascertain whether such things as cigarette smoking, glue sniffing - maybe it was petrol sniffing, I cannot remember - medical x-rays and other things would be

- have been shown themselves to produce chromosomal aberrations and the response I got basically was that the only thing people seem to worry about in these sorts of studies is medical x-rays. I do not think there is any firm evidence for cigarette smoking, and I have been told that the aboriginal community involved here does not suffer from petrol sniffing and other things that we were concerned about.

If they had that might have been a factor you would seek to control for by attempting to eliminate people who have been involved in - who are known to be involved in petrol sniffing, was that the way it would have worked?---Precisely. In other words, we would look to the anthropologist to identify, let us say, 15 people for whom the exposure was presumed to be high, we would interview those people, find out something about their medical background and how many x-rays they had likely had in their life, what their personal habits were with regard to any factors that we thought could cause chromosomal aberrations. Then we would seek to choose individuals on an individual match basis who would have similar lifestyle environment genetic background, who were in fact were in every way as much as possible like the exposed individuals except that they were not exposed to radiation.

Genetic characteristics may, in fact, be a fairly important factor to control for in selecting your control groups, I take it?---I would presume so. I have no hard evidence of that, but I would presume that there would be a genetic susceptibility affecting the natural rate of chromosomal aberrations.

I take it that one of the things you would attempt to control for may be different genetic susceptibilities or features as between different aboriginal tribes, for example, if some of your subjects were from Coober Pedy and others were from Pitjantjatjara, that would be the sort of factor you would try to match in your controls?---That is correct.

I take it that is why you mentioned in your report the necessity to consult an anthropologist to select the controls?---Yes.

Would I be right in thinking that as the selection of a control relies to some extent on available medical information and information about such abuses, like petrol sniffing, the selection of - the process for the selection of the controls is also made that much more difficult by lack of medical records and the paucity of generally the information that you have?---Yes, that is correct.

I take it those comments, in relation to selection of control groups, would apply to any of these epidemiological experiments that you have suggested in your report which would require a control group; that problem would be equally as relevant to lymphocyte assessment as it would be a urinalysis experiment? ---Yes, that is quite true.

If we turn, in the lymphocyte assessment, to the selection of the experimental group. It is a fundamental aspect of the experimental design, I take it, that the experimental group should comprise people who it is believed suffered radiation exposure?---Yes. If we included in the so-called exposed group people who, in fact, were not exposed, then it is easy to appreciate that the chromosomal aberration average over the group would be lowered by those unexposed - we would call them misclassified - people, and it would tend to make that so-called exposed group look very similar to the control group.

It may seem a trite point, but I just wanted to raise a fairly practical example with you. Take, for example, the evidence indicates that fall-out clouds went over Coober Pedy in 1956 or 1957, and that it is indicated that there were roughly 100

aboriginal people living at Coober Pedy at the time, and the identity of those persons could be ascertained. That may be as far as people can go in working out whether people were exposed in that it may be that an experiment could never be certain that the member of the hundred that you select was actually on the date under the cloud - sorry, under the cloud on the date when the cloud went over - in other words, it is just a question of probability as to whether that person was in fact exposed. It might be the best that you can do. Would you see that as a difficulty in - - -? ---I see that as an extremely significant difficulty in organising such a study; that is to say, if we cannot even achieve with certainty, or a fair degree of certainty, a division of subjects between exposed and not exposed, then we have extremely little to base our observations on.

Yes, thank you, doctor. I have nothing further.

THE PRESIDENT: Yes?

MR JAMES: I have no questions, Mr. President.

MR McCLELLAN: Doctor, this might be outside your field of public health, and if it is, please tell me: if we had one person who said I was under an atomic cloud, and if that person, as an assumption, we say was exposed to RADS, would that produce any chromosomal aberrations which could now be detected 30 years later, to indicate that there had been some significant exposure at some stage from whatever cause to ionising radiation?---Let me just paraphrase it to make sure I understood the question: what you are saying is that if we can document that someone received a hundred RAD, an acute dose of 100 RADS, would it be likely that we could see evidence of that 30 years later using chromosomal aberration?

Yes?---And I think the answer to that is, yes, given that we would have something to compare that person to.

What sort of person would you want to compare that person with?
---A person of the same age and sex, and personal habits, who had not been exposed to that radiation.

Yes, thank you.

THE PRESIDENT: Mr Kolodziej?

MR KOLODZIEJ: Just a few questions, doctor, and if this is a matter which is beyond your area of expertise, please say so and I will not continue: I am particularly interested in the final paragraph of your conclusions, where you say:

It could be argued however that damage
per se to minimise
risk.

May I just ask you, doctor, are you there urging the Australian Royal Commission into the British nuclear tests to make a particular recommendation, and if you are, I wonder if I could invite you to say what that recommendation is?---No, I am definitely not urging any particular recommendation. What I am doing - what I tried to do in those paragraphs you read - that paragraph you read is to summarise the thrust of our report, and essentially, what I am saying there is that it may be sufficient to demonstrate, for example, with chromosomal aberration tests, or with whole body counters or in some other objective way, that people were exposed to radiation - that may be sufficient in terms of the judicial issue, given that we have so little chance of demonstrating frank health effects, and perhaps the very last part of it is that it may be sufficient to disregard all of the health evidence, or lack thereof, and concentrate on what Mr McClellan was saying, is the other evidence related to the chronology of events that took place.

THE PRESIDENT: Are not you saying, doctor, really, in that passage that Mr Kolodziej read to you that the absence of proven damage does not of itself confer immunity from blame on those responsible for the tests?---That is precisely what I am trying to say, yes.

MR KOLODZIEJ: If I could just follow that up, what you are saying is, have a look at, for example, aberration chromosomes, it may be evidence that somebody has in fact been exposed to radiation?---Yes.

And on that basis, proceed in the judicial process to consider questions of compensation or the like?---I think that expresses it very well, although we did not even presume to necessarily recommend that the chromosomal aberration tests be conducted. In fact, we were trying to leave the door open for the considered opinion that that was not even necessary.

Well, thank you, Dr Somers; you are pointing us to something concrete.

THE PRESIDENT: Mr McClellan, anything further?

MR McCLELLAN: No, I have nothing further, your Honour.

THE PRESIDENT: Yes?

MRS FITCH: Dr Somers, in your reply to Mr McIntyre, you said that one exposed individual, or the chromosomal aberrations of one exposed individual could be compared with the number of chromosomal aberrations in a similar individual, if you like, who was unexposed. Do you consider that one such unexposed person is a sufficient number to give you a base line, as it were, for that comparison with an exposed individual?---In a theoretical sense, one individual would be enough, because we can take an unlimited number of lymphocytes from that person in a small quantity of blood, but I do take your point that in a practical sense, we would be walking on very thin ice, because if we were wrong in defining that person as someone who had or had not, for example, been exposed to medical x-rays, if we are basing it all on one person, we could easily go wrong and certainly, I should have made clearer that we would feel much more comfortable in comparing your one exposed individual, for example, with a group of people where we were fairly confident we understood the medical background.

THE PRESIDENT: Thank you, Dr Somers. I would like to add my congratulations to those of Mr Kolodziej for your lucid and elegantly expressed report?---Thank you very much.

THE WITNESS WITHDREW

THE PRESIDENT: That is it for today, is it?

MR McCLELLAN: Yes, it is, your Honour. The doctor might like to leave. Could I indicate, I spoke with Mr Maroney this morning. I had hoped that his statement would be available today. It will not be. The best I can do is to indicate that I hope that by some stage tomorrow, sent by courier from Melbourne, there will be a draft of the first third of the statement; point form for the second third and an absence of material for the final third of his statement. He has promised the statement to me complete by Monday morning, and I am afraid that is as well as I can do.

THE PRESIDENT: When will we have him, Wednesday?

MR McCLELLAN: Wednesday of next week, your Honour, and he is followed, as I think everyone appreciates, by Mr Stevens, so that we have, I think, four days of

AWTSC material, that will fill a nice slab of our time, but I had hoped to have Mr Moroney's statement today, but I am afraid I do not have it.

THE PRESIDENT: Well, that means we adjourn now to Wednesday, does it?

MR McCLELLAN: Yes, your Honour.

MR JAMES: Well, prior to the adjournment, there are a number of other witnesses in the various departments as indicated were likely to be called, in respect of whom statements are not yet forthcoming. In particular I had understood that there was to be a proof in due course made available for Sir Edwin
. Now, that is going to be a very very difficult exercise, variant on some months to come but your Honour will recall that in England, there were many volumes of material including the proof for the B inquiry and transcript made available to us, and some research has to be done, so it would be appreciated if those on whose behalf individual witnesses are being called, for the balance of the commission, are capable of obtaining proofs, we could have them as soon as possible.

There are a number of people, included a Professor Langlands, as I understand it.

MR McINTYRE: Well, I can assist there. Professor Langlands is being asked to look at certain of the symptoms referred to by the witness at Wallatina, but we could not, in fact, send the material to him until the transcripts arrived. They did not arrive again today, but I hope to have a proof within about a week or ten days.

THE PRESIDENT: Thank you, Mr McIntyre. Mr Collett, could you help on the proofs?

MR COLLETT: Yes, we now have a draft which is being considered. The problem which has been raised by Mr James has not been overlooked at all. I hope that within the next two weeks, either the draft or the final version will be made available.

THE PRESIDENT: Very well, we will adjourn until 10 am next Wednesday.

AT 2.45 PM THE MATTER WAS ADJOURNED
UNTIL WEDNESDAY, 5 JUNE 1985

