

Annual report of the Sarawak Government Medical Department.

Contributors

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SARAWAK

ANNUAL REPORT

OF THE

HEALTH DEPARTMENT

FOR THE YEAR

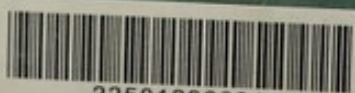
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KUCHING:

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HEALTH DEPARTMENT.

Annual Report for 1928.

1. **Staff.**—I took over the duties of Chief Health Officer of the State, on 21st May, 1928, from Dr. Marjoribanks, who had for some time previously been doing most valuable health work in addition to his own duties as Principal Medical Officer.

There was at that time no Assistant Health Officer, but sanction had been obtained for that appointment, and Dr. Christopher Gange was selected in England, leaving by s.s. *Naldera* on 14th July and arriving here on 13th August.

Dr. Gange continued in the department until the end of the year, rendering valuable assistance. Thereafter he was transferred to the Medical Department on loan for three months.

2. The following were the Staff at my disposal:—

Chief Sanitary Inspector.—Mr. Choo Ah Hian, formerly a senior dresser (1904) and now with six years' service in the Health Department.

Sanitary Inspectors and Probationers.—Mr. Bong Ah Jin, formerly a dresser (1918) transferred to Health Department in 1925.

Mr. G. W. Geikie, formerly a dresser (1921) and transferred to the Health Department in 1927, who is a diplomate of the Royal Sanitary Institute.

Mr. Suleiman, who joined the department in 1922.

Mr. H. A. Perera, who joined the Sarawak service at Miri in 1925, and was transferred to the Health Department in 1927. He holds the Ceylon Government Diploma for Sanitary Inspectors.

Mr. Alli Omar, who joined the Department in 1925.

Mr. A. Harry, 1926.

Mr. Geck Cheng, 1926.

Mr. Lee Swee Hock, who joined in 1927, and is a member of the American Public Health Association.

Mr. Selvadurai, 1927, who has undergone the Royal Sanitary Institute Course in Singapore.

Mr. A. Marican, 1927.

Mr. Nyuk Foh, 1927.

Mr. Edmund Reutens, 1927, who was then undergoing the Royal Sanitary Institute Course in Singapore.

Mr. Lim Beng Siang, who was formerly a dresser (1926) and was transferred to the Health Department in 1928. He was then undergoing his Royal Sanitary Institute Course in Singapore and was successful in gaining the Diploma in November.

Mr. H. F. Brodie, 1928.

Mr. K. Waini, 1928.

The Clerical Staff.—Consists of:—Mr. Mohamed Zen, who joined the Government Service as a clerk in 1921, and was transferred to the Health Department in 1928.

Mr. Jin Hoe, who was appointed a temporary clerk for Rockefeller Foundation work under Dr. Yeager in 1927.

3. **Organization.**—The month of June was occupied in studying all the various aspects of the local situation and conditions, after which it became possible to draw up an organized programme for the department.

4. The area within Municipal limits was divided up into four districts, as follows:—

A Central district comprising the Bazaar proper, bounded by the following roads, etc.:—Brooke Dock, Mosque Road, McDougall Road, Mathies Road, Padungan Road and Sungei Kuching.

A Southern district bounded as follows:—Sarawak Railway, Mosque Road, McDougall Road, Tabuan Road, Pig Lane, Bampfylde Road, Batu Lintang Road and Green Road.

An Eastern district bounded by the roads:—Sungei Kuching, Padungan Road, Mathies Road, Tabuan Road, Pig Lane, Bampfylde Road, Batu Lintang Road, Sekama Road and Sungei Sekama.

A Western district bounded as follows:—Sarawak Railway, Sarawak River, Blacksmith Road, and Green Road to its intersection with the railway.

5. *A Rural district* was also formed comprising the areas of the First Division, outside the Municipal boundaries of Kuching; but excluding the Administrative Districts of Upper Sarawak, Lundu and Sadong.

6. The staff of Inspectors was apportioned amongst the various districts as follows:—

The Chief Sanitary Inspector, Mr. Ah Hian, to take charge of the Shipping work, Birth and Death Registration, and vaccination; as well as to supervise generally the work of the other inspectors.

The Central district was put in charge of Sanitary Inspector Perera with Mr. Nyuk Foh as his assistant, until November, when Mr. Beng Siang returned from Singapore. Mr. Beng Siang acted as Assistant Sanitary Inspector Central, until the end of the year, with Mr. Reutens in charge of the rat campaign and Mr. Nyuk Foh as supernumerary.

The Southern district was put in charge of Sanitary Inspector Geikie with Mr. K. Waini as his assistant.

The Eastern district was apportioned to Mr. Ah Jin with Mr. Ali Omar as his assistant.

The Western district was taken over by Mr. Suleiman with Mr. A. Marican as his assistant.

7. The Rural district was given to Mr. Swee Hock with Mr. Geck Cheng as his assistant.

8. The First Division Outstations were brought into touch with the Department by transferring Mr. A. Harry to Bau in July and Mr. S. Selvadurai to Sadong during the same month.

9. The nucleus of work on a Mosquito section was started by appointing Mr. H. F. Brodie as Assistant Mosquito Inspector. This work will be alluded to later under the heading "Anti-Mosquito Work."

10. All the above inspectors entered very heartily into their new duties, and their difficult work has, on the whole, been conscientiously and efficiently performed.

11. **Vital Statistics.**—A preliminary difficulty was encountered in that no *census enumeration* of the town of Kuching was in existence, thus rendering it impossible to arrive at a Birth Rate or Death Rate. This was got over by instructing the four District Inspectors of the Municipal Limits, when locating every house in their district (which would of course be a normal part of their duties) to make a note of the numbers of adult males and females, and of the children, inhabiting them. By this means, within a couple of months, a sufficiently accurate numerical census was arrived at without cost or inconvenience of any kind.

The results may be tabulated as follows :—

Nan : District.	No. of Houses.	Adult Males.	Adult Females.	Children.	Density per House.
Central	701	4,690	1,617	1,785	10.8
South	407	951	668	1,237	7
East	567	1,677	1,071	1,187	6.9
West	646	1,349	1,478	1,362	6.5
Northern Kampongs	885	1,957	2,035	1,511	6.2
Totals	...	10,624	6,869	7,082	7.6

Total population of Kuching 24,575 in 1928.

This may be compared with the figure of 30,000 as given in *Whitaker's Almanack*.

12. By extracting the kampong-houses and populace from the above table, we can arrive at a useful approximation of the Malay element of the population—which is as follows :—

KAMPONG STATISTICS, 1928.

	Houses.	Males.	Females.	Children.
Northern Kampongs	885	1,957	2,035	1,511
Western Kampongs	550	1,077	1,196	1,054
Southern Kampongs	132	326	319	243
Eastern Kampongs	149	261	267	233
Totals	1,716	3,621	3,817	3,041

1928 population = 10,479 Malays.

13. A brief review of these figures shows the males of the general population to be in excess of the females to the extent of about 10.6; but, in the Malay factor, the females show some preponderance over the males. Another noticeable feature is the small proportion of children to adults in the general population. Even if worked out to the number of children per married couple, it would probably be considerably less than unity. Possible reasons for this will be found under the next heading (Schools and Infant Welfare) of the Report.

14. Where no census has previously been made, it becomes a matter of great difficulty to make estimations backwards or forwards from a single enumeration. His Highness will probably direct a census of the State at some time in the near future and, until that event gives us a definite basis to work on, I calculate the figures for Kuching on the basis of the figure obtained by enumeration for 1928, (24,575). The 1927 population was obtained arbitrarily by deducting 10 per cent of the recorded excess of immigration over emigration minus the excess of deaths over births, from the 1928 figure—giving the population for 1927 as 24,287. The following years will be calculated in a similar manner.

15. The following is a résumé of the Vital Statistics for 1927 in Kuching Town Area :—
Estimated population at mid year 24,287.

Total Births 541.
Birth Rate=22.27 per mille.
Total Deaths 678.
Death Rate 27.91 per mille.
General Infantile Mortality Rate 361.9.
Malay Infantile Mortality Rate 480.
Chinese Infantile Mortality Rate 156.2.

16. The following is the résumé for the year 1928 :—Estimated population of Kuching Town at mid-year 24,575.

Total Births 763.
Birth Rate=31.04 per mille.
Total Deaths 615.
Death Rate 25.02 per mille.
Total Deaths under one year of age=210.
General Infantile Mortality Rate 275.23.
Malay Infantile Mortality Rate 321.
Chinese Infantile Mortality Rate 166.4.

These figures show a considerable improvement on those of the previous year.

17. The Infantile Mortality rate is always supposed to be a delicate index to the general health conditions of a community. I have devised what seems to be a still more delicate indication of health conditions by incorporating also the "mean age at death." This latter statistic has been, in my opinion, quite unfairly discredited of late years. As a matter of fact it is a very valuable signpost in any general community, for the usual span of three scores years and ten, ought to be attained by everyone. Where the span is shortened it will be due either to disease or accident. Accident cannot generally be avoided, but nearly all disease can be averted under ideal conditions of personal care and communal solicitude, thus ensuring the attainment of a ripe age by most of the community. The index mentioned above, I have called a *Dyscratic Index* (Δ)—obtained by dividing the infantile mortality rate by the Mean Age at Death. An ideal figure would be unity, and the higher the index figure the greater the necessity for investigation and action. The Kuching figures for 1928 were as follows :—

Infantile Mortality Rate 275.23.
Mean Age at Death 28.4.
Dyscratic Index 9.69.

18. The Registration of Births and Deaths is under dual control which, I suggest, is scarcely necessary. The Chief Health Officer is the general Registrar and the Principal Medical Officer the Registrar for Europeans.

19. **Schools and Infant Welfare.**—Generally speaking, the fundamentals of every nation are (a) *territory* and (b) *citizens*. Whether the nation is going to advance or recede, to make its mark on history or to drop down with the tide, will depend on the two fundamentals just mentioned. To attain progress, the *territory* must be not only existent and productive, but it must be sufficient healthy to obviate any markedly deleterious effect on its inhabitants; moreover, the *citizens* should not only be automatons, but should be intelligent, self-respecting, industrious, and healthy.

As far as my experience goes I am convinced that the whole secret for the attainment of these most worthy objects lies with the gurus and teachers of the vernacular, private and secondary schools.

A coterie of teachers, properly trained in hygiene (as well as in other subjects of the schools curriculum) and filled with enthusiasm for the ideal, seems to me to be the most valuable asset a country can have, and to attain this object no cost should be too great.

20. The Infant Mortality figures quoted already, show that, in Kuching Municipal limits, out of every 1,000 Malay children born in 1927, practically half died before reaching the age of one year, and over 32 per cent died in 1928. These figures represent a preventable situation—unskilled midwifery, unsuitable feeding, ignorance, and apathy, all contribute to this result. The situation is one which needs most delicate handling. The policy of this country—and I think a very wise one—is to disturb the customs, habits, and prejudices of the inhabitants as little as possible. It is for this very reason that emphasis has been so strongly given above to the education of school teachers, since the problems can thereby solve themselves in course of time.

21. But I think a start could be made in other directions at the same time, and I suggest that a free *Infant and Children's Clinic* be started by the Health Department in a convenient part of the town. Open in the mornings from 9—12 daily for six days in the week. Three days for Malays, three days for Chinese. A sympathetic trained midwife to act as matron and to be assisted by a Malay and a Chinese helper. I do not think that any district visiting should be done for some time, until the entire confidence of the people has been won.

22. The following is a tabular list of the schools in the Municipal limits of Kuching, in 1928 :—

SCHOOLS.	SITUATION.	NO. OF TEACHERS.	NO. OF BOYS.	PUPILS GIRLS.	GOVT. AIDED OR PRIVATE.
St. Thomas' ...	McDougall Road	14	148	...	A
St. Mary's ...	Wayang Street	11	50	243	A
St. Joseph's ...	Rock Road	11	164	...	A
St. Theresa's ...	Do.	5	...	86	A
Hokkien Free School ...	Tabuan Road	12	140	74	A
Thai Thong (Hakka) ...	Carpenter Street	6	100	47	A
Kwong Min (Hakka) ...	Do.	3	52	18	A
Yik Kwang (Cantonese) ...	Do.	5	57	50	A
Keng Kiow (Hailam) ...	Do.	1	28	4	P
Min Teck (Teochow) ...	Khoo H. Yean Street	5	111	17	A
Lai Kwan (Cantonese) ...	Rock Road	2	18	32	P
Sze Chay ...	Wayang Street	1	20	4	P
Wee School ...	Gartak Street	1	12	...	P
K. Elem English School (Eurasian) ...	Gartak Street	1	25	...	P
Java Rong Vernacular ...	Kg. Jawa No. 1	5	74	...	G
Mosque " ...	Kg. Jawa No. 2	3	78	...	G
Gersik " ...	Kg. Gersik	3	70	...	G
St. Joseph's Chinese School ...	Green Road	1	20	...	A
Total ...		90	1,167	575	...

I am glad to report that all the schools in the above list have agreed to the vaccination of pupils before admission to the school. I think a printed admission card would be a useful thing—to be signed by the Health Department and presented at the school by every applicant for admission.

23. The above list shows a total of 1,742 school children in Kuching, against an estimated child population of 7,082 indicating the need for more schools.

24. The average number of children to each school teacher works out to 19, which would be quite satisfactory if only the teachers were all hygiene enthusiasts.

25. **Infectious Disease and Quarantine.**—Kuching is extraordinarily blest by Providence in the matter of freedom from infectious disease.

In an Appendix (marked A) to this report will be found a table giving the cause of death (by nationality) of all those who died in the Municipal Area in 1928. Extraction of those referable to infectious disease show only the following :—

Disease.	Chinese.	Malay.	Dyak.	Indian.	Javanese.	Total.
Beriberi ...	32	3	...	...	1	36
Chickenpox ...	...	...	1	...	...	1
Dysentery ...	25	7	2	2	...	36
Malaria and fever ...	6	7	...	...	...	13
Measles ...	...	1	2	...	...	3
Pneumonia ...	25	4	1	1	...	31
Smallpox ...	2	...	...	...	...	2
Tubercle ...	52	29	2	2	1	86
Typhoid ...	2	...	1	...	1	4

26. *Cholera* has been practically absent since the introduction of piped water supply from Matang in July, 1907, though I fear that, had the disease been subsequently introduced, the condition of the Kuching Kampongs would almost certainly have led to an epidemic.

Smallpox shows a very small incidence—due to the increasing appreciation of the value of vaccination.

Plague seems to have never visited Sarawak, at least I can find no records of it. This is somewhat remarkable since the Kuching sea-borne trade is almost entirely with Singapore where there has been a plague epizootic amongst the rats, in at least two centres of the town, ever since its first introduction from Hongkong in the year 1900. I can only explain it by the fact that the steamers of the Sarawak Steamship Company load in the Singapore Roads and not at the wharf. Nevertheless it behoves us to be careful, for in Kuching we have the right kind of rat and the right kind of flea, and all that is necessary to start the disease is the introduction of one infected rat into the town from the Singapore cargo.

27. The biggest toll of mortality is from the four diseases: *Tubercle*, *Beriberi*, *Dysentery* and *Pneumonia*. These are the same four diseases which head the weekly mortality lists in Singapore as in many other towns of the East. Much can be done to obviate them by education, propaganda and so forth, and I hope that a change will begin to be effected in the next few years.

28. Beriberi has been mentioned amongst the infectious diseases, notwithstanding the "deficiency" red herring which has been so persistently drawn across the public health trail in recent years. At least half a dozen cogent reasons can be adduced against the rice theory. The Sinhalese have a staple white rice diet and no beriberi. The staff of the Brazilian railway (*Lovelace* 1912) have had no rice for years and have much beriberi. Beriberi has occurred in N. Siam where no polished rice was eaten. Beriberi was absent from Goa (*De Mello*, Indian Sanitary Conference, 1913) until it was introduced by a Portuguese gunboat and then spread ashore. From 1895—1905 Singapore Gaol had a staple diet, of white rice, but no beriberi occurred for three years until a case was introduced which started an epidemic—all these facts point to a bacterial infection and this is borne out by the table quoted in paragraph 25 above, where in Kuching the Chinese are practically the only sufferers, although rice is a staple diet amongst the majority of the inhabitants.

29. A remark should be made about local facilities for dealing with cases of infectious disease. I found on my arrival the remnants of an isolation camp at Sekama consisting of three somewhat dilapidated *attap* and *kajang* wards in a patch of jungle. It seemed advisable to make these to some extent fitted for the reception of patients. The work was put in hand by our own staff. The jungle was cleared. The camp was fenced with barbed wire and a gate put up. Steps were made up the hill to the wards. Two of the three wards were re-built and two new kitchens constructed. A two-compartment latrine was made. It was intended only to have a place for urgent temporary use, and a plan was evolved and passed for the construction of a proper station at Pending, spread over five years. Unfortunately the financial situation necessitated the abandonment of the Pending scheme; consequently the Sekama Camp will be extended and improved somewhat during the coming year (1929) to make it suitable for the purposes of a temporary camp for the next few years.

30. **Sanitary Work in Districts.**—The new scheme by which the Municipal area was divided into four Sanitary districts came into force on 1st July, and the six months' work has been quite successful and promising.

31. Mr. Perera, who was in charge of the **Central Division**, reports over 1,000 house inspections. He comments on the insanitary conditions of his district, of which the main evils were overcrowding, and insanitary cubicles, latrines, and drains. Some of these conditions are due to the shortage of houses, which will to some extent adjust itself when the new Padungan town extension begins to become effective in 1929.

32. The **Conservancy and Scavenging** were in the hands of the Municipal Contractor. Four hundred and fifty houses were being regularly conserved out of a recorded number of 701 in the Division. The scavenging was carried out by two motor lorries and the work was fairly efficiently performed except perhaps during the additional strain of the fruit season. On my arrival the garbage was being dumped into the Sungei Kuching. Although covered twice daily by the tide the practice was an undesirable one, and the dumping was later transferred to the Eastern Division where the garbage was of use in filling up discarded pig-ponds.

33. Continual attention was paid to the *markets*. The fish stalls were reconstructed by the Municipality and covered with impervious tiles. Not enough ice is used, in fact no ice at all is used as a rule until decomposition has begun. Eight prosecutions were instituted by us, and conditions began to improve towards the end of the year.

34. *Licences* were issued to the following trades :—

Bakeries 5, Tea and Coffee shops 22, Eating houses 22, Confectionaries 19, Aerated water factories 4.

Constant visits were paid to the above establishments. The wearing of caps and aprons by the dough kneaders was enforced. With next year's licences special requirements will be incorporated. The water used in the aerated water factories is, in each case, filtered (three Jewell and one Berkefeld). The cleansing of these filters was insisted on once a month.

35. The following is the number of trades which were not licenced :—

Common Lodging-houses 9, Hotels 2, Laundries 7, Arrack Taverns 45.

It is to be hoped that eventually they will all be controlled by enactment—they were constantly inspected and stimulated throughout the six months.

36. The *Public Latrines* (two) and bathrooms (two) were regularly visited and supervised. A new latrine (Elsan system) in Market Street, was not ready by the end of the year owing to premature use and damage to the valves by sticks, etc.

37. All the *Schools* (ten) in this district were visited, and 78 vaccinations were performed at the Yik Kuan School. It is hoped that co-operation between the Education Department and ourselves will give promise of a brighter future for the health and happiness of the scholars of Kuching.

38. **Rat Campaign.**—This was in charge of the Sanitary Inspector Central, during the six months. No attempt has been made this year—nor will be made in 1929—to reduce the number of Kuching rats. Action has solely been on the lines of daily trapping in order to identify the rats of Kuching, and their diseases and their flea population, since the knowledge of our local position is an essential preliminary to the important matters of plague possibilities and rat extermination. The work on this branch started in August. In the five months, 1,741 rats were caught—717 being males and 1,024 females.

39. The species of the rats proved to be as follows :—

	Males.	Females.
<i>Rattus</i> (black rats) ...	285	401
<i>Decumanus</i> (brown or Norwegian rats) ...	429	620
<i>Mice</i> ...	3	4

40. Post-mortems were made on all the rats caught. Strangely enough, a large number of them (35 per cent in October; 71 per cent in November; and 61 per cent in December) were found to have yellow cysts in their livers.

Samples of these were sent to the British Museum and were identified as being the cysticercal form of the cat tapeworm—*Tænia tænieformis* Batsch 1786. How the rats become infected from the cats is forming the subject of further investigation—probably the filthy eating habits of the rat will account for it. Another interesting problem will be to discover what percentage of local cats are infected with this tapeworm.

41. All those rats which were caught alive were chloroformed for flea combing. The number of fleas obtained was 525. They were all of the species *Xenopsylla cheopis* which is the common rat flea of the tropics and is the flea responsible for carrying plague from the rat to man. Males numbered 229 and females 296. No *X. astia* were found. No plague infected rats were discovered, though a smear from one liver showed *streptococci*, *diplococci*, and *B. welchi*. One live rat was found to be suffering from empyema. The number of fleas found per rat varied according to the season of the year, as is usually the case. In October the average fleas per rat was 3.5; in November 2.5; in December 2.3. The numbers should fall rapidly in the early months of next year. Four hundred and three ticks (not identified) were also recovered from rats. Two rats were found to be infected with tuberculosis.

42. **Southern Division** was in charge of Mr. Geikie. About eight or nine daily paid coolies were engaged for work in this division, and the check-roll wages bill for the five months, totalled \$1,041.30.

Divisional sanitary inspections were as follows :—Factories 8, Bakeries 29, Dairies 22, Eating-houses 20, Hospital 18, Kampongs 45, Schools 30, Laundries 20, Piggeries 15.

43. *Vaccinations* in this division were as follows :—St. Theresa's Convent 37, Government Malay School 30, St. Joseph's School 22, Kampongs 54.

44. The work performed by the Sanitary coolies of the division, was :—

1. Whitewashing 17 widows' houses in Kampongs.
2. Building 22 pit latrines for widows in Kampongs.
3. Cleaning main road drains.
4. Building two incinerators (one being a conversion of an old well).
5. Building four sump-pits for disposal of surface sullage water.
6. Erecting an office store for the department—the cost being \$375 against an estimate of \$800.
7. Disinfection of Government Quarters one.
8. Clearing of undergrowth in Batu Lintang, Crookshank, and Palm Roads.
9. Filling ponds in Hospital compound.
10. Building a 7-compartment urinal for St. Joseph's Boys' School.
11. Oiling all kampong pit-latrines twice every week.
12. Laying 2,500 feet of subsoil pipes in the compound of the S.P.G. Mission, as an anti-mosquito measure.

45. *Malay Kampongs*.—There are several kampongs in this Division :—Jalan Haji Hassim 70 houses; Jawa Road No. 1. 43 houses; Nagor 13 houses; and part of Haji Taha six houses.

On my arrival I found these Kampongs to be almost entirely lacking in any sanitation. Latrines consisted of an upper structure over a 3-inch depression in the ground. Millions of flies were breeding steadily. Drains were ill kept, rubbish unburnt, houses dirty and unwhitewashed, and undergrowth rampant. The Inspector took this work in hand at once and, with the Tua Kampongs help, sanitary conditions were slowly but steadily improved. A graduated system of sanitation grants to the Tuas in this and other divisions proved an extraordinarily useful stimulus, but for which, the present progress would have been scarcely obvious.

46. The method of *pit-latrines* I devised differs from that of the Rockefeller suggestion in that it is not merely a hole drilled in the ground, which is gradually filled with decomposing faeces, and is generally a fly breeding and offensive nuisance.

A hole 3x3 is properly opened out and continued for at least two or more feet below dry season level of the subsoil water. Some broken stone is filled in to a depth of about six inches at the bottom of the water; and empty cement casks without tops or bottoms are stood on the stone and piled on each other in pipe-wise fashion till the topmost cask is 18 inches above the ground level. Stone is then filled round the outside of the bottommost cask until the level of the subsoil water is reached—after which the original earth or clay is packed round the casks to fill up the hole, and the clay is sloped to the top of the uppermost cask to prevent encroachment by flood water. An ordinary superstructure is

then built above it, and the latrine is complete. The advantage of this system is, that the ground-water forms a septic tank in which the nightsoil is continually liquified, and the movements of the subsoil water deal with it continually. If each such latrine is used by not more than four or five people, it will never need any emptying or attention beyond a weekly spraying of the surface to prevent the possibility of fly breeding in the thin floating layer of scum. The solution I recommend for spraying is :—

Solar oil	...	...	7 parts.
Kerosene	...	...	2 parts.
Turpentine	...	...	1 parts.
			—
			10
			—

If the householder makes his own excavation and has a few old poles or planks at his disposal—the latrine will only cost about \$2.20.

47. The Arrack-farm is situated in this Southern Division, at the junction of Green Road and the Railway line. The building is an iron structure with concrete flooring, owned by the Government; and the work is conducted by the arrack-farmer, Mr. Ong Tiang Swee.

A coolie-line for the workmen is provided. It is a plank-walled and zinc-roofed building, with a concrete floor. There is a two-compartment latrine of the bucket type, dealt with daily by private contract. There is a large raised water-tank. It is uncovered and harbours dead leaves and mosquitoes. The arrack is made from Nipa Sugar (*Gula Apong*), rice, and some spices or *rugi*. The ingredients are allowed to ferment in an open receptacle for several days, after which it is subjected to distillation. An average daily output of 60—90 gallons is maintained. A certain amount of arrack is imported from China, Singapore, etc., but there is no control of its quality, nor is there any retail licence necessary for its sale in the bazaar, etc., where 57 shops sell it.

48. The **Eastern Division** in charge of Mr. Ah Jin. An average of 14 coolies were employed on daily pay. The drainage of much of this sanitary division is badly contrived and much overgrown.

49. In the Padungan Road, there were, at the end of the year, 108 houses, six of which had been recently built. Also seven piggeries, three fish ponds, six sago factories, two jelutong refineries, a rubber factory and a sawmill. The new town area was making steady, though rather slow, progress. The unmade road, the lack of drains, and the stacks of building materials of all kinds have greatly added to our difficulties, and it has been quite a problem to control the mephitic odours and the breeding of mosquitoes. It has been necessary to oil 6,000 square yards daily. Forty-seven new shophouses have been completed and 33 are being occupied. The latrines are of the old bucket system but subsequent houses will be expected to make buildings for the latest type of bucket.

50. *Mathies Road* has 28 houses of which two have been built according to plans passed. Twelve of the houses have been whitewashed and five fitted with sanitary bucket latrines. There are ten piggeries which I hope will shortly be removed from the town area, which still has too great a number of these pernicious handicaps to sanitation.

51. *Ban Hock Road*.—There are 77 houses and no new ones have been built during the year. Nine houses have been dismantled; 31 houses have been whitewashed; four sanitary pit-latrines have been erected and also ten bucket-type ones. There are three piggeries and 19 abandoned ones. The sanitation has improved considerably.

52. *Tabuan Road*.—There are 86 houses, and no new ones have been built this year. Fifty-three houses have been whitewashed. Twenty bucket, and 15 pit-latrines have been built. There are 22 piggeries, of which four are abandoned. There are three fish ponds and one laundry wash place. Forty-four notices have been served this year.

53. *Pig Lane*.—There are eight houses and two more have been dismantled. Seven houses have been whitewashed. There are now two bucket, and three pit-latrines. There are two fish ponds and two abandoned pig-ponds. Six notices have been served here this year. The police barracks were kept clean.

54. *Bampfylde Road*.—There are 16 houses, one house and garage having been built according to plans submitted. Eight houses have been whitewashed. Two bucket, and three pit-latrines have been built. There are eight piggeries and one fish-pond. Three notices have been served during the year.

55. *Central Road*.—There are 29 houses, no new ones have been built this year. Twenty-one houses have been whitewashed. Two bucket and 15 pit-latrines have been built. There are nine existing piggeries and 15 abandoned ones. Twenty-eight notices have been served during this year.

56. *Central Road East*.—There are 23 houses, one house having been built during the year according to plan passed. Sixteen houses have been whitewashed. One bucket, and seven pit-latrines have been built. There is a laundry washing-place. There are three piggeries, one of which is abandoned. Eighteen notices have been served during the year.

57. *Batu Lintang Road*.—There are five houses, four have been whitewashed. Four pit-latrines have been built. There are one piggery and two fish-ponds. Four notices have been served.

58. *Sekama Road*.—There are 24 houses, and 23 piggeries. One house has been whitewashed.

59. *Kampung Batu Lintang*.—There are 14 houses, of which two have been whitewashed. Fourteen pit-latrines have been built.

60. *Kampung Sekama*.—There are 40 houses, of which four are newly built. Thirty-two have been whitewashed. Thirty-six pit-latrines have been built.

61. *Kampung Lomba*.—There are 46 houses, of which two are newly built. Thirty-three houses have been whitewashed, and forty-four pit-latrines have been built.

62. *Kampung Pinang*.—There are 32 houses, of which 28 have been whitewashed. Twenty-six pit-latrines have been built.

63. *Kampung Padungan Lama*.—There are still 24 houses left, of which six have been whitewashed. No pit-latrines have been built.

64. The *Sekama Road Quarantine Camp* has been already dealt with earlier in this report.

65. There are three dairies in this division. They are inspected regularly. Two notices have been served and complied with.

66. The tea, coffee and foodshops are subject to frequent supervision.

67. Municipal *Scavenging* stretched its tentacles into this division during the latter part of the year. The town garbage (not incinerated) was used to fill up abandoned pig-ponds in the Central Road area. Each lorry load is dumped, and another lorry follows it with earth which covers the garbage to a depth of one foot. Frequent spraying with disinfectant, with anti-malarial mixture, and with formalin, has been carried out by our department in order to obviate fly breeding, mosquito breeding, and offensive smell, from the garbage and from the ponds.

68. All the pit-latrines in this division have been oiled weekly by our staff, using the solar, kerosene, and turpentine mixture mentioned above.

69. The **Western Division** in charge of Mr. Suleiman. This division is almost entirely composed of Malay *Kampongs*. The first month or two (June and July) was devoted to a careful survey of all *kampongs*, their houses, compounds, conditions and surroundings. Then a start was made with the work, and five daily paid coolies were engaged. The help of the Tuas was, in most cases, very encouraging, and the system of graduated sanitation bonuses sanctioned by His Highness had a marvellous result in stimulating interest in this most important subject. I am glad to report that, by the end of the year, 172 pit-latrines (see paragraphs above) had been made:—Kampung Masjid 12, Kampung Bintangor 4, Kampung No. 1. 49, Kampung No. 2. 13, Kampung No. 3. 9, Kampung No. 4. 11, Kampung No. 5. 9, Kampung Patingan 17, Kampung Satok 42, Kampung Green Road 6. Total 172.

This is a very creditable result.

70. In order to help some *Kampung* widows (too poor, or busy, or debilitated) to carry out the necessary work, I sanctioned the help of our own staff, and 18 compounds of widows were dealt with, cleaned drains, whitewashed, repaired, and furnished with pit-latrines free of charge:—Kampung Masjid 1, Kampung No. 1. 2, Kampung No. 3. 2, Kampung No. 4. 1, Kampung No. 5. 1, Kampung Patingan 3, Kampung Satok 7. Total 17.

Similar work was carried out in each *Tua Kampung's* house, in order to provide an example which all might follow. The pit-latrines are oiled weekly with the special mixture mentioned above, and so far the results have been very satisfactory.

71. There are 30 piggeries in the division—a large bunch being situated at no great distance from the General Hospital—they should have been turned out before the hospital was built. I hope that this great disgrace of the town will soon be a thing of the past.

72. Vaccinations were performed as follows:—Datus Road 64, Kampung Satok 12, Rubber Road, etc. 10. Total 86.

73. Laundries, dairies, coffee shops and bakeries were regularly inspected and kept in order.

74. Thirteen notices have been served as necessary and duly complied with. Progress has been sure and steady and promises well for the future.

75. **Rural District work** by Mr. Swee Hock. The early part of the work consisted in a survey and supervision of the districts surrounding Municipal limits, and also of the Municipal *Kampongs* on the North Side of the River.

76. The *nightsoil* of the town was, during this year, disposed of in a rubber estate at Simpang Tiga just outside one end of the Batu Lintang Road. About 300 buckets were brought daily and trenched by two of the contractor's men. Water in a neighbouring pond was used for washing the buckets. Although the trenches were covered in with earth after each dump, a certain amount of fly breeding was inevitable. Frequent visits of inspection were made, but I understand that the new septic tanks at Padungan will be ready for use early next year, which will give a much more sanitary and convenient method of disposal.

77. The Government Dairy Farm in Pending Road was kept under frequent observation. The stock consisted of 64 cattle, buffaloes and goats, with eight buildings, and a staff of 28 including women and children.

The sale of milk amounted to about 75 bottles a day—each bottle holding 24 oz.

The buildings and equipment are by no means all that could be desired, but I understand that a new and up-to-date dairy farm has been sanctioned at a site near the 12th mile—which should prove eminently suitable.

78. The Northern Kampongs were temporarily put in charge of the Inspector Rural, although by Notification No. 77 of 27th July, 1922, they form an integral part of the Municipal area as from 1st August, 1922.

The following was the preliminary survey of the Kampongs and their population.

<i>Kampong.</i>		<i>Males.</i>	<i>Females.</i>	<i>Children.</i>	
<i>Western Division.—</i>				<i>Males.</i>	<i>Females.</i>
Tupong Ulu	...	40 Chinese	1 Chinese	...	...
		72 Malays	63	31	28
Sinjan	...	209	211	68	70
Tanjong	...	148	155	41	55
Sungei Bedil Besar	...	162	193	93	71
Sungei Bedil Kechi	...	243	255	76	79
<i>(Astana here).—</i>					
Boyan and Gersik	...	273	294	101	96
Soerabaia	...	169	163	82	77
Seman and Buah	...	175	206	58	89
Semarang and Pulo	...	280	300	120	116
Bahrn and Mantawah	...	186	194	72	88
Totals	...	1,957	2,035	742	769

79. It now becomes possible to enumerate the whole of the Kuching Kampong figures which are as follows:—

<i>In Sanitary</i>					
Kampong Districts.	Houses.	Males.	Females.	Children.	
Northern	... 885	1,957	2,035	1,511	
Western	... 550	1,077	1,196	1,054	
Southern	... 132	326	319	243	
Eastern	... 149	261	267	233	
Totals	... 1,716	3,621	3,817	3,041	

80. The water supply for the Northern Kampongs and Astana and Fort has, since 11th August, 1922, been effected by a 4-inch galvanised main laid under the River from a point near the Borneo Co.'s godowns, to a point below the Fort.

On 19th August, 1928, a second 4" main was successfully laid by the Public Works Department across the river bed between the new Blacksmith's shops at Padungan and the opposite shore at Kampong Buah. The installation was very smoothly and efficiently carried out and reflects great credit on the Public Works Department Engineers. The whole pipe, of the length requisite to span the river, was properly jointed on the Padungan side and each joint was "fished" with wooden sheathing. It was housed on temporary trolleys for which a special line was laid. The nose of the pipe was buoyed and a line made fast and taken across the river to a steam winch on the other side. The whole pipe was thus easily hauled across, with its nose floating, having sufficient flexibility to take the contour of the river bed without damage. This should prove a valuable addition to the cross-river water pressure; and I understand that it is intended to lay a third pipe to Kampong Sinjan some time in 1929.

81. In August an outbreak of smallpox in the Brang district of Upper Sarawak called for attention and I despatched a party thither consisting of the Rural Inspector, his assistant, a dresser, and two police. They returned on September 10th. A résumé of cases, and vaccinations, and enumeration of kampong inhabitants is appended:—

UP-RIVER KAMPONGS.

Name.	Houses.	Males.	Females.	Children.	Nationality.	S. poz cases & deaths.	Vacci.
Segu	97	169	168	197	Dyak	...	555
Gurong	26	40	33	57	Dyak	...	39
Kroo	28	56	46	82	Dyak	...	88
Pungoh	24	44	39	65	Dyak	...	81
Sebesi	21	33	36	65	Dyak	79.12	43
Pudu	11	20	22	23	Dyak	27.1	—
Peng. Ampat	8	14	13	9	Chinese	...	58
Blimbing	12	31	30	31	Dyak	...	80
Bungoh	42	86	66	85	Dyak	...	105
Medan	17	28	27	32	Dyak	...	44
Boyan	21	39	39	36	Dyak	...	37
Segat	15	20	20	22	Dyak	...	30
Batu Kawa	35	95	40	70	Chinese & Malay	...	17
Totals	357	675	579	774		106.13	1,177

82. A previous smallpox outbreak had occurred in the same district in the month of May. On that occasion 22 kampongs were dealt with, 135 cases being found, 24 deaths reported, and 2,186 vaccinations done.

83. Various other work was carried out by the Rural Inspector, dealing with the abattoirs, hospital compound, etc.

84. **Shipping.**—This branch of our work has been carried on by the Chief Sanitary Inspector, Mr. Ah Hian, who inspected 197 vessels of various kinds—steamers, schooners, junks, bandongs and kotaks.

85. The distribution and origin of the entering vessels was as follows :—

Steamers from Singapore and Pulo Bukum	...	...	71
Steamers from Limbang	...	...	25
Steamers from Hongkong	...	...	1
Steamers from Jesselton	...	...	1
Native craft from Permangkat	...	...	65
Native craft from P. Serasan	...	...	10
Native craft from Kayong	...	...	1
Native craft from Katapong	...	...	1
Native craft from Saigon	...	...	2
Native craft from P. Bukum	...	...	2
			<hr/> 179

86. The above may be expressed as tonnage :—

From.	Tons, 1927.	Tons, 1928.
Singapore	45,200	44,771
Limbang	3,880	5,297
Hongkong	762	1,430
Permangkat	1,222	1,267
Jesselton	49	140
Saigon	90	118
P. Serasan	125	37

87. A consideration of these figures just quoted shows the very large preponderance of trade (80%) with Singapore as compared with other places. The necessity for keeping a watchful eye on Singapore epidemiological conditions is therefore obvious. This is secured by a chart kept in the office, on which we record, week by week, the incidence of infectious disease in Singapore; and can thus take protective action when necessary. Many infectious diseases may be of importance through the human factor. The most serious of these is cholera, which is often hard to control. Remark has already been made on the advantages and results of a piped supply, in this connexion. Malaria is another important guest—since one patient may act as a reservoir of infection to many other people in the presence of a dangerous type of anopheline mosquito.

Plague and its introduction by cargo rats has already been commented on. In all these matters of ship-borne disease, unceasing vigilance is the price of peace.

88. **Entry of Passengers and Livestock to Kuching,** during the year 1928, was as follows :—Passengers 10,467, buffaloes 676, pigs 410, cattle 103, goats 16.

89. In recent years the international side of shipping matters has loomed very largely on the political horizon. The latest revision of the *Paris International Sanitary Convention* was signed at Paris on 21st June, 1926; and the effective date of the adhesion of Sarawak to this Convention was the 9th of October, 1928. We now have, therefore, certain new obligations in shipping relations with the outside world. One of these is the reporting of infectious disease amongst human beings and rodents. This we secure by telegrams in code to the League of Nations Epidemiological Bureau in Singapore, who pass on the news to Paris and Geneva, and include the returns in their weekly message which is broadcasted from Saigon. Another new obligation concerns the periodical deratisation of ships—for which provision will shortly be made. An international form of Bill of Health will also have to be adopted.

90. A brief mention should here be made of the **League of Nations Epidemiological Bureau in Singapore**. This most useful institution was started in the early part of 1925 to collect and disseminate information with regard to the spread of infectious disease in the Eastern Arena—a quadrilateral area of which the four corners are Egypt, South Africa, Japan, and New Zealand. A special two-letter code was devised for the purpose, and to-day practically every country of the East participates in the organization. The French Government of Indo-China very generously promised to broadcast the weekly bulletin in code from the powerful station at Saigon, so that all Eastern administrations can pick-up the message and thus know the conditions of other countries within a few days after the conclusion of the reporting week. The benefits of this action are incalculable. At my suggestion, the weekly Saigon message is regularly picked-up by the Kuching Wireless Station for which the department is very grateful. A mounted map of the Eastern Arena is framed in the Health Office, and the weekly returns are charted-out thereon, with coloured beads, thus giving a bird's eye view of the health conditions of the East at any moment. A visit by anyone interested would be much appreciated.

91. **Leper Camp**.—The Superintendent is Mr. C. Clunies-Ross, and the Assistant Surgeon, Dr. M. N. R. Kurup, L.C.P.&S., Calcutta, who was formerly in the Johore Medical Department and joined the Sarawak Service in 1924. There are six Sikh Warders.

92. The Camp is situated on a salubrious and undulating site at the 13th mile, and the residential portion is divided into three sections for the Chinese, Malays and Dyaks.

93. There is an official *Board of Visitors* which, in 1928, consisted of the following gentlemen:—(G.N. No. 98 of 16th February, 1928):—

Mr. Resident, F. F. Boulton, Chairman.
 Abang Haji Halil, Datu Iman.
 Abang Haji Fadel, Kampong Masjid.
 Haji Hassim, Kampong Patingan.
 Mr. Ahmat Arbi, Tua Kampong, Kampong No. 1.
 Mr. Ong Siow Sian, (Hokien).
 Mr. Law Cheng Phuang, (Teochew).
 Mr. Loh Shu Ng, (Khek).
 Mr. Lee Yeng Hoi, (Cantonese).
 Mr. A. Suleiman.
 Mr. Arnasalam.

This Board paid three visits during the year—in February, July, and October.

94. From August, the Administrative Control of the Camp was taken over by the Chief Health Officer, the Principal Medical Officer continuing to be responsible for the treatment of the patients.

95. On January, 1928, the following patients were in residence:—

Nationality.			Males.	Females.	Total.
Malays	...	...	39	7	46
Dyaks	...	...	87	22	109
Tamils	...	...	1	—	1
Chinese	...	...	51	4	55
		Totals	178	33	211

96. The admissions during the year amounted to 120; the discharges 35; the deaths 19; the absconding 1; re-admissions 8; and the births 5. Of the latter, all were removed within 24 hours of birth—two by relatives, and three by the R. C. Mission—I believe that none survived for long.

97. On the 31st December, the register was allocated as follows:—

Malays	...	...	45	16	61
Dyaks	...	...	109	39	148
Tamils	...	...	nil	nil	nil
Chinese	...	...	63	4	67
		Totals	217	59	276

The total population had therefore increased, during the year, by 65.

98. *Treatment*.—The main reliance has been placed on "Alepol" as a remedial agent. This is selected fraction of the Sodium salts of Hydnocarpus acids—the acids derived from the plant *Hydnocarpus wightiana*. It is given in 3% solution; and, during the year, 21,684 doses were given, with very good results.

99. Tartar Emetic in a 1% solution injected intravenously has a promising result in ulcerated cases, as also in positive cases which no longer re-act to Alepol.

100. Potassium iodide has proved very useful as a clinical test in cases apparently cured, since it causes a re-action in the presence of a residual activity of the disease.

101. For active ulceration an ointment was employed consisting of 10% of Moogral (or Hydnocreol), and 10% of Boric acid, in a vaseline basis.

102. *Other diseases treated* were:—Anæmia 1, Asthma 1, Bronchitis 2, Colic 9, Conjunctivitis 1, Constipation 2, Cuts 1, Debility 4, Delusions 2, Dropsy 1, Hepatitis 1, Leprotic fever 42, Malaria (B.T.) 6, Muli (Crab-yaws) 8, Nephritis 1, Neuritis (ulnar) 1, Rheumatism 6, Snakebites 2, Phthisis 2, Diarrhoea 48, Dysentery (amœbic) 47, Dysentery (Bacillary) 3. Total 191.

103. In addition the following routine was carried out:—For hookworm 348, Vaccinations 16, Dressings 13,543.

104. A review of the above list of diseases shows that over 50% are properly classed as being due to *water-borne infection*. This is hardly to be wondered at since the water supply of the camp is derived from a small stream which takes all the road washings in every rain storm. The water is pumped by a hand-pump to a raised tank and thence distributed to the camp by pipe line. The lepers themselves work the pump at stated hours each day. The tank was unfortunately struck by lightning on 8th October and was thus shattered. New tanks were at once asked from the Public Works Department and were placed on a hill nearby. A commission of inquiry into the working of the leper camp reported to Government on 24th August, 1928. One of their recommendations was, to provide a Jewell Filtration Plant. This was approved, but was later cut out of the Estimates owing to the exigencies of the financial situation. I propose, therefore, to take in hand departmentally, the improvement of the supplying stream in which a small reservoir will be made by the construction of a dam to obviate contamination by the filthy road drains.

105. The *food supply* of the Camp was up to now supplied at certain rates, more or less on a monthly delivery. This proved very unsatisfactory giving trouble in issue, in checking and in billing. Consequently tenders were called for, in the *Government Gazette*, towards the end of the year and Mr. Jee Pin Kee's tender was accepted for regular supply during 1929. The Contract was signed on 22nd December, 1928. A copy of this contract appears as *Appendix B* to this report.

106. Attached to the Contract are three Schedules giving the items required by the Contract. The following are the schedules which incidentally set forth the *daily diets* issued to Malays, Dyaks, Tamils, and Chinese:—

CONTRACT FOR SUPPLY OF MATERIALS AND DIETS TO THE LEPER CAMP—KUCHING.

Schedule 1. Sundries, Extras, etc.

1. Blankets *	...	Per 50
2. Clothing for men *	...	.. suit
3. Clothing for women *	...	.. suit
4. Cooking pots (iron) *	...	.. 50 pots of 4 pints each
5. Daun roko	...	.. 25 ties of three leaves each
6. Kerosene (Crown)	...	.. case of 2 tins
7. Lamps (tin) *	...	.. 50 lamps
8. Matches	...	.. case of 240 packets
9. Mats *	...	.. 50 mats
10. Mosquito-nets *	...	.. 50 nets (ready made)
11. Pinang nuts	...	.. kati
12. Plates (enamelled) *	...	.. 100 plates
13. Sireh	...	.. bundle of 30 leaves
14. Soap (bar, yellow)	...	.. case of 20 bars
15. Tea (Chinese)	...	.. packet of 4 tahils
16. Tobacco (Chinese)	...	.. packet of 8 tahils
17. Tobacco (Java)	...	.. tahlil

Schedule II.

18. Lorry hire to 13th mile and return. Per trip—

Schedule III.

19. *Diet A (for Malays)*

Daily	Rice (local milled, or Siam No. 2) ...	1½ lbs.
	Karibang (or labu merah) ...	4 tahils
	Salt fish	4 "
	Onions	1 "
	Salt	½ "
	Coconut oil	2 "
Once a week	Beef (ox or buffalo) on Wednesdays	8 "
	Fresh fish (any day available except Wednesdays)	1 kati

20. Diet B (for Dyaks and Tamils)

Daily	Rice (local milled, or Siam No. 2)	...	1½ lbs.
	Karibang (or labu merah)	...	4 tahils
	Salt fish	...	4 "
	Onions	...	1 "
	Salt	...	½ "
Once a week	Coconut oil	...	2 "
	Pork on Wednesdays	...	8 "
	Fresh fish (any day available except Wednesdays)	...	1 kati

21. Diet C (for Chinese)

Daily	Rice (local milled, or Siam No. 2)	...	1½ lbs.
	Karibang (or labu merah)	...	4 tahils
	Salt fish	...	4 "
	Onions	...	1 "
	Salt	...	½ "
Once a week	Lard	...	1 "
	Pork on Wednesdays	...	8 "
	Fresh fish (any day available except Wednesdays)	...	1 kati

22. Diet D Milk Diet.

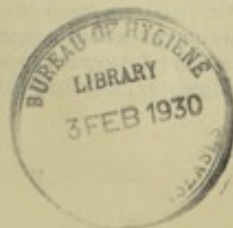
Condensed milk	...	1 ounce avoirdupois
Sago	...	1 tahils
Rice	...	2 "
Sugar	...	1½ "
Salt	...	¼ "
Bread	...	2 small loaves

107. Appendix C and D are specimens of the Requisition Forms and Bill Forms which will be put in use from the 1st January next. They are self explanatory, and should make for simplification and clarity of action.

108. Another innovation brought in during the year was the institution of a proper, up-to-date, register of the lepers. A sample page is attached to this report as Appendix E. The leaves are on the loose-leaf principle and are bound in two volumes—a current, and a transfer register. By this new system every leper (from the earliest admissions) is given a definite registered number which is never used again by any one else. The same registered number is also issued to him or her, in the form of a small circular brass identification disc. The photograph of each leper is taken on admission and pasted in the appropriate place in the register sheet.

109. The following is a résumé of the work done, buildings erected, etc., during 1928. Two trips (April and November) were made to Satang Island—the former leper camp—to bring back materials of the dismantled buildings.

- (a) 20 houses ex Satang were re-erected at the present Camp by the lepers themselves.
- (b) A cinema engine houses was put up by contract.
- (c) A mortuary was built by the lepers.
- (d) A dresser's quarter was erected by the lepers, including a kitchen.
- (e) Several bridges were made by the lepers, and also roads to the Malay and Chinese sections.
- (f) The Chinese lepers built their own Tua Pek Kong.
- (g) The R. C. Mission completed a small chapel for their use.
- (h) The Anglican Mission chose a site and submitted a plan for a small chapel which will be built next year by the lepers, with materials supplied by the Mission.
- (i) About 100 acres was felled and burnt by the Dyaks and padi was planted in September.
- (j) Streams were partially cleared of obstructions, and a start made on the sanitation of the camp.
- (k) The Morris lorry did good work throughout the year, the only mishaps being occasional fracture of springs due to the condition of the roads.



110. The *Cinema*, mentioned above, was operated for the first time on the evening of 27th July, when Mr. Barnes, the Superintendent of Telegraphs, kindly gave a preliminary demonstration. The following reels were shown until the weather proved too inclement :—

Propaganda Films.

Hookworm	...	...	1 reel
Smallpox	...	...	1 "
Malaria	...	...	3 reels

Comic, Etc., Films.

Lazy Lightning	...	...	3 reels
We're in the Navy Now	...	...	5 "
Lobby Gow	...	...	1 "
Seven Keys to Bald Pate	...	...	7 "
Made to order Hero	...	...	8 "
Mandarin	...	...	1 "
Just a Cow-boy	...	...	2 "
Half Fare	...	...	1 "
International News	...	...	1 "

Total 34 reels.

The shows were much appreciated by the lepers.

111. A brief historical note might be added before closing this review of the year's work.

The earliest Kuching Leper Camp was started at the 7th mile Rock Road, but it was not considered an entirely suitable site; and a meeting was held at the Court House on 14th September, 1917, at which it was decided to seek another site, and to invite subscriptions to a Fund to be known as the *Rajah Charles Brooke Memorial Fund*. Having examined a number of sites, *Satang Island* was fixed on, and the buildings were completed in the middle of 1924 at a cost of \$53,204.94, out of the Fund total of \$75,836.72. The difficulties of obtaining supplies during the *landas*, and in connexion also with the unsatisfactory water supply and the prevalence of malaria, made it essential to transfer the camp again, to some site ashore. Consequently the present site at the 13th mile was chosen, and the transfer effected in October 1925. Progress has since been steady and the site has proved to be eminently suitable. Mr. Clunies Ross joined the service as Superintendent of the Leper Camp on 1st February, 1926. He has a practical knowledge of field work, house construction, etc., and the control of the camp is well suited to a person of his experience. He is to be congratulated on the results obtained up to the present.

112. **Pauper Camp**—10th mile.—This camp is controlled by the Medical Department and administered by Mr. Clunies Ross. With the Board of Visitors, I pay an occasional visit, but have not otherwise anything to do with the place. The camp is entered from just beyond the 10th mile. There is a short stretch of bad private road (since closed to cars and locked) followed by a walk of $\frac{3}{4}$ to 1 mile.

There were about 90 paupers in residence when I visited in July and October 1928—all being Chinese males.

113. The diet scale per man consists of :—

Rice	...	...	1 catty daily
Salt fish	...	...	3 tahils "
Lard	...	...	$\frac{1}{2}$ " "
Salt	...	...	3 " a month
Chinese tobacco	...	...	$\frac{1}{2}$ packet per month
Matches	...	...	$\frac{1}{2}$ " " "
Kerosene	...	...	1 bottle " "

114. There are three wards, each about 110'x25', with concrete floors and verandah, wooden walls and shingled roof. Each ward has 10 rooms a side, each with 2 beds.

The roof space is unceiled, but has no jack-roof.

Each ward has a corrugated galvanized iron kitchen with a concrete floor on which cooking is done with their own movable earthenware stoves.

Each ward has a two-compartment latrine with pail. Fly breeding goes on to some extent.

The water supply is from a neighbouring creek, which seemed not very clean and is likely to be dangerous.

For purposes of administration a site nearer to the Leper Camp might possibly be considered?

115. **Anti-Mosquito Work.**—My first survey of Kuching Municipal area disclosed an incredibly wide network of open and badly kept earth drains, fresh swamp areas, and tidal swamp areas.

At first sight the problems and difficulties seemed rather overwhelming—but on review of the incidence and mortality statistics of the town, it seemed obvious that, for some reason or other, malaria was not as prevalent in the town as one would expect it to be. Epidemiological argument would suggest the comparative immunity as being due to the absence or rarity of the most dangerous types of malaria carrying anopheles.

However, the first thing to do, was to organize some programme of action.

116. I formed a *Mosquito Section* to cover the whole town, and to relieve the divisional inspectors of any of this work. The Mosquito section was to have an Inspector, and an Assistant Inspector.

Mr. H. F. Brodie was chosen to fill the latter post; while, for the former, an F.M.S. candidate—Mr. Nallathamby—was selected and arrangements made with the Institute of Medical Research at Kuala Lumpur, who kindly consented to give the candidate a three months' revision course at the Institute early in 1929.

117. The next step was to get Mr. Brodie well grounded in his bookwork, and identification work, on which he spent a month or two.

Then a large office wall map of the town was prepared in anticipation of a proper mosquito survey. From the centre of the town in Pig Lane, concentric circles were drawn A, B & C—the whole circle, to the periphery of C, having a diameter of 2.8 miles. Radii divided the circles into conveniently small sections A 1—8; B 1—16; & C 1—24.

118. Until the arrival of Mr. Nallathamby, Mr. Brodie's first field work was concerned with a circle of $\frac{1}{4}$ mile radius round the General Hospital. He did careful and painstaking work in this important and neglected area. The anopheline mosquitoes found were as follows:—

A. sinensis	...	...	127	breeding places
A. karwari	...	...	31	" "
A. kochii	...	...	48	" "
A. umbrosus	...	...	7	" "
and, A. separatus	...	...	1	" place

The only anopheline in this list, likely to spread malaria, was *umbrosus*, and that mosquito is not a strong carrier. This gave a possible confirmation to my surmise that malaria was being carried in Kuching by a weak type of carrier. When the complete survey of the town has been made, it will be interesting to see if the chief Malayan carrier (*maculatus*) is, or is not, present.

119. My plans for the future of this section are: to go over the whole town twice, in a very thorough mosquito survey. Then, to tackle each area that proves to be a danger-spot, by permanent measures of eradication as far as possible; and, at the same time, by personal circularisation, etc., to endeavour to bring home to the householders of the town, what mosquitoes carry, how they breed, and how the public can help to get rid of the public unnecessary pest. If we can enlist the co-operation of the public, we shall soon make fine progress, and secure tangible results.

120. **Foodstuffs and Their Control.**—Mention of foodstuffs, abattoir, etc., have been casually touched-on in different parts of this report. My seven months' experience here has shown that the subject is too large and important to be dealt with by the divisional inspectors in their daily routine work. From the 1st January, 1929, therefore, I am making a separate section to deal both with foods and also with the rat-campaign work and with this section (Pateomics) Mr. Perera and Mr. Reutens will deal.

121. The two Municipal *Abattoirs* are small and rather unsuitable buildings, situated near the intersection of Rock Road and Green Road.

The volume of the work carried on there, can be seen from the following figures:—

<i>Animals slaughtered.</i>	1926.	1927.	1928.
Pigs	9,186	7,853	9,301
Buffaloes	390	386	376
Cattle	411	341	167
Goats	77	118	189

Some temporary amelioration of their conditions, has been secured during the year, by providing proper lights; hanging gear to suspend carcasses from the soiled floor; more humane treatment of animals prior to slaughter; and by insisting on properly constructed lorries to convey the meat to the market in a cleanly and proper manner.

122. The reports of cold storage meat for the same three years is as follows:—

1926.	1927.	1928.
2,400 lbs.	2,400 lbs.	5,293 lbs.

The import of tinned meat I have not yet been able to arrive at.

123. **Water Supply.**—Mention has already been made of the Matang Water Reservoir and pipe lines, similar in length, which were opened in July 1907. This is a very good piece of work and a valuable asset to the town, for it has laid the spectre of cholera in a most effective manner. There are, I should imagine, very few towns of similar size in the East, which are so well supplied with a piped water supply.

124. The number of standpipes in the town amount to about 137. The metered consumption is about 2,160,000 gallons per diem, which gives the perfectly absurd figure of 89 gallons per head per day.

Kuching should be able to manage in comfort on 750,000 gallons per day. It is obvious therefore that about $\frac{2}{3}$ of the water supplied is lost by leaks or waste or over consumption. I think that money expended in reducing the consumption to normal and reasonable limits, would be far better spent, and at a fraction of the cost, than if devoted to extension of the existing supply.

125. I investigated the question of extensions of the supply, soon after arrival.—I should not recommend taking any supply from the Sarawak River which has a tidal influence right up to Buso and Simboh. The best and most economical place to make an additional

reservoir, would seem to be the upper reaches of the Sungei Rayu, which had a reasonable flow of water even in the dry spell when I saw it.

126. **Conservancy and Scavenging.**—The Municipal 1928 arrangements for these two important services have already been alluded to when referring to sanitary divisional effort. It is hoped that another year will see an extensive change for the better, since a *septic tank* for the Municipal sewage and an *incinerator* for the Municipal garbage will expunge a blot on our urban escutcheon.

127. **Meteorology and Climatology.**—Meteorology, always a subject of vivid interest to the agriculturist, to the sea-farer, to the aeronaut, as well as to many of the general public, is also a matter of great importance to the Health Officer; for, on the complex actions and re-actions of pressure, temperature, humidity, and air movement, depend the comfort and well-being of the delicately balanced human mechanism. It is for this reason that meteorological records are so often and so aptly entrusted to Health Departments.

128. In Sarawak there has, up to the present, been no centralized control or co-ordination. Certain stations, in all five Divisions of the State, send in some rainfall returns which are published in the *Government Gazette*.

129. In Kuching itself, certain records are kept by the Agricultural Department with instruments housed in different parts of the Museum grounds. These consist of a rather moribund barometer, a rain-gauge, a wet and dry bulb thermometer, a quite inadequate sun's maximum and minimum instrument, and a solar radiation thermometer in a condition of senile decay. Whether, therefore, observer was adept at his job or not, the state of the instruments are such that the records are not likely to be sufficiently accurate to have any intrinsic value.

130. The transfer of this work to the Health Department has been sanctioned as from January 1929. A few new up-to-date instruments have been ordered, and a small Meteorological Station will be made in the Museum grounds where it is hoped eventually to obtain the following records:—Rainfall, Evaporation, Maximum and Minimum Shade temperature, Wet and Dry bulb readings, Maximum Solar radiation readings, Minimum grass readings, Movements of subsoil water, Subsoil temperatures, Sunshine records, Wind direction and Velocity.

The Sanitary Inspector of the South Division will be put in charge as Meteorological Observer.

131. It is hoped also to co-ordinate the records of the other Sarawak Divisions, and to publish them promptly in the *Gazette*.

In *Appendix F*, will be found the 1928 *Rainfall records* of the various Divisions, such as I have been able to collect and chart.

132. **Legal Matters.**—Public Health Legislation occurs in the form of various Orders and Notifications, the majority of which only apply to the Kuching Municipal area. The legislation is very scattered. I am hoping next year, or the year after, to collect these diffuse and valuable enactments into a single public health order for the consideration of Government.

133. In the daily health routine, carried out under provision of the various Orders, mention has already been made of the various notices served to abate nuisances or to correct insanitary conditions. Every care is taken not to harass the public unduly. Tactful verbal conversation, is followed by warning in those cases where no notice is taken of the original suggestions. Written notices to abate are only resorted to, when other methods fail; and in each case the matter is personally inquired into by the Chief Health Officer and the notices personally signed by him. In nearly all cases the notices are complied with promptly within the time limits.

It is only very rarely that the offences are sufficiently heinous to require prosecution, and this is only sought when a preliminary warning has been ignored. Most of such cases are concerned with the sale of decomposing foodstuffs. During 1928, eight prosecutions were instituted, two of them dealing with butchers, and six with fishmongers. Fines were obtained in each case, and the offensive foods destroyed.

134. **The Health Office.**—A check on the routine work of the department is secured by several methods:—(a) Each divisional and sectional Inspector furnished a *weekly report* on his sanitary division or section, each Saturday morning. Each such report is perused and discussed with the Inspector by the Chief Health Officer who suggests any action that may be required thereon. (b) A *sumptuary graph* (or costing chart) is kept up-to-date, showing by means of a "pie-graph" the percentage of expenditure incurred each month against the various votes at the disposal of the department. (c) *Graphs and flagged charts dealing with almost all of the departmental activities* are displayed on the office walls. These graphs are kept up-to-date by the various inspectors, and form a pictorial record of existing conditions or work accomplished. These graphs are, many of them, such as are of considerable public interest, and we should welcome visits at any time from interested persons who have a few moments to spare. (d) *Library.* A library of Public Health and cognate literature is in the process of formation.

135. A beginning has also been made towards the formation of a small **Museum of Public Health Exhibits**, such as might be informative to the public, or useful for teaching purposes.

136. In closing this review of the year's activities, I should like to take the opportunity of thanking my staff for the interest displayed, and for the help rendered by one and all.

GILBERT E. BROOKE,
Chief Health Officer, Sarawak.

APPENDIX.—A.

DEATHS ACCORDING TO REPORT IN KUCHING MUNICIPAL AREA DURING 1928.

DISEASE.	Chinese.	Malay.	Dyak.	Indian.	Javanese.	Japanese.	Melano.	Total.
Aneurism	...	...	...	1	...	...	...	1
Ankylostomiasis	2	...	...	...	...	...	...	2
Appendix abscess	1	...	...	...	...	...	...	1
Apoplexy	1	...	...	...	...	...	...	1
Appendicitis	1	1	...	...	...	...	...	2
Asthma	...	2	...	...	...	...	...	2
Articular Fibrillation	1	...	...	...	...	...	...	1
Beri-Beri	31	3	...	...	1	...	...	35
Bright's disease	1	...	...	...	...	...	...	1
Bronchitis	6	5	...	...	...	...	...	11
Burns	1	...	...	...	...	...	...	1
Cancer of liver	...	...	...	1	...	...	...	1
" rectum	1	...	...	1	...	...	...	2
Carcinoma of coxum	1	...	...	...	...	...	...	1
" gastric	1	...	...	...	...	...	...	1
Cerebral Tumor	1	...	...	...	...	...	...	1
Cerebral Haemorrhage	1	...	...	...	...	...	...	1
Cerebral spinal meningitis	1	...	...	...	...	...	...	1
Cellulitis	1	...	...	...	...	...	...	1
Chicken-pox	...	...	1	...	...	...	...	1
Childbirth	4	2	...	...	...	...	...	6
Cirrhosis of liver	3	...	...	...	...	...	...	3
Colitis	...	...	1	...	...	...	...	1
Congenital syphilis	1	...	...	...	...	...	...	1
Convulsions	22	153	6	...	1	...	...	182
Cystitis	1	...	...	...	...	...	...	1
Dementia	1	...	...	...	...	...	...	1
Diabetic coma	1	...	...	...	...	...	...	1
Diarrhoea	4	6	...	...	...	...	...	10
Dyspepsia	...	1	...	...	...	...	...	1
Dysentery	25	7	2	2	...	...	...	36
Erysipelas	...	...	...	...	1	...	...	1
Exhaustion	2	1	...	...	...	...	...	3
Fever not specified	2	7	...	...	...	...	...	9
Fractured skull	3	...	...	...	...	...	...	3
Gastritis	1	2	...	...	...	...	...	3
General paralysis	1	...	...	...	...	...	...	1
Haemorrhage of wound	1	...	...	...	...	...	...	1
Hamoptysis	2	...	...	...	...	...	...	2
Hemiplegia	1	...	...	...	...	...	...	1
Heart disease	4	...	...	1	...	...	...	5
Infantile diarrhoea	...	...	...	...	...	1	...	1
Indigestion	1	...	...	...	...	...	...	1
Intestinal obstruction	1	...	...	...	...	...	...	1
Inanition	1	...	...	...	...	...	1	2
Malaria	4	...	...	...	...	...	...	4
Measles	...	1	2	...	...	...	...	3
Miliary Tuberculosis	1	...	...	...	...	...	...	1
Mitral stenosis	...	...	...	...	1	...	...	1
Murdered	1	...	...	...	...	...	...	1
Myeloid leukaemia	...	...	1	...	...	...	...	1
Nephritis	6	...	1	...	...	...	...	7
Old age	17	35	...	...	...	...	...	52
Opium enteritis	2	...	...	...	...	...	...	2
Parenchymatous goitre	...	...	1	...	...	...	...	1
Pericarditis	2	...	...	...	...	...	...	2
Peritonitis	4	1	...	...	...	...	...	5
Placenta prima	1	...	...	...	...	...	...	1
Pre-partum Haemorrhage	1	...	...	...	...	...	...	1
Prematurity	...	...	...	...	1	...	...	1
Pneumonia	11	2	...	...	2	...	...	15
" (Bron.)	6	2	...	...	4	...	...	12
" (Lob.)	8	...	1	1	...	...	...	10
Phthisis	50	28	2	2	1	...	...	83
Pott's Disease	2	...	...	...	...	...	...	2
Sarcoma Maxilla	1	...	...	...	...	...	...	1
Septicaemia	3	2	1	...	...	1	...	7
Septic Ulcer	1	...	...	...	...	...	...	1
Scurvy	1	1	...	...	...	...	...	2
Stillborn	4	6	...	...	...	...	...	10
Smallpox	2	...	...	...	...	...	...	2
Thrush	...	2	...	...	...	...	...	2
Tonsil Decay	1	...	...	...	...	...	...	1
Toxemia	1	...	...	...	...	...	...	1
Tumor	1	...	...	...	...	...	...	1
Tuberculosis of Neck	1	1	...	...	...	...	...	2
Typhoid	2	...	1	...	1	...	...	4
Unknown	3	20	...	1	...	...	...	24
Total	275	293	21	10	18	2	1	615

APPENDIX.—B.

CONDITIONS OF CONTRACT FOR LEPER CAMP, 1928.

1. This contract shall come into operation on the 1st day of January 1929 and shall determine unless previous renewed on the 3rd day of December 1929.

2. (i).—The Contractor agrees to supply to the Government during the said period the articles and materials enumerated in Schedule I hereof at the prices therein stated as the Government may from time to time require.

(ii) The goods supplied under this clause shall be of good and serviceable quality and those denoted by an asterisk in Schedule I hereof shall be of the pattern and quality of the samples thereof which can be inspected at the Office of the Chief Health Officer at any time during Office hours.

(iii) The Chief Health Officer or some person acting on his behalf may reject any goods or materials supplied under this agreement if the said goods or materials are not in his opinion of the requisite quality and may provide other goods or materials instead thereof at the expense of the Contractor.

(iv) The Contractor shall deliver the said goods and materials at his shop or at the Office of the Chief Health Officer as may be required and shall load them if so required on the lorries of the Government.

(v) The Government shall deliver to the Contractor a requisition in writing stating particulars of the amounts of the goods and materials required and the contractor shall provide the goods and materials as soon as possible after receiving the requisition provided that in the case of clothing and mosquito nets a reasonable time shall be allowed for making.

(vi) The Government will in general provide transport but the contractor shall when required provide a lorry or lorries at the cost shown in Schedule II hereof.

3. (i).—The contractor shall supply daily to the Government the several diets laid down in Schedule III hereof.

(ii) The provisions shall be of good standard quality and the Chief Health Officer or some other person acting on his behalf may reject any or all of the said provisions if they are not in his opinion suitable for the purpose for which they are intended and may provide other provisions instead thereof at the expense of the contractor.

(iii) The Government will notify the contractor in writing daily before 4 p.m., the number of diets of each kind which will be required for the following day and the time and place where the said diets are to be delivered.

(iv) Clauses (iv) and (vi) of paragraph 2 hereof shall apply to this paragraph.

4. If in the opinion of the Chief Health Officer the contractor fails to supply any of the said goods, materials, transport or diets when duly requisitioned by the Government or if any of the goods, materials or diets are of bad or inferior quality, or if the contractor does not otherwise perform the conditions of this contract to the satisfaction of the Chief Health Officer, the Chief Health Officer may determine this contract and may give the benefit thereof to any other person or persons.

5. On or before the 7th of the month the contractor shall render in duplicate in the form in Schedule IV hereof (vide Appendix D) a statement of his account for the previous month. This statement shall be subject to the approval of the Chief Health Officer who shall pass it to the Treasury for payment.

6. The contractor shall deposit the sum of \$500 with the Treasury on the signing of this agreement (the receipt of which is hereby acknowledged) as security for the due performance of the contract. The said sum shall be repaid to the contractor on the determination of this contract less any amount that may be due to the Government by the contractor.

APPENDIX.—C.

No.	No.	No.
OFFICE COUNTERFOIL.	ACKNOWLEDGMENT.	LEPER CAMP INDENT.
	Note:—This form should be returned by the Contractor to the Health Office.	Note:—This form should be affixed to the Contractor's monthly bill when presented.
	Date of Supply.....19.....	To Messrs.....Contractors.
A.....	A.....	Govt. Lorry a.
B.....	B.....	PLEASE supply to.....at.....m.
C.....	C.....	Health Office p.
D.....	D.....	to-morrow the.....inst., the following:—
Sundries:—	Sundries:—	Diet A. Quantity required.....
Item Quantity	Item.....Quantity.....	" B. " "
.....	"	" C. " "
.....	"	" D. " "
.....	"	Sundries:—
.....	"	Item No.....Quantity required.....
.....	"	"
.....	"	"
.....	"	"
.....	"	"
.....	"	"
Date of Order.....	Received as above in good order.	Signed.....
Clerk's Initials.....	Signed.....	Chief Health Officer.
	Supt. Leper Camp.	Kuching.....19....

APPENDIX.—D.

SCHEDULE IV.

THE GOVERNMENT OF SARAWAK

in account with Contractor

No.

DATE.								TOTAL	AT RATE.	\$	CTS.
Diet A											
Diet B											
Diet C											
Diet D											
Sundries											
1											
2											
3											
4											
5											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
Lorry Hire											

E. & O. E.

TOTAL \$

Contractor.

Received Payment

Checked by

Approved

Contractor.

Chief Health Officer.

APPENDIX.—E.

LEPER CAMP REGISTER.

Registered Number.....		Correspondence File No.	
Name.....		Race.....Age.....Sex.....	
Date of Admission.....19.....		Place of Origin..... Admitted by request of.....	
<div style="border: 1px solid black; padding: 10px; text-align: center;"> Photograph of Patient </div>	Summary of each month's Treatment:—		(Continue overleaf if necessary)
Past History:—	Date of Pathological Examinations:—		(Continue overleaf if necessary)
Condition on Admission:—	Final Result:—	Signed..... Medical Officer.	
	Signed..... Chief Health Officer.	Signed..... Superintendent Leper Camp.	

APPENDIX.—F.

RAINFALL FOR SARAWAK 1928.

First Division.—	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Kuching ..	21.49	18.62	9.65	6.87	5.60	5.98	4.99	5.07	7.08	16.26	18.86	19.00
Matang ..	16.84	21.92	10.40	5.35	10.14	6.20	3.23	8.08	12.05	16.91	17.36	21.00
Sungei China ..	16.77	23.48	18.78	9.68	9.36	5.60	5.37	9.68	9.15	19.68	18.45	20.80
Sungei Tengah ..	17.96	18.42	11.30	6.95	12.33	7.93	4.62	10.91	12.43	15.17	16.80	22.90
Leper Camp ..	20.69	15.97	7.06	7.45	5.65	5.45	3.12	8.80	8.80	10.60	18.20	20.60
Sadong ..	11.93	9.79	12.13	8.78	9.18	4.57	4.01	6.33	9.39	10.89	11.53	16.85
Lundu ..	15.46	16.90	11.25	—	—	—	2.78	3.97	5.45	9.78	10.04	18.77
Second Division.—												
Simanggang ..	—	—	—	—	—	—	—	—	—	—	—	—
Third Division.—												
Sibu ..	30.42	13.99	4.03	9.96	3.90	3.39	5.96	10.17	12.09	14.04	9.19	—
Kapit ..	—	—	—	—	—	—	—	—	—	—	—	—
Mukah ..	—	—	—	—	—	—	—	—	—	—	—	—
Fourth Division.—												
Miri ..	7.20	8.26	8.69	6.99	6.29	—	—	—	—	—	—	—
Baram ..	—	—	—	2.21	2.28	2.29	—	2.62	1.49	5.18	5.58	—
Bintulu ..	11.66	9.65	8.20	11.31	8.67	3.69	4.95	15.11	6.91	19.52	15.41	16.46
Fifth Division.—												
Limbang ..	16.40	12.53	5.34	11.91	11.99	5.32	11.37	9.94	7.99	13.04	17.28	13.98
Lauas ..	25.69	—	—	—	—	—	12.20	—	—	—	24.60	—
Trusan ..	26.98	—	—	—	—	—	—	—	—	—	—	—
Means for whole country ..	17.29	15.3	9.12	7.0	7.7	5.0	5.7	7.8	9.3	12.9	16.1	18.8





