

## **Annual report of the Sarawak Government Medical Department.**

### **Contributors**

Sarawak. Medical Department.

### **Publication/Creation**

Kuching : G.P.O., [1960]

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SARAWAK

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*MEDICAL AND HEALTH DEPARTMENT*

*ANNUAL REPORT*

*1960*







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Medical and Health Department,  
Kuching,  
Sarawak,  
Borneo.

29th June, 1961.

Sir,

I have the honour to submit for the information of His Excellency the Governor, and for transmission to the Right Honourable the Secretary of State, the Annual Report for 1960, of the Medical and Health Department of Sarawak.

I have the honour to be,

Sir,

Your obedient servant,

D. A. BAIRD,

*Director of Medical Services*

THE HONOURABLE THE CHIEF SECRETARY,  
KUCHING.



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# **MEDICAL AND HEALTH DEPARTMENT**

## **ANNUAL REPORT 1960**

### **I. BACKGROUND INFORMATION**

Sarawak occupies an area of about 46,000 square miles, on the northwest coast of the island of Borneo. It lies between latitudes  $0^{\circ} 50'$  and  $5^{\circ}$  North and longitudes  $109^{\circ} 36'$  and  $115^{\circ} 40'$  East.

2. The climate is tropical, with a heavy rainfall, a uniform temperature, and a high humidity. From early October until the middle of February the north-east monsoon brings heavy rainfall especially in the coastal belt. The mean annual rainfall at Kuching is 158 inches, but there is always a daily mean of three to seven hours of bright sunshine, depending upon the season. On the whole, the climate is a pleasant and equable one, in spite of the tropical situation of the country. It is never cold, and although it can get fairly hot in the daytime, the heat is never oppressive, and the nights are generally cool. The temperature is uniform, varying between a mean maximum of  $87.9^{\circ}\text{F}$  and a mean minimum temperature of  $72.5^{\circ}\text{F}$  in 1959.

3. The total population at the census held at midnight on 14th/15th June, 1960 was 744,529. At the previous census held in 1947, the population was 546,385. There has therefore been a total increase of 198,144 in the thirteen years, or an average annual increase of 15,242. Of the total population, 375,846 are males, and 368,683 females. Sea Dayaks are still the most numerous racial group totalling 237,741, followed by 229,154 Chinese, 129,300 Malays, 57,619 Land Dayaks, 44,661 Melanaus, and 37,931 other indigenous races. There has, however since 1947 been a percentage increase of 57.9 in the case of the Chinese population as compared with a percentage increase of only 24.9 for Sea Dayaks, 36.6 for Land Dayaks, 32.7 for Malays, and 25.6 for Melanaus.

4. Malays, Kedayans and many Melanaus profess the Muslim faith. There are a number of Christian Missions at work in Sarawak—Anglican, Roman Catholic, Methodist, Evangelical, and Seventh Day Adventist. There are also small communities of Hindus, Buddhists and Bahais. The 1960 census revealed that there were 174,123 persons professing the Muslim faith, 117,755 professing Christians and 452,651 of other religious beliefs.

5. Sarawak is basically an agricultural country, but the soil is generally poor. The main cash crops are rubber, pepper and sago. There are also large and important forest reserves, and timber production ranks after agriculture as the most important economic activity carried on in Sarawak. The principal minerals known to occur in Sarawak are petroleum and bauxite.

6. The staple diet of the population is rice but the actual production in Sarawak is inadequate for its needs, and rice has to be imported, mainly from Siam. Most of the rice planted, is hill padi, and the method of shifting cultivation normally employed, is a very wasteful one, resulting in generally reduced fertility unless the ground is allowed to lie fallow for fifteen years or so, after each crop.

Sago, tapioca, maize, yams and sweet potatoes are used in rural areas, to supplement rice.

7. Sarawak is a relatively healthy country by tropical standards. Tropical diseases such as bilharziasis, cholera, yellow fever, typhus, plague and relapsing fever are not encountered and small pox has not occurred in the country for many years.

8. The four main general hospitals are situated at Kuching, Sibuan, Simanggang and Miri. The Miri General Hospital formerly administered, by the Sarawak Shell Oilfields Limited, was taken over during the year by the Government Medical and Health Department. Many of the former staff were absorbed into the establishment of Government. A new hospital was opened during 1960, by the Methodist Mission at Kapit. It has thirty-six beds and is staffed by doctors and nurses belonging to the Mission. Other small mission hospitals, dealing almost exclusively with maternity cases, are situated at Kanowit, Sarikei, Mukah, Long San and Serian. Other institutions run by the Government Medical Department are the Sarawak Mental Hospital, seven miles from Kuching and the Rajah Charles Brooke Memorial Hospital for patients suffering from leprosy, situated at the 13th Mile on the Kuching-Penrissen Road.

There were nineteen private medical practitioners registered in Sarawak, at the end of the year in addition to the twenty-six Government doctors and specialists, two Shell Oilfields doctors and four mission doctors.

10. There were five Government dental officers and 151 private dentists registered during 1960, but of the latter, only one possessed a fully registrable qualification, the others being registered under a special provision of the Dentists Registration Ordinance.

11. Outside Government Service, there are no qualified pharmacists in Sarawak, but ninety-seven annual licences to sell poisons on a restricted basis were issued to business concerns during 1960.

12. The number of midwives registered under the Midwives Ordinance was 414.

13. Government total estimated recurrent expenditure for 1960 was \$55,199,840, of which \$6,146,689 was allocated to Health Services, representing approximately 11.1 per cent, of the total budget. This compares with 10.9 per

cent, for 1959. In addition, the sum of \$1,648,709 was provided in the Development Estimates, for work on development projects, during the year. In August 1960 a supplement to the Development Plan 1959-1963 was approved by Council Negri, and included provision for the first phase of a new General Hospital in Kuching, estimated to cost about \$12,000,000. In addition the sum of \$500,000 was approved for the provision of local hospitals and dispensaries, and the total scheme value of the new Sarikei hospital was increased from \$220,000 to \$507,500.

## II. GENERAL REMARKS

14. The year 1960 has seen considerable progress in the plan for the reorganisation and consolidation of the Medical Department's activities. The new Medical Headquarters administrative set up is now complete and consists of the Director of Medical Services, the Deputy Director of Medical Services, the Specialist Health Officer who is the equivalent of what in other territories is termed the Assistant Director of Medical Services (Health) and the Principal Matron. In addition to these four senior officers the WHO Senior Malaria Adviser is accommodated at Medical Headquarters to enable him to maintain the closest possible liaison. Divisional Medical Officers in Divisions I to IV have now been relieved of day to day clinical responsibilities and are thus able to travel more freely and to devote more time to district affairs. The Divisional Medical Officer IV is responsible also for Division V which until the end of 1959 was "covered" medically speaking by a visiting medical officer from Brunei. In 1961 medical work in the Fifth Division will be strengthened by the posting of a Medical Officer to Limbang, the divisional capital, and by the establishment of a small district hospital where formerly only a dispensary existed.

15. The Development Plan has progressed steadily. Extensive alterations and improvements have been made to the Sibu Hospital. These include the provision of a new theatre and X-ray unit and the provision of extra ward accommodation as a result of which the bed state has been increased from 190 to 280 beds.

16. Considerable improvements have been made to the Kuching Hospital, where the theatre unit has been modernised and equipped with a ducted air-conditioning system, and a new senior officers' clinic and casualty reception centre is under construction. The tender has just been awarded for a new forty-bedded hospital in Sarikei. Two new dispensaries each with rest beds have been built at Kabong and Ba Kelalan. Meanwhile plans for a new Central Medical Store to be built in the new wharf area at Kuching in 1961 are well advanced.

### III. STAFF

17. The senior staff of the department as at the 31st December, 1960, was as follows:—

| <i>Designation</i>                  | <i>Establishment</i> | <i>Actual</i> | <i>Remarks</i>                                                                                                                                                        |
|-------------------------------------|----------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Director of Medical Services ...    | 1                    | 1             | —                                                                                                                                                                     |
| Deputy Director of Medical Services | 1                    | 1             | —                                                                                                                                                                     |
| Specialist Health Officer ...       | 1                    | 1             | As from October 1960.                                                                                                                                                 |
| Ophthalmologist ...                 | 1                    | —             | Vacant.                                                                                                                                                               |
| Surgeons ...                        | 3                    | 3             | Kuching, Sibü and Miri.                                                                                                                                               |
| Specialist Alienist ...             | 1                    | 1             | —                                                                                                                                                                     |
| Medical Officers ...                | 22                   | 19            | Including three part-time Lady Medical Officers.                                                                                                                      |
| Dental Officers ...                 | 5                    | 5             | —                                                                                                                                                                     |
| Superintendents ...                 | 9                    | 9             | 1 R.C.B. Memorial Hospital.<br>2 Sarawak Mental Hospital.<br>3 Health Superintendents.<br>1 Travelling Dispensary Superintendent.<br>1 Medical Stores Superintendent. |
| Radiographer ...                    | 1                    | 1             | —                                                                                                                                                                     |
| Matron, Grade I ...                 | 1                    | 1             | —                                                                                                                                                                     |
| Matron, Grade II ...                | 3                    | 3             | —                                                                                                                                                                     |
| Sister Tutors ...                   | 2                    | 2             | One vacancy for Sibü being replaced by a Nursing Sister in 1961.                                                                                                      |
| Health Sisters ...                  | 2                    | 2             | —                                                                                                                                                                     |
| Almoner ...                         | 1                    | 1             | —                                                                                                                                                                     |
| Nursing Sisters ...                 | 18                   | 20            | One extra in place of sister tutor vacancy and one supernumerary.                                                                                                     |
| Administrative Assistants ...       | 2                    | 2             | —                                                                                                                                                                     |
| Pharmacist ...                      | 1                    | —             | Previous holder taking higher qualification in U. Malaya.                                                                                                             |

18. The improvement in the staffing position recorded in the 1959 report was well maintained, and at the end of the year all superscale and senior professional establishments were full with the exception of the vacancy of an Ophthalmologist caused by the sudden death of the previous holder of the post, three vacancies for Medical Officers, and one for a pharmacist.

19. A new Matron, Grade I (Principal Matron) arrived in September on transfer from Tanganyika.

20. The third Sister Tutor vacancy remained unfilled during the year, and an extra nursing sister was recruited to fill the vacancy. As there appears to be no likelihood of this vacancy being filled in the foreseeable future, it is proposed to abolish the post in 1961 and create one of nursing sister instead.

21. The take-over of the Miri General Hospital from the Sarawak Shell Oilfields Limited on August 1st called for an increase to the establishment of one surgeon, one medical officer, and two nursing sisters.

22. The Director of Medical Services represented the Government of Sarawak, and led the United Kingdom delegation at the World Health Organisation Regional Committee for the Western Pacific Region in Manila in August. The Deputy Director represented the Government at a Public Health Conference and Study Tour, held in Singapore and the Federation of Malaya on 25th August to 2nd September. One medical officer attended a World Health Organisation Seminar on Tuberculosis in Sydney, Australia, from May 2nd to June 4th as representative of the Government, and a second attended a W.H.O. Seminar on Public Health Laboratory Services in Manila in December.

#### IV. VISITORS

23. The following distinguished visitors from overseas, paid visits to Sarawak during the year, either to give expert advice or to inspect various aspects of the work of the department:—

|                                            |   |                                                                                             |
|--------------------------------------------|---|---------------------------------------------------------------------------------------------|
| Mr. C. J. Saunders                         | — | Senior Health Inspector, Department of Public Health, Netherlands, New Guinea.              |
| Dr. W. W. Yung                             | — | World Health Organisation Area Representative, Singapore.                                   |
| Sir Harry Wunderly                         | — | Colombo Plan Adviser on Tuberculosis.                                                       |
| Miss J. Whittington,<br>O.B.E.             | — | Overseas Director of the B.R.C.S. London.                                                   |
| Sir Geoffrey Tory                          | — | United Kingdom High Commissioner to Malaya.                                                 |
| Mr. F. L. Jones                            | — | Deputy Director, Field Officer (International Labour Office), United Kingdom.               |
| Mr. J. E. Ryan                             | — | Australian Commissioner, Singapore.                                                         |
| Miss J. H. Vickers }<br>Mr. C. P. Howell } | — | Members of the United Kingdom Branch of the Commonwealth Parliamentary Association.         |
| Lord Selkirk                               | — | United Kingdom Commissioner-General for South East Asia.                                    |
| Dr. Wadsworth                              | — | WHO Adviser on Nutrition W.P.R.O. Manila.                                                   |
| Mr. S. Polak                               | — | Area Representative, UNICEF.                                                                |
| Mr. P. S. Echavez                          | — | WHO Regional Sanitary Engineer, W.P.R.O. Manila.                                            |
| Dr. J. Ross-Innes                          | — | Medical Secretary, B.L.R.A. and Secretary of the International Leprosy Association.         |
| Mr. E. Melville, C.M.G.                    | — | Assistant Under-Secretary of State, Colonial Office.                                        |
| Mr. A. B. Millard                          | — | Director of Colombo Plan Supplies, Melbourne.                                               |
| Professor I. G. W. Hill,<br>C.B.E.         | — | St. Andrew's University, Scotland.                                                          |
| Mr. A. F. Daldy                            | — | Tropical Building Section, Crown Agents.                                                    |
| Dr. M. J. Colbourne                        | — | WHO Senior Malaria Adviser, W.P.R.O. Manila.                                                |
| Dr. E. B. Weeks                            | — | Malaria Section, WHO Geneva.                                                                |
| Senator J. G. Gorton                       | — | Minister for the Navy and assistant minister to the Ministry of External Affairs, Canberra. |

## V. TRAINING

### (a) Overseas

24. During the year eighteen members of the staff returned to duty, having completed courses of training overseas as follows:—

| <i>Course</i>               | <i>Number</i> | <i>Where taken</i>  |
|-----------------------------|---------------|---------------------|
| Dental Public Health        | 1             | Canada              |
| Dentistry                   | 1             | Malaya              |
| Dental Nursing              | 1             | New Zealand         |
| Health Inspector's Course   | 3             | 2 India<br>1 Malaya |
| T.B. Nursing                | 7             | Australia           |
| Operating Theatre Technique | 2             | Australia           |
| Biochemistry                | 1             | Australia           |
| Mental Nursing              | 1             | New Zealand         |
| Malaria Technicians' Course | 1             | Manila.             |
| Total                       | = 18          |                     |

25. In addition, there were a further fourteen Government sponsored students, and twelve serving officers undergoing training in medical or para-medical subjects, at the end of the year, as shown in the following table, making a total of twenty-six in all:—

| <i>Course</i>                      | <i>United Kingdom</i> | <i>Malaya</i> | <i>Colombo Plan Countries</i> |
|------------------------------------|-----------------------|---------------|-------------------------------|
| Post-Graduate Medical (M.R.C.O.G.) | 1                     | —             | —                             |
| Medicine                           | —                     | 4             | 7                             |
| Dentistry                          | —                     | 1             | 1                             |
| Pharmacy (B.Sc.Hons)               | —                     | 1             | —                             |
| Nursing                            | 2                     | —             | —                             |
| Dental Nursing                     | —                     | —             | 1                             |
| Health Inspection                  | —                     | —             | 6                             |
| Dental Mechanics                   | —                     | 1             | —                             |
| Limb fitting                       | —                     | —             | 1                             |
| Total                              | 3                     | + 7           | + 16 = 26                     |

26. One local girl who passed her M.B. B.S. examinations in 1959 in Malaya, and was due to return to Sarawak during the year, unfortunately fell sick, and was off duty for six months. She is now due to return in mid 1961. Another medical student passed his finals, and will be returning about the same time.

27. As in previous years, valuable help in the training of personnel of all kinds was received from Colombo Plan Countries, especially Australia, New Zealand and Canada. The first student left in December for training in Japan, where he is being taught prosthetic techniques at the National Institute for the Rehabilitation of the Physically Disabled in Tokyo. In addition to degree and diploma courses in medicine and allied subjects, short courses were arranged in Australia for nurses and hospital assistants. Two nurses and two hospital assistants completed a six months' course in tuberculosis nursing, and three more followed them in March. Two other hospital assistants were given a practical course of training in theatre work, and three more are due to follow them early in 1961.

#### **(b) Local**

28. The local training of nurses and other auxiliary staff, continued on a departmental basis during the year. At the end of 1960 there were seventy-two probationer nurses and twenty other categories of Medical staff in training in the country. The syllabus used in the nurses training schools at Kuching and Sibu is that approved by the General Nursing Council. Representations were made to this Council to recognise this training as contributing towards the period a Sarawak trained nurse need spend in studying in the United Kingdom preparatory to sitting for her state registration examinations. News has now been received that partial recognition has been given to the Sarawak training and nurses who commenced training after February 1958 need spend only two years in the United Kingdom, instead of three, before sitting their final examinations. Women with a satisfactory standard of education are now coming forward for training in adequate numbers. It has consequently been decided that the need no longer exists to continue with the training of male nurses. Instead it is proposed to give existing male staff instruction in the diagnosis and treatment of the common diseases of the country, and so fit them more adequately for their duties as hospital assistants.

29. During the year ten nurses and ten hospital assistants passed their final qualifying examination, and there were seventy-two probationers in training at the end of the year.

30. The training of midwives by the Sister Tutor (Midwifery) continued in Kuching Hospital. There was a change in policy, however, and the one year's training of *bidans* has now been replaced by a two years' course of training for selected students of a higher education standard. These girls will be capable, when trained, of running clinics in the larger centres, of population and of undertaking the duties of a hospital maternity nurse.

As far as possible, all trained nurses are now undergoing a year's midwifery training, after their general training, so that, in future, the maternity wards of all the general hospitals will be staffed by trained nurse/midwives.

In order to provide some help for mothers in the most distant longhouses, where it would be impracticable and uneconomical to post a fully-trained midwife, it is proposed to offer a simple and practical training in divisional hospitals. These women will be called "Home helps" and they will return to their longhouses equipped to give voluntary assistance to their fellow women and their children.

During the year twenty-six midwives qualified, and there were thirty-three in training at the end of the year.

31. The local training of X-ray technicians, laboratory technicians and dispensers continued in Kuching. Four technicians and one dispenser passed the final qualifying examination during the year and there were five technicians and six dispensers, in training at the end of the year. The appointment of a medical officer to take charge of the Central Pathological Laboratory, during 1959, was followed in June 1960 by the arrival of an experienced laboratory technologist from Australia provided under the Colombo Plan. These two appointments have greatly strengthened the training programme for laboratory technicians, and a new syllabus of training has been drawn up, and is now in use. The Medical Officer in charge is proceeding to the United Kingdom in March 1961, to undergo a course of study leading to the Diploma in Pathology.

32. Training of entomological assistants and microscopists, for the Malaria Eradication Project, continued under the direction of the World Health Organisation advisers, and the supervision of the senior Government staff attached to the Project.

## **VI. DIVISIONAL ORGANISATION**

33. As already outlined in Chapter II—General Remarks, the new divisional organisation, planned and put into operation in 1959, became effective during 1960, when the Divisional Medical Officers in Divisions I to IV were relieved of day to day clinical responsibilities. Each Divisional Medical Officer became responsible during the year for the overall administration of the medical and health services in his Division, and in the case of the Divisional Medical Officer, Fourth Division, for Division V also. There has been considerable devolution of duties from headquarters in Kuching to the Divisional headquarters, and there is now much closer supervision than hitherto of the many and varied health and medical activities in each Division. The Divisional Medical Officers are now able to travel around their Divisions much more frequently, supervising the work of the Sarawak Malaria Eradication Project, visiting static and travelling dispensaries, and ulu dresser stations, and advising local authorities on health matters through their locally appointed health inspectors.

34. In each Division, complete administrative and financial control of the activities of the Sarawak Malaria Eradication Project, has been taken over by the Divisional Medical Officer who is responsible to the Specialist Health Officer in Medical Headquarters for the work of the unit.

35. When the T.B. campaign, planned to start in Kuching in March 1961 spreads throughout the country, the organisation and administrative control of this important project will also be the responsibility of each Divisional Medical Officer.

36. In their annual reports, all Divisional Medical Officers remark on the high incidence of intestinal diseases, due to poor environmental hygiene, lack of suitable latrines, and polluted water supplies. In the First Division, simple plans for latrines were prepared and a start was made with the construction of experimental pit latrines at the request of villagers living near the Kuching/Serian Road. It is planned to extend this scheme in 1961.

37. During the year, two Divisional Medical Officers' conferences were held in Kuching, under the chairmanship of the D.M.S. Many important policy recommendations were made at these conferences which will continue to be held twice yearly as far as possible.

## **VII. PREVENTIVE AND SOCIAL MEDICINE**

38. The work of this section of the department has been strengthened by the appointment of a Specialist Health Officer at Medical Headquarters and by the replanning of Divisional Medical Officers duties already referred to under Chapter VI.

The Almoner who until the end of 1959 was seconded for duties with the Social Welfare Committee has now reverted to her departmental post and this all served to strengthen the social aspects of the Department's work.

39. Health education services are still in their infancy in Sarawak and will thus continue until more and better trained staff are available for this purpose. It is planned to give more emphasis to this work in future training programmes for hospital assistants, health inspectors and upcountry midwives. During the year, advantage was taken of both press and radio to present various aspects of health education to the public. The Specialist Alienist, the Ophthalmic Specialist and the Superintending Dental Officer each conducted a series of broadcast talks while opportunity has been taken to arrange for visiting experts to hold press interviews and to participate in "question and answer" programmes on Radio Sarawak. Lectures by various members of the staff have also been given to teachers and administrative officers in training. Divisional Medical Officers have produced monthly newsletters primarily for the benefit of their upcountry staff. These contain educational material for the use of hospital assistants in the course of their duties.

In October the Government Information Service arranged a Press visit to various sections of the Medical Department in order that they might acquaint themselves with its activities and so be the better able to inform their public. The Department operated a "Health Stall" at a Trade Fair promoted by the local Kuching Chamber of Commerce.

The local Councils of Kuching and Sibu successfully organised anti-spitting and anti-litter campaigns during the year.

#### 40. *School Medical Services.*

There are now 850 schools with close on 100,000 pupils in Sarawak. With the demands already being made on medical officers it is quite impossible to operate at present any system involving the regular medical examination of all school children. The Education Department is however giving more attention to the teaching of hygiene in the schools and sick children are, generally speaking, given free treatment at Government hospitals and dispensaries. As opportunity permits Medical Staff visit schools to give what help they can on matters of common interest. Discussions were held with the Director of Education during the visit of the World Health Organisation Regional Adviser on Nutrition on the question of improving school diets.

#### 41. *Maternal and Child Welfare Services.*

Sarawak is generally well served with trained midwives of which there are 414 on the register and of which about 150 are in Central or Local Government employment. The work of these women has been reviewed during the year and it has been generally agreed that more emphasis should be placed on public health work and the care of children. With this end in view plans are being prepared to provide refresher courses so as to make the district midwife a more useful auxiliary, until such time as fully trained health visitors are available. In this way it is hoped to spread infant welfare work to the country districts from the main towns to which at present it is largely confined. Detailed figures of the work done by these services during 1960 will be found in the section on Specialised Services.

#### 42. *Dental Health.*

The dental service has been further expanded by the opening up of a dental centre in Miri which will serve the Fourth and Fifth Divisions. There are thus now five dental officers on the establishment. The dental nurse scheme which was recently introduced to enable further expansion of the school service has proved highly successful. So much so that approval has been given to its further development and to the sending of a further twelve girls for training under the Colombo Plan auspices in the next three-year period. Detailed figures of the work done by the Dental Services during 1960 will be found in the Section on Specialised Services.

#### 43. *Mental Health.*

Steady progress has been made in the field of Mental Health, particularly in the development of outpatient and follow-up clinics. A start has also been made to investigate certain problems relating to the varying incidence of mental disorder in the different races represented in Sarawak and the reasons therefor.

One development of particular interest has been the establishment of a team specially trained to respond to any appeal from any part of the country for a trained escort in the event of a patient requiring such assistance to get to Hospital. In this same connection special accommodation is now reserved on the regular coastal steamship service for the use of mentally disordered patients. Details and figures of the work done in the Sarawak Mental Hospital, and in out-patient clinics will be found in the section on Special Hospitals.

## **VIII. EPIDEMIC AND ENDEMIC DISEASES**

### **(a) Malaria**

44. Early in the year the plans formulated in 1959, to convert the W.H.O. assisted Malaria Control Project to one of eradication, were initiated, and by the end of August a fully functioning country wide system of active case detection had been established. In addition, the number of passive case detection units was increased. Towards the end of the year a meeting was convened in Kuching which was attended by W.H.O. representatives from Geneva and the Western Pacific Regional Officer in Manila. The purpose of the meeting was to discuss the feasibility of eradication of malaria in Sarawak in view of the lack of control of the disease by the Kalimantan authorities along their border, and the certainty as to when such control would be established. As a result of the discussions, a plan of operations for the eradication of malaria will be prepared early in the new year. Also, as a result of the discussions, it was decided to establish "selective spraying" in certain areas of the country during 1961. The malaria eradication project is therefore entering the phase of consolidation except along the border areas.

45. The project still continues to be the most important public health campaign in the country, and considerable progress was made, during 1960. The project is administered by the Government, and assistance is received from W.H.O. in the form of technical advice, provided by a three man W.H.O. advisory team. The entomologist in the team exercises some executive control of Government entomological personnel in the field.

46. The project is described in greater technical detail at Appendix II to this report.

### **(b) Tuberculosis**

47. A plan to control Tuberculosis in Sarawak has recently been formulated. This project is receiving financial assistance from the Colonial Development and Welfare Funds, and from Colombo Plan sources in respect of certain items of equipment, supplies and personnel. Aid has also been requested from UNICEF in the form of X-ray equipment. Local staff to be engaged in the project are nearing completion of their training. The first of the Colombo Plan personnel has arrived in the shape of a Tuberculosis Nursing Sister/Tutor.

48. The date of commencement of the scheme depends on the outcome of discussions to be held with the Colombo Plan Tuberculosis Consultant in January 1961, and the early arrival of supplies and equipment. In December 1960, a draft plan of action was prepared relating to the commencement of the scheme in Kuching. This is to be presented at a series of meetings to be held with the Tuberculosis Consultant at which will be discussed the technical aspects, organisation, and records, to be maintained during the scheme.

**(c) Leprosy**

49. Sarawak was recently visited by Dr. James Ross-Innes, Secretary of the International Leprosy Association and Medical Secretary of B.L.R.A. Tentative proposals for the eradication of leprosy in the next ten-year period was the main subject of discussion with him and these are now being given further consideration by Government. Meanwhile highly successful results are reported from the Rajah Charles Brooke Memorial Hospital on the response of twenty-nine patients treated with Etisul by inunction and further trials with this drug combined with D.P.T. are continuing. Plans are in train to give hospital assistants a special course in leprosy control in order that upcountry patients can be more effectively diagnosed and treated.

**(d) Poliomyelitis**

50. Early in the year a small outbreak of poliomyelitis occurred in the Fifth Division following a report of a similar outbreak in Brunei. Later another outbreak occurred in Kuching. In both instances there was the usual rush by the public to clinics and outpatient departments demanding poliomyelitis inoculation despite the Department's continual effort to persuade parents to bring their children to infant welfare clinics for routine protective injections. A total of twenty-two cases were reported of which one proved fatal. There was no case of respiratory paralysis and almost without exception all occurred in children belonging to the 0-6 year age group.

**(e) Endemic Goitre**

51. The salt iodisation plant installed in Sibu last year has operated satisfactorily. In response to a demand from the people that the salt should be distinctively coloured the Divisional Medical Officer has devised a modification of the plant to permit of this being done and full details have since been sent to the manufacturers who have evinced considerable interest in the idea. The upcountry slogan is now "Buy green salt and avoid goitre". It is hoped that financial provision for the establishment of a similar plant in Kuching during 1961 to serve the upcountry areas of the Second Division will shortly be approved.

**(f) Iron deficiency anaemia**

52. This condition is widespread and little is known of its precise aetiology. At Government's invitation the W.H.O. Regional Adviser on nutrition visited

Sarawak and in association with the doctor attached to the Community Development project in Second Division made an initial appraisal of the nutritional problems in the area and more specifically investigated the prevalence and nature of anaemia. The adviser's report has been received and preliminary basic investigations are now going on in the Second Division.

**(g) Trachoma**

53. The incidence of this disease remains much the same, particularly in rural areas. It has not been possible yet to put into operation a country-wide scheme for its control, owing to other more pressing commitments. Some form of control is being exercised in the vicinity of dispensaries and in urban areas where medical facilities exist, but this does not apply to the more remote rural areas.

**(h) Gastro-intestinal diseases**

54. These are very common due to the absence in most places of any form of satisfactory sanitation or safe water supply. However the Public Works Department is pressing on with a scheme for the supply of safe drinking water in all urban and semi-urban areas, and the Medical and Health Department has had draft plans of various types of latrine accommodation prepared. The latter will be circulated to Divisional Medical Officers for comments before being approved. The finished plans are to be supplied to all local authorities in the country for their guidance.

**(i) Quarantinable diseases**

55. No case of smallpox, plague, cholera, yellow fever, louse-borne typhus, or louse-borne relapsing fever has occurred in Sarawak during 1960. About the middle of the year, an outbreak of smallpox occurred in the Barat Province of Kalimantan (Indonesian Borneo). Villages along the border areas of Sarawak and Kalimantan were visited and vaccinations performed. In the First Division, during the year, 1,508 primary vaccinations and 2,358 revaccinations were performed and in addition, the mobile Maternity and Child Welfare team did 1,973 primary vaccinations, and similar action was taken in the other Divisions. All possible measures were taken to ensure that contacts along the routes taken by Indonesian immigrants, were vaccinated.

## **IX. HOSPITALS AND DISPENSARIES**

**(a) General Hospitals**

56. The most important event of the year relative to the hospital section of the department, was the take-over by Government, of the Miri Hospital from the Sarawak Shell Oilfields Limited. This was an event of some historic importance when it is recalled that the oil company has been responsible for all hospital services in this area for nearly fifty years. It is a well-equipped general hospital of eighty-seven beds, which means that, together with the Tuberculosis

Hospital previously taken over by Government on 1st January, 1960, to which reference was made in last year's report, there are now one hundred and forty-eight Government hospital beds in Miri. The oil company still retains an out-patient clinic for the benefit of its employees.

57. The distribution of beds in the four Government hospitals in Kuching, Sibü, Simanggang and Miri, as at 31st December, 1960, was as follows:—

| <i>Hospital</i>                 | <i>General</i> | <i>Obstetrics</i> | <i>T.B.</i> | <i>Infectious</i> | <i>Mental</i> | <i>Total</i> |
|---------------------------------|----------------|-------------------|-------------|-------------------|---------------|--------------|
| 1. Kuching General Hospital     | 163            | 60                | 72          | 5                 | —             | 300          |
| 2. Lau King Howe Hospital, Sibü | 171            | 32                | 48          | 19                | 10            | 280          |
| 3. Simanggang General Hospital  | 65             | 4                 | 36          | —                 | —             | 105          |
| 4. Miri General Hospital        | 77             | 10                | 61          | —                 | —             | 148          |
|                                 | <hr/> 476      | <hr/> 106         | <hr/> 217   | <hr/> 24          | <hr/> 10      | <hr/> 833    |

58. In addition to these beds in the four Government general hospitals, there are thirty-six beds in the T.B. Convalescent Home, seven miles from Kuching, making a total of 896 beds available in Government institutes, excluding the special beds in the Mental Hospital and the Rajah Charles Brooke Memorial Hospital.

59. To this total can be added a hundred and five beds in mission hospitals, the majority of which are for obstetrics. The largest of the mission hospitals is the Christ Hospital, Kapit, staffed and run by the Methodist Mission. This thirty-six bedded general hospital was opened in September 1960, and is a modern and fully equipped institution with X-ray and operating theatre facilities, and with two doctors on its staff.

The other mission hospitals are run by the Roman Catholic Mission at:—

|          |   |                 |   |          |
|----------|---|-----------------|---|----------|
| Serian   | — | First Division  | — | 12 beds  |
| Sarikei  | — | Third Division  | — | 10 beds  |
| Mukah    | — | Third Division  | — | 5 beds   |
| Kanowit  | — | Third Division  | — | 26 beds  |
| Long San | — | Fourth Division | — | 16 beds  |
|          |   |                 |   | <hr/> 69 |

All these sixty-nine beds are for obstetrics.

60. There is therefore, a total of 974 general beds in the country or one bed per 764 of the population, excluding the special beds for the treatment of leprosy and mental diseases.

61. General Hospital In-patient returns.

| <i>Hospital</i>                 | <i>1956</i> | <i>1957</i> | <i>1958</i> | <i>1959</i> | <i>1960</i> |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|
| Kuching General                 | 7,696       | 7,426       | 7,925       | 8,395       | 8,416       |
| Lau King Howe Hospital, Sibulau | 3,689       | 3,954       | 4,594       | 5,637       | 6,028       |
| Simanggang General              | 1,044       | 1,192       | 1,205       | 1,326       | 1,625       |
| Miri General                    | 2,583       | 2,468       | 2,174       | 2,079       | 2,812       |
| Total                           | 15,012      | 15,040      | 15,898      | 17,437      | 18,881      |

62. *General Hospital, Kuching.*

This hospital serves Kuching, the whole of the First Division and part of the Second Division which has easier access to Kuching than to Simanggang. During the year there has been a steady increase in the pressure on beds, and in one of the surgical wards designed for twenty-eight beds, the daily bed state has varied between forty and fifty.

This serves to highlight the need for a bigger and better hospital in Kuching, plans for which, it has already been explained, are now in hand.

The senior professional staff consisted of:—

*On 31st December, 1960*

- 1 Medical Officer-in-Charge
- 1 Surgical Specialist
- 4 Medical Officers
- 1 Matron
- 10 Nursing Sisters (including Colony leave reliefs)
- 2 Sister Tutors.

63. There has been a slight improvement in the numbers of nursing staff available, but there is still a considerable shortage of locally trained nurses.

64. The hospital exterior was completely redecorated during the year, but no structural alterations were carried out except for the reconstruction of the out-patient clinic which when completed will serve as a casualty reception centre and senior service clinic.

65. The general out-patient department of the hospital is situated near the town centre. In the same building is housed a Maternity and Child Welfare Clinic, a Dental Clinic and an Eye Clinic while an adjacent building accommodates the Chest Clinic. The general out-patient clinic is administered by a Medical Officer seconded from the General Hospital assisted by a part-time

Lady Medical Officer. In addition to the 12,779 new cases seen during the year the following special services were undertaken:—

|                                                             |       |
|-------------------------------------------------------------|-------|
| Minor operations                                            | 1,650 |
| Medical examination of candidates<br>for Government service | 1,815 |
| Vaccinations                                                | 1,535 |

Of the 12,779 cases seen as out-patients 1,277 were referred for admission to the General Hospital, Kuching.

Surgical, medical and gynaecological out-patient consultation and follow-up clinics were also held weekly at the clinic.

66. *The Lau King Howe Hospital, Sibü.*

The year 1960 saw the final stage of the extensive alterations and additions, which have been carried out during the past five years, to convert the old buildings into a modern, and well-equipped general hospital of 280 beds. During the year the following works were completed:—

- (a) A new, air-conditioned operating theatre suite and central sterilising room.
- (b) An extension to the Nurses' Home capable of accommodating forty nurses.
- (c) Partial demolition and rebuilding of the old wards and X-ray unit on modern lines.
- (d) The addition to the out-patient department of a new air-conditioned mass-miniature X-ray unit.

When earth-filling of the low-lying grounds of the hospital and extensions to the kitchens of the Nurses' Home, are finished early in 1961, the scheme will be finally completed.

67. The senior professional staff attached to the hospital consisted of:—

- 1 Medical Officer-in-Charge
- 1 Surgeon
- 1 Medical Officer
- 1 Matron
- 4 Nursing Sisters.

68. *Simanggang General Hospital.*

This new 105 bedded general hospital, opened on 17th December, 1959, has now completed its first full year of operation. Working conditions for the medical and nursing staff have improved to such an extent that it is difficult to make comparisons with the work done in previous years in the old buildings. The actual number of admissions shows an increase of 300 over the previous

year's figure. But the main change is that patients are now housed in modern, hygienic accommodation which allows the staff to carry on their work in comfort and with reasonable efficiency.

The senior, professional staff during the year was:—

- 1 Divisional Medical Officer
- 1 Medical Officer-in-Charge
- 1 Part-time Lady Medical Officer (until November 1960)
- 1 Nursing Sister.

In the early part of the year the hospital was run by the Divisional Medical Officer, with the help of the part-time Lady Medical Officer. In March, however, a Medical Officer, who had previously been stationed in Betong, was transferred to Simanggang as Medical Officer-in-Charge of the hospital and the Divisional Medical Officer was relieved of clinical duties, as already explained in Section VI of this report. The Lady Medical Officer left for Miri with her husband, in November 1960, and no replacement has since been available. This has thrown a considerable burden on the remaining Medical Officer, and the Nursing Sister. There is provision in the estimates for a second sister at Simanggang and a posting will be made as soon as the new sisters' quarters, already approved, have been completed.

#### 69. *Miri General Hospital.*

As already mentioned in paragraph 56 of this Section of the report, this hospital was taken over by Government from the Sarawak Oilfields Limited, on the 1st August, 1960, following the take-over of the Tuberculosis Hospital on 1st January, 1960. These two hospitals, together with the static dispensary in Miri, are now treated as one unit. Before the take-over, the whole hospital was completely renovated, and as a result it is now an up-to-date institution of eighty-seven beds providing facilities for the investigation and treatment of patients from the Fourth Division.

The senior professional staff attached to the hospital was as follows:—

- 1 Medical Officer-in-Charge
- 1 Surgeon
- 2 Nursing Sisters.

70. The out-patient department of the hospital formerly the Miri Dispensary is to be considerably enlarged during 1961. Plans for these improvements have already been prepared and work is expected to start early in the new year.

71. Since the take-over on 1st August, there has been a very considerable increase in the volume of work done in the hospital, especially on the surgical side. Major operations performed between August and December numbered 257, and minor operations totalled 736.

**(b) Static and Travelling Dispensaries**

72. There were thirty static and twelve travelling Government dispensaries functioning throughout Sarawak during the year. All these are manned by trained hospital assistants, and supervised by the Divisional Medical Officers, and a Travelling Dispensary Superintendent.

73. All but one of the static dispensaries, contain rest beds for the admission of patients from a distance who require a few days in-patient treatment before returning home. Returns for the year are as follows:—

|     | <i>First Division</i>  | <i>No. of Restbeds</i> | <i>New Patients</i> | <i>Admissions</i> |
|-----|------------------------|------------------------|---------------------|-------------------|
| 1.  | Bau Dispensary         | 4                      | 10,023              | 126               |
| 2.  | Lundu Dispensary       | 4                      | 5,888               | 97                |
| 3.  | Serian Dispensary      | 5                      | 13,559              | 39                |
| 4.  | Tebakang Dispensary    | 4                      | 4,040               | 28                |
| 5.  | Nonok Dispensary       | 3                      | 1,910               | 5                 |
|     | <i>Second Division</i> |                        |                     |                   |
| 6.  | Lubok Antu Dispensary  | 4                      | 2,950               | 48                |
| 7.  | Engkilili Dispensary   | 4                      | 7,377               | 111               |
| 8.  | Lingga Dispensary      | 2                      | 4,479               | 89                |
| 9.  | Sebuyau Dispensary     | 5                      | 5,398               | 65                |
| 10. | Betong Dispensary      | 12                     | 7,181               | 430               |
| 11. | Spaoh Dispensary       | 8                      | 2,904               | 62                |
| 12. | Debak Dispensary       | —                      | 2,400               | 61                |
| 13. | Saratok Dispensary     | 5                      | 9,075               | 245               |
| 14. | Kabong Dispensary      | 10                     | 3,557               | 34                |
|     | <i>Third Division</i>  |                        |                     |                   |
| 15. | Sarikei Dispensary     | 12                     | 21,432              | 243               |
| 16. | Binatang Dispensary    | 12                     | 12,564              | 136               |
| 17. | Matu Dispensary        | 6                      | 5,775               | 5                 |
| 18. | Dalat Dispensary       | 6                      | 3,849               | 16                |
| 19. | Mukah Dispensary       | 8                      | 5,162               | 46                |
| 20. | Balingian Dispensary   | 6                      | 2,126               | 229               |
| 21. | Kanowit Dispensary     | 10                     | 6,812               | 91                |
| 22. | Julau Dispensary       | 14                     | 8,822               | 379               |
| 23. | Song Dispensary        | 8                      | 6,931               | 131               |
| 24. | Kapit Dispensary       | 4                      | 9,642               | 40                |
| 25. | Belaga Dispensary      | 8                      | 8,031               | 47                |
|     | <i>Fourth Division</i> |                        |                     |                   |
| 26. | Marudi Dispensary      | 8                      | 6,994               | 238               |
| 27. | Bintulu Dispensary     | 14                     | 5,933               | 263               |
|     | <i>Fifth Division</i>  |                        |                     |                   |
| 28. | Limbang Dispensary     | 12                     | 4,537               | 129               |
| 29. | Lawas Dispensary       | 10                     | 9,623               | 123               |
| 30. | Sundar Dispensary      | 4                      | 980                 | 6                 |
|     |                        | <hr/>                  | <hr/>               | <hr/>             |
|     |                        | 212                    | 199,954             | 3,562             |

There has been little change in the number of new cases seen, compared with 1959, but 622 more admissions were made to the restbeds.

74. The travelling dispensaries, with the exception of the travelling road dispensary, based on Kuching, are all established on long boats. These, following fixed schedules, travel along the rivers to inaccessible kampongs and longhouses.

Returns for the year are as follows:—

| <i>First Division</i>        | <i>Base</i> | <i>Total<br/>No. of Patients Treated</i> |
|------------------------------|-------------|------------------------------------------|
| Travelling Dispensary No. 2  | Kuching     | 12,104                                   |
| Road Dispensary              | Kuching     | 7,701                                    |
| Travelling Dispensary No. 3  | Simunjan    | 5,397                                    |
| <i>Second Division</i>       |             |                                          |
| Travelling Dispensary No. 4  | Simanggang  | Not functioning                          |
| <i>Third Division</i>        |             |                                          |
| Travelling Dispensary No. 7  | Sarikei     | 13,101                                   |
| Travelling Dispensary No. 8  | Kanowit     | 7,090                                    |
| Travelling Dispensary No. 9  | Kapit       | 4,298                                    |
| Travelling Dispensary No. 17 | Belaga      | 1,200                                    |
| <i>Fourth Division</i>       |             |                                          |
| Travelling Dispensary No. 11 | Tatau       | 11,521                                   |
| Travelling Dispensary No. 12 | Bintulu     | 9,271                                    |
| Travelling Dispensary No. 13 | Bekenu      | 7,776                                    |
| Travelling Dispensary No. 14 | Marudi      | 8,405                                    |
| <i>Fifth Division</i>        |             |                                          |
| Travelling Dispensary No. 16 | Limbang     | 10,093                                   |
|                              |             | <hr/> 97,957 <hr/>                       |

There has been an increase of 3,000 in the total number of patients treated by these travelling dispensaries compared with 1959, despite the fact that Travelling Dispensary No. 4 was not operating during the year.

75. A new static dispensary was opened at Kabong in the Second Division, during the year, replacing a travelling dispensary previously based there. Extensions to Marudi Dispensary were planned, but work had not yet started. Late in the year, work started on an extension designed to convert Limbang Dispensary into a small local hospital. This building will contain a theatre and X-ray suite, a doctor's consulting room, and ancillary offices. Sundar Dispensary was also improved during the year.

76. There are fifty-four ulu dressers throughout the country. These are distributed as follows:—

|                 | <i>Number</i> | <i>Employed by</i>                 |
|-----------------|---------------|------------------------------------|
| First Division  | 11            | 10 Local Authority<br>1 Government |
| Second Division | 9             | All Local Authority                |
| Third Division  | 5             | 3 Local Authority<br>2 Government  |
| Fourth Division | 26            | 2 Local Authority<br>24 Government |
| Fifth Division  | 3             | All Government                     |
| Total           | <u>54</u>     |                                    |

## X. SPECIAL HOSPITALS

### (a) Sarawak Mental Hospital

77. The number of patients in hospital on 31st December, 1960 was 300, including twenty-one patients on parole. During the year there were 429 admissions and 422 discharges.

78. The 429 admissions during 1960, were classified as follows:—

|                          |            |
|--------------------------|------------|
| Schizophrenia            | 250        |
| Affective psychosis      | 81         |
| Organic psychosis        | 48         |
| Neurosis and psychopathy | 17         |
| Toxic psychosis          | 6          |
| Epilepsy                 | 8          |
| Neurological illness     | 8          |
| Amentia                  | 6          |
| N.A.D.                   | 5          |
| Total                    | <u>429</u> |

79. The senior staff of the hospital consisted of the following:—

- 1 Specialist Alienist
- 2 Superintendents
- 1 Chief Hospital Assistant
- 1 Senior Hospital Assistant

80. As in 1959, there has been a considerable expansion during 1960 of out-patient psychiatric work. At the weekly Sekama Road Clinic in Kuching, the number of new out-patients treated, was 290.

The Specialist Alienist travelled frequently to Binatang, Sarikei and Sibu in the Third Division, and to Miri in the Fourth Division, to follow up discharged patients, and to hold out-patient clinics and treatment sessions. The following table gives an idea of the extension of out-patient clinic work since 1954:—

|      | <i>Admission<br/>to S.M.H.</i> | <i>Discharge<br/>from</i> | <i>New<br/>Out-patients</i> | <i>Total Attendances<br/>at Out-patient<br/>Clinics</i> |
|------|--------------------------------|---------------------------|-----------------------------|---------------------------------------------------------|
| 1954 | 112                            | 90                        | —                           | —                                                       |
| 1955 | 132                            | 75                        | 2                           | 12                                                      |
| 1956 | 154                            | 110                       | 13                          | 40                                                      |
| 1957 | 174                            | 110                       | 8                           | 48                                                      |
| 1958 | 195                            | 120                       | 19                          | 88                                                      |
| 1959 | 338                            | 342                       | 207                         | 367                                                     |
| 1960 | 429                            | 405                       | 290                         | 1,743                                                   |

81. Arrangements were made during the year for all escorts for patients travelling between Kuching and other Divisions, to be supplied by the Sarawak Mental Hospital from its staff and special accommodation has been made available in coastal ships plying between the Third and Fourth Divisions and Kuching, for this purpose.

82. In the hospital itself, voluntary admissions have increased considerably. In 1960, 46 per cent of all admissions were of this category, compared with 25 per cent in 1959.

83. New drugs which have become available during the year, have been given extensive trials, and those which have proved effective, have been adopted for use in selected cases. After discharge from hospital many patients require to stay on drugs for long periods, and the distribution of supplies of the required drugs by static dispensaries has been started.

84. During the year, two conditions have been seen with increasing frequency in the hospital. The first is peripheral neuropathy. Treatment is not difficult, but means for preventing its occurrence are being sought. The second, is neuro-syphilis, and a central register of cases is now kept by the Specialist Alienist. Divisional Medical Officers are notified of cases and asked to check contacts.

85. The Specialist Alienist has published three research papers during the year, which have aroused considerable interest abroad. He is continuing his study of the racial distribution of schizophrenia. In addition, a series of talks on mental health, was given over Radio Sarawak. The Specialist Alienist also represented Sarawak at the Annual Conference of the World Federation of Mental Health held in Edinburgh where he gave an account of his work and referred to some of the problems which face a psychiatrist in Sarawak.

**(b) The Rajah Charles Brooke Memorial Hospital**

86. The treatment of all patients suffering from leprosy in Sarawak, Brunei and North Borneo is carried out at the Rajah Charles Brooke Memorial Hospital, at 13th Mile, Penrissen Road, near Kuching which has accommodation for 520 patients. This hospital, is run by a small staff of hospital assistants, with a lay Superintendent in charge. The medical care of the patients is supervised by the Medical Officer-in-Charge of the Kuching General Hospital who makes regular weekly visits. As in previous years, the standard of treatment has been the sulphones i.e. D.D.S. tablets and U.C.B. injections. D.P.T. tablets and Etisul have also been used in selected groups of patients, and on the advice of Dr. J. Ross-Innes, Medical Secretary of the British Leprosy Relief Association, who visited Sarawak in October their use will be extended in 1961. It is his opinion, that a country-wide treatment campaign by hospital assistants at static dispensaries could eradicate the disease in ten years' time. In consequence it is planned, as a start, to bring groups of hospital assistants to the Rajah Charles Brooke Memorial Hospital, for training in the diagnosis and treatment of leprosy. Help towards the provision of accommodation and class-rooms for this project has been requested from the British Leprosy Relief Association.

87. As a further result of his visit, a sesame oil massage group has been started with a view to making physiotherapeutic work easier in the future. It is hoped to send a senior hospital assistant to study this type of work, in Vellore, Southern India, under Professor Paul Brand, at some future date, and also if possible, a medical officer with surgical experience to study operative techniques, in the rehabilitation of deformed patients.

88. The number of patients on the roll on the 1st January, 1960 was 388 and there were ninety-six admissions during the year. Seventy-seven patients were discharged and twelve died leaving 395 patients on the roll on 31st December, 1960. Of these, 154 were Chinese and 122 Ibans. The admissions showed an increase of fourteen over the previous year, and discharges, an increase of eight. The number of patients from North Borneo increased from forty-four to sixty-two. As in 1959, it is satisfactory to note, that, of the seventy-seven discharges, fifty-seven were undergoing treatment for periods of not more than three years, and nine had been in the hospital for six or more years. There were twelve deaths as against nine in 1959, but these were mainly in the over sixty age group. Of the ninety-six admissions seventy-six were lepromatous cases.

89. The help and encouragement given by Sir Anthony Abell, during his term of office as Governor, and the tradition which he started of attending the leaving ceremonies and presenting certificates, was very kindly carried on by his successor, Sir Alexander Waddell, who with Lady Waddell attended a leaving ceremony on the 17th of May. Their interest and encouragement was very much appreciated by patients and staff.

90. Development work continued during the year. Water pumps were purchased and installed, and new piping will follow, in 1961. The rubber plantation containing 2,500 trees made good progress, and over 500 other trees (oil palms, cashew nuts, budded rambutans, mandarin oranges, mangosteen, etc.) supplied by the Agriculture Department were planted. By the end of the year, there were over 200 laying pullets in the settlement, supplying all the eggs required on the battery system while a further 200 chickens were being raised. Pigs and goats continue to thrive, and multiply.

91. A feature of the school, during the year was its link-up with the Schools Broadcasting Service.

Handicraft lessons in sewing, dress-making, mat-making and carpentry for the boys continue to be taught by adult patients. There has been a steady sale of engraved parangs, mats, wooden bowls, lamp-stands, Chinese paintings, etc., made by patients. Members of the Kuching Division of the British Red Cross Society, continued their regular visits to the hospital and the distribution of comforts and reading material.

92. The Salvation Army, continues to look after babies born in the hospital, until the parents are ready for discharge. Clergy of different denominations visited regularly and held services. Gifts were received from the Chinese Chamber of Commerce, the Indian Muslim League, the Turtle Trust, the Sarawak Social Welfare Council, and the Dayak Association. All of these were much appreciated during the celebration of various festivals throughout the year.

## **XI. SPECIALISED SERVICES**

### **(a) Ophthalmic Services**

93. The sixth year of operation of the inter-territorial ophthalmic service in Sarawak, Brunei and North Borneo, ended tragically, with the death just before Christmas of Dr. Wyn Wallace, the Ophthalmologist. His services will be greatly missed by all his patients and colleagues.

94. The number of patients treated during the year was 3,743. This appears to compare unfavourably with the figures of 4,086 and 3,823 for 1958 and 1959 respectively but it must be mentioned that the ophthalmologist was on leave for some months of the year. Figures for the years 1955-1960 are given below:—

| <i>Year</i> | <i>New Patients</i> |
|-------------|---------------------|
| 1955        | 1,904               |
| 1956        | 2,671               |
| 1957        | 3,003               |
| 1958        | 4,086               |
| 1959        | 3,823               |
| 1960        | 3,743               |

Of the 3,743 new patients treated during 1960, 2,400 were Chinese.

95. The main conditions seen were:—

|                                    |       |
|------------------------------------|-------|
| Optical                            | 596   |
| Inflammatory diseases              | 1,997 |
| Injuries                           | 352   |
| Degenerative diseases              | 220   |
| Congenital and hereditary diseases | 51    |
| Neoplastic conditions              | 56    |
| Nutritional diseases               | 42    |
| Diseases due to climate            | 349   |
| Blindness                          | 80    |

96. The causes of blindness in the eighty cases seen were as follows:—

|                                   |          |
|-----------------------------------|----------|
| Cataract                          | 26       |
| Glaucoma                          | 17       |
| Optic Atrophy                     | 9        |
| Sclerosis Cornea                  | 4        |
| Trachoma                          | 3        |
| Retinitis Pigmentosa              | 3        |
| Staphylomata                      | 3        |
| Keratomalacia                     | 4        |
| Uveitis                           | 2        |
| Iritis                            | 2        |
| Leucoma                           | 1        |
| Retrolental fibroplasia           | 1        |
| Ophthalmia Neonatorum             | 1        |
| Panophthalmitis                   | 1        |
| Macular Pigmentary degeneration   | 1        |
| Phthisisbulbi (unknown infection) | 2        |
|                                   | <hr/> 80 |

97. The number of eye operations performed by the Ophthalmologist and his assistant was as follows:—

|                        |           |
|------------------------|-----------|
| Cataract               | 60        |
| Enucleation of eyeball | 20        |
| Other major operations | 33        |
| Pterygium excision     | 138       |
| Other minor operations | 687       |
| Total                  | <hr/> 938 |

#### (b) Dental Services

98. At the end of 1960, the senior staff of the Dental Section consisted of five dental officers, two dental nurses and five dental mechanics. Permanent

clinics are maintained at Kuching, Sibü and Miri. The Miri Clinic was opened in August, in temporary quarters in the Miri General Hospital compound, following its take-over by Government. Before this two visits had been paid by a dental officer, and visits were also paid on two occasions, to Simanggang, where pre-fluoridation surveys on school children were carried out.

99. In June 1960, a dental nurse returned from her two years' course of training in New Zealand and was posted to Sibü. Another married dental nurse resigned to accompany her husband abroad, but is expected to rejoin on her return.

100. At the beginning of the year, one of the dental officers went on loan to North Borneo, for two weeks.

101. During the year, the number of attendances increased by  $12\frac{1}{2}$  per cent and the amount of conservative work done, by 25 per cent. Denture work increased by over 50 per cent.

102. The total attendances at Kuching and Sibü clinics were as follows:—

|                |        |
|----------------|--------|
| Kuching Clinic | 29,841 |
| Sibü Clinic    | 11,977 |
|                | <hr/>  |
|                | 41,818 |

Treatments given included 43,331 extractions, 9,613 fillings, 1,155 dentures and 115 repairs to dentures. 1,305 periodontal treatments and scaling were performed, and 404 X-rays were taken.

103. One dental officer returned from Canada after completing a post-graduate course in Dental Public Health, under Colombo Plan auspices.

### (c) Pathological Laboratory Services

104. During 1960, all laboratories within the department were unified under the control of the Medical Officer-in-Charge of the Central Laboratory in Kuching. In addition to this parent laboratory, two subsidiary laboratories are maintained in Kuching, one in the Health Centre and the other at the Sarawak Mental Hospital. Divisional laboratories are attached to the hospitals in Simanggang, Sibü and Miri respectively.

105. The Central Laboratory is responsible for the training of all technical staff, and for the standardization of all stores and equipment throughout the country.

106. The senior staff consisted of the following:—

- 1 Medical Officer-in-Charge
- 1 Superintendent
- 1 Colombo Plan technologist appointed for a two-year period to assist with the training of technicians.

There were seven pupil technicians in training, amongst whom is the first female technician in the department. In all, there were nineteen trained technicians, seven pupils and fourteen attendants attached to the section at the close of the year. Two technicians successfully completed their qualifying examination.

107. A new training syllabus, drawn up at the end of 1959, has been put into operation, and with the help of the Colombo Plan technologist, the training of pupils is now on a sound footing. For the purpose of co-ordinating teaching activities, an experiment was tried appointing sectional heads in the Central Laboratory to the haematology, bacteriology and bio-chemistry sections. This has proved very successful, and has led to a general all-round improvement in the standard of work.

108. A considerable amount of new equipment has been purchased. In spite of the inadequacy of some of the laboratory premises, which are rapidly becoming too small for the volume of work being done, there has been a considerable improvement in the technical work performed in all laboratories. This has been due, in part to the introduction of new techniques and modern equipment, but also to the willingness of technicians to learn new methods and to apply them intelligently.

109. A summary of the work done in the Central Laboratory is given below. The figures for the previous year are shown in brackets.

|                           |                 |
|---------------------------|-----------------|
| Haematology               | 12,909 (13,522) |
| Serology                  | 18,916 (12,933) |
| Biochemistry              | 6,217 ( 5,479)  |
| Bacteriology              | 7,107 ( 6,350)  |
| Parasitology              | 4,739 ( 3,226)  |
| Water, milk and food      | 318 ( 997)      |
| Histological Preparations | 333 ( 236)      |
| Post Mortem examinations  | 83 ( 127)       |

Figures from the subsidiary and divisional laboratories show similar trends.

110. Other work done in the Central Laboratory included the establishment of a central syringe service, for the maternity and children's wards in the General Hospital, Kuching. This proved successful and is to be extended to the rest of the hospital in 1961.

Crystalloid solutions are also prepared, and are thoroughly tested for safety. New electric stills now produce enough pyrogen-free distilled water to supply sterile solutions and water for injection purposes to all hospitals and dispensaries throughout the country.

Although all blood transfusion services are run by voluntary agencies, the technical work of grouping and compatibility testing is done by the Government laboratory service. The number of blood transfusions given in Kuching in 1960 was 573 compared with 277 in 1959. Blood groupings nearly trebled over the same period. In June the Red Cross Society in Kuching established a small blood bank. This has been administered to a large extent by the staff of the Central Laboratory.

#### (d) X-ray Services

111. There are X-ray departments attached to the General Hospitals in Kuching, Sibü, Miri and Simanggang, and the Anti-Tuberculosis Association of Sarawak Chest Clinic, Kuching. The reconditioned unit, previously in the Kuching Hospital X-ray department, was installed in Simanggang following a thorough overhaul in Singapore, and has worked well, during the year. A new X-ray set was purchased and put into use at the Out-patient Clinic, Kuching in August 1960, with the result that, with the exception of examinations requiring special techniques, all X-ray examinations of out-patients are now done on the spot instead of having to refer them to hospital.

112. A personal monitoring service was introduced. This has demonstrated that none of the staff received excessive doses of radiation during the year.

113. Work done in the various X-ray departments is shown below:—

|                                        | <i>No. of patients X-rayed</i> |
|----------------------------------------|--------------------------------|
| Kuching General Hospital               | 5,954                          |
| Chest Clinic, Kuching (Mass Miniature) | 6,463                          |
| Chest Clinic, Kuching (Large films)    | 5,672                          |
| Simanggang General Hospital            | 2,724                          |
| Lau King Howe Hospital, Sibü           | 10,458                         |
| Miri General Hospital                  | 7,668                          |

Returns from the Kuching General Hospital given below, indicate the variety of work done in the X-ray departments:—

| <i>Nature of film</i> | <i>No. of examinations</i> |
|-----------------------|----------------------------|
| Bone                  | 2,037                      |
| Chest                 | 3,426                      |
| Gall Bladder          | 36                         |
| Genito-Urinary        | 331                        |
| Gastro-Intestinal     | 233                        |
| Abdomen (straight)    | 135                        |
| Obstetrical           | 150                        |
| Sinus                 | 41                         |
| Miscellaneous         | 17                         |

114. There is a small physiotherapy department in the General Hospital, Kuching. This is meantime in charge of a partially trained worker, who has been selected for a full course of training in physiotherapy in New Zealand in 1961 under the Colombo Plan.

#### (e) Surgical Services

1155. There were three Surgical Specialists on the establishment during the year, one in Kuching, one in Sibü, and the third in Miri. In Simanggang, emergency surgery and such other surgical work as he has time for is undertaken by the Medical Officer-in-Charge of the hospital.

116. The total number of operations performed during the year in the four hospitals was as follows. The figures for 1958 and 1959 are given for comparison.

|                              | 1958        | 1959        | 1960         |
|------------------------------|-------------|-------------|--------------|
| Kuching General Hospital     | 2,709       | 4,745       | 5,265        |
| Lau King Howe Hospital, Sibü | 1,945       | 3,379       | 3,046        |
| Simanggang General Hospital  | 260         | 253         | 359          |
| Miri General Hospital        | —           | —           | 2,117        |
|                              | <hr/> 4,914 | <hr/> 8,377 | <hr/> 10,787 |

117. The most common major operations performed were for acute appendicitis, the repair of inguinal hernia, the closure of perforated peptic ulcers and removal of enlarged thyroid glands. In the field of minor surgery traumatic work predominated.

118. The new operating theatre suite in the Lau King Howe Hospital, Sibü was commissioned for use on 1st December. In consequence all four hospitals have now got new or recently renovated operating theatre suites, complete with air-conditioning.

#### (f) Obstetrical Services

119. The obstetrical units of all the hospitals again operated to capacity throughout the year, and there was an increase in hospital deliveries in all four centres.

|                              | <i>Hospital Deliveries</i> |             |
|------------------------------|----------------------------|-------------|
|                              | 1959                       | 1960        |
| Kuching General Hospital     | 2,352                      | 2,586       |
| Lau King Howe Hospital, Sibü | 800                        | 1,097       |
| Simanggang General Hospital  | 169                        | 183         |
| Miri General Hospital        | Not available              | 330*        |
| Total                        | <hr/> 3,321                | <hr/> 4,196 |

\* Figures are for March to December only.

In addition 693 district deliveries were conducted by the domiciliary midwifery service, in Kuching, and 400 in Sibü, making a total of 1,093 in all, during the year.

120. The extent to which the hospitals catered for the obstetric abnormality is shown in the following table:—

|                                           | <i>Kuching</i> | <i>Sibü</i> | <i>Simanggang</i> | <i>Miri*</i> |
|-------------------------------------------|----------------|-------------|-------------------|--------------|
| Caesarean Section                         | 41             | 33          | 5                 | 10           |
| Forceps Deliveries                        | 61             | 52          | 3                 | 7            |
| Manual Removal of placenta                | 38             | 23          | 5                 | 1            |
| Breech Presentations                      | 62             | 42          | 4                 | 15           |
| Post-Partum haemorrhage                   | 103            | 104         | 9                 | 7            |
| Toxaemias of Pregnancy and the puerperium | 23             | 14          | 10                | 12           |
| Miscarriages                              | 410            | 297         | 53                | 48           |
| Stillbirths                               | 69             | 31          | 5                 | 2            |

\* Miri figures for August to December only.

#### (g) Maternal and Child Health Services

121. The work of this section continues to increase every year, and an increasing number of clinics run by local authorities are being established throughout the country. In Sibü, Sarikei and Binatang in the Third Division, the local authorities are now responsible for all Maternity and Child health services in their districts, and there are smaller local authority clinics in many other parts of the country. The maternal and child health services in the Kuching Municipal area and in most of the Kuching Rural District, are still administered by Government, but it is hoped that these services will soon be taken over by the authorities concerned. Government is responsible for the training of all midwives in the country, whether for government or local authority work. The Health Matron, who supervises the maternal and child health services throughout the country, has run a refresher course for local authority midwives and assistant health visitors, and further courses, with emphasis on the public health aspects of their work, are planned for 1961. Working under the Health Matron are two health sisters, one in Kuching and one in Sibü, while a nursing sister from the hospital was seconded for health duties to the Maternal and Child Health Clinic in Kuching during the year. In Kuching, Sibü and Simanggang, a lady medical officer was employed on a part-time basis to assist with the maternal and child health work.

122. The Health Matron toured all Divisions except the Third, during 1960, and also conducted a three months' Public Health course for assistant health visitors, pupil health inspectors, and tuberculosis health workers. A maternal and child health stand was organised by the Maternal and Child Health Section, at a Trade Fair, held in Kuching in July. In the latter part of the year the

staff of the Maternal and Child Health Section gave valuable assistance in a poliomyelitis immunization campaign. Of 8,954 children immunized, 2,385 were inoculated at Maternal and Child Health clinics throughout the First Division. The usual programme of prophylactic inoculations against whooping cough, diphtheria and tuberculosis was also continued.

123. In Kuching and District, clinics are held at seventeen different centres, and all are visited regularly by a team of assistant health visitors supervised by a health sister. At the Central Clinic and the Sekama Road Clinic the services of a doctor are regularly available. Returns for the year, from the seventeen clinics are given below:—

| Clinic                           | Child Health |                   | Ante-natal |        | Post-natal | Gynaecological |       |
|----------------------------------|--------------|-------------------|------------|--------|------------|----------------|-------|
|                                  | New Cases    | Total Attendances | New        | Total  | Total      | New            | Total |
| Central ... ..                   | 2,554        | 33,325            | 2,370      | 18,619 | 2,336      | 182            | 982   |
| Sekama Road ...                  | 683          | 9,821             | 642        | 4,584  | 746        | —              | —     |
| Bau ... ..                       | 463          | 3,787             | 406        | 1,768  | 372        | —              | —     |
| Tarat ... ..                     | 715          | 5,932             | 864        | 3,237  | 726        | —              | —     |
| 13 Small District Clinics ... .. | 1,107        | 12,870            | 1,187      | 5,160  | 947        | —              | —     |
| Totals ... ..                    | 5,522        | 65,735            | 5,469      | 33,818 | 5,127      | 182            | 982   |

124. In Sibü, the main clinic is the Sibü Urban District Council Clinic which is staffed and run by the Council under the part-time supervision of a Government health sister. The clinic work shows a considerable increase on previous years, as shown by the following returns:—

| Year     | Child Health |                   | Ante-natal |        | Post-natal |       | Gynaecological |            |
|----------|--------------|-------------------|------------|--------|------------|-------|----------------|------------|
|          | New Cases    | Total Attendances | New        | Total  | New        | Total | New            | Total      |
| 1958 ... | 2,195        | 14,807            | 2,215      | 11,671 | 1,536      | 2,037 | Clinic         | not opened |
| 1959 ... | 3,172        | 36,509            | 2,307      | 14,239 | 1,866      | 2,964 | 198            | 591        |
| 1960 ... | 2,879        | 40,001            | 2,531      | 16,072 | 1,898      | 3,660 | 272            | 1,009      |



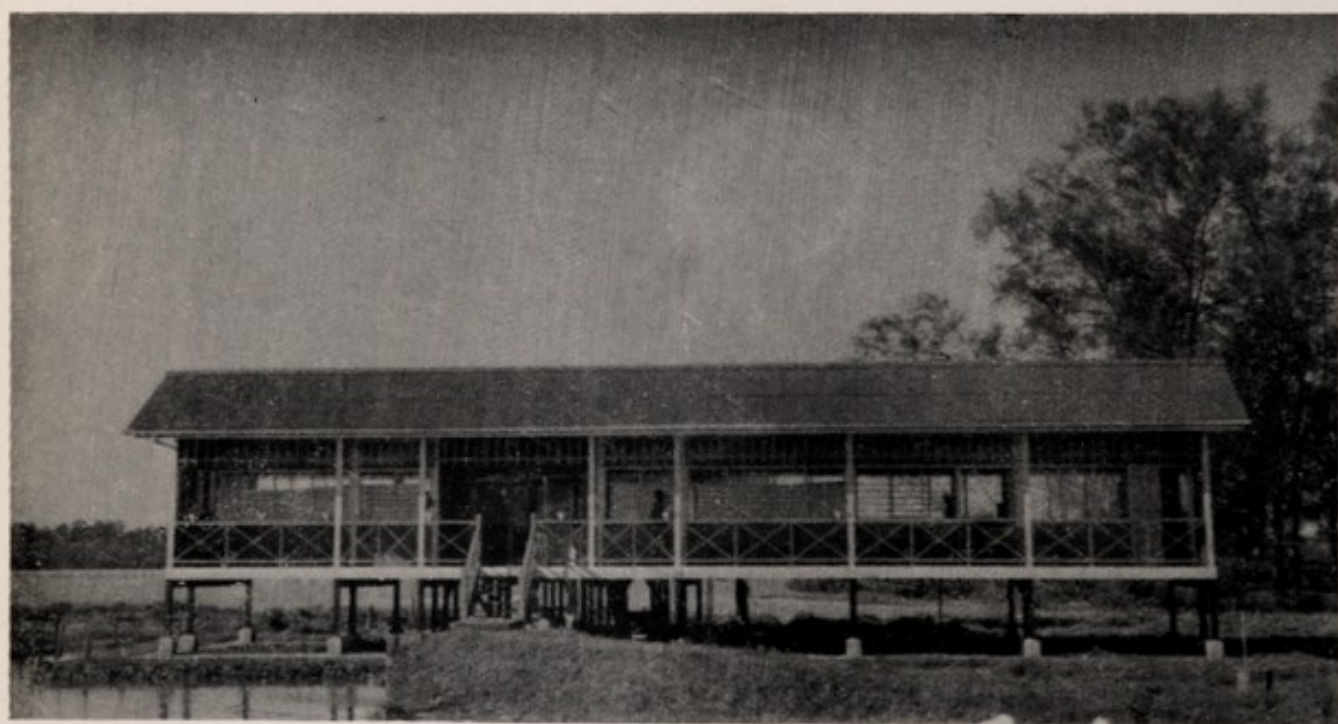
The Health Centre, Kuching.



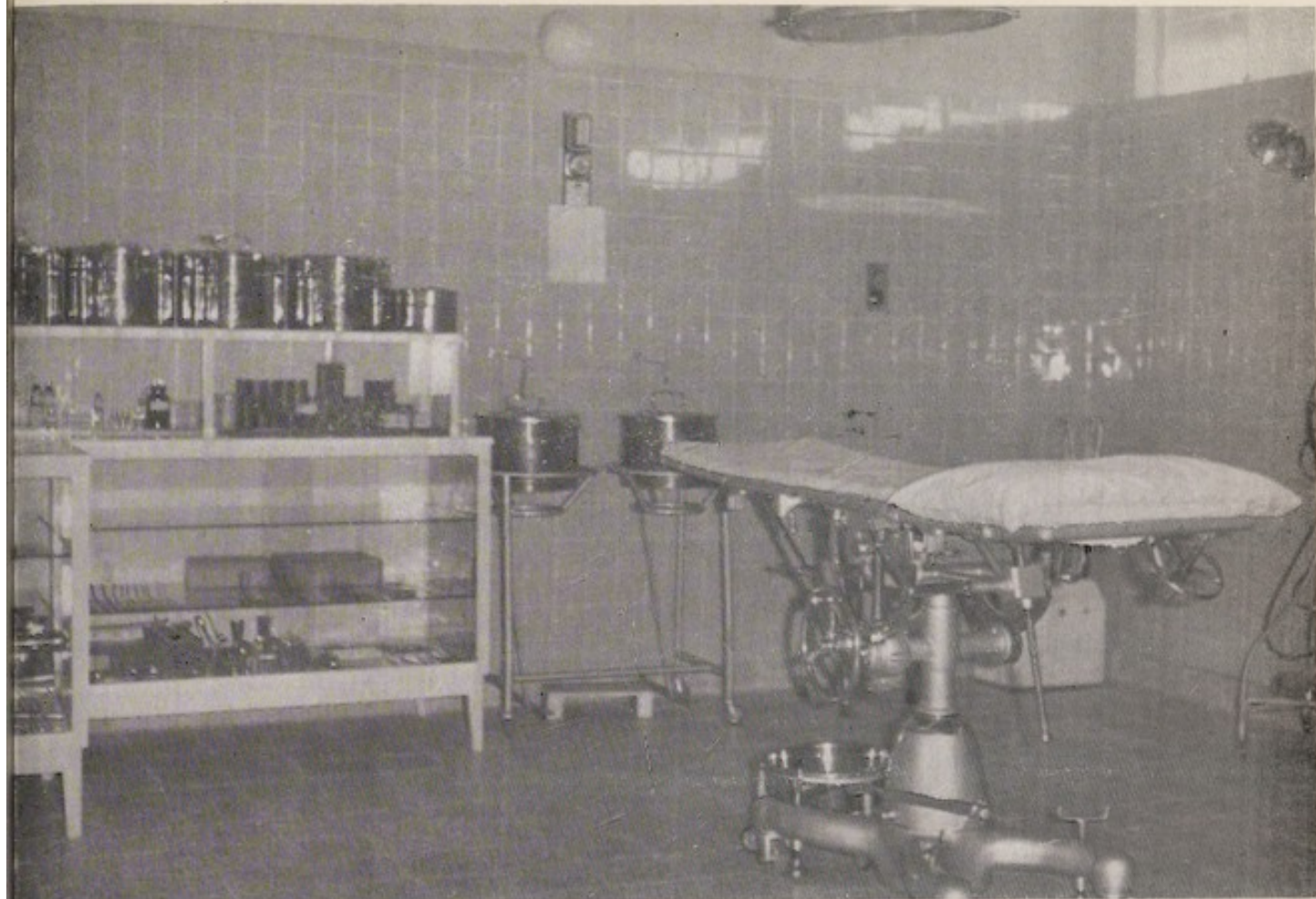
At the reception desk in the Health Centre, Kuching.



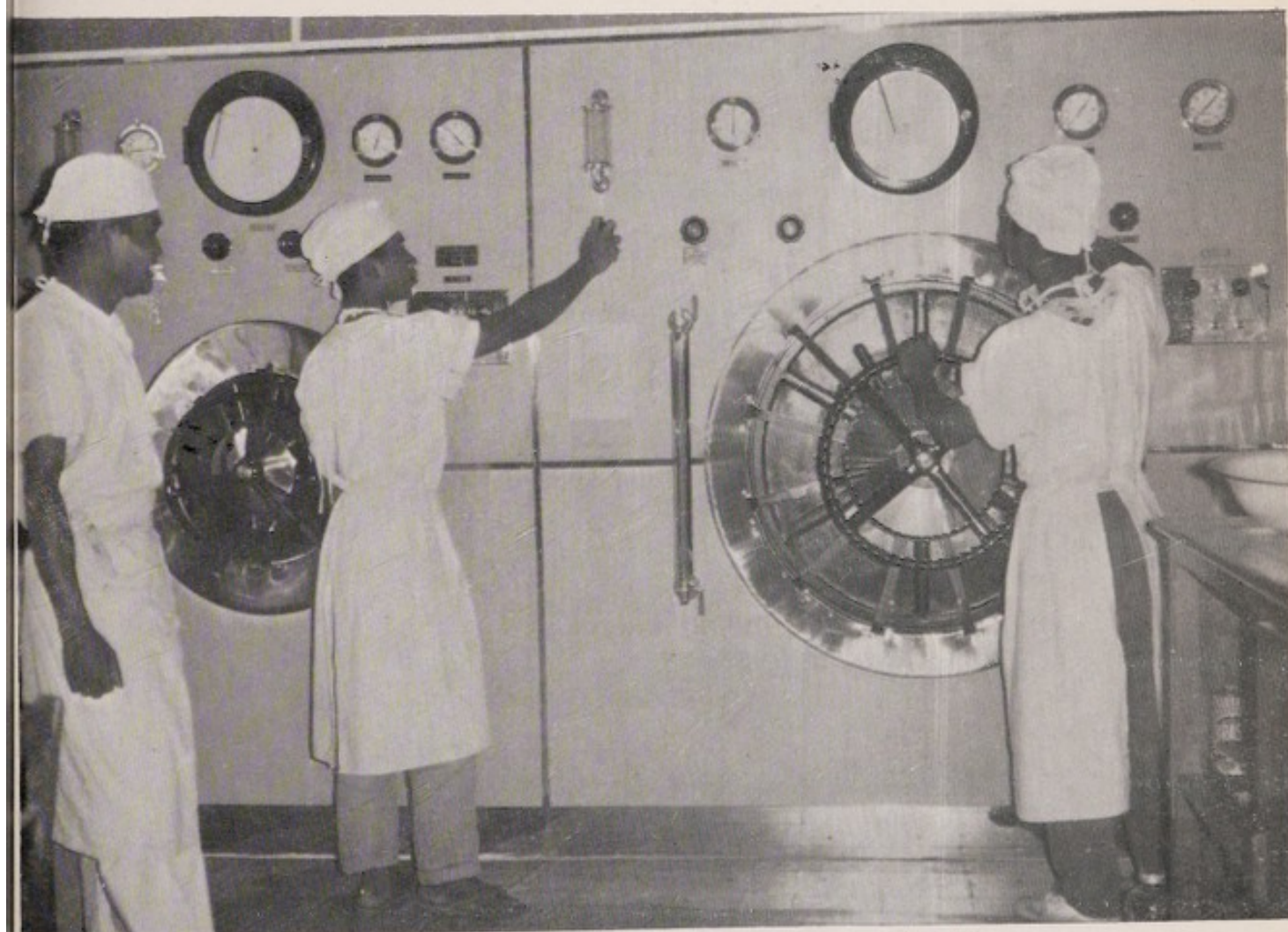
A travelling dispensary operating in the Second Division.



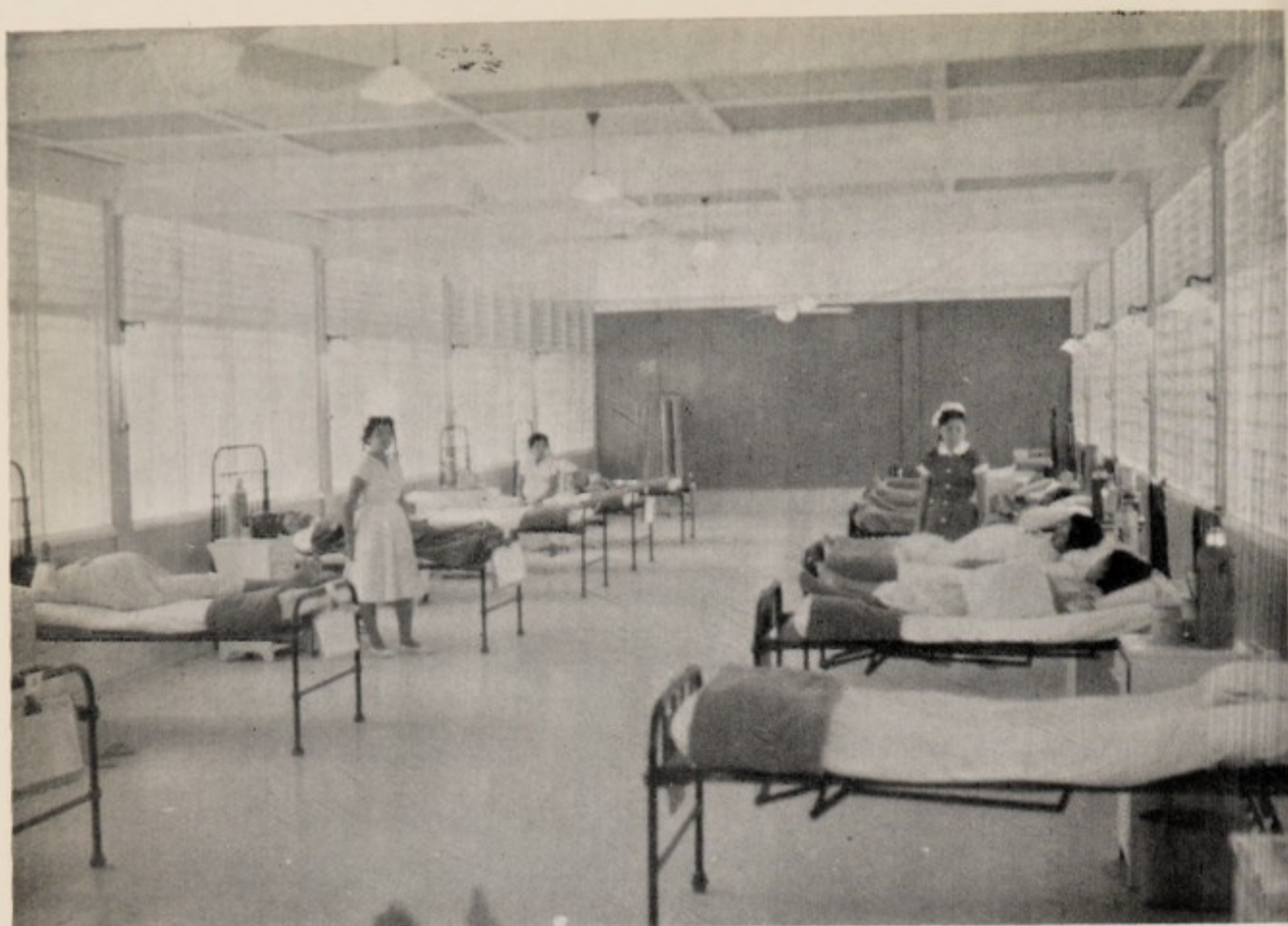
An example of the new type of static dispensary.



The new operation theatre in the Lau King Howe Hospital, Sibu.



Sterilising apparatus in the Lau King Howe Hospital, Sibu.



A new ward in the Lau King Howe Hospital, Sibu.



A concert at the Rajah Charles Brooke Memorial Hospital.

As in Kuching, a large number of poliomyelitis inoculations were given at this clinic during the immunization campaign.

125. The district deliveries conducted by the Sibu Urban District Council midwives have shown a steady increase over the past five years as shown by the following table:—

| <i>Year</i> | <i>Cases delivered</i> |
|-------------|------------------------|
| 1956        | 179                    |
| 1957        | 229                    |
| 1958        | 272                    |
| 1959        | 379                    |
| 1960        | 400                    |

In addition, seven midwives employed by the Sibu Rural District Council, delivered 327 cases during the year.

126. In Sarikei, the District Council Clinic work continues to expand as shown below:—

| Year     | Ante-natal |                   | Child Health |                   |
|----------|------------|-------------------|--------------|-------------------|
|          | New Cases  | Total Attendances | New Cases    | Total Attendances |
| 1959 ... | 447        | 2,407             | 257          | 2,009             |
| 1960 ... | 437        | 4,409             | 330          | 3,586             |

Post-natal attendances have steadily increased from 190 in 1959, to 500 in 1960, and home visits from 565 to 719 over the same period.

In six rural sub-clinics, 333 new ante-natal cases were recorded, and total attendances numbered 1,660. 273 deliveries were conducted in the district by the six midwives employed by the Sarikei District Council.

#### (h) Medical Stores Services

127. This section consists of:

- (a) The Central Medical Store, Kuching.
- (b) The Divisional Medical Store, Sibu.
- (c) The Divisional Medical Store, Miri.

All these are under the over-all supervision of the Superintendent of Medical Stores although (b) and (c) come under the Divisional Medical Officer, as far as the day-to-day running and supervision are concerned.

128. The Superintendent of Medical Stores was the only senior officer on the staff during the year. A Pharmacist returned from Singapore, after obtaining his B.Sc. (Pharmacy) at the University of Malaya, but after two and a half months, returned there for higher studies. The Chief Stores Dispenser went on leave, prior to retirement towards the end of the year, and a trained dispenser had to be posted to Miri, to take charge of the newly established Divisional Store.

One Probationer passed his qualifying examination during the year, and was promoted to the grade of Trained Dispenser.

129. The new Central Medical Store, mentioned in the 1959 report, which is to be built at the new Kuching port area, had not been started by the end of the year, but detailed plans had been approved, and it is hoped that building will begin in 1961. Meanwhile this section is still housed in the cramped and unsuitable building in the Kuching General Hospital compound. It orders, stores and distributes drugs, stores and medical equipment for the whole territory except Sibu, which receives most of its supplies direct from the suppliers. It also manufactures a wide variety of medicinal products, in its manufacturing laboratory. During the year, 26,728,100 tablets of nineteen different types, were produced from imported raw materials. It is estimated that a saving of over \$70,000 was effected, on these items alone. When the new manufacturing laboratories are built, it is intended to increase the number of locally produced items.

130. The Senior Dispenser in charge of the Sibu Medical Store, is also responsible, under the Divisional Medical Officer, for the operation of the salt iodisation plant. During 1960, 3,341 bags containing 882,085 lbs. of salt were iodised and exchanged for bags of uniodised salt deposited by dealers. The Divisional Medical Officer introduced a novel invention which colours all iodised salt a pale shade of green, during the iodisation process. It is now possible to check up on upriver shopkeepers and retailers, to ensure that all the salt sold in the goitrous areas, has been treated.

## **XII. VOLUNTARY ORGANISATIONS**

131. The Social Welfare Council, which is the recognised central welfare agency, to which Government funds are paid for distribution to other welfare bodies in Sarawak, continued its work of helping the aged, the indigent and the needy, during the year.

132. The Sarawak Branch of the British Red Cross Society has not only continued its various activities but during the year its Kuching division has organised in liaison with the Medical Department of Government a Blood Bank at the Kuching General Hospital. Other commendable work done by the Kuching division during the year has been the maintenance of its hostel for discharged hospital patients awaiting transport to their homes and for the relatives of those admitted to hospital from distant parts.

133. The Anti-Tuberculosis Association of Sarawak (ATAS) has expressed its wish to work in the closest liaison with Government in connection with the country-wide T.B. control project. Discussions have been held with the Association's working committee on the various forms of assistance which they hope to provide. The two T.B. longhouses maintained by the Miri branch of ATAS and the T.B. home near Kuching have all been fully committed during the year.

134. The work of the Salvation Army in connection with the Homes they separately maintain for both boys and girls has been of the greatest value to the Department. The girls' home cares also for old women in a special block set aside for the purpose and the children's section is particularly helpful in its acceptance of babies born of leprous mothers while the latter are undergoing treatment.

1355. During 1959, a blind fund was set up by the Social Welfare Council and this was administered by a committee which included the Government ophthalmologist and the hospital almoner. During the year, plans for the formation of a Sarawak Society for the Blind, were drawn up, and in December, an inaugural meeting of this Society was held in Kuching. Arrangements have been made for its affiliation with the Royal Commonwealth Society for the Blind.

136. The Rotary Club of Kuching raised the sum of \$5,000/- to pay for the training of an instructor of the blind in Malaya in 1961, and a suitable local man has been chosen for this course of instruction.

#### **Other Voluntary Agencies**

137. In Sibu, the Sibu Nursing Home and McCarthy Lodge, are both run by a local charitable organisation, known as the Sibu Benevolent Society. The former is for aged men, including chronic T.B. cases, while the latter institution caters for old people of both sexes. Government doctors visit these institutions regularly. In Miri there is also a home for aged paupers, run by a voluntary relief committee.

138. In Kuching, a Home for the Aged is maintained by the Sarawak Social Welfare Council. It is sited on the Serian road about twelve miles from Kuching. The inmates are all destitute persons. Accommodation exists for 130 such people, and includes a sick bay with 30 beds. The sick bay is run with the help of Roman Catholic nuns, and the Home is visited regularly by the Divisional Medical Officer, First Division.

5th May, 1961.

**Appendix I**

**MORBIDITY RETURN FOR IN-PATIENTS TREATED IN THE KUCHING,  
SIBU, AND SIMANGGANG HOSPITALS**

**INTERNATIONAL CLASSIFICATION OF DISEASES  
(INTERMEDIATE LIST)**

|   |    |                                                                       | <i>Cases</i> |
|---|----|-----------------------------------------------------------------------|--------------|
| A | 1  | Tuberculosis of respiratory system                                    | 981          |
| A | 2  | Tuberculosis of meninges and central nervous system                   | 24           |
| A | 3  | Tuberculosis of intestines, peritoneum, and mesenteric glands         | 17           |
| A | 4  | Tuberculosis of bones and joints                                      | 23           |
| A | 5  | Tuberculosis, all other forms                                         | 32           |
| A | 6  | Congenital syphilis                                                   | 1            |
| A | 7  | Early syphilis                                                        | 2            |
| A | 8  | Tabes dorsalis                                                        | —            |
| A | 9  | General paralysis of insane                                           | 2            |
| A | 10 | All other syphilis                                                    | 11           |
| A | 11 | Gonococcal infection                                                  | 4            |
| A | 12 | Typhoid fever                                                         | 194          |
| A | 13 | Paratyphoid fever and other Salmonella infections                     | —            |
| A | 14 | Cholera                                                               | —            |
| A | 15 | Brucellosis (undulant fever)                                          | —            |
| A | 16 | Dysentery, all forms                                                  | 524          |
| A | 17 | Scarlet fever                                                         | —            |
| A | 18 | Streptococcal sore throat                                             | 14           |
| A | 19 | Erysipelas                                                            | 6            |
| A | 20 | Septicaemia and pyaemia                                               | 6            |
| A | 21 | Diphtheria                                                            | 66           |
| A | 22 | Whooping cough                                                        | 6            |
| A | 23 | Meningococcal infections                                              | 8            |
| A | 24 | Plague                                                                | —            |
| A | 25 | Leprosy                                                               | 20           |
| A | 26 | Tetanus                                                               | 25           |
| A | 27 | Anthrax                                                               | —            |
| A | 28 | Acute poliomyelitis                                                   | 32           |
| A | 29 | Acute infectious encephalitis                                         | 31           |
| A | 30 | Late effects of acute poliomyelitis and acute infectious encephalitis | 28           |
| A | 31 | Smallpox                                                              | —            |
| A | 32 | Measles                                                               | 18           |
| A | 33 | Yellow fever                                                          | —            |

*Carried forward* 2,075

Appendix I—(Contd.)

|   |    |                                                                                 | <i>Cases</i>           |
|---|----|---------------------------------------------------------------------------------|------------------------|
|   |    |                                                                                 | <i>Brought forward</i> |
|   |    |                                                                                 | 2,075                  |
| A | 34 | Infectious hepatitis                                                            | 104                    |
| A | 35 | Rabies                                                                          | —                      |
| A | 36 | Typhus and other rickettsial diseases                                           | —                      |
| A | 37 | Malaria                                                                         | 50                     |
| A | 38 | Schistosomiasis                                                                 | —                      |
| A | 39 | Hydatid disease                                                                 | —                      |
| A | 40 | Filariasis                                                                      | 58                     |
| A | 41 | Ankylostomiasis                                                                 | 73                     |
| A | 42 | Other diseases due to helminths                                                 | 202                    |
| A | 43 | All other diseases classified as infective and parasitic                        | 65                     |
| A | 44 | Malignant neoplasm of buccal cavity and pharynx                                 | 22                     |
| A | 45 | Malignant neoplasm of oesophagus                                                | 6                      |
| A | 46 | Malignant neoplasm of stomach                                                   | 48                     |
| A | 47 | Malignant neoplasm of intestine, except rectum                                  | 2                      |
| A | 48 | Malignant neoplasm of rectum                                                    | 9                      |
| A | 49 | Malignant neoplasm of larynx                                                    | —                      |
| A | 50 | Malignant neoplasm of trachea, bronchus and lung,<br>not specified as secondary | 15                     |
| A | 51 | Malignant neoplasm of breast                                                    | 11                     |
| A | 52 | Malignant neoplasm of cervix uteri                                              | 33                     |
| A | 53 | Malignant neoplasm of other and unspecified parts of uterus                     | 13                     |
| A | 54 | Malignant neoplasm of prostate                                                  | 1                      |
| A | 55 | Malignant neoplasm of skin                                                      | 6                      |
| A | 56 | Malignant neoplasm of bone and connective tissue                                | 9                      |
| A | 57 | Malignant neoplasm of all other and unspecified sites                           | 49                     |
| A | 58 | Leukaemia and aleukaemia                                                        | 10                     |
| A | 59 | Lymphosarcoma and other neoplasm of lymphatic and<br>haematopoietic system      | 5                      |
| A | 60 | Benign neoplasm and neoplasms of unspecified nature                             | 124                    |
| A | 61 | Non-toxic goitre                                                                | 50                     |
| A | 62 | Thyrotoxicosis with or without goitre                                           | 29                     |
| A | 63 | Diabetes mellitus                                                               | 49                     |
| A | 64 | Avitaminosis and other deficiency states                                        | 137                    |
| A | 65 | Anaemias                                                                        | 134                    |
| A | 66 | Allergic disorders; all other endocrine, metabolic, and<br>blood diseases       | 108                    |
| A | 67 | Psychoses                                                                       | 116                    |
| A | 68 | Psychoneuroses and disorders of personality                                     | 64                     |
|   |    |                                                                                 | <hr/>                  |
|   |    |                                                                                 | <i>Carried forward</i> |
|   |    |                                                                                 | 3,677                  |

Appendix I—(Contd.)

|   |     | <i>Brought forward</i>                                        | <i>Cases</i><br>3,677 |
|---|-----|---------------------------------------------------------------|-----------------------|
| A | 69  | Mental deficiency                                             | 14                    |
| A | 70  | Vascular lesions affecting central nervous system             | 35                    |
| A | 71  | Non-meningococcal meningitis                                  | 6                     |
| A | 72  | Multiple sclerosis                                            | —                     |
| A | 73  | Epilepsy                                                      | 18                    |
| A | 74  | Inflammatory diseases of eye                                  | 146                   |
| A | 75  | Cataract                                                      | 78                    |
| A | 76  | Glaucoma                                                      | 17                    |
| A | 77  | Otitis media and mastoiditis                                  | 36                    |
| A | 78  | All other diseases of the nervous system and sense organs     | 105                   |
| A | 79  | Rheumatic fever                                               | 33                    |
| A | 80  | Chronic rheumatic heart disease                               | 22                    |
| A | 81  | Arteriosclerotic and degenerative heart disease               | 75                    |
| A | 82  | Other diseases of heart                                       | 67                    |
| A | 83  | Hypertension with heart disease                               | 36                    |
| A | 84  | Hypertension without mention of heart                         | 74                    |
| A | 85  | Diseases of arteries                                          | 6                     |
| A | 86  | Other diseases of circulatory system                          | 170                   |
| A | 87  | Acute upper respiratory infections                            | 200                   |
| A | 88  | Influenza                                                     | 76                    |
| A | 89  | Lobar pneumonia                                               | 70                    |
| A | 90  | Bronchopneumonia                                              | 258                   |
| A | 91  | Primary atypical, other, and unspecified pneumonia            | 65                    |
| A | 92  | Acute bronchitis                                              | 173                   |
| A | 93  | Bronchitis, chronic and unqualified                           | 104                   |
| A | 94  | Hypertrophy of tonsils and adenoids                           | 80                    |
| A | 95  | Empyema and abscess of lung                                   | 30                    |
| A | 96  | Pleurisy                                                      | 5                     |
| A | 97  | All other respiratory diseases                                | 89                    |
| A | 98  | Diseases of teeth and supporting structures                   | 46                    |
| A | 99  | Ulcer of stomach                                              | 162                   |
| A | 100 | Ulcer of duodenum                                             | 53                    |
| A | 101 | Gastritis and duodenitis                                      | 47                    |
| A | 102 | Appendicitis                                                  | 193                   |
| A | 103 | Intestinal obstruction and hernia                             | 146                   |
| A | 104 | Gastro-enteritis and colitis, except diarrhoea of the newborn | 470                   |
| A | 105 | Cirrhosis of liver                                            | 67                    |
| A | 106 | Cholelithiasis and cholecystitis                              | 62                    |
|   |     | <i>Carried forward</i>                                        | 7,011                 |

Appendix I—(Contd.)

|        |                                                                                                            | <i>Brought forward</i> | <i>Cases</i><br>7,011 |
|--------|------------------------------------------------------------------------------------------------------------|------------------------|-----------------------|
| A 107  | Other diseases of digestive system                                                                         |                        | 164                   |
| A 108  | Acute nephritis                                                                                            |                        | 112                   |
| A 109  | Chronic, other, and unspecified nephritis                                                                  |                        | 41                    |
| A 110  | Infections of kidney                                                                                       |                        | 49                    |
| A 111  | Calculi of urinary system                                                                                  |                        | 84                    |
| A 112  | Hyperplasia of prostate                                                                                    |                        | 17                    |
| A 113  | Diseases of breast                                                                                         |                        | 31                    |
| A 114  | Other diseases of genito-urinary system                                                                    |                        | 493                   |
| A 115  | Sepsis of pregnancy, childbirth, and the puerperium                                                        |                        | 32                    |
| A 116  | Toxaemias of pregnancy and the puerperium                                                                  |                        | 59                    |
| A 117  | Haemorrhage of pregnancy and childbirth                                                                    |                        | 207                   |
| A 118  | Abortion with sepsis                                                                                       |                        | 27                    |
| A 120  | Other complications of pregnancy, childbirth, and the puerperium. Delivery without mention of complication |                        | 4,387                 |
| A 121  | Infections of skin and subcutaneous tissue                                                                 |                        | 480                   |
| A 122  | Arthritis and spondylitis                                                                                  |                        | 44                    |
| A 123  | Muscular rheumatism and rheumatism unspecified                                                             |                        | 50                    |
| A 124  | Osteomyelitis and periostitis                                                                              |                        | 27                    |
| A 125  | Ankylosis and acquired musculoskeletal deformities                                                         |                        | 7                     |
| A 126  | All other diseases of skin and musculoskeletal system                                                      |                        | 34                    |
| A 127  | Spina bifida and meningocele                                                                               |                        | —                     |
| A 128  | Congenital malformations of circulatory system                                                             |                        | 26                    |
| A 129  | All other congenital malformations                                                                         |                        | 62                    |
| A 130  | Birth injuries                                                                                             |                        | 1                     |
| A 131  | Postnatal asphyxia and atelectasis                                                                         |                        | —                     |
| A 132  | Infections of the newborn                                                                                  |                        | 3                     |
| A 133  | Haemolytic disease of the new-born                                                                         |                        | —                     |
| A 134  | All other defined diseases of early infancy                                                                |                        | 32                    |
| A 135  | Ill-defined diseases peculiar to early infancy, and immaturity unqualified                                 |                        | 17                    |
| A 136  | Senility without mention of psychosis                                                                      |                        | 3                     |
| A 137  | Ill-defined and unknown causes of morbidity and mortality                                                  |                        | 358                   |
| AN 138 | Fracture of skull                                                                                          |                        | 17                    |
| AN 138 | Fracture of spine and trunk                                                                                |                        | 38                    |
| AN 140 | Fracture of limbs                                                                                          |                        | 220                   |
| AN 141 | Dislocation without fracture                                                                               |                        | 14                    |
| AN 142 | Sprains and strains of joints and adjacent muscle                                                          |                        | 18                    |
| AN 143 | Head injury (excluding fracture)                                                                           |                        | 101                   |
|        |                                                                                                            | <i>Carried forward</i> | 15,047                |

**Appendix I—(Contd.)**

|                        |                                                                     | <i>Cases</i>  |
|------------------------|---------------------------------------------------------------------|---------------|
| <i>Brought forward</i> |                                                                     | 15,047        |
| AN 144                 | Internal injury of chest, abdomen, and pelvis                       | 18            |
| AN 145                 | Laceration and open wounds                                          | 509           |
| AN 146                 | Superficial injury, contusion and crushing with intact skin surface | 153           |
| AN 147                 | Effects of foreign body entering through orifice                    | 20            |
| AN 148                 | Burns                                                               | 126           |
| AN 149                 | Effects of poisons                                                  | 55            |
| AN 150                 | All other and unspecified effects of external causes                | 106           |
| <b>Total</b>           |                                                                     | <b>16,034</b> |

## MALARIA IN SARAWAK — 1960

### I. INTRODUCTION

Sarawak lies on the northwest coast of the island of Borneo and has a total population of 744,529. The main town is Kuching, the capital, which lies in the First Division, and has a population of over 50,000.

Of the total population, 124,463 persons are considered to lie within the area in the consolidation phase of eradication. A total of 620,066 persons is considered to be in the attack phase area.

There are Five Divisions in Sarawak, of which the Fourth and Fifth are considered as one operational unit. The Malaria Eradication Project is operated by the Medical Department of Sarawak on a divisional basis with control from Headquarters. Assistance regarding technical aspects of the Project is received from a WHO Advisory Team, consisting of a Senior Malaria Adviser, a Malariologist, and an Entomologist.

### I. PROGRAMME SINCE ITS INCEPTION

After preliminary surveys by WHO personnel, operations against malaria commenced as a Pilot Project in 1953. The results were encouraging, and so this pilot project was gradually expanded to cover all areas of Sarawak and was then known as the Sarawak Malaria Control Project. At the beginning of the year, it was decided that every effort should be made to eradicate malaria and thus the scheme is now described as the Sarawak Malaria Eradication Project.

### III. PROGRAMME DURING 1960

The organisation of operations is given in Annex I, and differs from that of previous years. This has resulted from a re-organisation within the Medical Department, and the appointment of a Specialist Health Officer at Medical Headquarters responsible to the Director of Medical Services for the project. The WHO Advisory Team has relinquished all executive responsibility.

#### (1) Malariometric findings

Spleen surveys are no longer carried out in Sarawak. Parasite surveys are used to assess the progress of the project in all areas, and to determine the extent of the problem remaining. The results of such surveys are given in Annex II. Microscopy results are given in Annex III.

#### (2) Entomological findings

Known vectors are *A. leucosphyrus* and *A. barbirostris*. *A. sundaicus* is almost certainly a vector in certain coastal areas, but this is under investigation for confirmation. *A. balabacensis* occurs in the north eastern areas of Sarawak, but its status as a vector is unknown, and seems improbable at present.

## Appendix II—(Contd.)

Recently the question of *A. letifer* being a vector has arisen. A summary of entomological findings is included in Annex IV.

**(3) Spraying operations**

These extend over the whole of Sarawak, with the exception of those areas within the consolidation phase. The cycle of spraying is twice yearly, using 75 per cent DDT (w.d.p.) at a strength of 2 gms. per square metre. In a small area in the First Division where *A. sondaicus* is a vector, Dieldrin 50 per cent (w.d.p.) is used twice yearly in a strength of 0.6 gms. per square metre. A summary of spraying statistics is given in the following table:—

TABLE I  
SUMMARY OF SPRAYING STATISTICS — 1960

| Sprayed Structures |           |        | Doors unsprayed because |         |         | Insecticide used                        |
|--------------------|-----------|--------|-------------------------|---------|---------|-----------------------------------------|
| Doors              | Farm huts | Others | Locked                  | Pantang | Refused |                                         |
| 159,187            | 24,151    | 3,373  | 2,079                   | 85      | 607     | 54,926.7 kilos.<br>D.D.T. 75%<br>w.d.p. |
| 61                 | —         | 2      | —                       | —       | 1       | 9.37 kilos.<br>Dieldrin 50%<br>w.d.p.   |

**(4) Surveillance operations**

Passive case detection exists in all areas of the country but the degree of access of the rural population to the fifty-four passive case detection units varies according to topographical conditions.

Active case detection is proceeding in all areas included in the attack phase, and in one area in the consolidation phase of the project. The operational unit for active case detection is determined by the division of the country into sectors, based on the administrative districts which lie within a division. There are seventy-two active case detection sectors in Sarawak.

The results are shown in Annex II.

**(5) Investigation and Treatment**

During the year this aspect of the project has developed in accordance with the increase in surveillance activities. There is now an investigation team in each division, remembering that the Fourth and Fifth are treated as a single entity.

**Appendix II—(Contd.)**

The duties of an investigation team are to follow-up proven cases of malaria including the taking of histories, the tracing of contacts, related entomological work, and the taking of all blood samples considered necessary.

In the investigation of proven cases of malaria, the following order of priority has been followed—

- (a) Infection in infants.
- (b) *P. falciparum* infections.
- (c) Occurrence of a case in an area rendered free of malaria.
- (d) All other cases.

**IV. PLANS FOR THE FUTURE**

The 1961 programme provides for the following:—

- (a) Continuation of residual spraying in all areas other than those where it has been clearly demonstrated that interruption of transmission has been achieved.
- (b) Spraying on a selective basis in areas where interruption of transmission has been achieved except in isolated villages.
- (c) Continuation of active and passive case detection in all areas.
- (d) Continuation and expansion of investigational activities.
- (e) Radical treatment where possible of all known cases of malaria occurring in Sarawak.
- (f) A special study of the situation in areas bordering on Kalimantan with special reference to those places where regular movement of people across the frontier is known to occur for trading or other purposes.
- (g) The training of local personnel as opportunity permits in an endeavour to generally raised standards.

**V. ITEMS OF SPECIAL INTEREST**

**(1) Communications and Logistics**

The extension of active case detection, investigation, and treatment operations has naturally led to an increase in the problems connected with such activities.

The costs involved in the provision and maintenance of hulls and outboard engines for the many sectors have to be estimated in advance. It is difficult to do this because of the varying operative conditions pertaining to the project, some of which shorten the life of a boat or engine very considerably. The project employs large, medium, and small hulls.

In addition the project uses land transport where feasible, and also existing air services for the transport of emergency supplies and blood slides.

**(2) Nomadic and Semi-nomadic groups**

These groups still constitute a problem because their mode of life makes it difficult to ensure adequate control.

**Appendix II—(Contd.)**

Occasionally a group will settle in one place for an indefinite period of time. The group will retain contact with other nomadic groups, and at the same time establish contact with neighbouring settled communities. If the area is one where transmission has been interrupted, then the risk of its reintroduction arises.

**(3) Border traffic**

This continues to be a problem in relation to the scheme for eradication of malaria in Sarawak. The problem is twofold:—

- (a) Migrants entering Sarawak from Kalimantan with a parasite rate ranging from 0 to 15 per cent.
- (b) Healthy individuals crossing the border to visit relatives and perhaps returning infected.

**(4) Inter-territorial co-operation**

A good example of this has occurred recently. DDT supplies to Sarawak were delayed and a small supply was obtained on loan from the North Borneo Government.

There is insufficient liaison between the British Borneo territories and Kalimantan. It is important that this is fostered in every possible way.

**VI. TECHNICAL ITEMS**

**(1) Insecticides**

Some details regarding use and consumption have been given in Table I above, where spraying operations were described.

The quality of insecticide miscibility and deposition has been satisfactory.

**(2) Spraying equipment**

The project uses Taiwan hand-pressure sprayers and to a limited extent lift-and-pressure pumps. This equipment with the exception of pressure gauges is satisfactory. There is still no simple solution to the problem of a relatively cheap pressure gauge for use with this equipment.

It has not been the practice in the past to regrade the Tee-jet but this is under consideration.

**(3) Microscopy**

Decentralisation with the aim of decreasing the time-interval between collection and examination of slides has begun, and should be completed in the early part of 1961.

**(4) Drug administration**

The use of drugs is restricted to the treatment of known suspected cases. Difficulty is being experienced in devising a system for the radical treatment

**Appendix II—(Contd.)**

of proven cases with a minimum of delay between the collection of blood from such persons and their treatment. This applies particularly to isolated *P. vivax* and *P. malariae* infections in remote areas.

**(5) Administration**

In October 1960, the Sarawak Government assumed full responsibility for the administrative and technical direction of the programme. The WHO staff relieved of executive responsibility now constitutes an advisory team to the Director of Medical Services, Sarawak.

**(6) Personnel including Training**

Under the administrative changes referred to in paragraph (5) above, executive control has been strengthened by the assumption of technical and administrative responsibility by Divisional Medical Officers responsible to Headquarters.

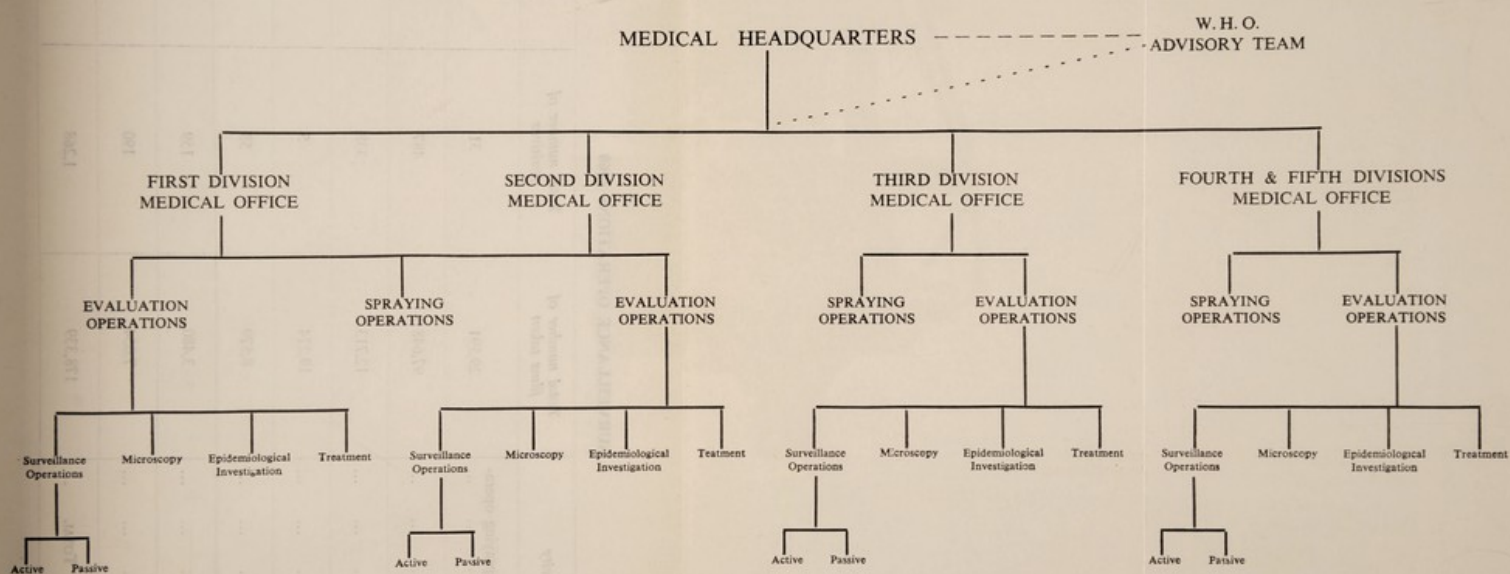
The implementation of an eradication programme has accentuated the importance of sufficient staff at the superintendent level, and action has been taken on this aspect of staffing during the year.

Concomitant with the increase in senior supervisory staff, there is a need for responsible staff at a lower level i.e. squad leader and/or senior canvasser. Owing to various factors it has been difficult to meet this need.



## THE SARAWAK MALARIA ERADICATION PROJECT

## ORGANIZATION CHART



Annex II

**SURVEILLANCE OPERATIONS 1960**

| <i>Type of activity</i>                            | <i>Total number of films taken</i> | <i>Total number of positives</i> | <i>Percentage of positives</i> |
|----------------------------------------------------|------------------------------------|----------------------------------|--------------------------------|
| Slides collected during spraying operations ... .. | 29,591                             | 31                               | 0.1%                           |
| Active case detection ... ..                       | 97,648                             | 487                              | 0.5%                           |
| Passive case detection ... ..                      | 12,713                             | 338                              | 2.7%                           |
| Mass blood surveys ... ..                          | 19,274                             | 5                                | 0.03%                          |
| Incidental surveys ... ..                          | 8,579                              | 58                               | 0.7%                           |
| Investigation ... ..                               | 3,480                              | 159                              | 4.6%                           |
| Treatment ... ..                                   | 7,054                              | 190                              | 2.7%                           |
| <b>TOTAL ...</b>                                   | <b>178,339</b>                     | <b>1,268</b>                     | <b>0.7%</b>                    |

Annex III

\* MALARIA MICROSCOPICAL WORK 1960

| <i>Source of films</i>                              | <i>Total number of films examined</i> | <i>Total number of positives</i> | <i>Percentage of positives</i> |
|-----------------------------------------------------|---------------------------------------|----------------------------------|--------------------------------|
| Surveillance operations ... ..                      | 189,022                               | 1,407                            | 0.7%                           |
| Evaluation of examination of negative slides ... .. | 16,633                                | 9                                | 0.05%                          |
| Evaluation of examination of positive slides ... .. | 686                                   | 686                              | —                              |

\* It must be remembered that the above work includes some slides from 1959. Hence the results in Annex II and Annex III will not tally.

## SUMMARY OF ENTOMOLOGICAL FINDINGS 1960

Entomological investigations were extended during this period to cover the whole country.

**Vector**

Further indirect evidence against *A. sundaicus* in the First Division was obtained, when 186 *A. sundaicus* and 3 *A. barbirostris* were caught in an investigation in which 3 out of 4 members of the investigation team contracted malaria. *A. balabacensis* was found to be widespread in the northern part of the country and common in places. Evidence on its vectoral role will be difficult to obtain as there is now little malaria in the area over which it occurs in any numbers. There is a suspicion that *A. letifer* may be a vector in connection with a locally contracted case of malaria in an unsprayed area near Sibuluan. In the investigation, captures were made of 493 *A. letifer*, 47 of them indoor, and no other anophelines were taken. The indoor captures showed 31.4 *A. letifer* per man-hour, a very high figure. No sporozoites or oocysts were found, but ovary dissections by Detinova's method gave a parity rate of 60.3 per cent (93 parous + 63 nulliparous) indicating a daily mortality of only 22.3 per cent, which is well within vectoral capacity.

**Night adult captures**

6,802 anophelines of thirteen species were taken in 5,826 man-hours of indoor and outdoor collection at night giving 1.17 anophelines per man-hour. These captures are summarised below:—

| Species                |     |     |     | Number taken |
|------------------------|-----|-----|-----|--------------|
| <i>A. barbirostris</i> | ... | ... | ... | 2,967        |
| <i>A. leucosphyrus</i> | ... | ... | ... | 69           |
| <i>A. balabacensis</i> | ... | ... | ... | 141          |
| <i>A. sundaicus</i>    | ... | ... | ... | 192          |
| <i>A. letifer</i>      | ... | ... | ... | 975          |
| Non vectors*           | ... | ... | ... | 2,458        |

\*Includes *A. kochi*, *A. tessellatus*, *A. "hyrcanus"*, *A. maculatus*, *A. philippinensis*, *A. separatus*, *A. ludlowi*, and *A. albotaeniatus*.

Annex IV—(Contd.)

**Importance of unsprayed Dwellings and extensions to Dwellings**

This is shown in the records for the First Division, January to July in which 33 man-hours were spent searching in unsprayed structures. Most of these were farm-huts or extensions to longhouses built since the previous spraying. It is felt that these indicate the need for a six-monthly spraying cycle, as otherwise they would go unsprayed for a longer period.

| <i>Species</i>                | <i>Sprayed surface</i> | <i>Unsprayed surface</i> |
|-------------------------------|------------------------|--------------------------|
| <i>A. barbirostris</i> ... .. | 61                     | 77                       |
| <i>A. leucosphyrus</i> ... .. | 15                     | 16                       |
| <i>A. letifer</i> ... ..      | 2                      | 27                       |
| Others (non vectors) ...      | 16                     | 0                        |
| Total ... ..                  | 94                     | 120                      |
| No. man-hours ... ..          | 555.5                  | 33                       |
| No./man-hour ... ..           | 0.17                   | 3.63                     |

**Daytime adult captures (outdoors)**

A considerable amount of time was spent searching outdoors during day-time for anophelines; no record of the time spent was kept. Relatively few anophelines were found in these searches.

| <i>Species</i>                | <i>Biting</i> | <i>Resting</i> | <i>Total</i> |
|-------------------------------|---------------|----------------|--------------|
| <i>A. barbirostris</i> ... .. | 50            | 45             | 95           |
| <i>A. letifer</i> ... ..      | 10            | 3              | 13           |
| <i>A. tessellatus</i> ... ..  | 2             | 12             | 14           |
| Others ... ..                 | 2             | 10             | 12           |
| Total ... ..                  | 64            | 70             | 134          |

It is belived that while daytime biting by *A. barbirostris* is not unusual in parts of the First Division it is too infrequent to play a major role in malaria transmission. Further investigation is under consideration. Four Muirhead Thompson type pit traps were tried without result.

### Dissections

Dissections for gland and gut infections and of ovaries for the parity rate by Detinova's method were carried out. No gland or gut infections were found in 1,613 *A. barbirostris*, 47 *A. leucosphyrus*, 18 *A. balabacensis*, 117 *A. sundaicus* and 440 *A. letifer*.

Ovary dissections are summarised below:—

| Species                    | Total | Parous | Nulliparous | % Parous |
|----------------------------|-------|--------|-------------|----------|
| <i>A. barbirostris</i> ... | 1,709 | 558    | 1,151       | 32.6     |
| <i>A. leucosphyrus</i> ... | 63    | 17     | 46          | 27.0     |
| <i>A. balabacensis</i> ... | 16    | 1      | 15          | 6.3      |
| <i>A. sundaicus</i> ...    | 116   | 21     | 95          | 18.1     |
| <i>A. letifer</i> ...      | 432   | 187    | 245         | 43.3     |

### Blood meal identification

Out of 84 *A. barbirostris* caught in a variety of situations, including outside resting places in daytime 35 (41.6%) had fed on man and 37 (44.1%) on pigs. The rest had fed on dogs or unidentified mammals. Man, pig, dog, cat and fowl are the only available blood meals in most areas concerned. No cattle are kept and wild animals are uncommonly met with.

### Larval collections

Random larval surveys were done at most localities visited for night captures. Larvae of seven species were taken. Two species, *A. baezi* and *A. barbumbrosus*, were not taken as adults.

### Simian malaria

Twelve monkey bloods representing four species were taken in the Kelabit plateau. Nine of these were captives and three were shot in remote areas, far away from human habitation. Nine bloods including two of those shot were positive for simian malaria, the species being undetermined. Further action to determine the species has been taken.