

University Report

BBC AFRICAN SERVICE, LONDON

MS 45772/11

UNIVERSITY REPORT

no. 165

Broadcast on 12th, 14th, 15th and 17th September, 1971

COSMO PIETERSE: In this week's 'University Report' cancer research at the University of Botswana, Lesotho and Swaziland - specifically research on food fungi, liver cancer and food storage. Now, cancer is, of course, known not only as a scourge and a killer, and often a slow and painful killer, but as an attacker of all parts of the body, all layers and types of society, all parts of the globe. It may be right for us layfolk to think of cancer as a single pathological phenomenon like the common cold and like the cold still one of medical sciences' biggest challenges. But can medicine treat cancer as undifferentiated?

This was one of Allan Macartney's concerns when he spoke to Dr. Philip Martin, Senior Lecturer in biology at the Roma Campus of U.B.L.S. Dr. Martin is currently engaged on the cancer research project in Lesotho, and Allan asked him -

ALLAN MACARTNEY: Is there anything peculiar about cancer, types of cancer in Southern Africa as a whole?

DR. P. MARTIN: Yes, in fact Southern Africa forms a most interesting ground for the study of cancer, because you have this remarkable concentration of peculiar types of cancer in definite geographical areas. Now in the European countries and in North America you have, of course, very high instances of various cancers too. But the

DR. F. MARTIN: People move around very frequently and it is not possible to do the types of epidemiological study that we can do outside here. In most of these areas that we have access to, the people stay in their homes, do not travel very far, or if they do travel they return to their homes and the influences that we can investigate may be taken as being of significance. Now in the Transkei we find even that oesophageal cancer afflicts some parts of the population in some areas, while leaving other populations completely alone, and those areas which are afflicted have been talked of often as 'cancer gardens', a somewhat flippanant term perhaps, but quite appropriate.

The other interesting thing is that in Swaziland which, up to now, has normally had only liver cancer as its main problem there are areas of oesophageal cancer suddenly appearing, and these can be treated almost as epidemics. This feature, I think, is quite peculiar to Southern Africa.

ALLAN MACARTNEY: So that there would be hope that because of the peculiarities of the sub-continent you might be able to isolate factors more readily?

DR. P. MARTIN: I believe that is true yes. But, of course, the problem at a glance seems so simple, but when you look into it further it becomes entirely a different matter.

COSMO PIETERSE: So, the global fight against cancer, the co-ordinated battle against a world-wide enemy of mankind, takes on specific tactical shapes. Research into sources or causes of cancer is one such tactic, a kind of reconnaissance. And this is what Dr. Martin's work is about. In fact -

DR. P. MARTIN: It's a study of the food storage fungi involved in stored foods in Swaziland and Lesotho.

COSMO PIETERSE: Dr. Martin is working at present, in Lesotho particularly. His earlier research, since 1966, was in Swaziland. He had become interested in that country because of reports of the high frequency of liver cancer in Swaziland. Earlier cancer studies from England had shown that ground nuts could contain a substance called aflatoxin. Aflatoxin is formed by a common fungus or mould, *aspidillus flavus* and aflatoxin causes liver cancer in experimental animals like rats. But the connection between cancer and ground-nuts in Swaziland seems not to be a simple one. Ground-nuts are widely eaten: in all three of the country's main areas. On the highveld in the west, in the central middleveld and on the lowveld in the east, near the Mozambique border. But it's on the Eastern lowveld that there is the highest incidence of liver cancer; it's on the lowveld, in the east, where there is most aflatoxin, and it is here, on the same eastern lowveld of Swaziland where more mould or fungus is found associated with the ground-nuts. Which leads to Allan Macartney's question about Dr. Martin's line of research enquiry.

ALLAN MACARTNEY: So you're trying to find out why this fungus is prevalent in the lowveld?

DR. P. MARTIN: Yes, now we've traced this to a peculiar type of storage of food. In most of the areas that we visited in Swaziland they use grass baskets, sacks jute bags, and they use a variety of modern methods including a cement silo and a metal tank. Now in the eastern part of Swaziland they still use the ancient form of pit storage, and although there is nothing intrinsically

DR. P. MARTIN: wrong with pit storage, because the pit is largely anaerobic which prevents the growth of organisms, in most areas the maize is kept quite dry and in actual fact the maize after a period of up to three years is still perfectly edible. Unfortunately, however, in some of the low lying areas the pit does become wet and on exposure to the air when the grain is removed, the aspodilus and other fungi can very readily invade. And if the grain is then kept within the house for any length of time you can get a very quick formation of aflotoxin. Aflotoxin, I might add, is commonly formed in groundnuts but can be formed in maize and sorghum though usually to a lesser degree. We don't know the reasons for this but the fungus seems to prefer to form toxin in ground-nuts for a reason that we haven't determined.

ALLAN MACARTNEY: How this was the earlier phase of your research in Swaziland, now that you're based in Lesotho are you continuing with the same project in Lesotho or are there variations?

DR. P. MARTIN: There are variations, for one thing the pit method of storage seems to have gone out, except in the south-west part of the country, and this is largely due to the fact that there is a different tribe there - a Xhosa tribe from the Cape, and the Xhosa tribe is still using the older form of storage. I gather that pit storage in Lesotho has been dropped by the Basuto people because they felt, as early as 1918, that this was no longer suitable. I don't think, however, that there is anything intrinsically wrong with these methods of storage. The grain basket for example, which is still widely used in Lesotho, is a very practical method. The grain baskets are huge, woven by the women in the village usually, they usually stand something like five feet tall and about two or three feet

DR. P. MARTIN: wide, and they can take an enormous amount of grain, and when the grain basket is sealed at the top the villagers say that this prevents destruction by rats, and also tends to cut down on the minute parasites such as weevils and other destructive insects. This of course we have to check, we don't know this for a certainty but this is a matter of common observation. Certainly the grain that I've seen in these grain baskets appears to be just as good as that stored in a silo.

ALLAN MACARTNEY: Now that's the food side of things. I suppose you then have to work out some connection with the incidence of cancer. Now is this all types of cancer, or how do you sub-divide it?

DR. P. MARTIN: Well we're very interested in Lesotho as a country because it appears to have a very low incidence in the two main types of cancer which are prevalent elsewhere. To the north in Swaziland and in Mozambique there is the highest rate of liver cancer in the world, and similarly to the South and the Transkei, there is the highest rate of oesophageal cancer in the world. Now Lesotho has a very low rate of oesophageal cancer in the world. Now Lesotho has a very low rate of oesophageal cancer as a whole, and there is not single case of oesophageal cancer reported from the mountain area of the country. The mountainous area of the country extends from the East and covers perhaps three fifths of the total area. The oesophageal cancer, is present in the lowland area, but is insignificant when you compare it with Transkei. Now, on the other hand, liver cancer appears only to be restricted to the mountainous areas and is not so common in areas below six thousand feet, and this is a striking finding. In other words, it appears that oesophageal cancer and liver cancer are mutually exclusive, and this is also true of the

DR. P. MARTIN: wider picture as a whole, we find that oesophageal cancer is not very prevalent in the Mozambique or in Swaziland and liver cancer is very low in the Transkei. So it would seem that there is some environmental factor that is regulating this.

ALLAN MACARTNEY: I presume that it is not diet that is the different factor.

DR. P. MARTIN: Well we don't know this but it is, as I said earlier, it is a good hunch that we are trying to pursue. If this disparity in frequencies could be traced to some prominent dietary factor or to some method by which food is stored or eaten, then we would be a long way towards solving the problem.

ALLAN MACARTNEY: Now how do you get your human sample in this operation, the people who have got cancer. Do you get co-operation from, for example, government hospitals. How does this work?

DR. P. MARTIN: We have the most excellent co-operation from the government Dr. Labona, who is the superintendant in the hospital at Maseru has given us his fullest co-operation and has made it possible for us to start a Lesotho Cancer Registry. This Cancer Registry dates from April 1970. We estimate that there are about six hundred cases of cancer yearly in Lesotho, and, of course, only a fraction of these come to hospital. Our sample, therefore, of the population that does present itself to the hospital is somewhat biased, it represents the wealthier members of the community rather than the poorer. However, we have to accept that. Since April 1970 we have had a hundred and twenty cases of cancer reported, of which, about sixty percent are cancers of the cervix, and about ten per cent cancers

DR. P. MARTIN: of the liver, and about five percent cancers of the oesophagus. We haven't analysed our results fully yet except to note that there is this mutual exclusiveness between liver and oesophagus.

ALLAN MACARTNEY: Now I understand that some pioneering work was done earlier in East Africa about cancer or lymphoma. Does this have any bearing on your work?

DR. P. MARTIN: Yes it has quite a considerable bearing. It was thought by many people in the South African Institute for Medical Research notably Professor James Gear, the Director, that there could be some relationship between cervical cancer and the ordinary herpes virus - the cause of shingles. And if it was proven that the virus co-operated, as it were, with another external influence to be determined then we would have made a very great step forward indeed.

ALLAN MACARTNEY: Now what you are hoping to get? Is it a statistical correlation between various factors. What sort of proof are you looking for?

DR. P. MARTIN: Well, if we could be satisfied that there was a particularly outstanding influence in Lesotho, that could be held responsible for the induction of liver cancer, such as, a very high proportion of aflatoxin in the diet of the mountain people, then this could be used as evidence. We've gone a long way towards finding that in Swaziland already. But, of course, there could be very many different environmental influences that you could study.

ALLAN MACARTNEY: Now you've talked about Swaziland in the earlier stages, are you still keeping in touch with the problem in Swaziland?

DR. P. MARTIN: Yes indeed. We have still got to analyse your results from the work we did last year when we made a fairly intensive study of the pits in the Lowveld area, Mr. Geoffrey Gilman from the Tropical Stored Products Institute in Slough, has made an excellent survey of food storage methods in Swaziland as a whole, and he has already been down in Lesotho this year where we studied three lowland areas and three mountain areas. Our main enquiry was directed to the storage of wheat. Now the mountain people use the summer wheat, naturally, because the winters are very cold, whereas in the lowland areas it is possible to use winter wheat and because of this, the crops are stored at different times of the year. Now it has been shown in Israel that the influence of cold can have a marked effect on the toxicity of crops, that is if the crops are exposed to say, conditions of extreme cold out of doors, the fungi in these crops can form toxins which they would not ordinarily form if the weather was more clement. Now the first thing we would look for is evidence of this toxicity in the stored samples of our wheat.

ALLAN MACARTNEY: How far have you got with this sampling?

DR. P. MARTIN: Not very far - we've received our samples of the wheat and we are doing the basic culturing for the fungi, but we haven't done any toxicity determinations on them

ALLAN MACARTNEY. Now where do you do this, has the university got the facilities on the Roma campus to do this?

DR. P. MARTIN: We're hoping, eventually, to feed samples of wheat to experimental rats, our facilities are adequate at the moment but we still need a very high proportion of trained staff. Our main problem is that we have very

DR. P. MARTIN: little technical assistance, if we had this technical assistance granted we would be able to carry on our experiments in a far more ambitious fashion.

ALLAN MACARTNEY: So that, summing it up, you would hope that your research would have application not only to Lesotho but Swaziland and perhaps the Transkei as well, in solving this regional problem?

DR. P. MARTIN: Yes indeed, if we send our students from this University to carry on this work we could get a very important amount of information very quickly. We have already got two people in the department who are interested, they have expressed a great interest to take on this study - the more students whom we can interest in this type of experiment the better.

COSMO PIETERSE: The more students we can interest in this type of study the better. Dr. Philip Martin - Senior Lecturer in Biology on the Roma Campus of the University of Botswana Lesotho and Swaziland talking to Allan Macartney about his research in cancer. And that's all from 'University Report' this week - next week creative writing at Makerere University in Uganda - one of the questions discussed - should African Universities be subsidising artists and writers in particular? Tune in to hear Robert Scrumaga take an axe to that one!

BROADCASTING RIGHTS: FREE FOR USE BY
ALL BROADCASTING ORGANIZATIONS OUTSIDE
BRITAIN IN ENGLISH OR TRANSLATION.

PUBLICATION RIGHTS: NOT FREE FOR
PUBLICATION OUTSIDE BRITAIN IN
ENGLISH OR IN ANY OTHER LANGUAGE.