

MINUTES OF THE FOURTH MEETING

WHO Conference Hall
Thursday, 22 September 1966 at 2.30 p.m.

CHAIRMAN: Dr S.R. Sayampanathan

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Fourth MeetingThursday, 22 September 1966 at 2.30 p.m.PRESENTI. Representatives of Member States

AUSTRALIA	Dr. H.E. Downes Dr R. Taureka
CAMBODIA	Dr Thor Peng Thong
CHINA	Dr C.K. Chang Dr T.C. Hsu
FRANCE	Médecin-Général M. Orsini
JAPAN	Dr M. Matsuo Mr K. Watanabe Mr Y. Matsuda
LAOS	Dr Koukèo Saycocie
MALAYSIA	Dr L.W. Jayesuria Dr R. Dickie Dr C.H. James Mr Abdul Aziz bin Mohamed
NEW ZEALAND	Dr C.N.D. Taylor
PHILIPPINES	Dr A.H. Cruz Mr J.M. Morales Dr A.N. Acosta Mr V. Buencamino Mr W. Ilustre Mr J. Alvarez Mr I. Bantug Mr B. Hizon Mr D. Gonzales Mr P. Viray Mr A. Asuncion Mr I. Nicanor Mr R. Austria
PORTUGAL	Dr Nuno Campelo de Andrade Dr Manuel Florentino Matias Mr Carlos da Luz Nunes

REPUBLIC OF KOREA	Dr Y.K. Cha Mr J.H. Suh Mr N.J. Choi
SINGAPORE	Dr S.R. Sayampanathan
UNITED KINGDOM	Dr P.H. Teng Dr C.H. Gurd
UNITED STATES OF AMERICA	Dr R.K.C. Lee Dr H. De Lien Mr M.K. Koizumi
VIET-NAM	Dr Lê-Nhân-Thuân
WESTERN SAMOA	Dr J.C. Thieme
II. <u>Representatives of other intergovernmental organizations</u>	
SOUTH PACIFIC COMMISSION	Dr G. Loison
III. <u>Representatives of non-governmental organizations</u>	
INTERNATIONAL COMMITTEE OF CATHOLIC NURSES	Mrs M. Ordonez
INTERNATIONAL COUNCIL OF NURSES	Mrs R.S. Diamante
INTERNATIONAL PLANNED PARENTHOOD FEDERATION	Professor Han Su Shin
THE WORLD MEDICAL ASSOCIATION	Dr J.C. Denoga
IV. <u>WHO Secretariat</u>	
REPRESENTATIVE OF THE Director-GENERAL	Dr P.M. Kaul Assistant Director-General
SECRETARY	Dr Francisco J. Dy Regional Director

At this meeting Dr SAYAMPANATHAN (Singapore), Vice-Chairman, took the Chair.

- 1 THE EPIDEMIOLOGY OF FILARIASIS IN THE WESTERN PACIFIC REGION: ITEM PROPOSED BY THE GOVERNMENT OF PORTUGAL: Item 15 of the Agenda (Document WPR/RCL7/8)

The CHAIRMAN invited the Chief Representative of Portugal to introduce this item.

Dr ANDRADE (Portugal) referred to document WPR/RCL7/8 prepared by the Secretariat, which summarized the situation in various countries where the disease prevailed. The Representative of Western Samoa had conveyed to the Committee earlier some important information on the progress of activities in his country. His delegation considered it opportune for the Committee to review the problem and he hoped that representatives would report on the situation in their own countries.

Filariasis was found in Portuguese Timor and the incidence varied from 5 per cent. to more than 20 per cent. Lymphoedema appeared in rates from 1.9 per cent. to 5.7 per cent. Wuchereria bancrofti was present, and another type, similar to Brugia malayi but with some peculiar characteristics, had been found recently. Pathologically, it had a pattern similar to W. bancrofti but only rarely had it been found to produce lesions on the genitals. Its periodicity was found to be nocturnal. The study of this new type of microfilariae had been started by David and Edeson and was being continued by Professor Cruz Ferreira of the National School of Public Health and Tropical Medicine. Anopheles barbirostris was considered to be the vector. The routine treatment adopted was hetrazan (diethylcarbamazine) - six tablets of 0.06 gms. a day per month for a year.

Several blood samples had been found to be negative four to five months after treatment. Prophylactically, hetrazan had been used in doses of three tablets, also once a day per month, in hyperendemic areas. Blood was checked every six months. Trials had started in 1965 and were continuing.

Dr DOWNES (Australia) stated that filariasis in Australia was interesting for two reasons: the worm was first discovered by Joseph Bancroft in Brisbane, Queensland in December 1876. Microfilariae were found to be endemic from northern New South Wales to the north-east of Australia. Endemicity was mainly concentrated in the Brisbane area and the vector was C. pipiens fatigans. Clinical manifestations of the disease included lymphangitis, hydrocele and elephantiasis. In 1909-1910, 11.10 per cent. of the admissions to the Brisbane Hospital had microfilariae. In 1922-1924 the incidence had gone down to 5 per cent.

Dr TAUREKA (Australia) stated that, as far as was known, all filariasis in the Territory of Papua and New Guinea was due to nocturnal periodic W. bancrofti. The disease was endemic in the coastal areas up to 1500 feet, but in some localized areas transmission occurred at higher altitudes. In general, about 30 per cent. of the population might be infected, but clinical manifestations were relatively low; for example, hydrocele was 5 per cent., elephantiasis was 1-2 per cent. In this general distribution, there were localized areas in which the disease was much more highly endemic and where the infection rate was 50 per cent. and the elephantiasis rate as high as 12-13 per cent. These hyperendemic areas were associated with a higher index of transmission. The main vectors were members of Anopheles punctulatus. Culex p. fatigans was

not susceptible to infection, but was perhaps a vector of secondary importance. A small-scale control project (this was not eradication) had been carried on for over seventeen years by the School of Public Health and Tropical Medicine of Sydney. Hetrazan was shown to have reduced the microfilariae endemicity but did not bring it down to zero. Residual insecticides partially interrupted transmission because of the longevity of the life of the worm which was up to twenty years. Control measures had been applied for long periods even though residual insecticides did not bring the percentage down to zero.

Dr THIEME (Western Samoa) said that a different type of bancrofti was found in Western Samoa. This was diurnal sub-periodic. The vectors were Aedes polynesiensis, Aedes samoanus and Aedes upolensis. The endemicity in rural areas was from 16 to 38 per cent. The town area was less infected, the endemicity being only 16 per cent. A campaign had been started in May last year in which ten million tablets of hetrazan had been distributed. This had been thought sufficient for the population of 120 000 people. Later on, it had been found that the population had increased to 135 000 and the tablets had, therefore, been increased to twelve million. Distribution had been made by the district medical officers to the women's committees. The tablets had been given weekly for six weeks and twelve doses had been given every month, making an eighteen-dose regimen. There had been good support on the part of the people and only a few had refused to co-operate, although some had forgotten to take the tablets and therefore the percentage of infection had risen. Preliminary results had revealed a definite reduction in cases in some areas where the incidence had gone down from 27.6 to 1.7 per cent. In another area with a higher rate of 38.1 per cent., the

incidence had fallen to 5.1 per cent.; in one area it had been reduced from 32.2 per cent. to 7.3 per cent. Of particular significance was the reduction in the density of the carriers of microfilariae, generally to 1-2 per cent. In some areas it was now below 1 per cent. The positive cases were being followed up and treated.

Dr JAYESURIA (Malaysia) stated that the examination of slides by workers attached to malaria teams had revealed that filariasis did in fact exist in Sabah and Sarawak. No information was, however, available on the extent of the disease.

In West Malaysia human filariasis was due to two species - Wuchereria bancrofti and Brugia malayi. Infection by W. bancrofti was first regarded as rare but recent work during the past decade had shown that this infection was more widely distributed than originally suspected, especially in the rural areas where it affected the Malays and the aborigines. The urban vector of W. bancrofti was Culex pipiens fatigans. In the rural areas transmission had been attributed to A. whartoni and A. maculatus. Brugia malayi occurred in swampy areas around the mouths of rivers and in paddy fields in the northwest. It also occurred in other scattered areas of the country, although the people there were not so heavily infected. The vectors in the hilly regions were not definitely known but Mansonia dives, A. donaldi and Aedes chrysolinaetus might be involved. B. malayi occurred in two forms - the periodic form where the microfilariae exhibited nocturnal periodicity, and the semi-periodic one in which the microfilariae were found by day as well. The two forms were transmitted by different vectors.

The periodic form was characteristic of the coastal paddy fields and swampy areas of South Kedah, Penang (mainland), Penang Island and

North Perak. Transmission was attributed to A. compestris (formerly known as the dark-winged A. barbirostris) and to a lesser extent by M. uniformis, M. indiana and M. annulifera. This type of terrain had no reservoir of animal infection.

The semi-periodic form was characteristic of swampy forest areas and had animal reservoirs of infection, particularly the dusky leaf-monkey (Presbytis obseurus) which had a natural infection rate of 70 per cent. Transmission was by various species of Mansonia, particularly M. bonnea, M. dives, M. annulata and M. uniformis.

W. bancrofti infection was not heavy and the clinical features were relatively rare. Occasional cases of lymphangitis, hydrocele and chyluria had been noted in association with microfilariæmia.

There was no significant difference in the clinical manifestation between the two forms of B. malayi. Infected humans developed enlargement of lymph glands, a retrograde lymphangitis and transient swelling of the affected limb with slight eosinophilia, or a marked leucocytosis and eosinophilia associated with preliminary changes. These early stages generally passed unnoticed by the population. Attacks of adenolymphangitis, lasting three to five days often associated with fever, occurred at irregular intervals. The affected limbs, nearly always the legs below the knee in B. malayi infection, might show transient swelling during the attacks and ultimately lead to elephantiasis. Sometimes abscesses were associated with the attack. Recent work suggested that eosinophilic lungs or tropical eosinophilia in Malaya might have a filarial aetiology.

It was estimated that 5 per cent. of the total population had filariasis mainly due to B. malayi, about half of them living in the

more heavily infected areas or the banks of the large rivers as they flowed into the sea. In such areas, up to 45 per cent. of the people had microfilariæmia and 5-6 per cent. elephantiasis of the legs.

The control programme was divided into two phases. In the first phase all persons (about 155 000) living in the more heavily infected areas were treated. In the second, the work was to be extended to the less heavily infected areas and at the same time resurveys would be carried out in the area covered previously and retreatment given where necessary. A four-man team worked under the supervision of a health officer. It was estimated that the team should be able to treat 3000 to 4000 people a year at an all-in cost of M\$25 000 (about US\$8300) per annum, i.e., around M\$6.50 (US\$2.15) per person treated.

Mass treatment of an area was indicated when the microfilariæ rate in the community was above 10 per cent. and there was reappearance of clinical filariæsis. The drug used was citrate of salt of diethylcarbamazine (a piperazine derivative) given orally in a standard dosage of 5 mg. per kg. body weight in weekly doses for six weeks. Pregnant women, the sick and infirm, and infants under four months were excluded from treatment. House visits were made for two or three days after treatment to provide palliatives, in the form of aspirin, fomentations, etc. During these visits, previous absentees might be found and treated. Lymphatic reactions due to the effect of the drug on the adult worms occurred in up to 4 per cent. of the people treated, commonly after the second or third dose. Depending on the density of the population and ease of access to the area, a team could deal with 300 to 400 people a day.

A systematic filariasis control campaign was instituted in 1961 with six trained teams operating in areas of high endemicity. In the Bukit Meriam area of Central Kedah, a low-lying swampy area of about twenty square miles with a population of about 4000, some 3227 people had been examined in 1959. The microfilaria rate had been 26 per cent. and the mean number of microfilariae per 20 c.mm. of blood was 2.6. Ninety-one per cent. of the people had been treated. In a re-examination, some seven to twelve months later, it had been found that the microfilaria rate had declined from 26 per cent. to 1.5 per cent. and the mean number of microfilariae in 20 c.mm. of blood from 2.6 to 0.18. In 1962, a blood survey was carried out in the area. A total of 2972 people were examined and it was found that the microfilaria rate was 0.58 and the mean number of microfilariae in 20 c.mm. of blood was 0.058. An examination of 324 children born in the area since the control campaign started showed that none of them had contracted the infection.

In areas where a reservoir of animal infection was present and where control of vectors was not a practical proposition like the Pahang Tua area of East Pahang, it would appear that retreatment of all positive cases every two years alone would not be sufficient but mass treatment should be carried out, in addition, once in every six years or so.

Dr CHA (Republic of Korea) said that filariasis was not a major public health problem in his country. Several endemic areas had been reported. B. malayi was the only known specie of human filaria. The clinical pattern was quite similar to that of filariasis bancrofti. Recently, from 1965 to the early part of 1966, a small survey had been made on Cheju Do Island. The two villages concerned were located in the southern coastal area of the island, about thirty miles apart.

The microfilariae incidence in one village was 16 cases out of 228 people, or about 7 per cent., and in the other, 79 cases out of 336 people, or 22.2 per cent. The findings in the survey indicated that the principal clinical manifestation was elephantiasis which showed sex and age differences. Eighty-four cases had been observed in the two villages - 30 were males and 54 females. A higher incidence of elephantiasis had been observed among people over twenty years old. The cuticular hypotrophic changes (elephantiasis) appeared more often in the lower extremities, 77 per cent. more often than in the upper part of the body. Microfilariae had been found in the blood in 4.7 per cent. of 84 cases, and 19 per cent. of the cases had complained of occasional high fever; 2.4 per cent. had lymphangitis only in the lower extremities. No chyluria were observed in Cheju Do.

Dr HSU (China) said that filariasis was a serious public health problem in only a small part of the province and in Pescador, which was located between Taiwan Island and Mainland China. W. bancrofti was present and C. pipiens fatigans was the sole vector. B. malayi had never been found among the local people, but only in people coming from Mainland China or Chinese students coming from South-East Asia.

The control programme had been started in 1958 and since then US\$130 000 had been spent on it. Although it was nearing a successful conclusion, to eliminate the disease would require continued efforts for a considerable length of time. In Pescador, the entire seventy-four villages had been examined and it had been found that the incidence of filariasis ranged from 0.5 to 17.5 per cent., averaging about 8.3 per cent. In Taiwan proper, an island-wide survey had been made and 180 villages with a total population of 300 000 had been found

to be affected. The incidence in these 180 villages ran from 0.2 to 10 per cent. The control programme was carried out by means of anti-parasite measures, that was, detection of microfilariae carriers by mass blood survey and drug treatment of carriers detected. This was repeated once a year in the endemic area. The objective was to reduce the microfilariae rate in every endemic village down to a level below 0.5. Mass drug treatment had also been given in some relatively highly endemic villages during the period 1960 to 1963. Insecticide house spraying with HCH had also been applied. In all of the 74 villages in Pescador, the microfilarial rate had been brought down to 0.7 per cent. In 1963, mass resurvey and treatment had been carried out in all the villages in Taiwan proper. At the end of June 1966, there were only five villages recorded with a microfilarial rate of over 0.5 per cent. for both Taiwan proper and Pescador.

Dr ORSINI (France) referred to the filariasis control programme carried out in French Polynesia by the Institute of Medical Research. This was based on drug treatment of carriers and control of mosquito larvae. Carriers were detected through blood surveys. In Tahiti, 6.8 per cent. carriers of microfilaria had been found. Studies were being carried out to find the most suitable treatment regimen. The drug (diethylcarbamazine) was prescribed for oral application once every two months, at a dosage of 6 mg. per kilogramme body weight. In 1965, 19 000 blood examinations had been made, 10 000 for drug treatment; 2 per cent. of Aegypti polynesiensis were found positive for filarial larvae.

The REGIONAL DIRECTOR drew attention to the Inter-regional Seminar on Filariasis which had been convened in Manila last year. Copies of

the report had been distributed to governments in the Region, as well as to those in other regions which had participated. Further copies were available.

The Regional Director then referred to the various statements made by the Representatives and asked if the Rapporteurs had now sufficient material to draft a resolution.

Dr HSU suggested that the resolution might contain reference to the importance of continuing efforts to control the disease. Experience had shown that it could be controlled. In Taiwan, for example, the incidence had been reduced from 8 per cent. to 0.5 per cent.

Dr ANDRADE supported this proposal.

Dr THIEME suggested that it might be useful to ask for UNICEF's continued support to such campaigns.

The CHAIRMAN believed that nobody would disagree with this suggestion. He then asked the Rapporteurs concerned to draft an appropriate resolution. (For consideration of draft resolution, see minutes of the fifth meeting, section 1.)

2 THE EPIDEMIOLOGY OF ENDEMIC GOITRE IN THE WESTERN PACIFIC REGION:
ITEM PROPOSED BY THE GOVERNMENT OF PORTUGAL: Item 16 of the Agenda
(Document WPR/RCL7/9 and Add.1)

The CHAIRMAN invited the Chief Representative of Portugal to introduce this item.

Dr ANDRADE (Portugal) stated that endemic goitre occurred in varying intensity in the Western Pacific Region, but was a public health problem

in some countries. In Portuguese Timor, the rate was 4.9 per cent., i.e., 2697 cases in a population of a little more than 55 000; 63.6 per cent. of the cases examined belonged to Type 1, 25.9 per cent. to Type 2 and 10.4 per cent. to Type 3. So far, there was no evidence of related deafness, dumbness or intellectual deficiency. The hardness of water and its iodine contents had been checked in water samples from twenty-eight sources in one of the endemic areas. Both had been found to be low. Until now, no known goitrogenic factors had been detected. In the meantime, the Health Services were prepared to implement a control scheme based on mass application of iodine oil injections such as was being done in New Guinea. As documentation on the control of goitre was incomplete, it was considered useful to bring this to the attention of the Committee for discussion and advice. It would be interesting to hear of the experiences in New Guinea.

The REGIONAL DIRECTOR referred to document WPR/RCL7/9, which summarized the information available in the Regional Office. He also drew attention to the addendum to this document which contained the most recent information secured from Papua and New Guinea.

Dr JAYESURIA (Malaysia) admitted that no systematic survey or study had been made of endemic goitre in West Malaysia, although there had been a number of ad hoc studies, observations and investigations, which provided a fairly good picture of its epidemiology and prevalence. Polumin, in a study of the disease among aborigines, had shown that thyroid enlargement occurred in about 40 per cent. of those under study and that there had been little difference in the incidence of goitre between aborigines and Malays living in the remote inland districts. He had also observed that thyroid enlargement was commoner in females

in whom the gland tended to enlarge and become more nodular with increasing age. Endemic goitre had also been found by Polunin in the hills and valleys of Kedah and Upper Perak and in the interior of Kelantan and Trengganu. Other goitre areas in Malaya had been discovered on the western slopes of the main mountain range in Selangor and in Negri Sembilan. Subsequent investigation in 1959 by a medical team in a district in Kedah had confirmed Polunin's findings.

In a study carried out by Ng Cheuk Hing, Surgical Specialist of the District Hospital, Klang, it had been observed that about 5 per cent. of the cases in the surgical outpatients' department complained of thyroid swellings, and it was obvious that there were many more milder cases which never turned up in the hospital. The enlargement tended to be uniform in the younger age group and nodular in the older one. He believed that the lack of iodine was not the only cause for goitre, as the diet of the poorer people living along the sea coast contained enough and the cases had been shown to have normal serum-bound iodine levels. It was possible that auto-immunity might be an important factor. These cases had been shown to be positive to the Zinc Flocculation and Thymol Turbidity tests. It had also been noted that the older age group tended to be hypothyroid. The high pregnancy rate in Malaysia, with its increasing demand on the thyroid, might also be a contributing factor. Cases among children under fifteen years were rare and this further confirmed that the lack of iodine was not the only cause. The incidence started about puberty, coinciding with the increasing demand on the thyroid. The enlargement was uniform. The incidence would rise up to the age of thirty-five when the goitre became nodular and hypothyroid and did not seem to subside without treatment. The disease was much more common in females.

Although the admission of goitre cases in the hospitals showed a rising trend, this did not necessarily mean an increase in incidence. The rise might be attributed to the increasing knowledge of the population and overall admissions into hospitals over the past decade which had almost doubled. From the various studies and observations available, it appeared that Malayan waters were usually soft and their iodine contents exceedingly low, ranging from 0.2 to 0.5 parts of iodine per thousand million. The higher percentage in the tropics of run-off water, which had not had the opportunity to leach iodides out of the soil, might lower the river water iodine concentration. For an area to be goitre-free the water should contain 3-5 parts of iodine per thousand million.

Goitre occurred especially in remote inland areas where transport was difficult and where there was an adequate supply of local river fish with a low iodine content. In more accessible areas dried sea fish was the important item of the diet and the analysis of four of the principal dried sea foodstuffs gave iodine contents from 36 to 134 parts iodine per hundred thousand. On the other hand, observations of cases among population-groups living nearer the sea coast tended to show that, even though their diet might contain enough iodine, auto-immunity and high pregnancy rates with their increased demand on the thyroid might be a contributing factor.

Dr DICKIE (Malaysia) stated that no systematic study had been made as yet in Sarawak or Sabah. However, a number of years ago, it had been recognized that there was a considerable incidence of visible goitre, especially in the upper reaches of rivers in all the five administrative divisions of Sarawak. Dr Dickie referred to the statement in paragraph 1.5 on page 3 of the document which said, "Goitre is endemic over a large

area of Sabah." His colleague from Sabah had informed him that this was not quite correct, as visible goitre was restricted to three fairly circumscribed regions. In Sarawak, it was more widespread and was, in fact, found in all the divisions. Accurate figures of the incidence of the disease were not available but in some areas where ad hoc surveys had been made the figures were much the same as in West Malaysia, that is, between 20 and 40 per cent. In 1958, the Kapit and Kanowit Districts in the Third Division of Sarawak had been particularly affected with a high incidence around the Rejang River and its tributaries. As a result, the Government had decided in 1958 to set up a salt iodization plant in Sibul, the divisional headquarters. Co-operation between the importers of the salt and the Government was very good and it was known that nearly 100 per cent. of all the salt consumed in the up-river endemic areas of this Division was now iodized. In order to check whether the salt was, in fact, reaching the upper reaches of the river and getting to the long houses, a simple process had been introduced at the iodization plant whereby a minute quantity of a green vegetable dye was put into it during the iodization process. This "green salt" was now well known to all the people in these areas. They were informed by means of posters and radio propaganda and now demanded it.

A second salt iodization plant had been set up in Kuching, the capital of Sarawak, where a large proportion of the salt destined for the ulu areas of the First and Second Divisions and also, to some extent, for the Fourth and Fifth Divisions, was imported. This plant was expected to come into operation in January next year and arrangements had already been made with the salt importers. It was hoped that by next year most of the salt going to the goitre endemic areas of Sarawak would be iodized.

The REGIONAL DIRECTOR pointed out that the working paper prepared by the Secretariat had been based on a monograph published by WHO in 1960 and therefore the information it contained was not up-to-date. It was especially inadequate in so far as New Zealand was concerned because an intensive programme of salt iodization over several decades had succeeded in practically eliminating goitre in New Zealand.

Dr TAYLOR (New Zealand) confirmed the Regional Director's statement that goitre had virtually been eliminated in New Zealand. It had been found that it occurred in both races. In the Maori race it was associated to a large extent with giving up their seafood diet and taking to the European diet. The control of goitre had been brought about by having under the Food and Drug Regulations a requirement that iodized salt should contain between 0.75 and 1.5 parts of iodine per 20 000 and the surveys that had been done from time to time showed that, in general, iodized salt was used almost exclusively in the homes.

Dr CRUZ (Philippines) stated that in 1965 questionnaires had been sent to the provincial and city health officers in the different parts of the Philippines and the partial returns received showed that goitre was widely distributed, cases having been reported especially in the Mountain Province and in Oriental and Occidental Mindoro. These findings had been verified by malaria workers who distributed iodized salt to the native population of these provinces. The situation was now being assessed and it was hoped that more information would soon be available.

Dr HSU (China) stated that goitre was a problem in Taiwan. Salt was iodized and the Government held the monopoly for its production and sale. A goitre control programme had been started last year and from

October this year it would be expanded to cover the whole island. Pilot projects had been carried out from 1958 to 1969, during which the rate among schoolchildren in areas where goitre was most endemic had dropped from 44.9 to 2.8 per cent. among males, and from 58.6 to 5.3 per cent. among females. A survey had shown that in the younger age group the rate had dropped from 21 to 5.1 per cent. among males and from 41 to 21 per cent. among females. The male group seemed to have responded faster. These remarkable results had encouraged the start of a control project using iodized salt. This project, which had been carried out between February 1965 and June 1966, had the support of both WHO and UNICEF which had provided the machine and the potassium iodide. Forty townships in forty counties where goitre was most prevalent had been chosen, covering about 1 000 000 inhabitants, and 20 000 tons of iodized salt had been used. It was intended to extend the control programme to the whole island.

A study of the epidemiology of goitre had also been made with the co-operation of the University. Random sampling had been used and about 400 000 schoolchildren in 921 primary schools scattered all over the island had been examined. This represented one-fifth of the total school population. The criteria set up by the WHO Expert Committee had been followed. The incidence among the pupils in Grade 1 was about 13 per cent.; in the county of Nankow the incidence was 63 per cent. and in others the rate was as high as 46 per cent. In Grade 2 the average was 1.2 per cent. but in the highly endemic areas the rate was 18 per cent. A survey was now being undertaken in the experimental control area and it was hoped that a report on the results would soon be available. Salt had been originally prescribed to be iodized with 33 PPM potassium iodide.

According to the agreement drawn up with WHO and UNICEF, the iodine content of salt found in the wholesale shops and in the homes had to be checked periodically. It had been found that it came down to about 24 PPM. To improve this defect, it had been necessary to check the moisture of the original salt, the mixing process in the machine and the storage of iodized salt while in transport. This situation was now being studied.

Dr SAYCOIE (Laos) stated that, according to the statistics of his Ministry of Health, endemic goitre was frequent in the northern provinces. Forty-nine cases had been found in Savannakhet and thirty-eight in Dampasak over the past six years. In the Vientiane Province eighty-four cases had been reported in 1965. In High Mekong the incidence was 1.3 per cent. and in Southern Laos and Vientiane 0.3 to 0.1 per cent. Some of the local doctors believed, however, that the incidence was higher. It had also been reported that in the northern part of the country, goitre was more frequent in women than in men. It appeared at about 30 to 40 years of age.

Dr TAUREKA (Australia) said that goitre occurred in the remote parts of the Territory of Papua and New Guinea, notably in the Huon Peninsula. It appeared in well defined regions where it tended to be nearly universal in the population, and often spectacular goitres were seen. Undoubtedly, this pattern was due to the subsistence economy of the people who were dependent on the immediate environment for all food and water. If iodine were deficient in this environment, the lack of trade in foodstuff meant that no outside traces of iodine would enter the area to mitigate the effects of the deficiency. The mountainous terrain in the goitrous area

of New Guinea excluded any possibility of preventing goitre by conventional methods.

Spectacular success with the control of yaws had been achieved by medical patrols making infrequent visits to remote areas and giving injections of penicillin. This had suggested to the Territory's Department of Health that periodic injections of iodized oil into the muscles might provide a depot of iodine that would last for months or years, and release small amounts of iodine to the general metabolism. McCullagh had followed up this suggestion by injecting 1.0 to 4.0 ml. of iodized oil ("Neohydriol", May and Baker) into the deltoid area of 3934 individuals. No local or general undesirable effects had been observed, and comparison with a control group three years later had demonstrated significantly less goitre in the injected group. The results were further assessed after a total of five years by Hennessy who confirmed the observations, and obtained further evidence by serum protein bound iodine determination that, after five years, a single injection of iodized oil led to significantly higher levels than in control subjects. In this regard, it might be noted that Clarke, McCullagh and Winnikoff had reported that depots of 0.5 ml. of iodized oil containing 40 per cent. iodine (wet weight) appeared adequate for one to one-and-a-half years, and depots of 1.5 ml. for one-and-a-half to two years, as judged by values of twenty-four hour percentage retentions of I^{131} .

Buttfield had measured radio-iodine uptake by the thyroid by means of a portable scaler, as well as iodine determinations in twenty-four hour urine samples of a group of 150 subjects. His findings were consistent that iodine deficiency was the major cause of endemic goitre in the Huon area of New Guinea.

There being no further discussions, the CHAIRMAN requested the Rapporteurs to prepare an appropriate resolution. (For consideration of draft resolution, see minutes of the fifth meeting, section 1.)

The meeting rose at 4.10 p.m.