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**Dr Denis Burkitt, CMG FRS in interview with Dr Max Blythe
Oxford, 10 December 1990**

Interview Two

MB Denis, I'm going to break in at this point and ask you about your overseas wartime. We talked about Olive being left at home. What happened? You were overseas in Africa for two and half years.

DB Yes. I was first of all posted...I didn't know where I was going. But when we got somewhere near Gibraltar we said, 'Now, if we now turn eastwards we're going to the Mediterranean, if we go southwards we're going to South Africa.' And we turned east and then we got to Port Said, where we got de-shipped and put into a train and brought down to Port Taufiq, where we were under canvas - miserable part of the desert - for a time. And then we got on to another ship and brought down to Mombasa. Now you see I'd heard so much about Mombasa and Kenya from my Uncle Roland as a boy, it was rather fascinating seeing, with my own eyes, Kenya. So we were de-shipped at Mombasa and I think we spent a night in some sort of transit, and then we went by train up, four hundred odd miles to Nairobi. Now, without mentioning any names, I think I should mention one circumstance. We were on a dry ship, with no alcohol, which didn't worry me as a non-drinker. But I can remember a senior official, who was actually a medical in the department I was joining, was so drunk on the train that the African servants had to pick him up, carry him to bed and he would empty his bladder on the floor of the cabin - he was sharing a cabin with me. And I said to myself, 'Now, surely we as British government officials, all of us are ambassadors, and according to how we live and behave, many Africans are so going to judge our country for good or for bad.' And I just felt so disgusted with a man behaving in that way that I lost all respect for him, although he was my senior later on, I lost respect for him. But it was a wonderful journey. You know, to go through the Kenya highlands, which my Uncle had told me so much about; to look out the window of the train in the morning and to see the giraffes and the zebras and the ostriches and so on running all over the plains. It was a wonderful journey.

MB You found a deep attraction for this country right away?

DB Yes, I think I did. And I loved that journey up in the train. And then when I got to Nairobi we were put into a lorry - I forget if we walked or were put into a lorry - but we went to a transit camp, which meant a place with huts where all the arriving troops were put awaiting their postings. I had no Swahili. I was given an African servant who had no English. He kept saying 'simu' to me which meant I was wanted on the telephone. I didn't know what simu was and I had to learn a few simple words like simu for telephone and taa for lamp. And I went downtown and bought a hurricane lamp, which I think I had until we came home to England where I brought it with me. My uncle then had left, but I met his partners; I met some of his old friends who talked about him and knew him and loved him. And I twiddled my fingers for

hardly a week or so at Nairobi and then I was posted to a military hospital on the island of Mombasa, which was a school converted into a hospital. It was very hot, the hottest season of the year, December, January time. But I was doing surgery, I was in a hospital, the place was teeming with interest, places to bathe, and I think I was reasonably happy there. But I was glad when I was posted; three months later I got a posting up to Italian Somali Land. I flew up I suppose in a RAF plane, and there was the only posting in the army for three months I really disliked, because I had nothing to do. I was surgically in charge of a service station hospital, the whole of the hinterland was desert, to the other side was sea. By doing my work slowly and trying to sort of stretch it out I could keep moderately busy to about ten in the morning, but then there was nothing to do, so I was fed up doing nothing and wasting my time out there. And then I was promoted to major. I was captain at that time; I was promoted at that time to major and posted to be surgeon of a hospital in a beautiful area of the highlands of Kenya. Now, normally as a senior officer I would be able to get a position to fly down but the last thing I wanted to do was to fly down. I wanted to go down in a truck with all the other ranks and people, because to spend several days going over the desert and camping in the open at night would be so much more interesting. And I still have things I bought, camel bells and things on that trip. And I managed to avoid getting a flight down and to go down by transport. Now, I must mention, when I left Nairobi three months earlier, all my kit, my sleeping bag, everything was meant to go up by transport and it still hadn't arrived after three months. I picked it up again, I think, just before my next posting. But things like that happen. I suppose since that time one of the dreams which has frequently recurred to me in life has been losing my luggage, and I'm not sure that was the start of it all.

MB Never quite catching up with you.

DB But I went down by truck, sleeping out under a mosquito net in the desert, and I thoroughly enjoyed it. And we got down to a place called Nanyuki and went into a transit camp again, and by train down to Nairobi and then by car. In those days there were no tarmac roads; there were dusty, dirty roads. So we went by car from Nairobi. I suppose it must have been seventy to eighty miles through the Rift Valley up to Gilgil. And I spent a very happy - I suppose at least six months - very happy, more than six months time at Gilgil. I was in charge of the surgery there. It's a lovely country with piles of interest. There was an American mission station about thirty miles away called Naivasha (?) where they had a school, they had a printing press, they had a hospital; they were very kind people. And I used to quite often go down there for weekends. Some truck would drop me off on the main road and I'd walk the last five miles across the plains. But that was a nice break, they were very kind and I loved it. And I had a good correspondence with Olive all the time I was there and I really enjoyed Gilgil; I mean it wasn't a hardship at all.

MB You were quite clear that even after the war, whenever the war came to an end, you were going to go back there? By this stage you were clear you'd go back?

DB Fairly clear. But let me go a little bit further on. When I was at Gilgil I got leave and I went with another officer, whom I still keep a bit in touch with, and we went up to Uganda. We went by train to Kisumu on the east coast of Lake Victoria. We crossed the lake on a ship. And then we went to stay at Mengo Mission Hospital.

Years afterwards I was chairman of the board of governors, but I didn't expect that then. I went to stay at Mengo Hospital. I'd heard of it; it was a very well known mission hospital. And I went to stay with a farmer with a great tea plantation; a man who was a very fine Christian. We still keep in touch with his family. And then I went the whole way across Uganda on the most shaky, disreputable possible buses, but it was fascinating, right over to the Mountains of the Moon. And I stayed with a headmaster, a missionary doctor - not a doctor, a parson. We heard from him about a fortnight ago; we still keep in touch with him. And I went down to the south-west, lovely country, and a leper colony at Lake Kijanebalola (?) and met old friends and people there. And altogether the people were so friendly. I mean the Africans were so friendly. I was enormously attracted to Uganda as perhaps a place I might go to. I saw the teaching hospital and it just seemed to me that this is the place. And I still have the diary I wrote during that month, and it appealed to me enormously. I went back again then to my station in Kenya and it was in late 1945 I got orders that I was to be posted to the war in Burma. So we left everything. We went back to the transit camp again in Nairobi. I can remember leaving the transit camp because it was on my birthday and I was the officer in charge of the draft. I can remember walking out ahead of the whole column marching out of the station to go to Burma.

MB But it didn't happen?

DB No, it didn't happen. So we went into a transit camp near Mombasa for a few days and then we got on a ship and went across the Indian Ocean. And they didn't want me in Burma, so they dumped us all in what was Ceylon. To begin with I was just stuck in the middle of a jungle with a whole lot of African troops. And we were told to bring them down to the sea and teach them to swim, but they all knew how to swim far better than we did. You don't have to teach Africans to swim. So we just hung around. It's the only time in my life I ever remember seeing a tarantula, one of these big spiders about as big as your hand. But we were knocking around, I suppose for ten days or two weeks, in the jungle in tents, wondering what was going to happen. And then I was posted to a hospital in a beautiful site in the southern part of Colombo, a kind of a tourist centre now, a place called Mount Lavinia, right on the Indian Ocean and a beautiful place to be and I enjoyed it there. I was doing surgery. I wasn't busy; I was able to visit friends, people, in Colombo, and go and look at elephants and all the kind of local sites, it was fascinating.

MB Denis, I'm going to move us on a bit just to push us through the war a little bit to keep up with our time schedule. When did the war actually, effectively end for you and you got back to Olive?

DB I spent there months at Mount Lavinia, three months at another hospital at a place called Kadugannawa (?) outside Kandy, three months at another hospital and then I was posted to, we thought, Bangkok. But the war stopped before I got to Singapore and so instead of going to Bangkok we were shipped off to Singapore. I was stuck into a transit camp in a racing stadium there and I heard I was going to be de-mobbed, demobilised, and I sent a telegram to Olive and I just said 'Flying home'. And Olive thought I'd be home the next day, and it took me six weeks to get home because you went from staging post to staging post and went on the bottom of the list. But eventually I got home and rang up Olive and we linked up again after two and a

half years, rather strangers, but it was wonderful, and that was in early '46. And so we went to our home, my home in Ireland, together then to get to know each other after being separated. And I felt at that time that I should apply again to the Colonial Office, who turned me down before. But having been in Africa and worked in Africa, they couldn't say I'm not fit to work in Africa so they never referred to the previous interview at all; they said, 'Fine, we'll have you.' Now, I felt I couldn't say that I've got a vocation to work in Africa but I'll only go if, and if, and if, because that would make a vocation a farce. So I said, 'I only understand surgery, but I'll do whatever I'm asked to do.' And so six months later I had to leave Olive again with our first daughter on the way, which was the far hardest parting because I felt I was sticking a knife into her back in a way, it was far the hardest part. She couldn't come out with me but she joined me six months later and then we had a marvellous... I think we'd both say with ups and downs, but on the whole, a marvellous twenty years together in Africa.

MB In Uganda?

DB In Uganda.

MB Starting off as a medical officer doing very general duties.

DB Starting off as a medical officer up country. I thought I should have been sent to the University; after all I was only one of two qualified surgeons in the country.

MB Serving more than a half a million people.

DB Six million. And of course your wife feels that more than you do. But looking back it was dead right for two reasons. First of all, later on when I was senior consultant surgeon and responsible for surgery in all the hospitals, I used to visit every hospital in the country once or twice a year. Now, they knew that I had been in their shoes and that made much more understanding than if I'd come out as a kind of academic who had never been in their position. And later on when I got interested in geographical medicine and was collecting data from hospitals all over East Africa, I would visit these hospitals, do rounds with them, discuss patients with them, get to know them, and I was able without exception to get them to co-operate in collecting data for me with my research work. Now, if I hadn't have come out as one of them, as it were, I wouldn't have had the same open door to try and get a give and take. I would give them what I could and they would give me what I wanted. And I suppose I got 98% of the data - I got first full cancer patterns, and subsequently, for the whole bigger picture of diseases of western culture, through mission hospitals. Because the government officials are moved every six months or so, so you might find a chap's only been there a month. Now, how does he know what's common or what isn't, and he's not likely to enter into a programme if he's going to be posted in six months. But in the mission hospital, the fellow might be there thirty years or twenty years or ten years, it becomes his home. And also being out in the blue he welcomes with open arms the idea of getting involved in research because he doesn't know he can do really worthwhile things in the research, but when you can explain to him that he can be the key man, you get things done. You've got to encourage them. My friends used to tell me that I did most of my work by blarney. Blarney is this: if you meet a missionary

doctor in the wilds of the Congo or somewhere, and you say 'Good morning, Smith, you're a world authority.' 'Well he says, 'How can I be a world authority, working in this little hospital in the middle of the Congo forest?' Well I say to him, 'There's no-one in the world who knows more about the disease pattern in this tribe here than you do.' Well he says, 'Come to think of it, you might be right.' And he says to you then, 'What do I do?' Well, he expects you to tell him to write down all the common things and I tell him to get a book and a pencil and write down everything he doesn't see. That's the last thing he's thought of. And it's the things that you don't see that give the clue, particularly when you are talking about diseases which only occur in western culture. And before long he's got an article in the local journal and he realises he's doing something. So with a little bit of encouragement you can get all sorts of lonely people doing projects for you.

MB Denis, I want to spend the rest of our time together today talking about medical geography, geographical medicine as you talk of. It started with you looking at hydrocele. Is that right?

DB It did.

MB And some of the early work you described to me, actually, I felt I was seeing your father's robin territory maps again.

DB Well. I never heard the word geographical pathology. I didn't know I was doing it. But what very quickly struck me after...when I went up to Lira they had been doing about twelve major operations a year. I put it up to I think seven hundred in the first year. It was very easy to do that, and I suppose I was doing all the wrong stuff. I thought surgery was the only thing worthwhile because you could see immediate results. Perhaps it would have been better if I'd have been doing hygiene or something. After all, if I'd have been putting in drains or water supplies that would have done more for the community. But I found I spent nearly half my surgical time operating on hydrocele which is collections of fluid in the scrotum around the testicle. Now, in this country you call it a hydrocele if it's 10cc(cm³), or perhaps a bigger one might have 15cc. We had them up to a gallon. I mean, things I'd never heard of. I used to operate about eleven in the morning and I did them all under spinal anaesthetic because I only had a schoolboy with minimal training to pour ether or chloroform on to a mask. If I gave a spinal anaesthetic it paralysed the chap from the waist down, and I was only operating below the waist and so I felt peace of mind. But I used to operate on so many people. And then once a week I'd go out to a sub-dispensary to do a clinic and see people, and I'd bring back the people I'd operated on. And I had an open-backed truck and I would pick out a whole lot of other guys who needed surgery and bring them all back, and then return them again. And before long I recognised that all the hydroceles nearly were coming from the east of my district and not coming from the west. I had registered that. So we could do things then which you can't do now. I could write to the local chiefs in all the different dispensaries I visited and say, 'I'm visiting there next Monday week. I wonder could you just parade a hundred men, and put them in front of me.' And so they'd get a hundred men and you'd go down and see how many had hydroceles. I mean they'd all stand naked there; it was dead easy. And so I did this at each post along the Lango [district], and I found that on the eastern side of my district about 30% of the men had hydroceles and

on the other side of my district, only 1%, and it was a gradient from one to the other. And we found that this was due to microfilaria, which was the cause. Now, I don't know whether it's ever been followed up because I left the country. But I do remember hydroceles, and I published it in the *Lancet*. And that was my first sally into geographical medicine. I got into quite a lot of other things later on when I got to Mulago, but that was the first paper I ever published on geographical medicine. We published several other things. We got on to the lymphoma, which we'll do another week, and then we got on to western diseases. But that was the beginning.

MB But this was while you were still a medical officer responsible for a territory?

DB Lira, I might say...the nearest x-ray machine to me was two hundred and seventy miles away by dirt roads. And the doctors today could hardly diagnose anything without a computer and a CAT scan and I don't know what. You just have to learn to use your hands and the most simplest of things. And a lesson, which I'll bring up later probably, is: it's far more important in any situation, but particularly in the Third World, if you have a good guy - I don't mean, I was, but I'm talking about somebody else - a good guy with poor facilities, he does far more than the poor guy with all the facilities in the world. Now, we're talking about geographical pathology and how it helped me get on later to cancer. I spent a night a few weeks ago with a friend of mine who for thirty-eight years was a medical missionary in Uganda. And he built a mud hut - sun dried bricks, thatched roof, later on tin roof - and he plotted the different forms of cancer in his area from the mud hut. Marvellous job. Now, when he came back to England after thirty-eight years in Africa, the Queen made him a CBE, a Companion of the British Empire. Now, that is a decoration which many heads of major cancer research institutes would covet. To me, and to my friends who knew Ted [Williams], it was nice to see it going to a chap who had the ingenuity and the persistence and the doggedness, you know, to follow things through without facilities and yet do a marvellous job.

MB Just two points while I'm clearing this up. One, who was Ted?

DB Ted you'll come across in the 'long safari'¹. He was the fellow who bought and looked after and was responsible for the car.

MB Right. So we shall meet him in due course on that journey. The other one was, for people following our talk together, when was that first article on hydrocele published in the *Lancet*?

DB '46. Now wait I went out to Uganda in '46. I think it was either '47 or '48.

MB Right.

¹ The long safari refers to the 10,000 mile trip down the east side of Africa undertaken by Denis Burkitt and two colleagues in 1961, in order to obtain information about the geographical distribution of Burkitt's lymphoma. This journey is the subject of an interview recorded with Dr Denis Burkitt for the Medical Sciences Video Archive of the Royal College of Physicians and Oxford Brookes University, MSVA 056.

DB Possibly '48.

MB Denis, while we have time today we could go on a little bit more with the medical geography. You could tell me the next step along. Hydrocele was one step.

DB Hydrocele was one step. Now, there is another step we came across. I wasn't any more responsible than my colleagues for this, we published it jointly. We came across a very peculiar type of ulcer, where you have an ulcer and the skin all round it is undermined so you could push a forceps underneath all the way round, which is quite different from any other ulcer we were familiar with. And we found that it only occurred along the banks of the River Nile and nowhere else. Later we found that it occurred in at least one river in New Guinea, and that it occurred in one or two rivers in Australia, but I think about three of us reported it as an ulcer which only occurred along the Nile. Actually, all our cases at Mulago came from a village on the Nile called Buruli, or County Buruli, and we called it Buruli ulcer. Later we discovered it was due to an acid fast bacillus looking almost the same as tubercule. Where it came from I don't think we yet know, but it was so geographically located that in subsequent years I visited my old hospital in Lira and I found three or four patients with this easily recognisable ulcer. And there was a doctor from Poland or somewhere, a medical officer then, and I said to him, 'I know where all these chaps came from. They all came from Abugi.' And he got out the notes and they all did. He said, 'How in the world did you know that?' Well, I knew that they only had one dispensary on the Nile and these cases never happened anywhere except on the Nile and, therefore, they all must have come from this station. And that's just a little example of geographical medicine.

MB Denis, do you want to take me into the first meeting up with the lymphoma tumour?

DB Let me give you one more geographical one. There was another condition we came across which hadn't been described in children, where you had enormously hard masses of fat and skin which were almost as if you poured plaster of Paris underneath. You could put your hand under and lift them up - terribly easily to recognise clinically. It was called sub-cutaneous phycomycosis. But that again we reported the first cases in Africa, and it only came from certain areas. But now the lymphoma.

MB Yes, you met a child with a horrendous infection of jaws.

DB Well, we had from time to time over my first years in Uganda, we met children with a tumour, which we called (?), in one part of the jaw, round the face. And the pathology was just a round cell thing, some kind of a cancer. And we looking back - horrifying now - it was totally wrong, as ruthless surgeons, we would cut these out. Now, this was totally wrong, as we discovered later on. But a day came when I had finished doing my surgical ward rounds - we had three surgical units and I had one of them - and I got a message from Dr Hugh Trowell, who will come into our story a lot. He went out in 1929, and he was senior government physician also in charge of the paediatric wards. And the message was, would I as surgeon on call, go and consult with him on a puzzling case in the children's ward. Incidentally, later on when we get on to fibre and things, when I met him in a conference in 1970, we stood in exactly the

same place in that same ward and we have a photograph of it. But in any case he called me and he showed me a child with swellings on both sides of his upper jaws, both sides of his lower jaws, loose teeth, some of the teeth had fallen out altogether, and I had never seen, read or heard about anything like that. The path reports said it was round cells, but not much more, or something or other, and I was totally and utterly puzzled by it. And I said to Hugh, 'I've never seen anything like this.' I imagine I just stuck it in my mind and I said, 'This is a curiosity, neither of us with ever see a case again, so we needn't be over anxious about it because you all see curiosities occasionally in life. Then a few weeks later - I was in charge of all district surgery at that time - I was doing surgical ward rounds in the hospital at the beginning of the Nile at Jinja, where the Queen opened the hydroelectric dam just before she was made Queen - I think her father died during that visit. And I was doing a ward round, I looked out of the window - when I say a window there was no glass in the window, just a wooden shutter - and I saw a mother and a child sitting on the grass outside and the child had a swollen face. And something prompted me to leave my ward round and go out and look at that child. And I saw exactly the same thing as the curiosity I had seen a few weeks before, and I said I can't let this pass. If you see something twice it's not a curiosity, we must get hold of it. And so I did what you could do then - I don't know whether you could now - I plonked the mother and the child into my car and I drove them back to my wards in Mulago Hospital and began to investigate, and found that there were not only tumours in the jaws but other parts of the body as well. And this led me into my investigation of these jaw tumours.

(At this point in the interview Dr Burkitt starts referring to slides illustrating children affected by the tumour.)

Now, let me show you first of all the different parts of the body, the characteristic distribution, which can be involved in what turned out to be a single tumour syndrome and not a whole lot of different tumours, as had previously been considered. Now, here we have a child with a tumour of the right maxilla together with the mandible. Here we have two jaws [quadrants of the jaw] involved; in the last picture we had three jaws involved. Now the second commonest presentation after jaw tumours, which were the commonest, were swellings in the abdomen. The swellings in the abdomen might be tumours in the liver and very commonly tumours in the kidney. And here we see the tumours of the kidney involving not only both kidneys, but with multiple discrete tumours scattered throughout the kidneys in contrast to something like a nephroblastoma or a hypernephroma, which was a tumour involved in a kidney. Now, we also had tumours in the ovaries; very common in young girls, and yet tumours of the ovary in young children are exceedingly rare. And here we have bilateral ovarian involvement of a girl aged three. The third commonest presentation after abdominal tumours was paraplegia, paralysis of both legs together with total sensory loss. And here we have a child with total loss of sensation and of movement in both legs with bedsores developing because she had been confined to bed. This we found later to be due to tumours at the back of the abdomen impairing the blood supply to the spinal cord, easily distinguished from (?) paraplegia in tuberculosis, in which you have clinical kyphosis and radiological evidence of kyphosis? to the spine, which is absent, of course, in these patients. Then there are many other parts of the body can be involved. We have got tumours of the long bones, here the lower end of the femur associated with a pathological fracture. Or we found tumours of the thyroid, and again like the kidneys, bilateral, both lobes of the thyroid involved and associated with a jaw tumour, again suggesting that these are all part and parcel of a

single process and not distinct separate tumours. Here we have a tumour of the right testis. You notice the testis is hanging lower than the other side because it is enlarged, and all the tissue of the testis and the epididymus has been replaced by tumour tissue. Tumours here of the salivary glands, the parotid and submandibular salivary glands. And the interesting thing is that although this tumour turned out to be a lymphoma, it tended to avoid peripheral lymph nodes, whereas all other forms of lymphoma selectively involve peripheral lymph nodes. We found that this tumour could surround, without going into it, the peripheral lymph gland and then grow happily in something like the salivary gland. The first thing that clicked in our thinking was this: these different tumours, they didn't all occur in any patient but they tended to occur together. You might get jaws and ovaries, or ovaries and long bones, or long bones and kidney, or kidney and jaw. There was a particular pattern of tumour: they tended to occur together; the jaws didn't have to be involved, and therefore it couldn't be the primary. And previously these were all considered to be totally different cancers. If they occurred in the eye, they were small round cell tumours, they were called - a well-known tumour - retinoblastoma. If they occurred in the kidneys, they were nephroblastomas - small round celled tumour. If they occurred in the ovary they were granulosa cell tumours - small round celled tumour. If they occurred in the long bones they were (?) tumours - small round celled tumour, and so on and so forth. And according to which doctor saw them - they might be in the gynaecological clinic, they might be in the dental clinic - and according to which pathologist wrote a report, they were all given different names and put into different compartments. Now, you can't in any way blame the pathologist because the pathologist has to make a diagnosis of something that's in the book; he can't diagnose something which isn't in the book, so all he could do is to go as near as possible. And in other parts of Africa the ovarian tumours had been written up as tumours of the ovaries, or people said retinoblastoma were unduly common in Africa; they weren't retinoblastomas. So the first bit of the doctor's thinking was: if all the results of a common cause tend to occur together, therefore, if things tend to occur together you must at least assume the possibility that there might be a shared or common cause. See, if you smoke cigarettes - the same community, the same people - they get lung cancer, they get bronchitis and they get stained fingers, now, because they're all due to smoking cigarettes. No one says lung cancer is due to having stained fingers, but they all have the same cause, smoking cigarettes. So I said, 'Now the only logical deduction is that these are not a whole lot of different tumours, that they are all somehow connected, and they must all therefore have some basic cause. Now, we looked into the age distribution, and these tumours, particularly of the jaws, were unknown under the age of two, they rose up to a peak about seven, eight, nine, and they pretty well disappeared by about twelve. Now, no other children's cancer has that distribution, and the distribution was the same whether it was a jaw, or a kidney, or an ovary, or what have you. So that was an additional factor, just from ordinary deductive thinking, to say that there must be some connection between these tumours.

MB The cytology would have...

DB No, not till later. Still we just talked about a tumour syndrome. The cytology settled it all later. But, first of all, we then found the cytology was still round cell tumour, and that all the patients were coming from the north and east of our country, where they had less thick populations, less good transport than the south and the west. The areas which were the most densely populated and with the best transport were not

providing them, and that seemed to be an anomaly. Now, I am not quite sure where along the line it was, somewhere after this, Greg O'Connor, an excellent pathologist, and Dennis Wright, an excellent pathologist, went back to all the histology records over the last ten or twenty years and re-classified them. Dennis Wright was the first person - and he was proved right - that if he was shown a section of the cells of this tissue, with no other information, of the site or age or anything, he could detect it from the cytology. He wrote that up in about 1964, a little bit later, but then Greg O'Connor wrote it up too, and the cytology eventually proved that they were all the same. We published it first as a syndrome involving the jaws in African children. We said involving the jaws, but we knew it could occur without the jaws. We said a syndrome because we were not able to say what it was histologically, but it was the same picture as it were.

MB So this was in the sixties and this was published in the *Lancet*?

DB This was published in the *Lancet*, I think, yes. I think Dennis Wright's paper came out about in '63 or something like that, but he had presented it also at the four yearly conference of the UICC, (Union Internationale Contre le Cancer) in Paris, where I presented three papers too. And the conference was almost dominated by this tumour; we had reports from all the world. But you see, once we knew...but at that time - we were getting people from the north and the east, not the south and the west - I was visited at about that time by a very good friend called George Oetlé, who was director of the cancer research programme in Johannesburg in South Africa - excellent chap, great friend. And George said something to me which clicked, he said, 'Denis this tumour doesn't occur in South Africa.' So I said to myself, if this is one of the commonest - and it proved to be not only the commonest, but commoner than all other children's cancer added together in tropical Africa - and it doesn't occur in South Africa, with excellent records and everything, it must have a limited geography. So there were two things I wanted to find out. Number one, do you everywhere that people get jaw tumours, do they also get the other tumours, the kidney, the testis and so on? That's the first thing we want to know. The second thing we want to know is, first of all where this is unknown and where it occurs? And then we might be able to draw a map of where it occurs, and that's going to give you an opportunity of saying what operates in that part of Africa which doesn't operate anywhere else in the world except in New Guinea and Malaysia, that's all we knew in those days. So what we did is from my own photographs - I should have brought one of those along with me - but from my own photographs I made a leaflet with three pictures. One of them with four jaws, one of them, I forget, one of two jaws and one of them some other part of the body. And then I put a brief description in of how do you recognise this tumour. And I wanted to send these all over Africa to find out where the tumour occurred and whether other tumours occurred at the same time. It's fun looking back. The research grants available were very minuscule. I put in for two research grants: some money they had at government for research, but nobody ever put in for a research grant, they didn't know what to do with it. So I got two grants, one was for £10 and one was £15, the two together amounted to £25. I used most of that on postage stamps and I used what was left over from postage stamps on printing these, locally, these little illustrations. And for the £25, or \$75, or something we drew the initial map of tumour distribution, which must have almost gone into thousands of papers and all that's been written about that ever since. Which is nice to bring out the facts. There is in

America, a concept - and I think there's some in this country - that research is rather like a sausage machine, and the more dollars or pounds you put in this side, the more ideas come streaming out the other side. Now, you can't turn dollars into ideas. You can sometimes put in ideas and get out pounds or dollars. Often the group with the most pounds or the most dollars have the least ideas. So we've always been glad that we ran on a shoestring because we found a challenge attractive. Now, this brings on - I don't know whether you want to go on any further - this brings us on into the long safari, really.

MB I'm going to make that the subject of next times interview because there is a big story to add to where we've already arrived, and I thought that we might close now today. We've had a long session, and anticipate the long safari at our next meeting Denis, thank you.

DB Thank you.