

The Straits Settlements medical report.

Contributors

Straits Settlements. Medical Department.

Publication/Creation

[Place of publication not identified] : [publisher not identified], [1921]

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STRAITS SETTLEMENTS.

ANNUAL REPORT

ON THE

MEDICAL DEPARTMENT

FOR THE YEAR

1921

BY

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PUBLISHED BY AUTHORITY.

Singapore:

Printed at the GOVERNMENT PRINTING OFFICE, SINGAPORE.
by J. E. TYLER, Government Printer.

1922.

5385



The Straits Settlements Medical Report for the year 1921.

HEALTH AND POPULATION.

1. The following table gives the estimated mean population for 1920, and the population for 1921 ascertained by the decennial census taken in April, 1921:—

SETTLEMENT.	POPULATION.		Births No.		Deaths No.		Birth Ratio per mille.		Death Ratio per mille.	
	Estima- ted. 1920.	Census, 1921.	1920.	1921.	1920.	1921.	1920.	1921.	1920.	1921.
Singapore ...	391,311	417,859	10,803	12,315	13,851	14,111	27'61	29'47	35'40	33'30
Labuan ...	6,970	5,909	206	203	152	199	29'55	34'35	21'80	33'67
Penang ...	154,086	162,310	4,553	5,193	5,439	5,126	29'55	32'00	35'30	31'58
Province Wellesley	142,710	130,335	4,391	4,624	3,928	3,730	30'77	35'48	27'52	28'61
Dindings ...	12,712	11,927	355	333	442	366	27'14	27'92	34'77	30'69
Malacca ...	157,069	153,599	5,315	6,104	4,898	4,468	33'84	39'73	31'18	29'09
Total ...	864,858	881,939	25,623	28,772	28,710	28,000	29'63	32'62	33'20	31'54

The figures for the European population are:—

	POPULATION.		Births No.		Deaths No.		Birth Ratio per mille.		Death Ratio per mille.	
	Estima- ted mean 1920.	Census, 1921.	1920.	1921.	1920.	1921.	1920.	1921.	1920.	1921.
Straits Settlements.	9,151	8,045	209	259	114	73	22'84	32'19	12'46	9'05

2. The total immigrants from China were in:—

1917 ...	...	...	...	...	...	155,167
1918 ...	...	...	...	...	...	58,421
1919 ...	...	...	...	...	...	70,912
1920 ...	...	...	...	...	...	126,077
1921 ...	...	...	...	...	...	191,043

Births.

3. The births registered during the year numbered 28,772 as compared with 25,623 in 1920. The ratio per mille was 32'62 against 29'63 in 1920 and 30'29 in 1919, and is the highest ratio registered since the Registration Law (1897) came into force.

Deaths.

4. The deaths from all causes registered in 1921 were 28,000 as against 28,710 in 1920 and 27,957 in 1919. This corresponds to a ratio per mille of 31'54, a decrease compared with 33'20 in 1920 and 33'04 in 1919. The average death-rate for the last 10 years is 34'65 per mille.

The lowest death-rates in the last 10 years were 29·15 in 1915 and 30·70 in 1916: the decrease in mortality in those years was largely due to a war-time measure, the repatriation of thousands of decrepit Chinese to their native land; the highest death-rate in the past 10 years was 43·85 per thousand in 1918 when the Influenza epidemic struck the country.

Infantile Mortality.

5. The infantile mortality gives a ratio of 179·23 per mille as against 194·86 per mille in 1920 and 212·42 per mille in 1919—these figures exclude all children born elsewhere than in the Colony; the highest ratio of infantile mortality, 208·30, was among Indians, the Eurasians coming next with 191·25 per mille.

European Officers.

6. Table showing the sick, invaliding and deaths of European Officials of all ranks:—

	1920.	1921.
(1) Total number of officials on the Establishment	444	481
(2) Average number resident in the Colony	351	395
(3) Total number on sick list	350	386
(4) Total number of days on sick list	3,031	2,728
(5) Total number invalided	7	11
(6) Total deaths	3	4
(7) Total deaths in the Colony	3	2
(8) Average daily number on the sick list	96	105
(9) Average number of days on the sick list	8·65	7·07
(10) Percentage of deaths to average number resident	·83	1·05

Zymotic Diseases.

7. The following table gives the number of cases of Zymotic Diseases occurring in the Colony during 1920 and 1921, excluding imported cases:—

SETTLEMENT.	PLAGUE.				CHOLERA.				SMALL-POX.				CEREBRO-SPINAL MENINGITIS.			
	1920.		1921.		1920.		1921.		1920.		1921.		1920.		1921.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Singapore	61	55	2	27	34	33	2	1	5	3	147	34	28	21	70	38
Penang	..	..	7	..	..	..	..	..	34	22	3	2	..	..	13	13
Province Wellesley	..	..	..	..	3	..	4	3	6	1	4	..	..	..	3	3
Malacca	..	..	..	..	21	4	..	..	..	..	1	1	1	1	..	..
Labuan	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dindings	..	..	..	..	..	..	..	..	60	17	..	..	..	..	..	..
Total	61	55	28	27	58	37	6	4	105	43	155	37	29	22	86	54

Vaccination.

8. During the year there were 64,168 vaccinations. Of these 43,672 were successful, 2,536 modified, 3,089 failed and 14,871 were not seen. Most of the "not seen" were in the Rural parts of Malacca. Twenty-nine thousand seven hundred and sixty-two of the vaccinations were performed in Singapore where there were 20 cases of Small-pox between May and end of August, 17 cases in September, 55 cases in October, 26 cases in November and 29 in December.

Diphtheria.

9. The number of deaths from Diphtheria was 13 compared with 25 in 1920. Thirteen cases were treated in hospitals. Only 2 of these ended fatally.

Enteric Fever.

10. Enteric Fever was responsible for 117 deaths, the number for 1920 being 103. The number of cases of Enteric Fever treated in the hospitals was 174 with 86 deaths as against 167 cases and 61 deaths in 1920.

Beri-beri.

11. Beri-beri accounted for 1,299 deaths compared with 1,025 deaths in 1920. In 1919 the number was 1,430: of the total cases treated in hospitals, viz., 684, 184 ended fatally. The fall in 1920 coincided with an increased use of parboiled or undermilled rice, supplemented by other articles of diet.

The highly polished Siam rice is now again freely obtainable, and is used as the staple article of diet amongst the poorer classes of Chinese. It is therefore to be anticipated that the Beri-beri death-rate will further increase.

Pneumonia and Influenza.

12. The mortality from these two diseases, which has been high since the Influenza pandemic of 1918, shows a decrease.

Deaths registered as due to Pneumonia were 1,704, and Influenza 265, as against 1,966 and 362 respectively in the previous year.

Many of the pneumonia cases develop from an attack of Influenza.

A number of deaths really due to Influenza are doubtless included under the heading fever not specified.

Venereal Diseases.

13. Six thousand seven hundred and eighty-one cases were treated in the Straits Settlements Government Hospitals and Dispensaries of whom 4,319 were inpatients.

	<i>Singapore.</i>	<i>Malacca.</i>	<i>Penang and Province Wellesley.</i>	<i>Totals.</i>
Syphilis ...	2,096	277	2,345	4,718
Gonorrhœa ...	782	100	476	1,358
Chancroid, etc., ...	347	28	320	705
			Total	6,781

Intravenous injections of organic arsenical preparations for syphilis ...	5,362	931	3,852	10,145
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In syphilis over 5,000 mercurial injections were also administered.

In Gonorrhœa both lavage and ordinary intraurethral injections were used locally; more than seven hundred subcutaneous injections of Gonorrhœal phylacogen were given in suitable cases.

Out-Door Treatment.—(a) A free part time antiveneal clinic especially for seamen was opened at Tanjong Pagar on 1st July, 1921.

Since that date printed notices inviting seamen with venereal disease to attend this dispensary have been distributed to every incoming ship. (It is reported however that Captains seldom circulate these notices amongst their crews).

Venereal case cards are given to seamen treated to be retained and shown to Medical Officers in charge of Anti-Venereal Clinics at other ports.

The Tanjong Pagar Clinic was until the end of the year in charge of a Royal Army Medical Corps Officer, who has since been relieved by a medical officer of our own Service.

The attendances for the half year, only 304, were disappointing.

I am not in favour of having any other special out-door dispensaries for sufferers from Venereal Diseases, but advocate their treatment in separate rooms at our ordinary dispensaries. There is both a saving in cost and an absence of the stigma attached to patients who attend a dispensary labelled "Venereal."

(b) Women and children are attended by the Lady Medical Officer at the Out-door Dispensary, Kandang Kerbau.

(c) Alterations are in progress at the North Canal Road Out-door Dispensary to provide facilities for giving modern treatment there.

(d) Two dispensaries are being erected in rural areas on Singapore Island: in both of them there will be separate accommodation for treating patients with Venereal Diseases.

(e) A few out-patients are treated at the General and Tan Tock Seng Hospitals.

Treatment.—As regards treatment of Syphilis the hope of cure by one or two courses of intensive arsenical treatment has not been realised. Most patients stop treatment when the outward and visible signs of the disease disappear. This is not peculiar to the Far East: it is on record that only 11 per cent of those attending venereal wards and dispensaries at home complete the prescribed courses. The use of mercury too has been greatly neglected since the discovery of 606 and its allies: late neurosyphilis has in consequence become far commoner.

Mercury should be given an equal place in the treatment of Syphilis, and organic arsenical preparations used in moderate doses: otherwise there is a danger of death from arsenical poisoning or from acute syphilitic toxæmia.

During the war when Salvarsan was difficult to obtain, Mr. R. L. SPITTEL, F.R.C.S., Surgeon, General Hospital, Colombo, devised a modification of Donovan's Solution of arsenious and mercuric iodides as an intravenous injection in syphilis.

I made use of Mr. SPITTEL's formula with success in Kedah hospitals during the same period, and have experimented with it largely in our hospitals in the year under review.

As regards its arsenical content the solution is by no means equal in effect to the Salvarsan group, but as a vehicle for the administration of mercury and the iodides it seems unrivalled.

Reports from medical officers vary, but there is agreement that in many cases it rapidly removes all outward signs of the disease. When this occurs the patients usually stop treatment, just as he does if treated with Salvarsan.

Amongst the advantages of this solution are, its low cost, less than half-a-cent per dose against two-and-a-half dollars per dose of Salvarsan (it seems hardly worth while using the latter on a cooly who may never take a second dose) and the fact that arsenic, mercury and potassium iodides are all administered simultaneously.

Mr. R. L. SPITTEL himself has favoured me with his views. He is still of opinion that for the administration of Mercury and Iodides the intravenous route is greatly superior to any other method of administration in vogue, but that the arsenic may now be omitted from his formula which then contains mercuric and potassium iodides; its use is to be combined with a course of Salvarsan or other organic arsenical preparation.

Visit of Commissioners.—The Commissioners of the National Society for combating venereal diseases (Mrs. ROLFE and Dr. HALLAM) visited Singapore from January 17th to 27th: Government voted \$5,000 for their expenses.

They held a number of meetings and conferences, showed propaganda films and visited the various Medical Institutions. They later, through their Society, submitted a report and recommendations to the Colonial Office.

The Medical Department is in full sympathy with the Commissioners' plans for free and extended diagnosis and treatment of venereal disease by Government Medical Officers.

As regards their proposals for counter-attractions, while these can be provided for Europeans and educated natives, ninety per cent of our population is outside both facilities for recreation and moral suasion.

Prevention of the spread of venereal diseases.—There is the clearest medical evidence that this can be effected by immediate self-disinfection after exposure to infection.

Instant washing in soap and water is usually sufficient. Prevention is better than cure, and cure is notoriously impossible in many cases of venereal diseases.

It has been aptly remarked that to rely on hospitals and dispensaries alone is like building vast numbers of Small-pox hospitals and neglecting vaccination.

The education of the public will in time effect a diminution in venereal diseases, which can never be brought about by treatment of the already infected.

Phthisis and Tuberculosis.

14. The total deaths registered from Phthisis and Tuberculosis were 3,258 against 3,336 in 1920, and 3,112 in 1919. 1,500 cases were treated in hospitals with 717 deaths . . .

Dysentery.

15. Dysentery accounted for 1,090 deaths as against 1,085 and 1,209 in 1920 and 1919 respectively. Of the cases treated in hospitals, which totalled 1,452, 490 ended fatally, against 1,451 cases with 462 deaths in 1920.

Malaria.

16. Malaria was responsible for 4,713 deaths compared with 4,690 deaths in 1920, and 4,843 deaths in 1919. The corresponding figures for "Fevers not specified" were 2,281, 3,165 and 2,132. Malarial admissions to the hospitals were 7,681 with 567 deaths, compared with 7,539 cases and 548 deaths in 1920.

Ankylostomiasis.

17. The total numbers of Ankylostomiasis cases treated and of deaths therefrom in the hospitals of the Colony for the last 5 years are:—

Year.	Remained from pre- vious year.	Admitted during the year.	Total treated.	Deaths.
—	—	—	—	—
1917	...	83	1,443	268
1918	...	122	1,592	385
1919	...	78	1,110	241
1920	...	69	1,432	312
1921	...	100	1,844	278

Treatment:—The following routine treatment was adopted by Dr. TULL in the District Hospital, Penang, from August, 1921, and is now being used in other hospitals.

No food after 4 p.m. on the day preceding treatment, but water *ad lib*, and one ounce of Magnesium Sulphate at 8 p.m. Next morning at 7 o'clock

a single dose of 2 c.c. of oil of *Chenopodium* in capsule followed in 2 hours by one ounce of Magnesium Sulphate.

The patient is urged to lie quietly, preferably on his right side, and to sip hot water after taking the *Chenopodium*. No solid food is given on the day of treatment. Should collapse occur, it is met by injecting one half c.c. of pituitrin intramuscularly.

Stools are collected and washed in a fine meshed sieve, which entangle the worms: these are placed on a black photographic tray and counted.

The daily washing of the stools of each patient is continued until two negative results are obtained—usually about the 4th or 5th day. As soon as two negative results are obtained the stools are examined for ova of *Ankylostoma*. If ova are present, the *Chenopodium* treatment is repeated on the 10th day after the first treatment.

If ova are not present, the patient is transferred to another ward (for convenience sake) and in a few days his stools are again examined for ova. As most of the patients who suffer from *Ankylostomiasis* usually have one or more concurrent diseases, it is not a waste of time to keep them for a few days.

Of 179 patients treated in this ward from August to December, 1921 only 1 required a second course of treatment, three required a third course, and only one required a fourth course.

The following figures show the results obtained:—

Number of patients treated	...	...	...	179
Of these there were Chinese	...	...	...	91
" " Tamils	...	...	...	82
" " Malays	...	...	...	6
Number discharged as cured showing no ova of <i>Ankylostoma</i> in stools	...	...	...	101
Number absconding before completion of treatment	...	...	...	77
Number died	...	...	...	1
Total number of days spent by the 179 patients in the ward	...	...	...	1,516
Average stay in hospital	...	...	...	8 days.
Hæmoglobin estimation:	30% and under	34 patients.		
" "	35% - 50%	and under 64 patients.		
" "	55% - 65%	and under 66 patients.		
" "	70% and upwards	15 patients.		

Even during the short stay in Hospital 52 cases showed marked improvement in their hæmoglobin percentage, an average of 13 per cent. In 5 patients the hæmoglobin diminished in spite of treatment.

Number of worms expelled.—In spite of all possible precautions it is not nearly always possible to recover all stools, for the patients will use the latrine preferably to a chamber pot, so that the count of worms is sure to be low. But 4,439 worms were recovered, an average of 25 per patient. The largest number of worms recovered from any one patient was 465, of which 426 were passed during the first 24 hours after the administration of *Chenopodium*.

This record is from the notes of Mr. D. C. RICHARDS, Assistant Surgeon, Penang.

Ulcers.

18. Four thousand one hundred and sixty-nine cases or nearly 10 per cent of all admissions were under the heading "Ulcers".

During the last five months of the year treatment of chronic ulcers by the intravenous injection of 1 c.c. rising to 5 c.c. of a 2 per cent solution of Tartar Emetic was tried in Tan Tock Seng Hospital by Dr. V. B. KYLE.

Definite and often severe pain in the ulcerated area was commonly complained of after the first injection. After the third, fourth or fifth injection surprising improvement was often shown. Sloughs disappeared and ulcers assumed a bright scarlet colour. When this stage was reached it was usually found advisable to stop the injections otherwise the ulcers tended to revert to their former unhealthy condition, and a dysenteric type of diarrhoea sometimes ensued.

Having arrived at a healthy stage ulcers were found to heal well and rapidly under routine local applications. In all 149 patients received this treatment, of whom 68 were discharged with soundly healed ulcers and 23 left before treatment was completed; 11 did not benefit; 9 died of concurrent diseases, and the remainder were still under treatment.

19.—TREATMENT OF LEPROSY IN THE STRAITS SETTLEMENTS.

I.

Record of cases Treated in Singapore in 1921.

(1) In February, 1921, regular courses of intravenous injections of 3 per cent Sodium Hydnocarpate Solution were started in the Female Leper Camp, Singapore. The initial dose was 1 c.c. twice weekly, increasing by $\frac{1}{2}$ c.c. weekly, until a maximum dose of 5 c.c. was attained.

In some cases slight fever with rigors, nausea, and pain in bones and joints occurred. This was met by discontinuing the injections for a couple of weeks, and then resuming with smaller doses.

The average first course lasted 3 months: after an interval of 2 or 3 weeks, a further course was started beginning with an initial dose of $2\frac{1}{2}$ c.c. once weekly and increasing by $\frac{1}{2}$ c.c. weekly to a dose of 5 c.c. once weekly, which was maintained for a month. Similar courses followed after suitable intervals.

In some cases the thickening of the veins and tissues surrounding the punctures rendered it necessary after a time to substitute intramuscular for intravenous injections.

(2) From June, 1921, in cases where ulceration was a marked feature, a course of tartar emetic was given before the sodium hydnocarpate course. A 2 per cent solution of tartar emetic was injected intravenously twice weekly beginning with 2 c.c. and increasing by 1 c.c. each succeeding week to a maximum of 5 c.c.

Under this treatment ulcers healed well and rapidly except in every extensive and long-standing cases. As healing progressed the sodium hydnocarpate course was started.

(3) During the last 2 months of the year Muir's E. C. C. O. in doses of from $\frac{1}{4}$ c.c. to 2 c.c. was tried on 2 cases.

One advantage of this preparation is that it can be given intramuscularly or subcutaneously without the pain experienced when sodium hydnocarpate is so used.

During the same period we also tried samples of a colloidal preparation of Antimony, Oskol Stibium, in ulcerative cases: it is non-irritating and less toxic than the 2 per cent solution of tartar emetic.

(4) *Results.*—In all over 2,000 intravenous injections were administered during the year.

The first effect of treatment is sometimes to intensify existing lesions or to produce new ones, but improvements usually appear when treatment is continued.

Cases of early leprosy respond better to treatment than those of old-standing. The Tubercular type improves rapidly, while the mixed type is most resistive. The maculo-anaesthetic type is intermediate. An increase of muscular power, disappearance of anaesthesia and healing of ulcers are favourable signs.

In the tubercular type of cases the nodules either slowly subside or break out into ulcers and then gradually heal. In milder cases there is a steady shrinkage of the raised patches and diminution in thickening of ears, etc.

Forty-two female patients remained at the end of 1921. Of these 7 showed very marked improvement, one being apparently cured.

Twenty-one showed definite improvement—14 remained *in status quo*. Of these 14, 4 did not receive the treatment, while 3 had only newly entered.

(5) Treatment on the same lines was carried out at the male leper camp, Singapore, which is only a collecting station, as the inmates are transferred to Pulau Jerejak Male Leper Asylum, Penang. Seventy-eight lepers were in this camp for varying periods during the year; most of them improved even though their stay was short.

In the case of one, an Eurasian named Scott, who was permitted to remain in Singapore, marked improvement occurred.

(6) The variations in treatment in Singapore have been planned by Dr. V. B. KYLE, and carried out under his supervision by Assistant Surgeon JIT SENG, who has given most of the injections and has kept the notes of the cases.

We are indebted to both these officers for their care and their accurate observations on the effects of the various preparations and dosages used. The administration of Tartar Emetic in ulcerative cases started in Singapore is being introduced into the Penang Male Leper Asylum. E. C. C. O. MUIR'S is also being extensively tried.

Illustrative Cases.

(7) The following are taken from Mr. JIT HENG'S notes:—

(i) THOMAS FRANCIS SCOTT—Eurasian male, age 33, admitted into the male leper camp on 23rd January, 1918. The bacilli lepra were demonstrated in smears taken from the patient when he was admitted. Before he underwent the systematic line of treatment, introduced from February, 1921, the patient showed the characteristics of the tubercular type of leprosy, his face and ears being closely covered with prominent nodules. The skin over the palms of the hands was pink and tightly stretched, but over the dorsum, it was greatly thickened. The face, ears and hands appeared very big and sensation on the hands was impaired. The feet were oedematous and very big. On the sole of the right foot and in the furrow between the fourth and small toes of the left foot, there were two deeply excavating ulcers. The patient passed through his first course of injections without any marked improvement resulting. Sodium Hydnocarpate alone was used at this time, and after the first course the patient's ulcers were still as indolent as before but less septic. The nodules on the face and ears appeared more prominent and deeper in colour. When tartar emetic was introduced in June, 1921, the patient was put under a course of treatment with this drug. Commencing doses produced no immediate reaction, but when the dosage had reached 5 c.c. reaction was evident by the presence of transient giddiness with nausea and diarrhoea. Treatment was then suspended for two weeks. Meanwhile

the condition of the patient's ulcers improved: they got cleaner and smaller, so that finally, after he had received 10 injections of Tartar Emetic, it was deemed advisable to put him under another course of Sodium Hydnocarpate. The skin lesions of the patient were then seen to improve. The dark brown colour of the nodules faded away while the nodules themselves slowly subsided. In all, the patient has received up to the present date, 10 intravenous injections of Tartar Emetic with 9 subcutaneous and 39 intravenous injections of Sodium Hydnocarpate. The bacilli lepra are present in smears; still he has improved greatly. The nodules on his face and ears have subsided, leaving behind slight elevation and thickening of the skin on these areas. Sensation has fully returned to both hands, and the elephantine nature of the hands and feet is less marked. The ulcer on the sole of the right foot is still present, but is dry, clean and very small, while that in the furrow between the fourth and small toes of the left foot has completely healed up.

(ii) CHUA CHYE HOE, Chinese Teochew boy, aged 6, admitted 8th April, 1921; mother also an inmate in the camp. The boy's condition on admission was as follows:—Pinkish nodules present on the face especially over the malar. Three big whitish looking anaesthetic areas surrounded by zones of thickened pinkish skin on the buttocks. A few pinkish nodular patches on back of thighs and buttocks, while both feet below the ankles presented macular anaesthetic patches. The boy was given $\frac{1}{2}$ c.c. of Sodium Hydnocarpate solution, bi-weekly during the first course, increasing by $\frac{1}{2}$ c.c. weekly. In subsequent courses, he received the same doses as the adults got, and he developed no ill effects. Local reaction in the form of greater prominence and deeper colour of the nodules on the face and limbs was present as in other cases and he improved similarly. At the end of June, 1921, 20 injections of Sodium Hydnocarpate had been administered and even in this short space of time, improvement was indicated in the return of sensation to the three big zones of depigmented anaesthetic areas on the buttocks. In all, up to the present date, this patient had received 45 injections of Sodium Hydnocarpate, administered intravenously at first but subcutaneously later: good results are evident in the patient's present condition. No more thickening or nodules on the face, but a faint pinkish tinge remains over the malar bones. Anaesthesia has been fully banished from all previously affected areas, although the buttocks still present the depigmented areas, which are however less distinct and cannot be differentiated into definite zones. No bacilli lepra in smears taken recently.

(iii) CHEY YENG, Chinese (Cantonese) female, age 22, admitted 23rd May, 1921. No family history of leprosy. This case, typically tubercular in type, has shown very fast and marked improvement. The bacilli lepra were demonstrated on admission. *Condition*: the whole body, face and limbs were covered with thick, reddish, prominent nodules, while pinkish anaesthetic patches were scattered here and there. Up to the present date she has received 38 injections of Sodium Hydnocarpate, all given intravenously. At the end of her first course of treatment, in August, 1921, she showed practically no improvement, but rather, the skin lesions appeared to be more intensified, due to the onset of the local reaction caused by the drug. In the early days of her stay in the camp, the patient was very sickly so that I had to omit giving her injections frequently and to attend to her concurrent complaints. But as the injections progressed, she improved in strength, so that in the second and subsequent courses she was able to receive her treatment quite regularly without experiencing any ill effects. At present, all nodules have entirely disappeared from her body, leaving behind a smooth skin with pinkish patches faintly visible here and there and spots of a darker colour on the lower limbs and buttocks on the sites of the old nodules. On the back of the trunk are seen many round but small depigmented areas, which are, however, quite sensitive. There are no anaesthetic areas. The bacilli lepra were, however, still found in smears taken from the lobule of the patient's left ear recently.

II.

Record of cases treated in the Male Leper Asylum, Pulau Jerejak, Penang, 1921.

(This Asylum contains an average of 450 male lepers.)

(1) During the years 1918 and 1919, seven men and during the year 1920 thirty were treated with injections of sodium gynocardate, mostly subcutaneous. About one half showed slight improvement. Gynocardate oil, unlike hydnocarpate, is however not a true Chaulmoogric oil, and the use of sodium gynocardate was abandoned as unsatisfactory.

(2) In January, 1921 an attempt was made to induce all lepers who were not in a hopeless condition to undergo systematic intravenous treatment with either sodium hydnocarpate, sodium morrhuate, or sodium soyate. Oral administration was combined with injections: where the intravenous route was impossible intramuscular injections were used.

(3) One hundred and forty-six lepers were under treatment at the end of the year. In 3 of these the lepra bacilli could no longer be found, and all lesions had disappeared, while 40 others seem to be on the road to recovery.

(4) Details of treatment and illustrative cases furnished by Mr. A. H. WHEATLEY, resident assistant surgeon at Pulau Jerejak Leper Asylum, are added. Mr. WHEATLEY deserves much credit for his work.

The treatment has been carried out entirely by him: he has had much difficulty in inducing patients to begin and to persevere in the courses, as many, although warned to the contrary, expect a rapid cure.

TREATMENT.

A.—By Sodium Hydnocarpate.

(1) Method of administration—intravenous or intramuscular combined with internal administration.

(2) Dosage—an injection of a $\frac{1}{2}$ c.c. of a 3 per cent solution is given twice weekly. Dose is increased gradually to 4 c.c. which is given once weekly. Internally on non-injection days, 3 grains in capsule are given thrice daily. This dose is increased daily by 3 grains until 15 grains are being taken thrice daily.

(3) Average number of injections was 42 per patient.

(4) Results:—

Total cases treated	...	...	60
Not improved	...	...	16
Improved slightly	...	...	29
Improved greatly	...	...	13
Lesions disappeared	...	...	2
			60

(5) Duration of disease in treated cases was from 2 to 31 years.

(6) Illustrative cases—

(a) Velasco, a Eurasian

Duration of disease is 4 years

Condition when treatment was commenced:—

Nodules on face;

Ears thickened;

Anaesthetic patches on buttocks, thighs, legs and feet;

Ulceration of nasal cavity;

Lepra bacilli present in nasal smear.

Condition on 31/12/21:—

Nodules absent;

Ears not thickened;
 Anaesthetic patches absent;
 Ulceration of nasal cavity healed;
 A few bacilli still present in nasal smear.

(b) Murugan, a Tamil.

Duration of disease is 3 years
 Condition when treatment was commenced:—
 Nodules on face;
 Ears thickened;
 Anaesthetic patches on fingers, buttocks and feet;
 Ulceration of fingers;
 Lepra bacilli present in nasal smear.
 Condition on 31/12/21:
 Nodules absent;
 Ears not thickened;
 Anaesthetic patches absent;
 Ulceration healed;
 Lepra bacilli absent from nasal smear.

Both these patients have since been discharged.

B.—By Sodium Morrhuate.

(1) Method of administration intravenous, intramuscular and internal.

(2) Doses—an injection of a $\frac{1}{2}$ c.c. of a 3 per cent solution is given twice weekly. Dose is gradually increased to $2\frac{1}{2}$ c.c. twice weekly. Internally on non-injection days 3 grains in capsule are given thrice daily. This dose is increased daily by 3 grains until 15 grains are being taken daily.

(3) Average number of injections was 36 per patient.

(4) Results:—

Total cases treated	...	...	8
Not improved	...	...	2
Slightly improved	...	...	4
Greatly improved	...	...	2
Lesions disappeared	...	...	0

(5) Duration of disease was from 3 to 7 years

(6) Illustrate case—

Gangayah, a Tamil
 Duration of disease is 5 years.
 Condition when treatment was commenced:—
 Nodules on face, forearms, buttocks and thigh;
 Ears much thickened;
 Ulceration of ears and feet.
 Condition on 30/6/21:
 Nodules absent;
 Ears slightly thickened;
 Ulceration healed:
 Patient absconded on 11/7/21.

C.—By Sodium Soyate.

(1) Method of administration—intravenous, intramuscular and internally.

(2) Dosage—an injection of a $\frac{1}{2}$ c.c. of a 3 per cent solution is given twice weekly. Dose is gradually increased to 4 c.c. when this dose is given

once a week. Internally on non-injection days 3 grains in capsule are given thrice daily. This dose is increased daily by 3 grains until 15 grains are taken thrice daily.

(3) Average number of injections was 32 per case.

(4) Results:—

Total treated	...	...	...	45
Not improved	...	...	10	
Slightly improved	...	...	20	
Greatly improved	...	...	14	
Lesions disappeared	...	...	1	45

(5) Duration of disease 1 year to 4 years.

(6) Illustrative cases—

Koomarasamy, a Tamil.

Duration of disease is 7 years.

Condition when treatment was commenced:—

Lepra bacilli present in nasal smear;

Nodules on face;

Ears thickened;

Anaesthetic patches on fingers and soles.

Condition on 31/12/21:

Nodules on face disappearing;

Sensation returning to anaesthetic patches.

Sensation returning to anaesthetic patches.

D.—By Sodium Hydnocarbate (3 per cent) 1 Part and Sodium Soyate (3 per cent) 2 Parts.

(1) Method of administration—intravenous, intramuscular and subcutaneous.

(2) Dosage—an injection of a $\frac{1}{2}$ c.c. twice weekly. Dose is gradually increased to 4 c.c. when this dose is given once a week. Internally on non-injection days 3 grains of Sodium Soyate in capsule are given thrice daily. This dose is increased daily by 3 grains until 15 grains are being taken thrice daily.

(3) Average number of injections 17 per patient.

(4) Results:—

Total cases treated	...	...	...	20
Not improved	...	...	2	
Slightly improved	...	...	7	
Greatly improved	...	...	11	
Lesions disappeared	...	...	0	20

(5) Duration of disease from 6 months to 15 years.

(6) Illustrative cases—

Velliam, a Tamil.

Duration of disease is 6 years.

Condition when treatment was commenced:—

Lepra bacilli present in nasal smear;

Nodules on face;

Ears thickened;

Anaesthetic patches on legs and feet;

Ulceration of feet.

Condition on 31/12/21:

Nodules greatly decreased;

Ears less thickened;

Sensation returning to anæsthetic patches.

Ulceration diminishing.

E. "E. C. C. O."

(1) Method of administration—intramuscular and subcutaneous.

(2) Dosage—not yet definitely decided.

(3) Results:—

Nine cases have been under treatment since 1/12/21.

One nodular case of 14 years' duration has shown considerable improvement.

F.—Summary of Treatment.

Medicine.	Not Improved.	Slightly Improved.	Greatly improved.	Lesions Disappear.	Treatment Commenced from 1st Dec., 1921.	Total.
Sod. Hydnocarpate ...	16	29	13	2	...	60
„ Morrhuate ...	2	4	2	0	...	8
„ Soyate ...	10	20	14	1	...	45
„ Hydnocarpate and Soyate ...	2	7	11	0	...	20
E. C. C. O. ...	...	...	...	...	9	9
Oscol Stibium ...	...	...	...	...	4	4
Total ...	30	60	40	3	13	146

Conclusions.—Over two-thirds of those treated have shown signs of improvement. Nodular cases appear to benefit more than anæsthetic cases. In cases that have laryngeal or ocular trouble, it is best to give small doses and to stop them if there is any severe local reaction, as otherwise these complications become worse.

III.

General note on Remedies.

(1) Chaulmoogra and Hydnocarpus oils are obtained from *Taroktogenos Kurzii*, from *Hydnocarpus Wightiana*, and from some other varieties of *Hydnocarpus*, by expression from the fresh seeds. Chaulmoogra oil has long been known as a remedy for Leprosy but it has been found impossible to administer enough of it by the mouth and inunction to cure the patient, while, injected intramuscularly, it is too painful.

(2) Dr. VICTOR HEISER was the first to mix Chaulmoogra oil with camphorated oil and Resoroin, and administer it intramuscularly, thus securing better absorption with less pain.

(3) Dr. P. HARPER'S mixture of Chaulmoogra oil combined with Ether, with a little Iodine or carbolic acid added constitutes an advance on Heiser's preparation, as it is more absorbable and can be injected intravenously daily without danger.

(4) Sir LEONARD ROGERS has also introduced an advance on Heiser's solution in sodium hydnocarpate; it is composed of the sodium salts of the most active unsaturated acids of Chaulmoogra oil, which can be obtained from Hydnocarpus oils as well as from the true Chaulmoogra oil. Sodium hydnocarpate may be given intravenously in 3 per cent solution without pain, but when used for a lengthy period the veins get thickened and difficult to penetrate with the needle: injected hypodermically or intramuscularly it causes some pain.

(5) A probable further advance on sodium hydnocarpate is Muir's preparation known as E. C. C. O. His formula is:—

Ethyl esters of the fatty acids of oil from Hydnocarpus—

Wightiana seeds ...	...	...	...	1 c. c.
Creosote ...	...	...	...	1 c. c.
Camphor ...	...	...	...	1 gram.
Olive oil ...	...	...	...	2½ c. c.

He dissolves the camphor in doubly distilled creosote, and adds it and the Ethyl esters to doubly distilled olive oil which has been heated for half an hour to 96° C on a water bath and then cooled.

Muir finds that this solution is painless even when given hypodermically or intramuscularly, and that it is more efficient in nodular and nerve leprosy than any other preparation. He reports that when given intravenously no injury is produced to the veins. Muir's preparation is not unlike that introduced by Dr. DEAN in the Hawaiian Islands which has produced excellent results.

(6) Other useful solutions are:—

- (a) 3 per cent of sodium soyate—a preparation from the oil of the soya bean;
- (b) 3 per cent of sodium morrhuate—a preparation from the fatty acids of cod liver oil.

Though neither of these is as active as sodium hydnocarpate, both are useful to ring the changes. They are often of benefit when improvement has temporarily ceased under treatment with hydnocarpate compounds.

(7) Where there is much ulceration it is desirable to give the patient a course of injections of a 2 per cent solution of Tartar Emetic before beginning other treatment. A colloidal preparation of Antimony known as Oscal Stibium (Oppenheimer) has lately been introduced: it is claimed to be superior to Tartar Emetic.

(8) To sum up, at the time of writing, I am of opinion that the best results are to be obtained from injections of E. C. C. O. (Muir's), preceded by a course of Tartar Emetic or of Oscal Stibium injections where ulceration is a feature. It may be beneficial in many cases to alternate the E. C. C. O. with courses of sodium hydnocarpate, sodium morrhuate and sodium soyate.

20. Total in-patients treated and mortality in all Hospitals of the Colony for the past six years:—

Year.	Number treated.			Number of Deaths.			Percentage of Deaths to Total treated.		
	Europeans.	Natives.	Total.	Europeans.	Natives.	Total.	Europeans.	Natives.	Total.
1916 ...	1,843	32,623	35,466	82	3,289	3,371	4'45	9'78	9'50
1917 ...	1,904	34,559	36,463	83	4,006	4,089	4'36	11'59	11'21
1918 ...	3,197	39,836	43,033	143	5,698	5,841	4'47	14'30	13'57
1919 ...	2,944	37,812	40,756	139	4,602	4,741	4'72	12'17	11'69
1920 ...	3,454	39,343	42,797	165	4,120	4,285	4'77	10'47	10'01
1921 ...	2,184	41,309	43,493	74	4,311	4,385	3'39	10'44	10'09

Singapore Hospitals.

21. The number of cases treated in the European wards of the General Hospital during the year under review was 1,638 against 1,812 in 1920. The number in the native wards was 6,532 against 5,925 in 1920. The total deaths were 666.

22. Eleven thousand three hundred and seventy patients were treated at the Tan Tock Seng's Hospital, with 1,530 deaths. The average daily sick was 703'80, compared with 622'79 in 1920.

23. The number of patients remaining in the Lunatic Asylum on 1-1-1921 was 399, and the admissions during the year were 308, making a total treated of 707 patients (54 Europeans and 653 Asiatics). The total deaths were 5 Europeans and 68 Asiatics, and the daily average inmates 424.

24. In the Kandang Kerbau Women's Hospital the total patients treated were 651, of whom 5 were Europeans, 56 Eurasians and 589 Asiatics. The total deaths were 77, (5 Eurasians and 72 Asiatics). The total number of patients treated and the total deaths in 1920 were 575 (1 European and 574 Eurasians and Asiatics) and 64 deaths (all Asiatics) respectively.

Penang Hospitals.

25. The total number of patients treated in all Penang Hospitals, including Dindings was 12,094, of whom 442 were Europeans and 11,652 Asiatics. Of these 1,146 died: (22 Europeans and 1,124 Asiatics): in 1920, the total treated was 12,321 (535 Europeans and 11,786 Asiatics), and the total deaths 1,168 (39 Europeans and 1,129 Asiatics).

Province Wellesley Hospitals.

26. On the 1st January, 1921, there remained in the Hospitals in Province Wellesley 148 patients and during the year 2,976 cases were admitted, making a total treated of 3,124—all these were Asiatics. The total deaths were 289. In 1920 the total cases treated were 3,272 with 284 deaths.

Malacca Hospitals.

27. Four thousand two hundred and forty-one patients were treated in the Hospitals at Malacca and Jasin during the year under review, with a mortality of 450 cases. In 1920 the figures were 4,997 and 611 respectively.

Labuan Hospital.

28. In the Civil Hospital, Labuan, 292 patients, of whom 1 was a European, were treated in 1921 with 14 deaths. In 1920 the figures were 244 (2 Europeans) and 13 deaths respectively.

All Hospitals.

29. The total number of patients treated and the total deaths in the Hospitals of the Colony for some of the more important diseases are shown in the subjoined statement with the corresponding figures for the four preceding years:—

Diseases.	1917.		1918.		1919.		1920.		1921.	
	Total treated.	Total deaths.	Total treated.	Total deaths.	Total treated.	Total deaths.	Total treated.	Total deaths.	Total treated.	Total deaths.
Malarial Fevers ...	7,355	613	7,726	766	6,446	472	7,539	548	7,681	567
Dysentery ...	1,516	563	2,481	739	1,708	632	1,451	462	1,452	490
Diarrhoea ...	431	28	407	41	420	35	460	23	451	23
Beri-beri ...	1,520	299	1,725	283	1,556	236	363	43	684	184
Phthisis & Tuberculosis	1,214	594	1,337	692	1,442	686	1,450	698	1,500	717
Enteric Fever ...	116	42	251	106	142	63	167	61	174	86
Ulcers ...	2,323	1	2,432	2	3,196	1	4,027	5	4,169	3
Venereal Diseases ...	3,232	82	2,774	101	3,451	77	3,836	52	4,319	44
Ankylostomiasis ...	1,526	268	1,714	385	1,183	241	1,501	312	1,944	278

Out-Door Dispensaries.

30. Forty-three thousand and seventy patients sought medical assistance as out-patients in the different out-door dispensaries of the Colony compared with 30,535 in 1920 and 30,097 in 1919. The Dispensary at Jalan Klapa, Singapore, was closed on 19th February, and the building converted into a teaching centre for Sanitary Inspectors.

A part-time out-door venereal clinic was started at Tanjong Pagar, Singapore, in July. Part-time out-door dispensaries were started in three Police Stations during the year, viz., at Bayan Lepas, Penang; Penaga, Province Wellesley and in Labuan. The attendance at all 3 was encouraging.

School Inspection.

31. Systematic inspection and treatment of school children by Government Medical Officers was started during the year under review.

In Singapore the Lady Medical Officer, Kandang Kerbau, undertook the inspection of Girls' Schools as a part-time duty and examined 393 girls at the Fairfield Girls' School.

She reports that the nutrition, cleanliness and clothing of the children in this school are fairly satisfactory, but that 84 per cent have carious teeth and 8.4 per cent have vision of 6/12 or less.

Forty-seven per cent have enlarged tonsils; malarial fever and skin diseases are rare.

The treatment of skin diseases was carried out at the School by a nurse.

A private dentist, Mr. T. S. WANG, arranged to attend to the children's teeth, charging those who could pay and doing the remainder free.

Ninety-five dollars was invested in tooth brushes, and daily tooth brush drill was carried out. Girls suffering from other conditions if well to do were referred to their own doctors, and if poor, received free treatment by the Lady Medical Officer at Kandang Kerbau.

Male Schools, Singapore.

The Malay School boys at Siglap, Padang Terbakar, Tanglin Besar and Tanglin Kechil, Tanjong Katong and Teluk Kurau were inspected by Dr. A. L. MURISON in August. After August no Medical Officer was available for this work until the end of December when Dr. R. B. MACGREGOR assumed duty as School Medical Officer.

Penang.

The Senior Health Officer Dr. SAYERS undertook the inspection of boys' schools as a part-time duty from April, 1921, until the end of the year.

He visited 113 schools and examined 7,801 pupils.

Treatment of the diseases from which pupils suffered was carried out with the available means. Well-to-do children were referred to their doctors.

If the school were near a hospital or dispensary poorer children were treated there.

In outlying schools, the pupils were treated by the medical officer after examination, and drugs were in some cases given to the teachers to continue treatment; in Malay Rural Schools periodic visits were paid by Malay dressers for the same purpose.

Recommendations *re* Sanitary improvements to schools were submitted to the Education Department.

College of Medicine.

32. The total number of students on the Roll for the full course of L.M.S. was 132, of whom 33 joined in the year under review. Seven students qualified for the L.M.S. The total number of Licentiates now amounts to 124.

Miscellaneous.

33. Fifty-three Medical Practitioners were registered during the year. The total number now on the Register is 631.

Forty-three licences were issued to chemists and druggists and 33 licences to dentists under the Deleterious Drugs Ordinance.

Fifty-two licences were issued under the Poisons Ordinance.

The Hospitals Board ambulance answered 326 calls for conveying cases to Hospitals.

The following were members of the Hospitals Board during the year excluding Government ex-officio members:—

The Hon'ble Mr. D. Y. PERKINS.

Mr. M. J. UPCOTT.

Dr. M. J. RATRAY.

Dr. P. S. HUNTER.

Dr. MCKERN.

Mr. TAN KHEAM HOCK.

I assumed duty as Principal Civil Medical Officer on 4th January, 1921, succeeding Dr. S. H. R. LUCY who retired, and relieving Dr. GILBERT BROOKE who had been acting in the capacity since August, 1920.

The following officers arrived from England on appointment to the Straits Medical Service:—

- Dr. J. B. MASON on 3rd January, 1921. He was posted for duty as R. M. O., St. John's Island, Singapore and later served in Labuan and Penang.
- Dr. L. J. PAVILLET on 5th March, 1921. He was at once seconded for service in Johore.
- Dr. K. BLACK arrived on 21st April, 1921 and assumed duty as Surgeon, Native Hospitals, Singapore.
- Dr. J. R. KAY-MOUAT arrived and assumed duty as Assistant Principal, Medical School, on 23rd July, 1921. He was promoted to the post of King Edward VII Professor of Physiology in November, 1921.
- Dr. (Mrs.) S. WINSTEDT reported her return from War Service and assumed duty as Lady Medical Officer on 16th March. She is employed in the General Hospital, Singapore. Dr. (Mrs.) O'MAY assumed duty as Lady Medical Officer, Kandang Kerbau, on 7th June, 1921. Both these officers were transferred from the service of the Federated Malay States Government.
- Dr. J. C. TULL reported his arrival and assumed duty as Medical Officer in Penang on the 24th January, 1921. He was gazetted as Pathologist, Penang, on 1st July, 1921.
- Dr. C. L. STEWART was transferred on 1st June to the Federated Malay States Service *vice* Dr. O. J. MURPHY who assumed duty in Singapore as Lecturer in Midwifery at the Medical School and officer in charge of Maternity Hospitals.

The following Medical Officers were appointed temporarily locally:—

- Dr. L. WHEELER from 21st February: he was transferred to Kedah on 12th September, 1921.
- Dr. W. F. TODD and Dr. T. E. MARSHALL from 1st October and 9th November, respectively.
- Dr. T. W. H. BURNE was seconded for service in Johore on 3rd October, 1921.
- Drs. C. J. SMITH, T. W. H. BURNE, T. C. A. CLEVERTON and H. W. FURNIVALL returned from leave on 16th July, 29th July, 8th August, and 21st September, respectively, and Drs. J. R. McVAIL, W. H. FRY, J. S. WEBSTER and G. H. MACALISTER proceeded on furlough on 25th February, 25th May, 8th September and 18th September respectively.
- Drs. J. A. CAMPBELL, J. T. DUNCAN, J. H. T. TENNENT and H. S. SUGARS, D.S.O., M.C., were invalided out of the Service, the latter on account of wounds received while serving in France in 1917.

A. L. HOOPS,
Principal Civil Medical Officer,
Straits Settlements.

APPENDIX A.

SINGAPORE.

GENERAL HOSPITAL.

REPORT BY DR. W. A. TAYLOR, B.A., M.B., B.Ch., *Acting Chief Medical Officer.*

1. *Work done.*—A comparative table from 1915 to 1921 inclusive is attached.

Year.	Number of patients treated in European Wards.	Died.	Percentage.	Number of patients treated in Native Wards.	Died.	Percentage.
1915 ...	1,084	51	4·68	3,258	246	7·59
1916 ...	1,038	65	6·26	3,350	297	8·09
1917 ...	1,120	49	4·37	3,800	382	10·05
1918 ...	1,206	59	4·89	4,683	499	13·01
1919 ...	1,558	83	5·32	4,771	470	9·85
1920 ...	1,812	91	4·96	5,925	518	8·74
1921 ...	1,638	87	5·37	6,532	579	7·94

Maternity Wards.

2. There were 615 admissions as compared with 458 in 1920.

The nationalities of the cases were as follows:—

Europeans	...	...	...	...	129
Eurasians	...	...	...	...	27
Chinese	...	...	...	...	311
Tamils	...	...	...	...	71
Singhalese	...	...	...	...	3
Sikhs and other Indians	...	...	...	...	30
Malays	...	...	...	...	1
Javanese	...	...	...	...	2
Japanese	...	...	...	...	39
Jews	...	...	...	...	2
					615

3. The work of the X-Ray Department has increased considerably; 734 cases were radiographed during the year as against 468 in 1920 and 316 in 1919.

4. *Staff.*—Dr. W. A. TAYLOR was in charge as Acting Chief Medical Officer from the 17th February. He relieved Dr. J. S. WEBSTER.

Dr. JOHN GRAY acted as Senior Surgeon up to May 17th, when he was transferred to Penang as Acting Chief Medical Officer: Mr. KENNETH BLACK, F.R.C.S., succeeded him until the return from leave of the Senior Surgeon Mr. C. J. SMITH, F.R.C.S., on July 4th, 1921.

Dr. H. B. DODDS took over the duties of Radiologist from Dr. J. S. WEBSTER who proceeded on leave to Europe in September.

5. *Native Police.*—There were 1,049 admissions to Hospital, an increase of 248 as compared with the previous year. The nationalities of these patients were Malays 502, Sikhs 238, Other Indians 233, Javanese 19, Chinese 55, Bugis 2.

The principal diseases treated amongst police were Pyrexia of uncertain origin 234, Venereal diseases 94, Skin 53, Injuries 82, Malaria 43, Bronchitis 49, Asthma 26, Ankylostomiasis 82.

SURGERY, GENERAL HOSPITAL.

REPORT BY C. J. SMITH, F.R.C.S, Edinburgh.

Operations.	Total.	Cured.	Relieved.	Not Relieved.	Died.
1. Gynæcological	58	52	1	3	2
2. Abdominal	125	97	1	12	15
3. Genito-urinary	60	59	1	...	...
4. Skull and Brain	5	3	...	...	2
5. Bones	8	8	...	...	...
6. Thorax and Contents	5	5	...	...	...
7. Face, Mouth and Jaws	9	9	...	...	...
8. Rectum and Anus	16	16	...	...	...
9. Arteries and Veins	3	3	...	...	...
10. Ductless Glands	11	11	...	...	...
11. Amputations	2	1	...	...	1
12. Nerves	1	1	...	...	...
13. Abdominal Walls	28	28	...	...	...
14. Bone, Joints and Bursal	10	10	...	...	...
15. Skin and Subcutaneous Tissue	7	7	...	...	...
16. Throat, Nose and Ear	23	23	...	...	...
17. Eye	6	6	...	...	...
Total Major Operations	377	339	3	15	20
Minor Operations	267	267	...	...	...
Total	644	606	3	15	20

Percentage of deaths to total Major Operations 5.30

Percentage of deaths to total all Operations 3.10

Note.—In Caesarian Section Operations 3 children were delivered dead.

FREE MATERNITY HOSPITAL, VICTORIA STREET.

REPORT BY DR. W. A. TAYLOR, B.A., M.B., B.Ch.

During the year under report 493 women were delivered, an increase of 151 patients over the previous year.

There were born males 266 and females 234.

The nationalities were as follows:—

Chinese 401, Japanese 12, Tamils 49, Jews 3, Eurasians 16, and Others 12. = 493.

There were 6 adult deaths due to neglected labour with Sepsis 1, Acute Gastric Enteritis 1, Secondary Syphilis 1, Peripheral Neuritis 1, Cerebral Malaria 1, Pulmonary Embolism 1.

There were 30 still-born babies.

Six premature babies died.

There were 47 complicated cases.

During the year the accommodation for patients was increased by three beds.

The Nursing Staff was increased by the addition of one Staff Nurse and one Probationer. Prior to this the Matron worked single-handed.

PRISON HOSPITAL.

REPORT BY DR. A. L. MURISON, M.R.C.S., L.R.C.P., *Medical Officer-in-charge, Prison Hospital.*

1. The health of the Prison has been satisfactory.
2. The water-carriage system of sewage disposal was completed and worked well during the year.
3. The Prison has been free from Beri-Beri (only one case was admitted into hospital, the patient having contracted the disease outside) and scurvy. There were 8 cases of Enteric fever during the year, of which 7 proved fatal. Thorough disinfection of all uncooked vegetables and of all the wells was adopted: no fresh cases occurred during the fourth quarter of the year under review.
4. *Dysentery*.—There were 49 admissions to hospital with 6 deaths against 10 and 2 in 1920 and 28 and 9 in 1919. The increase is partly due to the greater number of vagrants admitted during the year: most of the cases were 'relapses' of the disease contracted before admission to the prison.
5. Tuberculosis accounted for 12 admissions with 4 deaths.
6. There were 628 admissions to hospital during the year with an average daily sick of 20.42 against 529 and 24.57 in the previous year. Amongst these were 2 European and 1 Eurasian vagrants.
7. *Criminal Prison*.—The total population was 3,771 and the average daily number 727. 506 were admitted to hospital with 26 deaths. The average daily sick was 16.5.
8. *Civil Prison*.—The total population was 6,299 and the average daily number was 122.16. Eighteen were admitted to hospital with 3 deaths. The average daily sick was 0.4.
9. *House of Detention*.—The total population was 1,197 and the average daily number 77. 104 were admitted to hospital with 12 deaths. The average daily sick was 3.5.
10. There were 41 deaths in hospital of whom 16 were Long Sentence prisoners, 5 Short Sentence, 5 Revenue Grade, 12 Vagrants and 3 Civil prisoners.
11. Besides these, there were 3 deaths in the cells; two in the Civil Prison, and one in the Criminal Prison, due to Bright's disease, Chronic gastritis and heart failure.
12. *Suicide by hanging*.—There were 3. One in the Civil Prison—a remand prisoner, addicted to opium-smoking; two in the Criminal prison, one a Tamil; the other a Chinese long sentence prisoner, who assaulted a Warder and was sentenced to penal servitude for life.
13. *Executions*.—There were 6: 5 Chinese and one Sikh.
14. Medical Officer-in-charge, Dr. FITZGERALD, was relieved by Dr. WEBSTER in the middle of February. Dr. A. LOGAN MURISON took over from Dr. WEBSTER early in September, 1921.

TAN TOCK SENG'S HOSPITAL, SINGAPORE.

REPORT BY DR. V. B. KYLE, M.D., B.Ch., *Medical Officer.*

1. <i>Work done</i> .—Remained on 31st December, 1920	...	638
Admitted during the year 1921	...	10,732
	TOTAL	11,370
Discharged	...	9,236
Died	...	1,530
Remained on 31st December, 1921	...	604
	TOTAL	11,370

2. The average daily sick was 703'80 as compared with 622'15 in 1920.
3. The percentage of deaths to total treated during the year was 13'45.
4. There were 1,530 deaths during the year. Of these the number dying within 24 hours of admission was 122. The number of patients coming to the hospital in a starved condition was notable, and contributed to the high death-rate.
5. The average daily stay in hospital of those discharged was 13'19 days; of those dying 16'57 days; and of those remaining 72'16 days.
6. *Malaria*.—Two thousand seven hundred and twenty-six cases of Malaria were treated during the year. The number of cases remaining in hospital at the end of the year was 48. There were 205 deaths, a mortality rate of 7'52 per cent.

<i>Types of Malaria.</i>	<i>Total Cases treated.</i>	<i>Deaths.</i>
Benign Tertian ...	420	10
Malignant Tertian ...	963	134
Quartan ...	213	6
Mixed ...	127	5
Chronic ...	402	45
Unclassified ...	601	5
TOTAL ...	2,726	205

Systematic blood examinations were carried out in fever cases: positive results were as follows:—

Malignant Tertian 959, Benign Tertian 499, Quartan 266, Mixed 279, Negative 6,388; total 8,391.

In the Special Malaria Ward, 3,984 *intravenous* injections of Quinine bi-hydrochloride were administered.

7. *Dysentery*.—There were 453 cases of Dysentery treated during the year. Of these 238 cases died, a death-rate of 52'53 per cent.

8. *Beri-beri*.—Beri-beri is again on the increase, due to the removal of rice control, and to starvation from lack of employment. Comparative figures are:—

	1919	1920	1921
Cases ...	700	136	297
Deaths ...	78	14	75
Percentage Mortality ...	11'14	10	25'25

Fifty-eight cases remained under treatment at the end of the year. Twenty-six chronics were transferred to Pasir Panjang Hospital.

9. *Enteric Fever*.—Eighty-five cases of Enteric fever were treated during the year. There were 37 deaths showing a death-rate of 43'52 per cent against 41'66 per cent in 1920.

10. The Venereal Diseases were as follows:—

Syphilis Primary 237, Syphilis Secondary 797, Syphilis Tertiary 98, Syphilitic Arthritis 73, Gonorrhoea 162, Gonorrhoeal Arthritis 105, Gonorrhoeal Ophthalmia 16, Soft Chancre 193; total 1,681.

There were 8 deaths from Syphilis.

11. *Helminthiasis*.—Two hundred and eleven cases of Ankylostomiasis were treated during the year. There were 22 deaths giving a mortality of 10.42 per cent. Fourteen cases remained in hospital at the end of the year. Three thousand one hundred and eighty-seven stools were examined during the year with the following results:—

Ankylostomiasis Ova	...	...	...	1,244
Round-worm Ova	...	...	...	378
Whip-worm Ova	...	...	...	198
Round & Whip-worm Ova	...	...	...	102
Ankylostomiasis & Round-worm Ova	...	...	...	122
Ankylostomiasis, Whip-worm Ova	...	...	...	112
Ankylostomiasis, Whip & Round-worm Ova	...	...	...	63
Negative	...	...	...	1,968
TOTAL				4,187

12. *Tuberculosis: General and Pulmonary*.—Out of 478 cases of Tuberculosis treated during the year there were 456 Pulmonary Tuberculosis, and 22 General Tuberculosis. Three hundred and eighteen cases died, a death-rate of 66.52 per cent.

One thousand eight hundred and ninety-three Sputa were examined with the following results:—

Negative 1,474; Positive 419.

13. *Ulcers*.—One thousand two hundred and sixteen cases of Ulcers were treated during the year; 106 cases remain in hospital.

14. *Plague*.—There were 4 cases of Bubonic and 2 of Pneumonic Plague which were transferred to the Middleton Hospital.

15. The Surgical work was as follows:—

Operations performed, Major	...	...	316
" " Minor	...	...	1,132
TOTAL			1,448

Dr. MURISON was Surgeon, Native Hospitals, for the first half of the year, and Dr. K. BLACK for the second.

16. Eight thousand one hundred and forty-five Intravenous injections were administered.

17. *Medico-Legal*.—One hundred and twelve dead bodies were sent by the Coroner for post-mortem examination. Eight hundred and thirty-eight cases were sent by the Police for treatment.

18. *Japanese*.—The number of patients for 1921 was 274. There were 4 deaths among them giving a death-rate of 1.45 per cent. The mortality for the previous year was 6.31 per cent.

19. *Staff*.—Assistant Surgeon D. W. RUFUS died on 16th June, 1921 from Pulmonary Tuberculosis. He qualified at King Edward VII Medical School in March, 1920. A promising career was thus cut short.

20. All Dressers now live on the premises. A new building was utilised as quarters for unmarried junior Dressers.

Regular instruction is now given to all Dressers and periodical examinations were held. The standard of education required for applicants has been raised. There has been no difficulty in filling vacant posts.

21. Dr. W. A. TAYLOR was in charge until 16th February, 1922, when Dr. V. B. KYLE took over from him.

LEPER ASYLUMS, SINGAPORE.

REPORT BY DR. V. BLACKER KYLE, M.D., B.Ch., *Medical Officer.*

1. *Male Camp McNair Road.*—

Remained on 31st December, 1920	...	...	20
Admitted during 1921	...	...	58
		Total	78

Transferred to Pulau Jerejak, Penang	...	...	42
Discharged for repatriation to China	...	...	1
Absconded	...	...	4
Died	...	...	15
Remaining on 31st December, 1921	...	...	16
		Total	78

2. *Female Camp (temporarily at Kandang Kerbau, Hospital):*—

Remained on 31st December, 1920	...	...	36
Admitted during 1921	...	...	9
		Total	45

Discharged	...	...	Nil
Absconded	...	...	Nil
Died	...	...	3
Remaining on 31st December, 1921	...	...	42
		Total	45

LUNATIC ASYLUM.

REPORT BY DR. H. J. GIBBS, M.R.C.S., L.R.C.P., *Medical Superintendent.*

1. There remained on the 31st December, 1920, three hundred and nineteen males and eighty females.

Two hundred and forty-two males and sixty-six females were admitted in 1921.

The total treated was seven hundred and seven.

2. Of the admissions 22 males and 15 females had previously been under treatment in this Asylum.

3. Of the total treated one hundred and eleven males and eighteen females were discharged as recovered; sixteen males and twelve females as relieved, 18 males and 22 females as not improved; six males absconded; and sixty males and thirteen females died.

4. There remained on 31st December, 1921, 350 males and 81 females.

5. The average daily numbers were 337 males and 87 females.

6. The maximum and minimum daily numbers were respectively 446 and 400.

7. The nationalities of the admissions are:—

			<i>Males.</i>	<i>Females</i>	<i>Total.</i>	
British	...	...	8	3	11
Other Europeans	...	...	2	—	2
Eurasians	...	...	3	5	8
Japanese	...	...	3	1	4
Chinese	...	...	154	41	195
Malays and Allied Races	...	...	28	7	35
Tamils	...	...	35	8	43
Other Nationalities	...	...	9	1	10
		Total	...	242	66	308

8. The physical condition of those admitted are shown as:—

				<i>Males.</i>	<i>Females.</i>
Good	...	...	...	89	10
Fair	...	...	...	65	26
Impaired	...	...	...	65	23
Greatly Impaired	...	...	...	23	7

Ten of the admissions died within a month of their admission.

9. As to the causes assigned for the mental alienation of the admissions Syphilis proved again to be a dominating factor. The blood of 195 males and 10 females of those admitted were examined by the Government Pathologist for Wassermann Reaction. Seventy-one males and 3 females gave positive results.

The blood of 42 of the other male inmates admitted prior to 1921 was also examined and positive results were obtained from nineteen. Alcoholic intemperance accounted for 35 of the male admissions.

10. *Discharges.*—The recovery rate for the year was 27·86. It compares favourably with those of previous years and also of the Home asylums.

Twenty females were transferred to the Central Asylum at Tanjong Rambutan.

11. *Criminal Population.*—There remained on 31st December, 1920, seventeen lunatic criminals and nineteen criminal lunatics. There were admitted during the year eight of the former class and four of the latter. Of the 48 criminals treated the sentences of seven expired, five recovered and were returned to prison and three died. There remained on the 31st December, 1921, thirteen lunatic criminals and twenty criminal lunatics; one of the former and two of the latter are females.

12. *Deaths.*—The death rate based on the average daily number resident was 17·22 per cent; on the total treated it was 10·32 per cent.

13. *Industries.*—Six thousand nine hundred and six yards of cotton cloth were woven by the male patients from which the female patients made clothing and bedding for the asylum inmates.

From canvas purchased through the Crown Agents 40 canvas strong rugs and 14 combination suits were made.

14. *Revenue.*—The revenue received from paying patients amounted to \$18,530.58.

15. *Kitchen Garden.*—It furnished over 50,000 lbs. of vegetables and a large quantity of fruit and sugar-cane for the patients.

The saving to Government was \$2,538.

16. As this, in all probability, will be the last report I write on the Asylum I take the opportunity of tendering my grateful thanks to the staff and attendants for their helpful co-operation during my tenure of office as Medical Superintendent.

TABLE I.
LUNATIC ASYLUM.

Table showing the Admissions, Discharges and Deaths during the Year 1921.

—	Male.	Female.	Total.	Male.	Female.	Total.
In the Asylum on 1st January, 1921	...	...	...	319	80	399
Cases admitted:—						
First Admissions	...	...	...	220	51	271
Not First Admissions	...	...	...	22	15	37
Total cases under care during the year	...	...	...	561	146	707
Cases Discharged:—						
Recovered	111	18	129	...	...	...
Relieved	16	12	28	...	...	...
Not Relieved	18	22	40	...	...	...
Absconded	6	"	6	...	...	...
Died	60	13	73	...	...	...
Total cases discharged and died during the year	...	...	...	211	65	276
Remaining in the Asylum on 31st December, 1921	...	...	...	350	81	431
Average number resident during the year	...	...	...	337	87	424

TABLE III.

LUNATIC ASYLUM.

Table showing the Length of Residence of those Discharged, Recovered and of those who Died during the Year 1921.

Length of Residence.	Recovered.			Died.		
	Male.	Female.	Total.	Male.	Female.	Total.
Under one month	4	...	4	8	2	10
From one to three months	26	2	28	16	4	20
" three to six months	26	6	32	8	3	11
" six to nine months	23	6	29	10	...	10
" nine to twelve months	10	1	11	4	1	5
" one to two years	13	2	15	5	...	5
" two to three years	5	1	6	2	2	4
" three to five years	3	...	3	4	1	5
" five to seven years ... ..	...	...	...	2	...	2
" seven to ten years	1	...	1	...	...	..
" ten to fifteen years ... ..	...	...	...	1	...	1
TOTAL	111	18	129	60	13	73

BERI-BERI HOSPITAL, PASIR PANJANG.REPORT BY DR. H. J. GIBBS, *Medical Superintendent.*

1. There remained on 31st December, 1920, thirty-two patients.
2. During 1921 fifty-two were admitted giving a total treated of eighty-four.
3. Of this number 5 were discharged cured, 28 relieved, seven absconded and 8 died.

There remained on 31st December, 1921, 36 patients.

4. The average daily number was 32.
5. Of the deaths 3 were directly from beri-beri; 3 from pulmonary tuberculosis, one from chronic nephritis, and one suffering from cataract and optic atrophy committed suicide by hanging.

BLIND WARD, PASIR PANJANG.REPORT BY DR. H. J. GIBBS, *Medical Superintendent.*

1. These two wards, formerly used for beri-beri patients, were opened early in the year when a number of chronic blind were transferred from other hospitals, viz.: 50 males from Tan Tock Seng, and 60 males from the District Hospital, Penang.

2. In all 113 blind received treatment.

They suffered from the following eye-troubles:—

Gonorrhœal ophthalmia	...	...	...	1
Ulceration of Corneæ	...	...	...	7
Opacities of the Corneæ	...	...	...	43
Iritis	...	...	...	4
Cataract	...	...	...	24
Staphyloma	...	...	...	10
Optic Neuritis	...	...	...	2
Optic Atrophy	...	...	...	13
Disorganisation of Eye-ball	...	...	...	9

3. Basket and broom making on a small scale were taught some of the blind: they proved themselves adept at the work.

KANDANG KERBAU HOSPITAL FOR FEMALES.REPORT BY DR. L. S. O'MAY, M.B., CH.B., *Lady Medical Officer.*

I have been in charge since 7th June, 1921.

In-patients—

In-patients remaining on 31st December, numbered	...	54
Admissions during the year	...	597
		651

Of these 495 were discharged.

77 died.

79 remained; total 651.

The nationalities of those admitted were:—

Europeans	...	...	...	5
Eurasians	...	...	...	56
Chinese	...	...	...	351
Indians	...	...	...	122
Japanese	...	...	...	11
Malays	...	...	...	42
Others	...	...	...	10

The average daily number of patients was 66.05.

The percentage of deaths to total treated was 12 per cent.

The number of patients who died within 48 hours of admission was 13.

Excluding these the percentage would be 10 per cent.

There were 24 operations performed under chloroform.

One hundred and twenty cases were injected intravenously for Syphilis, receiving 578 injections of arsenical preparations.

Out-patients.—The Dispensary is in charge of the Assistant Surgeon for Government Servants, their wives and children, and indigent males.

Total numbers of out-patients were:—

<i>New.</i>	<i>Repetition.</i>	<i>Total.</i>
—	—	—
5,326	440	5,766

A women and children's dispensary was opened on June 30th by the Lady Medical Officer.

Total numbers of out-patients were:—

<i>New.</i>	<i>Repetition.</i>	<i>Total.</i>
—	—	—
469	601	1,070

of these 251 were children.

The attendances steadily increased from 51 in July to 296 in December.

Nationalities.—Eurasians 234, Chinese 116, Tamils 64, Malays 29, Jews 19, Sikhs 4, Others 3.

HEALTH OF SINGAPORE POLICE FORCE.

REPORT BY DR. A. LOGAN MURISON, M.R.C.S. (ENGLAND), L.R.C.P. (LONDON), *Police Surgeon.*

The general health of the members of the Police Force shows an improvement compared with last year.

The number of cases treated at the out-patient department at the Central Station shows a decrease from 6,167 to 5,606.

The number of Venereal cases were 130 as compared with 117 last year. This is probably due to the fact that sufferers have been recently encouraged to report themselves infected instead of trying to conceal their sickness.

There is an increase from five to twenty-eight in the number of notifiable diseases, chiefly due to measles (eleven) and small-pox (six, including one death).

Malaria is less prevalent.

A scheme is being put forward to rebuild parts of the Central Station on more sanitary lines. The whole of the force has been vaccinated. Recruits are vaccinated after being enrolled.

The total number admitted to the General Hospital was 1,067 compared with 823 in 1920.

The number and nationality of the recruits admitted to the force were as follows:—

Europeans 4, Eurasians 2, Sikhs 54, Malays 226, Javanese 25, Indians (other than Sikhs) 98, Chinese 59, Siamese 1, Japanese 1.

APPENDIX B.

PENANG.

REPORT BY DR. J. GRAY, M.D., B.Ch., *Acting Chief Medical Officer*

Population.—The population of Penang Island is 304,572, for Province Wellesley 130,335 and for the Dindings 11,927 according to the 1921 census.

Births.—The number of births recorded for Penang Island was 5,193, for Province Wellesley 4,624 and for the Dindings 333, the nationalities being European 56, Eurasian 66, Chinese 3,147, Malay 1,310, Dravidian 542, Other Indians 19, Others and Unknown 32.

Deaths.—The number of deaths recorded for Penang Island was 5,126, for Province Wellesley 3,730 and for the Dindings 366.

Birth and Death rates.—The birth and death rates for Penang Island for the last 5 years:—

	<i>Birth Rate.</i>	<i>Death Rate.</i>	<i>Influenza Mortality per thousand.</i>
1917	29'48	35'72	229
1918	37'18	44'01	204
1919	30'16	41'71	177'23
1920	29'55	35'30	163'19
1921	32'00	31'58	179'47

Zymotic Diseases.—The number of deaths from Influenza in Penang Island was 48 as compared with 123 in 1920 and 480 in 1919.

Through the medium of ships, 3 deaths from Influenza took place at the Quarantine Island. Thirty-nine cases were landed there with this disease. Four hundred and sixty-one ships were inspected including 9 infected ships—Small-pox 6, Cholera 2 and Cerebro-spinal Meningitis 1.

Small-pox.—The number of Small-pox cases in Penang Island was three with 2 deaths compared with 34 cases with 22 deaths last year. In Province Wellesley there were 4 cases with no deaths compared with 6 cases with one death in the previous year.

Vaccinations.—Ten thousand three hundred and fifteen Vaccinations were performed by the Government Vaccinator in Penang and 3,461 by the Municipality and private practitioners.

Plague.—There was one case of Plague in Penang Island; he recovered.

Cholera.—There was no Cholera in Penang Island. In Province Wellesley there were 4 cases with 3 deaths.

In Penang the deaths from Malaria for the past 5 years have been:—

1917	...	...	...	683 deaths.
1918	...	...	...	723 „
1919	...	...	...	752 „
1920	...	...	...	672 „
1921	...	...	...	620 „

The average death-rate per annum from Malaria in quinquennial periods has been:—

1901-1905	...	...	...	244 deaths.
1906-1910	...	...	...	843 „
1911-1915	...	...	...	590 „
1916-1920	...	...	...	716 „

HOSPITALS.

The number of admissions and deaths in all Hospitals in Penang and the Hospital at Quarantine Station for the past 5 years was:—

				<i>Admissions.</i>	<i>Deaths.</i>
1917	...	...	...	8,718	977
1918	...	...	...	10,061	1,452
1919	...	...	...	12,036	1,724
1920	...	...	...	11,385	1,168
1921	...	...	...	12,094	1,146

The chief recorded cases for these Hospitals for the same period were:—

Diseases.	1917.		1918.		1919.		1920.		1921.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Phthisis	272	145	354	175	320	176	299	189	445	180
Malaria	1,493	118	1,379	137	2,107	175	2,557	150	2,342	121
Dysentery	406	119	337	132	493	182	367	105	334	96
Diarrhoea	140	4	150	21	161	20	157	10	147	4
Ankylostomiasis	306	163	360	80	207	42	261	46	614	68
Venereal Diseases	993	36	771	52	764	31	1,002	24	1,149	13
Influenza	...	...	964	185	472	177	937	118	145	7
Teuants	6	3	3	3	1	1	6	2	4	4
Plague	6	4	29	17	5	4	...	...	..	...
Cholera	14	8	80	55	285	180	...	...	3	...
Small-pox	39	10	58	16	352	108	19	9	45	7
Enteric Fever	11	4	20	13	13	4	13	5	8	3
Cerebro-Spinal Meningitis	...	...	...	...	...	...	...	...	20	9

The most marked extension of work during the year has been in the schools in which all the pupils are now regularly examined and in the work of the outdoor dispensaries which are doing a large increase including much anti-venereal work.

Beri-beri shows a striking decline:—

				<i>Cases.</i>	<i>Deaths.</i>
1918	...	...	...	76	24
1919	...	...	...	89	12
1920	...	...	...	25	6
1921	...	...	...	31	10

GENERAL HOSPITAL, PENANG.

The numbers treated in the General Hospital during the past 5 years were:—

Year.	1st and 2nd Class Wards.	Deaths.	Percent-age.	Native Wards.	Deaths.	Percent-age.
1917	350	19	5.4	2,284	105	7.2
1918	503	35	6.95	2,933	232	8.81
1919	462	21	4.58	2,984	291	9.75
1920	485	36	7.42	2,901	254	8.75
1921	398	21	5.27	2,826	220	7.78

Of the above 21 deaths in the 1st and 2nd class wards 6 took place within 48 hours of admission; and of the 220 deaths in the Native Ward 61 were within 48 hours; deducting these the death-rate was 3.80 and 5.75 respectively. The number of Police admitted during the year was 322 as compared with 649 in 1920.

The number of free patients treated in the wards of General Hospital was 980 compared with 445 previous year, the majority of these were "police cases."

Lunatics.—The number of persons certified as of unsound mind and transferred to Singapore Lunatic Asylum was 72 males and 7 females compared with a total of 59 for last year.

Maternity Hospital.

This institution was taken over by the Government from 1st January, 1922.

Report on Surgery at the General Hospital, Penang, during 1921.

Two hundred and fourteen major operations were performed by the Surgeon.

One hundred and eighty-one improved or were cured, 26 died, 7 did not improve.

The Surgeon also did 91 minor operations.

PRISON HOSPITAL.

REPORT BY R. W. NICKELSEN, L.M.S. (Madras), *Assistant Surgeon-in-charge, Prison Hospital, Penang.*

1. The sanitary condition of the Prison and the general health of the prisoners were satisfactory.

2. There remained 11 patients in Hospital at the beginning of the year. Three hundred and fifty-one patients were admitted during the year making a total of 362 patients treated as compared with 473 treated in 1920.

3. The daily average sick was 17.32 as compared with 17.68 of the previous year.

4. Fifteen deaths occurred during the year, giving a death-rate of 4.14 per cent as compared with 18 deaths and a death-rate of 3.97 for the preceding year.

5. The deaths were due to Dysentery 1, Malaria 3, Pneumonia 1, Pulmonary Tuberculosis 4, Diarrhoea 1, Ankylostomiasis 5; total 15.

6. One hundred and thirty-nine vagrants were admitted during the year. Four remained from the previous year making a total of 143. Eleven deaths occurred among the vagrants.

7. The principal diseases treated were:—

Dysentery 32, Malaria Fever 50, Bronchitis 12, Diarrhoea 24, Abscess 8, Ulcers 33, Injuries 18, Ankylostomiasis 55.

DISTRICT HOSPITAL, PENANG.

REPORT BY DR. J. C. TULL, M.D., C.M., (McGill), L.R.C.P. AND S. (Edinburgh),
L.R.F.P. AND S. (Glasgow), M.R.C.P. (London).

1. There remained on 31st December, 1920, three hundred and twenty-eight patients and 6,178 patients were admitted during 1921, making a total of 6,596 patients. The corresponding figures for 1920 were 324 and 4,537, making a total of 4,861.

2. The number of deaths during the year was 550 giving a death-rate of 8.45 per cent as compared with 506 and 10.40 per cent in 1920.

3. Of the deaths 25 occurred within 24 hours of admission and 78 within 48 hours. Excluding these the death-rate would be 8.06 per cent and 7.25 per cent respectively.

4. The principal diseases treated were:—

	Admitted.	Deaths.	Percentage.
Malarial Fever ...	1,902	59	4.56
Dysentery ...	200	71	35.20
Phthisis ...	337	126	37.38
Ankylostomiasis ...	464	52	11.20
Venereal diseases ...	441	7	1.58

5. The average daily number of sick was 306.98 as compared with 304.53 in 1920.

6. Six hundred and thirteen minor operations were performed during the year.

7. *Ophthalmic Ward*.—One hundred and forty-seven patients were treated during the year of whom 132 were in-patients and 15 out-patients.

Operations performed by Dr. GOSSIP:—

Cataract Extraction ...	...	...	12
Pterygium Excision and Cauterised	...	...	2
Entropion Plastic Operation ...	...	...	10
Total ...	...	...	24

BALIK PULAU HOSPITAL.

REPORT BY J. GRAY, M.D., BCh., *Acting Chief Medical Officer*.

Work done.—Two hundred and forty cases (240) were admitted during the year, and a total of 250 cases treated.

The average daily sick was 15.20 as compared with 20.90 of 1920.

The principal diseases treated were:—

Malaria ...	47 cases with 14 deaths.
Ulcers ...	60 ...
Pyrexia ...	15 ...
Dysentery ...	12 cases with 4 deaths.

There were 29 deaths. The percentage of deaths to total treated is 11.6 as compared with 8.10 in 1920.

Two cases of small-pox and one case of chicken-pox were reported.

Two thousand four hundred and eighty-four re-vaccinations were performed among the residents of P. Upih, Kongsii, Titi Teras and Jalan Baru.

The system of issuing vaccination notices to occupants of the houses in an infected village rendered great help in making a census of inmates of dwellings in the village and enabled vaccination to be performed on all the inhabitants.

LUMUT HOSPITAL.

REPORT BY DR. J. GRAY, M.D., B.Ch., *Acting Chief Medical Officer.*

Building.—During the year a new Mortuary was erected. A new female ward, and Assistant Surgeon's and two dressers' quarters are in course of construction.

Work done.—There were 587 admissions which, with 18 remaining from the previous year, made a total of 605, as compared with 511 for the previous year.

The daily average number of patients was 25.44 as compared with 24.03 of last year.

Two hundred and seventy-one cases of Malaria were treated with 5 deaths.

Blood films of all fever cases and those who had enlarged spleens were examined and also stools of all admissions.

Six hundred and seventy intravenous injections of quinine and cacodylate were given for Malaria. Ninety intravenous injections of Novarsenobillon were administered for Yaws and Syphilis.

Deaths.—There were 32 deaths during the year and of these 10 died within 48 hours of admission.

The percentage of deaths to total treated was 4.9 as against 8.02 in 1920. The percentage excluding those dying within 48 hours of admission was 3.4 as against 4.10.

Infectious Disease.—There was one case of measles admitted in hospital and 10 cases of chicken-pox in Bruas (Dindings) with no deaths.

Sanitation.—Periodical visits were paid to the Anti-Malarial Works and new breeding grounds of mosquitos were dealt with by filling in or by bi-weekly oiling operations.

FEMALE LEPER WARD, JELUTONG.

REPORT BY R. W. NICKELSON, L.M.S. (Madras), *Assistant Surgeon.*

Twenty-nine patients remained at the end of 1920 and three cases were admitted during the year making a total of 32 cases treated in all.

There were 2 deaths during the year.

Twelve patients were treated during the last quarter with Sodium Morhuate and Sodium Hydnocarpate injections.

LEPER ASYLUM, PULAU JEREJAK.

REPORT BY DR. F. R. SAYERS, *Medical Officer-in-charge.*

Statistics:—

Remained on 31st December, 1920:—

Colonial	...	...	...	...	...	194
Perak	...	...	...	...	...	174
Selangor	...	...	...	...	...	54
Kedah	...	...	...	...	...	16
					—	438

Admitted during 1921:—

Colonial	...	...	...	...	...	100
Perak	...	...	...	...	...	64
Selangor	...	...	...	...	...	30
Kedah	...	...	...	...	...	23
					—	217

Total inmates ... 655

Discharged during 1921 ...	...	...	...	...	Nil.
Absconded during 1921 :—					
Colonial ...	...	...	...	...	2
Perak ...	...	...	...	...	1
Selangor ...	...	...	...	...	Nil.
Kedah ...	...	...	...	...	1
					— 4
Transferred during 1921 ...	...	...	...	...	Nil.
Deaths during 1921 :—					
Colonial ...	...	...	...	...	74
Perak ...	...	...	...	...	80
Selangor ...	...	...	...	...	33
Kedah ...	...	...	...	...	14
					— 201
Remained on 31st December, 1921 :—					
Colonial ...	...	...	...	...	218
Perak ...	...	...	...	...	157
Selangor ...	...	...	...	...	51
Kedah ...	...	...	...	...	24
					— 450

Staff.—(a) The health of the staff has been good.

(b) Mr. A. H. WHEATLEY continued as Resident Assistant Surgeon throughout 1921.

Inmates.—The general health of the inmates was good owing to the absence of any epidemic such as Influenza and to the increased number who were treated for Leprosy. At the end of the year there were 146 undergoing special treatment.

The inmates are now becoming convinced that with regular and sustained treatment Leprosy can be alleviated and even cured.

Water Service.—There was no shortage of supply during the year.

The total rainfall was 2,627 millimetres. The average annual rainfall for previous 5 years is 2,016 millimetres. The extension to the reservoir in the Asylum has not been completed. A new kitchen is being erected.

Donation.—Gifts of cake and fruit to the inmates were kindly provided at Christmas by the Methodist Mission, Penang.

The tables appended are :—

- (a) Giving the numbers of admissions, total number of deaths, and the daily average for 1921.
- (b) Giving the nationality of the inmates.

TABLE A.

SHOWING THE NUMBER OF ADMISSIONS, TOTAL NUMBER OF DEATHS, TOTAL NUMBER OF INMATES AND THE DAILY AVERAGE FOR 1921.

Year.	Remained from previous year.	Admissions.				Total.	Deaths.	Percent- age of Deaths.	Daily average patients.
		Colonial.	Perak.	Selangor.	Kedah.				
1921.	438	100	64	30	23	655	201	30.68	44.53

TABLE B.
SHOWING THE NATIONALITY OF INMATES FOR 1921.

Nationality.	Colonial.	Perak.	Selangor.	Kedah.	Total.
Chinese	247	213	82	28	570
Eurasian	6	1	...	...	7
Malay and Javanese ...	1	1	1	...	3
Tamil	37	23	1	11	72
Kling Islam	3	...	...	...	3
Total	294	238	84	39	655

PROVINCE WELLESLEY.

REPORT BY DR. J. R. McVAIL, M.B., ch.B. (Glasgow), *Medical and Health Officer-in-charge.*

Infantile Mortality.—The rate per mille for the year under consideration was 104·12 against 100·20 for the previous year and 101·35 for 1919.

Zymotic Diseases.—Notifiable infectious diseases show a marked decrease when compared with the figures of the previous years as per the following table:—

	1917.	1918.	1919.	1920.	1921.
Variola	331	112	65	7	5
Varicella	38	35	18	27	16
Puerperal Fever ...	1	2	1	2	—
Cholera	2	—	13	3	4
Cerebro-spinal Meningitis	—	—	—	—	1

Malaria.—Admissions to Government Hospitals were 606 with a death rate of 8·25 per cent against 455 cases with a death rate of 5·93 per cent for the previous year.

In Estate Hospitals there were 521 admissions with a death rate of 0·57 per cent against 524 cases with a death-rate of 0·76 per cent (Ankylostomiasis). Two hundred and twenty-three cases with a death rate of 21·52 per cent were admitted to Government Hospitals against 240 cases with a death rate of 11·25 per cent for the previous year. Out of the 223 cases admitted 112 cases occurred in the Southern District with 26 deaths. Fifty-two cases were treated in Estate Hospitals with a death-rate of 13·46 per cent.

Diarrhœa and Dysentery.—Government Hospitals treated 199 cases with a death-rate of 28·14 per cent against 166 cases with a death-rate of 33·73 per cent for the previous year. Estate Hospital figures are 242 cases with a death-rate of 16·52 per cent against 271 cases with a death-rate of 23·24 per cent for the year 1920.

Phthisis accounted for 75 cases with a death-rate of 44 per cent in the Government Hospitals against 72 cases with a death-rate of 47·22 per cent for 1920. Figures for similar periods from Estate Hospitals show 22 cases treated with a death-rate of 50 per cent for the year 1921, and 16 cases with a death-rate of 37·5 per cent for 1920.

Venerœal Disease.—One hundred and sixty cases were admitted to hospital wards in 1921 with two deaths against 212 cases with 7 deaths in 1920. The Out-patient department dealt with 195 cases against 137 cases in 1920.

The following table gives the total number of patients treated in the Government Hospitals and Outdoor Dispensaries together with a comparative statement of the previous three years:—

Year.	Admissions.	Death Rate.	Out-Patients.
1918	3,681	12'07	4,669
1919	2,935	9'50	3,745
1920	3,272	8'69	4,225
1921	3,124	9'25	6,337

The subjoined statement shows the number of primary vaccinations compared with births during the past five years.

Year.	Births.	Vaccinations.	Ratio.
1917	4,484	3,645	81'29
1918	4,100	3,307	80'48
1919	4,361	3,873	94'25
1920	4,391	3,410	77'65
1921	4,624	3,779	81'72

Rainfall.—The mean total rainfall of the four recording stations in the Province was 2,350'75 m.m. against 2,203'32 m.m. for 1920.

Water Supply.—The Bukit Seryah and Bukit Panchor Reservoirs were maintained in order. Most of the pipes required for augmenting the water supply for Prai and Butterworth have been delivered.

Reclamation Works.—Four and a half acres of Crown land at Butterworth was reclaimed with sand filling. This work was commenced last year.

Health Work.—During the year periodic visits have been paid to estates, villages and Police stations and half-yearly reports furnished as regards estates. Most estates have adopted the Government type of Estate latrines.

Staff.—Dr. HARRISON was in charge throughout the year.

BUTTERWORTH HOSPITAL.

Work Done.—(a) Sixty-four patients remained from the previous year, which with 1,330 admissions during the year makes a total of 1,394 cases treated as against 1,519 for 1920. The average daily number of sick was 63'72. Sixty-six remained on 31st December. One hundred and forty-nine operations were performed during the year of which 105 were cured, 42 relieved and 2 died.

BUKIT MERTAJAM HOSPITAL.

Work Done.—Forty-four patients remained from the previous year, which with 956 admissions during the year makes a total of 1,000 treated as against 996 during 1920. The average daily number of sick was 56'8 as compared with 44'08 in 1920. The number of deaths amounted to 108, of these 25 died within 48 hours of admission. Fifty-eight patients remained at the end of the year. Nine hundred and fifty-six stools were examined of which 159 showed ova of Ankylostoma. The blood of all patients (956) was examined; 248 showed Benign-Tertian infection and 38 contained Malignant Tertian parasites.

SUNGEI BAKAP HOSPITAL.

Hospital Statistics.—There were 40 patients remaining at the beginning of the year, 690 patients were admitted during the year, making a total of 730 as against 757 in 1920.

Percentage of deaths to total treated was 9.43. There were 24 deaths within 48 hours which brings down the percentage to 4.79. The average daily number of sick during the year was 28.052. At the end of the year 38 patients remained in Hospital.

MALACCA HOSPITALS.

REPORT BY DR. RICHARD DESMOND FITZGERALD, M.C., B.A., M.B. B.Ch., D.T.M.
AND H., Acting Chief Medical Officer.

	\$	c.
The total revenue of the department for 1921 was	20,262	94
The expenditure	209,360	59

The population of Malacca is composed as follows:—

Europeans	395
Eurasians	2,000
Chinese	46,083
Malays	102,452
Indians	9,751
Others	557
	161,238

Births.—The total number of births for 1921 were 6,104 as compared with 5,315 births in 1920, 5,934 in 1919 and 5,300 in 1918.

The following table shows the nationalities:—

	Male.	Female.	Total.
Europeans	7	3	10
Eurasians	34	52	86
Chinese	758	648	1,406
Malays	2,075	1,946	4,021
Indians	201	229	430
Others	76	75	151
Total	3,151	2,953	6,104

The birth-rate per mille was 37.86.

Deaths.—Four thousand four hundred and sixty-eight deaths was registered during the year as compared with 4,898 in 1920, 4,970 in 1919 and 7,633 in 1918.

The following table shows the nationalities:—

	Male.	Female.	Total.
Europeans	—	1	1
Eurasians	17	26	43
Chinese	982	313	1,295
Malays	1,221	1,161	2,382
Indians	428	235	663
Others	65	19	64
Total	2,713	1,755	4,468

Comparison of death-rate with the preceding five years:—

1921	...	...	...	...	27'71
1920	...	...	...	...	31'18
1919	...	...	...	...	32'48
1918	...	...	...	...	50'04
1917	...	...	...	...	48'97
1916	...	...	...	...	37'38

Vaccinations.—The total number of vaccinations performed was 15,001.

Municipality.—The estimated population for the Municipality for 1921 is 30,671. There were 975 births and 758 deaths within the Municipal limits.

DURIAN DAUN HOSPITAL.

A. Paying Wards.

The year's work.—

Remained on 31st December, 1920	...	...	75
Admitted during the year	...	...	1,398
Discharged	...	...	1,278
Transferred	...	...	26
Absconded	...	...	8
Died	...	...	94
Remaining on 31st December, 1921	...	...	67

The daily average number of sick was 72'50.

The number of deaths within 48 hours of admission was 28.

The percentage of deaths to total treated was 6'38.

The percentage excluding those dying within 48 hours of admission was 4'56.

The number of Europeans admitted during the year was 116 males and 27 females. There was one death—a case admitted suffering from puerperal septicæmia and retained placenta.

The principal diseases treated and their mortalities were:—

<i>Diseases.</i>	<i>Total cases treated.</i>	<i>Deaths.</i>
Malaria	370	21
Ankylostomiasis	124	15
Beri-beri	13	0
Dysentery	72	21
Pneumonia Lobar	21	4
Broncho-Pneumonia	12	3
Syphilis	54	0
Gonorrhœa	31	0
Tuberculosis	25	6
Ulcer	91	0
Wounds	193	4

B. Free Wards.

Remained on 31st December, 1920	...	163
Admitted during the year 1921	...	1,880
Discharged	...	1,585
Transferred	...	Nil.
Absconded	...	23
Died	...	273
Remaining on 31st December, 1921	...	162
The average daily number of sick was	...	199'48
Percentage of deaths to total treated was	...	13'36
Number of deaths within 48 hours was	...	44
The percentage of deaths to total treated excluding those dying within 48 hours of admission was	...	11'45

The principal diseases treated with their mortalities were:—

<i>Diseases.</i>	<i>Total cases treated.</i>	<i>Deaths.</i>
Malaria	455	54
Ankylostomiasis	338	71
Beri-beri	131	9
Dysentery	97	29
Pneumonia Lobar	56	13
Broncho-Pneumonia	15	3
Syphilis	238	2
Gonorrhœa	52	0
Tuberculosis	135	46
Ulcer	427	0
Wounds	39	0

Report on Surgery during the year 1921.

There were 1,367 surgical operations performed during the year—ninety three major operations and 1,274 minor operations.

QUARANTINE CAMP.

Total number of cases admitted for treatment 25. Thirteen of those were lepers and nine had chicken-pox.

JASIN HOSPITAL.

Staff.—Assistant Surgeon Veerasingam was in charge until 29th March, 1921, when he was relived by H. R. Saravanamuthu.—

Remaining on 31st December, 1920	47
Total number of admissions during 1921	728
" of discharges, etc.	652
" of deaths	80
Remaining on 31st December, 1921	43
The daily average number of sick was	51.96
The percentage of death to total treated	10.32
The number of deaths within 48 hours of admission was	17

The percentage of deaths to total treated excluding those dying within 48 hours of admission was 8.12. There was one case of Blackwater fever:—

<i>Diseases.</i>	<i>No. of cases.</i>	<i>No. of deaths.</i>
Malaria Malignant	116	15
" Benign Tertian	65	4
" Chronic	18	2
Dysentery	27	6
Ankylostomiasis	54	13
Beri-beri	6	Nil
Broncho Pneumonia	29	5
Pneumonia Lobar	7	4
Phthisis	12	7
Ulcers	70	1

Total number of Estate Coolies treated	215
" of Government Servants treated	107
" of other Paying Cases treated	10
" of Free Cases treated	443
Total	775

PRISON HOSPITAL.

The number of admissions during the year was 92 and the number of deaths 3, namely one each from dysentery, malarial fever and phthisis.

THE MALACCA AGRICULTURAL MEDICAL BOARD.

This Board has, notwithstanding difficulties and some opposition, enhanced its reputation.

Malarial surveys have been made on all unhealthy estates, and much has been done to improve unhealthy coolie lines. Estates have been visited with regularity; works in the nature of sub-soil drainage have had to be postponed on most Estates owing to the financial crisis.

The two great difficulties which have been met with during the year are shortage of staff, and uncertainty of collection of assessment owing to depression in the rubber growing industry.

With regard to the former it will be remembered that the Board in 1920 lost the services of DOCTORS RATTRAY and SCHARFF. Dr. T. CLARKE who was engaged to fill one vacancy resigned in February, 1921. Dr. JUDSON who came out from England in June resigned in August.

DOCTORS FERGUSON, AMNER and FISHER worked throughout the year.

A Chinese Doctor, Mr. TAN SENG TEE, was engaged as a part-time Medical Officer on 7th February, 1921, and employed throughout the remainder of the year in visiting Chinese estates.

Another Chinese Medical Officer (whole time) is being engaged and Dr. MCPHERSON who has had 10 years' local experience is expected in February, 1922.

Difficulty is still experienced by Medical Officers in identifying Chinese estates. It is hoped that eventually all these estates will put up a suitable signboard at the entrance to the plantation.

With a staff of four Europeans and 2 Chinese Medical Officers, consisting of the right type of men, and provided that the Estates are in a financial position to carry out recommendations, the Malacca Agricultural Medical Board can carry out the work which has been entrusted to it by Government.

OUTDOOR DISPENSARIES.

SINGAPORE.

(North Canal Road.)

1. Assistant Surgeon K. C. SINHA was in charge.

The number of patients treated during the year was 14,112. Of this number 5,436 were out-patients of the Singapore Police Force.

The number of attendances was 34,899 as compared with 16,770 in the year before.

The Dispensary was open for 206 days with an average daily attendance of 117.18 as against 56.46 in the previous year.

Out of 14,112 patients treated, 5,931 were paying patients, 6,801 Government servants and their families, and 1,380 indigent patients.

2. The nationalities of those treated were as follows:—

	<i>Males.</i>	<i>Females.</i>
Europeans	78	17
Eurasians	111	55
Chinese	4,734	1,065
Malays	3,854	199
Indians	3,591	308
Others	82	18
Total	12,450	1,662

3. The principal diseases treated were:—

Malaria	682
Pyrexia	1,895
Beri-beri	36
Neuritis	191
Dysentery	64
Other Bowel complaints	947
Pneumonia	32
Broncho-Pneumonia	72
Phthisis	62
Bronchitis	1,024
Venereal Diseases	898
Parasitic Diseases	1,157
Skin Diseases	850
Ulcers	1,207
Wounds and Injuries	1,233
Burn and Scald	92
Eye Disease	316
Cellulitis	49
Abscess	225
Rheumatism	259
Myalgia	571
Neuralgia	76

KANDANG KERBAU.

Government Outdoor Dispensary.

Five thousand seven hundred and ninety-five persons were treated here during the year, of whom 496 women and children were attended by the Lady Medical Officer. Six thousand eight hundred and thirty-six visits were paid.

PENANG.

Chowrasta Dispensary.

The patients treated during the year numbered 8,899 against 8,734 in 1920.

The Dispensary was open for 311 days, the daily average number of visits being 50.21, that of 1920 being 45.40.

The principal diseases treated as compared with that of the preceding year were as follows:—

	1920.	1921.
Beri-beri	1	13
Influenza	20	71
Dysentery	27	68
Malaria	167	204
Pyrexia	1,736	1,688
Venereal Diseases	391	991
Bronchitis	372	565
Diarrhœa	208	222
Ulcers	1,474	984
Injuries	755	487

Nationalities of those treated comprised:—

	1920.	1921.
Europeans	12	10
Eurasians	293	295
Chinese	2,337	2,604
Malays	2,837	3,221
Indians	3,017	2,761
Others	238	10

Outdoor Dispensary, Lumut.

The total number treated was 830 cases as against 658 of last year. Of these 390 were Malays, a marked increase.

Of the total cases 238 were for Malaria and 96 for Yaws.

The principal village and all schools were regularly visited and free drugs were given to the sick.

Outdoor Dispensary, Balik Pulau.

During the year 2,737 persons presented themselves for treatment at the Outdoor Dispensary at Balik Pulau and also at Bayan Lepas, in the Police Station once a week, as compared with 1,477 of the previous year.

From April, 1921, all the Vernacular Schools in the District were visited and the children treated as required.

Outdoor Dispensary, Butterworth.

Butterworth: 2,032 cases including 282 Malays were treated during the year as against 1,705 in 1920. The number of visits paid was 3,501. 752 Government Officers were treated, the majority of these being employees of the Federated Malay States Railways. The receipts for the year amounted to \$728.39 as compared with \$432.50 for 1920.

An outdoor dispensary was started at Benaga during the month of October, 1921, a room in the Police Station being used for the purpose. The Senior Dressor, Butterworth Hospital, attends there twice a week. The number of patients in October was 133, in December 274. The total number treated during the three months (October—December) amounted to 644, of whom 508 were Malays.

Outdoor Dispensary, Bukit Mertajam.

The number of patients treated during the year was 1,952 including 497 Malays, as compared with 1,393 in 1920.

Outdoor Dispensary, Sungei Bakap.

One thousand and seventy-two patients including 168 Malays were treated as against 835 in 1920.

Outdoor Dispensary, Nibong Tebal.

Six hundred and thirty-seven patients including 122 Malays attended for treatment as against 292 for 1920. Of these 224 were Government Servants, 207 were paying attendants and 206 were indigent.

The average daily number of visits was 7.93, against 2.06 in 1920. Collections amounted to 54.35, as against \$27.65 in 1920.

MALACCA.**Malacca Outdoor Dispensary.**

This was under the charge of Mr. R. M. NUNIS throughout the year.

Three thousand nine hundred and thirty-five cases including 995 Malays were treated in the Dispensary as compared with 3,539 in 1920.

Alor Gajah Dispensary.

During the year 339 cases received treatment in the Out-patient Dispensary—males 304, and females 35. The majority were Malays.

The Dresser in charge was chiefly occupied in doing vaccinations.

GOVERNMENT HEALTH BRANCH.**ANNUAL REPORT ON SINGAPORE, 1921.**

BY DR. G. E. BROOKE, M.A., L.R.C.P., D.P.H., *Chief Health Officer, Singapore.*

Mrs. GILMORE acted as Sister in Charge until the 4th April when she died. She had rendered long and useful service to the Government and her death proved a great loss to this Branch.

Shipping.

1. During the year 1851 visits were paid to ships, and the numbers of crew and passengers examined were 153,719 and 358,028 respectively. Eighteen ships were infected as follows:—

	<i>Small-Pox.</i>	<i>Influenza.</i>	<i>C. S. M.</i>	<i>Remarks.</i>
Hongkong ...	4	—	1	—
Madras ...	—	—	1	—
Sourabaya ...	1	—	—	—
Bombay ...	1	2	—	—
Jeddah ...	4	—	—	—
Penang ...	1	—	—	—
Indragiri ...	1	—	—	—
Swatow ...	—	—	1	—
Singapore ...	1	—	—	—
Total ...	13	2	3	—

2. Two hundred and thirty-two Immigrant ships bringing coolies from Amoy, Swatow, Hongkong and Hoihow were boarded, and the total number of 182,275 immigrants examined. Only three of these ships were infected. One from Hongkong with Small-pox, one from Hongkong with Cerebro-spinal Meningitis and one from Swatow with Cerebro-spinal Meningitis.

3. Eleven pilgrim ships were boarded on arrival, and 9,316 pilgrims inspected. Of these, five ships were infected with Small-pox. There were 12 outgoing pilgrim ships on which 9,864 pilgrims were examined at the Wharf and Bills of Health issued in each case.

4. Eighty-three corpses were inspected on ships, twakows, or sampans in the Harbour, and sent to St. John's for post-mortem where necessary.

5. Forty-three water-boats supplying the shipping of the port were examined and certified as fit.

6. The disinfection launches, *Hygeia* and *Crow*, were used on 731 occasions for the fumigation of infected ships and ships requiring disinfection prior to departure. They were also used on seven occasions for the conveyance of heavy luggage and for change of the St. John's Police Guard.

Office Work.

7. Bills of Health to the number of 2,951 were issued, representing a revenue of nearly \$15,000.

8. The number of disinfection certificates issued was 740, representing a revenue of \$7,400.

9. Permits for the export or import of human remains were granted in 42 instances, representing a revenue of \$420.

10. The total revenue of the branch was, therefore, in the neighbourhood of \$22,709.

11. Exemption permits were issued to 175 vessels (T. S. Certificate).

12. Sixteen Bonds for the surveyance of passengers ashore were sent by relatives of friends of passengers, and lodged with the branch.

13. Passes to the number of 51 were issued to cabin passengers to secure their observation by either the Municipal Health Officer, Police or Military Surgeon as the case might be.

14. Eighty-three outdoor patients, chiefly from the Marine Department, received treatment, and were granted leave where necessary.

15. Six prosecutions were instituted. One against the Master of s.s. *Lake Fielding* for not carrying a qualified medical practitioner. He was fined \$50 and costs. The second was against the Master of s.s. *Soon Ann* for failing to register the death of one of the ship's officers. He was discharged. The other four concerned the Rural Areas for concealing Small-pox cases. These resulted in fines amounting to \$75.

16. Twenty-two ports were declared infected or suspected for various diseases.

17. Singapore is now the 6th largest world port. Vessels arrived from 265 ports during 1921. The magnitude of the port and its world-wide trade demand very special vigilance on the part of the Health Branch.

18. In 19 years we have paid 28,818 visits to ships and inspected 7,464,937 crew and passengers.

Quarantine Station.

19. The total passengers admitted during the year only amounted to 8,950 — an exceptionally small number due to the healthiness of the coolie ports. The greatest number in residence on any one day was 2,947 on the 10th October.

20. The total sick remaining in the Quarantine Station Hospital, and admitted during the year, amounted to 311.

21. There were 69 deaths in Hospital, giving a death-rate of 22.18 per cent.

22. Forty-seven passengers died in the camps; and four corpses were sent from ships or shore for post-mortem examination and burial.

23. Of the cases treated, there were not many suffering from infectious disease. No plague or cholera occurred: and only 32 cases of small-pox were admitted of which eight died. These small-pox cases were all amongst Hadjis returning from Mecca in September and October, 5,242 being landed for quarantine. Many of these pilgrims were half-starved and much exhausted. Minor ailments, such as scabies, ringworm, conjunctivitis, etc., were very common; and a great many cases of beri-beri were noted.

24. Eight contacts gave birth to children during their residence, of whom seven were Malays and one a Chinese.

25. The European Hospital (five small wards) was used by four patients—one German measles, two malaria, and one with a rash of uncertain etiology.

26. We were able to assist the Municipality by quarantining 323 of their cerebro-spinal contacts—none of whom developed the disease.

27. Government contacts from Islands or Rural Districts to the number of 48 were detained for observation. Six of these were cerebro-spinal contacts and the rest were small-pox. One of the small-pox contacts developed the disease during the period of observation.

28. Passengers from 80 non-infected ships were detained to complete their quarantine period: none of them developed any infectious disease.

29. Passengers from 17 infected ships were detained. Those from two of these ships subsequently developed further cases.

30. Seven thousand one hundred and twenty-four vaccinations were performed on the Station.

31. The distilling plant was used sufficiently often to keep it in good order, and 91,050 gallons of seawater were distilled and pumped into the reservoir. The price of wood is gradually coming down, but is still too high to warrant the distillation of all the water required.

32. Singapore water to the amount of 846,000 gallons was obtained from Messrs. Hammer & Co., and pumped direct into the service reservoir. The water was of good quality.

33. The reservoir was kept in good order and the service was satisfactory.


34. A substantial iron fence for the subdivision of camps was completed during the year, and has proved a very satisfactory substitute for the dilapidated barbed wire fence which had been in use for many years. It is now possible to isolate shiploads satisfactorily.

35. In April a fixed police force of 21 Sikh "Additional-constables" was substituted for the Guard of the Town Force which for many years had been used for St. John's and relieved monthly. A Lance-Corporal from Singapore now takes charge of this permanent guard, and is relieved monthly.

36. Much has been done by the Health Officer with the help of the Lay Superintendent and Staff in improving the drainage, grading and afforestation of the station.

37. Over three hundred trees have been planted, obtained from Botanic Garden seedlings, or from locally grown seed. These afford grateful shade to the large numbers of contacts who have to spend most of their day out of doors in their camps; and at the same time serve to purify the air and reduce the temperature.

38. Surface and sub-soil drainage has received considerable attention. An experiment was made early in the year to put sub-soil drainage on a more scientific basis than is secured by the use of round agricultural pipes. The latter are very apt to get choked by silt-root, etc., or disconnected by subsidence of the soil. It therefore seemed to me that an inverted half-pipe section would be the most reasonable solution, in that it would protect the channel from the pressure above, and at the same time tend to keep itself automatically clear, since the water naturally wears its own channel in the earthen bed.

The plan was carried out with bent corrugated iron sheets, giving lateral flanges to prevent subsidence, *e.g.*  This experiment proved satisfactory, and the sub-soil drainage flowed freely throughout the year. I am at present getting samples of the same type, made in concrete by Mr. DUNMAN of Tanjong Katong; if they prove to be satisfactory, I shall try the adoption of them in rural work.

Rural.

39. The rural work during the year has been in charge of the Rural Health Officer, Dr. SCHARFF: results are now beginning to show.

40. The Rural population was 68,034. The deaths for the year totalled 2,164, and the births 1,942, giving crude rates per mille of 36.8 and 33.1 respectively.

41. With the exception of a slight small-pox epidemic, the only infectious cases in rural areas during the year consisted of: two cases of chicken-pox, one case of plague, one case of enteric fever and three scattered cases of cerebro-spinal meningitis of a mild strain. No clue was found as to the origin of the plague case; no infected rats were discovered.

42. Small-pox began by a case at Paya Lebar on July 28th; and 35 cases in all were reported or found in rural areas up to the end of the year, chiefly in an area with Gaylang as a centre, and Serangoon and Siglap on the periphery. This area was promptly dealt with by removal of the sick, isolation of contacts, and general house-to-house inspection and vaccination. Nine of these cases were found to have been concealed, and prosecutions resulted in four convictions. The remaining nine cases were isolated ones, chiefly at Pasir Panjang, and were probably derived from Singapore Town. At no time did the epidemic give any cause for anxiety; in fact the whole total (147) in town and island for the year was far short of any single week's total in Calcutta, at any time during the first three months of 1920.

43. The total vaccinations, including those at the Quarantine Station, were 11,998. Of these 217 were done at the Government Health Office where Government Officers were invited to attend.

44. Villages throughout the Island were cleaned up, houses whitewashed, and general mosquito-control established—the number of houses inspected being 10,501.

45. Twenty-six incinerators were built at suitable spots, and have proved very valuable—about 469,386 cubic ft. of refuse being burnt therein.

46. The medical as well as the sanitary control of the Police Stations in the Rural District was handed over to the Health Branch. Re-vaccination of all the police was completed. Five sick policemen were visited, and one was found to be suffering from small-pox.

47. Anti-malarial work occupied much attention. The investigation of *maculatus* breeding grounds brought to light the chief danger areas of the Island, chiefly at Woodlands, Bukit Timah and Pulau Ubin. Action was taken in each case. Clearing and sub-soil draining, supplemented by regular oiling, resulted in the entire disappearance of *maculatus* in the Woodlands district, to the great improvement of the health of the Police Station and neighbourhood. Oiling and drainage were also carried out at Bukit Timah and Pulau Ubin.

48. Anti-mosquito work was regularly carried out by the Sanitary Inspectors in all villages, and household breeding sources kept under constant observation. Drainage of pools and swamps in Siglap, Bukit Timah, Bukit Panjang, Paya Lebar, Pasir Panjang and Seletar was carried out by specially trained coolies conveyed from place to place by a Public Works Department motor lorry. Owing to the absence of definite compounds and the proximity of jungle to many of the houses in rural areas, a larval index has not

the same value as it would have in urban districts, and has not therefore been undertaken, but I have noticed a very great improvement in villages, which are now comparatively clean and tidy.

49. Monthly Mosquito Surveys were made at the General Hospital, and at Tan Tock Seng Hospital, with a view to determining the visiting species at different monsoon periods, and at different hours of the night. The work was carried out partly by Dr. SCHARFF and partly by myself. Monthly visits were paid both between the hours of seven and eight P.M. and also after midnight. The hour of the night does not apparently make much difference to the species of mosquito found, but it was noted that the percentage of *Mansonia annulifera* to other species at Tan Tock Seng became very much less after midnight. On the whole the number of mosquitoes at the General Hospital was remarkably few—and anophelines at both hospitals were fortunately rare. The main fauna remain undisturbed by the change of monsoon. The commonest night mosquitoes at Tan Tock Seng are: *Mansonia annulifera* and *Culex fatigans*. At the General Hospital: *Culex fatigans* and *Tæniorrhynchusager*.

50. The rural milk supplies derived chiefly from centres at Gaylang, Changi, Tampenis and Bukit Timah were kept under observation, and the condition of the cowsheds much improved.

51. *Food and Drugs*.—Information having been given that a shipment of bad tinned salmon was about to arrive, an investigation of samples from 30,282 cases was made, and 500 of these were destroyed as being unfit for human consumption.

52. *Sanitary Inspectors*.—The need for more active and controlled health work in rural districts has become increasingly obvious. I therefore divided the island (extra-municipal) into five sanitary divisions, each sufficiently large to require the services of a Sanitary Inspector, the most important village in each division to be considered as its headquarters. No trained men were however available and it was necessary therefore to train five men ourselves. By arrangement with the Royal Sanitary Institute in London, that Body agreed to a syllabus on the lines they had adopted in Bombay. A convenient centre was found in the old Jalan Klapa Dispensary, and the building was reconstructed to form lecture room, laboratory, store rooms offices, etc. The six months' course began on May 1st and the Depôt was formally opened by H. E. Sir LAURENCE GUILLEMARD on July, 14th. Five probationary candidates were selected from applicants and signed agreements with the Government.

Three other Inspectors, already in the Government Service, attended a number of the lectures and demonstrations. The training consisted of practical work in the field in the morning, the afternoon being devoted to lectures and practical laboratory work. An examination was held on December, 8th, 9th and 10th in which three candidates were successful: JOHN SCHINDLER de VILLIERS, RALPH EARNEST STANLEY, and WILLIAM REYNOLD ANGUS—each of whom obtained a certificate of the Institute.

53. Approval was obtained to erect five dispensaries, one in each of the divisional headquarter villages. Two of these were begun during the year. The idea of these dispensaries is to provide medical advice by resident Assistant Surgeons in centres of growing rural importance, and to serve at the same time as a residence for the Sanitary Inspector in the neighbourhood of his work.

54. *The Committee on Sanitary Education*, which was appointed in November, 1918, did not hold any meetings during 1921, but to part of their policy effect was given by the delivery of a course of twelve lectures in Hygiene to 162 school teachers, given by me in the large hall of Raffles Institution.

ANNUAL HEALTH REPORT.

PENANG.

By DR. F. R. SAYERS, M.D., D.P.H. (Dublin), *Senior Health Officer, Penang.*

1. The Rural Areas of the Island were free from "dangerous infectious disease" except for two cases of Small-pox in Balik Pulau District. Ten thousand six hundred and sixty-one vaccinations or re-vaccinations were performed by the Government Vaccinators.

Port.

2. Dr. MARTIN was Port Health Officer throughout the year.

Four hundred and sixty-one ships were inspected and 58,491 crew units and 137,957 passengers were examined.

Six pilgrim ships carrying 6,389 pilgrims to Jeddah were examined.

Six pilgrim ships bringing 5,185 pilgrims from Jeddah arrived; of these 5 were infected with small-pox.

Nine ships infected with dangerous infectious disease arrived here as follows:—

6th May, 1921: s. s. *Thongwa* from Madras with Cerebro-Spinal Meningitis.

18th June, 1921: s. s. *Lai Sang* from Calcutta with Cholera.

18th June, 1921: s. s. *Syria* from Colombo with Small-pox.

4th August, 1921: s. s. *Thongwa* from Madras with Cholera.

10th September, 1921: s. s. *Titan* from Jeddah with Small-pox.

16th September, 1921: s. s. *Agapenor* from Jeddah with Small-pox.

19th September, 1921: s. s. *Antilochus* from Jeddah with Small-pox.

26th September, 1921: s. s. *Peleus* from Jeddah with Small-pox.

27th October, 1921: s. s. *Orestes* from Jeddah with Small-pox.

The disinfecting launch *Kite* was used 12 times as compared with 156 times in 1920, this decrease being due to the fact that the Dutch Indies ceased to consider Penang infected with Plague. Ten permits to bury ashore corpses from ships or tongkangs, 10 permits to import, export or tranship coffins, 390 Bills of Health, and 8 Disinfection Certificates were issued during the year.

Quarantine Station, Pulau Jerejak.

3. During the year 19,653 coolies and passengers from 141 ships were admitted to the station. Of these 4,819 were Indian Immigration coolies and 14,834 deck passengers as compared with 38,428 Indian Immigration coolies, and 5,305 deck passengers of last year. Of the 14,834 passengers 5,137 were pilgrims from Jeddah.

The following cases were treated at the Hospital:—

Cholera	...	...	...	...	3
Influenza	...	...	...	...	39
Malaria	...	...	...	...	96
Dysentery	...	...	...	...	30
Measles	...	...	...	...	2
Chicken-pox	...	...	...	...	17
Pneumonia	...	...	...	...	6
Small-pox	...	...	...	...	42
Other Diseases	...	...	...	...	207
					<hr/>
				Total	442
					<hr/>

Besides these 291 were treated as Outdoor cases. There were 74 deaths as compared with 176 deaths in 1920. Of these 16 died within 48 hours of admission to the station. Of 74 deaths 64 occurred among pilgrims; excluding the deaths within 48 hours. The death-rate is 2'93 per mille.

Small-pox.—There were 42 cases of small-pox with 7 deaths. Of these 4 died within 48 hours of admission.

Vaccinations.—Ten thousand three hundred and seventy-seven vaccinations were performed during the year with 62 per cent of success.

Rainfall.—The total rainfall was 24'77½ millimetres in 112 days.

The greatest fall being 1'01 on 19th September, 1921.

The health of the staff was good.

The water supply remained excellent.

The average daily number at the station was 355'43 as compared with 932 of the preceding year.

Condensed Report of seventeen years' work.

Harbour and Quarantine, Penang.

Years.	Vessels.	Units of crews and patients inspected.	Passengers landed on Quarantine Station.	Small-pox treated.	Cholera treated.	Plague treated.	Daily average Quarantine Station.	Vaccinations.
1905 ...	869	214,136	10,406	10	1	...	171	...
1906 ...	675	204,988	23,288	16	8	2	461	6,490
1907 ...	633	219,839	17,650	4	24	1	116	5,652
1908 ...	1,205	176,119	21,175	51	9	2	366	5,691
1909 ...	503	161,971	23,059	25	2	1	359	5,614
1910 ...	526	217,967	71,876	62	33	2	1,584	12,205
1911 ...	1,144	277,151	134,957	109	387	1	3,740	63,988
1912 ...	634	287,373	55,493	75	4	4	1,111	38,297
1913 ...	818	272,473	53,937	11	12	1	120	37,276
1914 ...	1,040	215,067	48,399	171	9	...	116	32,609
1915 ...	405	148,662	23,176	3	...	...	478	21,562
1916 ...	662	213,726	42,736	11	1	...	817	36,806
1917 ...	367	203,757	37,595	11	12	...	820	36,808
1918 ...	551	173,813	33,481	7	80	...	720	29,536
1919 ...	493	210,839	50,733	6	264	...	1,189	39,941
1920 ...	432	207,424	43,733	4	8	...	932	41,230
1921 ...	461	197,448	19,653	42	3	...	353	10,377

ANNUAL HEALTH REPORT, MALACCA.

BY DR. F. WOOLRABE, *Health Officer, Malacca.*

Mortality.—The headings of Malarial Fever, Fever Unspecified and Convulsions account for 64'48 of total deaths as against just under 60 per cent in 1920.

The figures for the last 3 years are:—

	<i>Malarial fever.</i>	<i>Unspecified fever.</i>	<i>Convulsions.</i>	<i>Total.</i>
1919 ...	962	924	1,439	3,325
1920 ...	1,293	736	947	2,976
1921 ...	834	753	1,294	2,881

It is noticeable that the total deaths from Malarial Fever and Unspecified Fever show a reduction and it is not unreasonable to assume that this is due in part to the creation of the Malacca Agricultural Medical Board as a large estate population exposed to Malaria comes under its purview while the heading Convulsions which shows a rise covers cases mostly drawn from a section of population with which Estate Medical Officers do not deal.

Tetanus.—The number of deaths from Tetanus was 51. Forty of these were among infants in the Municipal areas. The Municipal Lady Inspectors had 10 cases of deaths from Tetanus reported to them. That means that in the small residuum of new births in the Municipality which escaped their supervision 30 cases of Tetanus occurred, and emphasises strongly both the need and the advantage of instruction in mother-craft.

Milk.—Fifteen samples were examined of which seven were found to be adulterated with water. Prosecution was undertaken in these cases.

Water.—Forty-one samples were examined chemically. Monthly analyses were made of the Municipal pipe water supply from Ayer Kroh as well as quarterly analyses of the 3 Bukit China wells from which water is sold in the Town.

The remaining samples were from wells on estates, at private houses, Police Stations, etc.

Estates.—Three hundred and seventy visits were made to estates and 273 separate estates were visited.

Sanitation on the larger estates is on the whole good; where it is defective the fault lies chiefly in the habits of the coolies, except as regards malarial conditions. Even in the latter case some outbreaks of Malaria have been caused by coolies clearing the edge of a stream in a ravine for gardens.

In other cases a desire for tidiness has led Managers to clear ravines.

Many of the smaller estates have been entirely closed, only a caretaker and sometimes not even a caretaker being left, and others are carrying on with the smallest possible staff.

A large number of mosquito surveys have been made by Estate Medical Officers, with the result in one case of practically banishing Malaria from an estate with a sinister reputation.

Mosquito Surveys.—The Town and Fort has been fairly well surveyed by the Municipal Mosquito Inspectors and the Municipal Health Officer. Anophelines have been found in a few places. The general opinion of the population is that mosquitoes are much fewer. In the country many surveys have been made. Towards the end of the year 6 mosquito coolies were engaged and oiling is now done in suitable places such as Pulo Sebang, etc.

Vaccination.—The record of vaccinations by Government Vaccinators is as follows:—

Perfect	...	...	...	...	3,016
Modified	...	...	...	...	249
Failures	...	...	...	...	197
Not seen	...	...	...	...	11,539
					—
			Total	...	15,001
					—

In addition the Estate Medical Officers vaccinate children on the Estates.

GOVERNMENT ANALYST'S DEPARTMENT, SINGAPORE.

REPORT BY DR. FRANKLAND DENT, M.Sc., Ph.D., F.I.C., *Government Analyst, Straits Settlements.*

The following table shows the Revenue and Expenditure for the year 1921, and, for comparison, the Revenue collected during the preceding year:—

Revenue.	1920.	1921.	Expenditure, 1921.	
<i>Fees of Office.</i>	\$ c.	\$ c.		\$ c.
Petroleum Inspection ...	2,735 00	2,490 00	Personal Emoluments	26,840 56
Miscellaneous ...	5,850 50	5,683 50	Stores from England (a)	500 00
			Miscellaneous ...	515 66
Total ...	8,585 50	8,173 50	Transport ...	423 94
By sale of Pyridine ...	2,215 00	1,969 00	Total ...	28,280 16

(a) Estimated.

Petroleum.

(a) KEROSENE.

The following table gives a comparison between the quantities tested on importation into the Island of Singapore during the years 1920 and 1921:—

Description of Oil.	1920.			1921.		
	Number of Consignments.	Tins.	Tons.	Number of Consignments.	Tins.	Tons.
<i>Case Oil.</i>						
American Oil.	Devoe's ...	...	...	6	10,000	...
	S. Arrow ...	...	...	11	27,307	...
	Tiger ...	1	3,998	11	35,800	...
	Eagle ...	...	...	1	360	...
Langkat Oil.	Crown ...	126	420,731	93	358,623	...
	Dragon ...	21	69,605	15	46,376	...
	Cross ...	22	22,119	18	19,200	...
	L. Glass ...	4	6,316	6	4,253	...
	Fish ...	11	20,418	9	14,800	...
Total ...	185	543,187	...	170	516,719	...

Fourteen consignments for Penang, Malacca, Port Swettenham and Johore port were tested for their flash points.

(b) MINERAL TURPENE AND DRIALENE.

Four hundred and thirteen tins of Mineral Turpene and 900 of Drialene were imported into Singapore as against 1,700 tins of the former in 1920.

(c) LIQUID FUEL.

Forty-six samples were tested for their flash points as against 74 samples in 1920. Three samples of Cylinder oil were further submitted to viscosity tests.

(d) TESTING VESSELS FOR DANGEROUS PETROLEUM VAPOUR.

Forty-five vessels as against 43 in 1920 were tested for inflammable vapour, by means of Redwood's Standard Instrument, either before being allowed to enter Port-limits under Rule 23 made under the "Petroleum Ordinance, 1908", or to enter Dry Dock under By-law 77 of "The Straits Settlements Ports Ordinance, 1912".

Explosives.

Nine consignments were tested on importation into Singapore in accordance with the Rules under "The Arms and Explosives Ordinance, 1912". All passed the prescribed tests.

The following table gives the details of these and for the purpose of comparison, those imported and tested during the two preceding years:—

Year.	Number of consignments.	Number of packages of 50 lbs. each.				Total.
		Dynamite.	Gelignite.	Blasting Gelatine.	Gelatine Dynamite.	
1919	7	400	1,200	1,000	120	2,720
1920	6	1,550	2,120	1,550	...	5,220
1921	9	698	3,140	1,089	...	4,927

Fragments of an exploded bomb and materials for making ore were sent in by the Police for examination.

Monopolies Department.**(a) CHANDU REVENUE ORDINANCE.**

The chemical work under this Ordinance, formerly carried out by the Assistant Superintendent in charge of Opium Factory was taken over by this Department on February 11th.

Exhibits in 151 cases instituted by the Monopolies Department for various breaches of the Ordinance were examined and reported upon. Forty-two samples of chandu prepared at the factory were assayed.

(b) LIQUORS REVENUE ORDINANCE.**(a) Bhang.**

Exhibits in 15 cases of seizures of bhang were examined and reported upon.

(b) Intoxicating Liquors.

The spirit strengths of 6,642 samples of liquors from Singapore and 376 samples from Malacca were determined for assessment of duty.

In addition to the above 77 samples of brandy, 3 of whisky 5 of gin, 2 of rum, 6 of toddy, 5 of arrack, 28 of illicit samsoo, 8 of samsoo suspected of being diluted arrack, and one of methylated spirit were more fully examined with a view to their correct classification for duty purpose. Twenty-two samples of cheap liquors purporting to be of European origin were examined in a case of selling liquor under a false trade description.

(c) *Methylated Spirit.*

Consignments of arrack were methylated for industrial purposes on 47 occasions. They consisted of 456 large drums and 43 small ones containing about 67,986 gallons as against 519 drums containing 72,576 gallons in 1920.

Counterfeit Coins.

Ten sets of exhibits from Singapore and three from Malacca were sent in by the Police. They included 2,012 counterfeit 5-cent pieces, 322 10-cent pieces, 20 20-cent pieces, and 1 5-cent (nickel) piece and a large number of moulds and other apparatus and materials used in their manufacture. The alloy used was in many cases composed of Lead and Antimony obtained by melting down spoons of "Antimony-ware".

Toxicology.

Thirty-three specimens of stomach contents, washings, etc., were received from Singapore, Penang, Malacca and Johore.

Opium was detected in 7 cases, alcohol in 6 cases, and arsenic, bismuth, tuba-root, hydrochloric acid, sulphuric acid, powdered glass, and alkali in one case each.

Arsenic was detected in a cow's viscera received from Malacca.

Poisons.

Five sets of exhibits were sent in for examination. In one case a powder sold as a febrifuge was found to consist of commercial cyanide of potassium and in another a liquid was found to be strong sulphuric acid.

Deleterious Drugs.

Twelve specimens were sent in for analysis. In one case 8 tins labelled "Morphine Muriate Powder" were found to contain a mixture of starch and chalk. Another tin labelled "Cocaine" contained a mixture of boric and salicylic acids with a thin covering of cocaine hydrochlorate on the top.

Water and Milk.

Seventeen samples of water and 22 of milk were sent in for examination and report.

Miscellaneous.

Other samples not included under any of the above heads, which were sent in for analysis and report, included:—

Twelve bamboo tubes containing a mixture of pepper and ground glass from the Chief Police Officer, Johore, 7 test meals, 2 articles of clothing for blood stains and 3 articles in a vitriol throwing case, a specimen of clothing saturated with kerosene, a number of proprietary medicines from the Principal Civil Medical Officer, two samples of mineral, 3 of rubber, 2 of flour, 2 clinical thermometers for verification, one sample each of ink eradicator, boiled linseed oil and opium and a piece of lead cable-sheathing.

GOVERNMENT ANALYTICAL DEPARTMENT, PENANG.

REPORT BY MR. J. C. COWAP, B.S.C., F.I.C., *Deputy Analyst, Penang.*

Details of Revenue and Expenditure for the department for 1921 are given in the following table together with the Revenue for 1920:—

Revenue.	1920.	1921.	Expenditure, 1921.
	\$ c.	\$ c.	\$ c.
Petroleum Inspection Fees	2,851 00	2,448 50	Personal Emoluments 9,176 00
Miscellaneous ...	1,169 50	1,530 50	Stores ... 372 00
Certificate for Export of Petroleum Fees ...	266 50	194 50	Miscellaneous ... 154 00
			Transport & Travelling Allowances ... 280 00
Total ...	4,287 00	4,173 50	Total ... 9,982 00

Three hundred and eighty-four Reports on General Analytical Work were issued together with 115 Reports on Petroleum Tested.

Petroleum.

The following table shows the amount of Petroleum imported into the Settlement and tested during the year. All samples of Kerosene and Heavy Petroleum passed the Standard tests:—

A. KEROSENE.

	Number of Consignments.	Tons.	Gallons.
East Indian Bulk Oil ...	25	9121'5	—
East Indian Oil in Tins ...	20	—	78,800
American Bulk Oil ...	2	—	1,690,423
Total ...	47	9121'5	1,769,223

B. HEAVY PETROLEUM.

East Indian in Bulk ...	13	5775'5	—
East Indian in Drums ...	7	—	8,450
Total ...	20	5775'5	8,450

C. DANGEROUS PETROLEUM.

Fifty-seven consignments representing 957,592 gallons of dangerous petroleum were imported and examined.

Spirits.

One thousand four hundred and seventy-eight samples of imported or locally manufactured spirit were examined for alcoholic strength. Of these 1,154 were done for the Monopolies Department and 324 for the Kedah Government.

Other Spirits.

One hundred and seven other samples of spirits were examined generally in order that they might be classified under the Liquors Revenue Ordinance.

They mostly consisted of brandy or liquors purporting to be brandy, or Chinese spirits suspected to contain arrack. Various samples of toddy and illicit liquors were also analysed.

Opium, Chandu and Bhang.

One hundred and forty-four samples of opium and chandu dross were examined either for the Monopolies Department or for the Kedah Government. Most of the work was in order to keep a check on the chandu shop-keepers and to guard against payment by Government of the full drawback for bad or adulterated dross.

Milk.

Forty-five samples of milk were analysed. Of these twenty-one, all collected by the Municipal Health Department, were adulterated by the addition of water. The highest percentage of added water in any of these samples was 77.

Water.

Analysis of 39 samples of water were carried out. They were taken chiefly from drinking wells or proposed drinking wells in Penang, Kedah, Province Wellesley and the Dindings.

Coining Cases.

Exhibits in three cases of counterfeiting coinage were examined.

Explosives.

Four importations of Gelignite representing 135,000 lbs. were inspected and examined on importation.

All passed the statutory tests.

Toxicology.

Specimens of human viscera, etc., were examined in seven cases of suspected poisoning.

In one arsenic was discovered and in one mercury.

The other five contained no poison.

Miscellaneous.

The miscellaneous samples included tin-ore, bran, petrol, flour, cloth, rubber, potassium cyanide, sugar, rice, etc.

**REPORT ON THE KING EDWARD VII COLLEGE OF MEDICINE,
SINGAPORE, FOR 1921.**

School Council.—The Hon'ble Dr. LIM BOON KENG resigned on leaving Colony. Messrs. YEOW NGAN PAN, TAN KHEAM HOCK and TAN CHENG KEE were re-elected.

School Staff.—Dr. G. H. MACALISTER proceeded on leave in September, his duties and seat on the School Council being taken by Dr. J. R. KAY-MOUAT. Dr. H. M. HOLT resigned in February and was replaced by Captain J. SLOPER, R.A.M.C., as Acting Professor of Anatomy. Dr. O. J. MURPHY was appointed lecturer in Midwifery in June and the post of Tutor in Midwifery held by Dr. P. H. LOH was abolished as unnecessary. The Hon'ble Dr. D. J. GALLOWAY was unable to lecture, owing to his administrative duties, during

the October term his place being taken by Dr. R. B. MACGREGOR. Dr. DENT, Lecturer in Physics and Chemistry, was absent on leave from February to November and was replaced by Mr. J. C. COWAP.

Dr. WEBSTER, Lecturer in Clinical Medicine and Ophthalmology, proceeded on leave in September his place being taken by Dr. H. B. DODDS for Medicine and by Mr. K. BLACK for Ophthalmology. Dr. DAWSON undertook Clinics in Infectious diseases, an addition to the teaching which will become a recognised part of the course next year. Mr. G. W. CRAWFORD resigned his post of Lecturer in Practical Pharmacy on account of ill-health to the regret of the Staff and Students. Mr. F. L. LA MOTHE was appointed *vice* Mr. G. W. CRAWFORD as Lecturer in Pharmacy. Dr. J. R. KAY-MOUAT, who was appointed Assistant Principal, assumed duty on July 23rd, 1921: he was appointed King Edward VII Professor in Physiology in November.

STUDENTS.—

1. *Administration.*—The Students representative committee appointed to confer with the Principal upon matters affecting their interests has facilitated the maintenance of order and good understanding. The discipline has been good throughout the year. No suspensions or dismissals have been necessary. Three students left.

2. *Health.*—The health has been up to the average: Ankylostomiasis has been diagnosed in several students. There has been one case of Beri-beri and several cases of Malaria, all contracted outside the school.

3. *Recreation of Students.*—An athletic ground has been provided on the site of the aviation ground and is being prepared for games. A library of general literature has been founded by Mr. SEE TIONG WAH who has presented six book cases with over one thousand books to the Students' Union.

Education.—Seven qualified for L. M. S. Diploma, making a total of 124 graduates.

Students in 5th year and over	...	...	...	37
„ 4th	„	...	...	24
„ 3rd	„	...	...	25
„ 2nd	„	...	...	16
„ 1st	„	...	...	33
				<hr/> 135
Subtract 3 who have left	...	...	...	3
Total now present	...	...	...	<hr/>132

of whom 61 are Government indentured students.

The entrance examination has been replaced by the Senior Cambridge with additional subject and a higher standard than a pass, namely that of "credit" being required in English and Mathematics. The standard in Anatomy and Physiology has been raised to correspond.

The course for Hospital Assistants has ceased; the last entrant for this course passed the examination this summer.

No Pharmaceutical Students have passed during the year. The granting of Dental Certificates has been abolished.

The courses have been extended during the year, particularly as regards systematic teaching in Gynæcology and Midwifery and Clinics in infectious diseases. Casualty Officer work, to afford practice in minor surgery and nursing and other treatment to the final year students, has been instituted at the General Hospital.

Equipment.—The furnishing of the Anatomy and Physiology departments has been increased. The accommodation in these departments has been enlarged. The votes-in-aid have helped the departments to cope with the extra numbers doing practical work, but the apparatus is not as yet quite adequate. The addition of an epidiascope now on order and more microscopes will greatly add to the facilities for demonstrations. The books on order from the same vote will bring the reference library and students' library thoroughly up to date. The library with the new periodicals added is now the most efficiently equipped part of the School.

Financial.—The Government contributions were increased by votes in aid totalling \$17,000. Part of this was unexpended owing to the delay in arrival of the epidiascope, the microscopes and certain books ordered under this vote through the Crown Agents in England.

The revenue and expenditure for the year 1921 was as follows:—

King Edward VII Memorial Fund.—

<i>Assets.</i>		<i>Liabilities.</i>	
	\$ c.		\$ c.
Balance brought forward 1-1-21 ...	15,531 82	Gratuity to Professor CAMPBELL ...	6,187 50
Invested capital ...	120,800 00	Balance ...	130,144 32
	<u>136,331 82</u>		<u>136,331 82</u>
<i>Receipts.</i>		<i>Payments.</i>	
	\$ c.		\$ c.
Balance brought forward 1-1-21 ...	19,939 56	Commission ...	198 72
Interest ...	8,790 98	Investment ...	13,000 00
	<u>28,730 54</u>	Balance ...	15,531 82
			<u>28,730 54</u>

Council of King Edward VII College of Medicine Fund.

<i>Assets.</i>		<i>Liabilities.</i>	
	\$ c.		\$ c.
Invested capital ...	82,200 00	Overdraft at bank ...	1,459 91
Equipment ...	2,032 83	Locker's deposit ...	20 00
		Dr. LIM BOON KENG'S prizes ...	285 00
		Subscription for prizes ...	463 05
		Balance to credit ...	82,004 87
	<u>84,232 83</u>		<u>84,232 83</u>
<i>Receipts.</i>		<i>Payments.</i>	
	\$ c.		\$ c.
Balance 1-1-21 ...	3,194 93	Miscellaneous ...	163 20
Fees ...	4,235 00	Commission ...	397 13
Interest ...	6,221 82	Stipends to students ...	7,246 82
Miscellaneous Receipts ...	157 50	Allowance to clerk ...	240 00
	<u>13,809 25</u>	Books and Appliances ...	1,034 51
		Balance ...	4,727 59
			<u>13,809 25</u>

PATHOLOGICAL DEPARTMENT.

REPORT BY DR. G. A. FINLAYSON, M.A., M.B., Ch.B., M.R.C.P.,
Government Pathologist.

Laboratory, Sepoy Lines.

Total number of specimens examined	...	...	3,157
Widal reaction for "Enterica"	...	...	696
Enteric fever	positive reaction	...	129
	partial "	...	130
	negative "	...	405
Para-typhoid B	positive "	...	1
	partial "	...	3
	negative "	...	23
Widal reaction for Dysentery-bacillary	...	...	5
	positive reaction	...	5
Malaria	parasite present	...	11
	" absent	...	75
Syphilis	Wassermann reaction	...	1,830
	positive	...	783
	partial	...	251
	"	...	63
	negative	...	733
Diphtheria	throat swab.	...	64
	bacillus present	...	27
	" absent	...	37
Gonococcus	diplococcus present	...	79
	" absent	...	62
Sputum for T. B.	bacillus present	...	61
	" absent	...	44
Leprosy	bacillus present	...	28
	" absent	...	8
		...	20
Meningococcus	diplococcus present	...	29
	" absent	...	19
	pneumococcus observed in three cases.	...	10
Plague	bacillus present	...	2
	" absent	...	1
Urine	casts, albumen, etc.	...	62
	organisms B Coli	...	17
		...	12
Varied specimens including:—			
	Vaccines prepared	...	11
	Histological sections	...	64
	Examination of pus, etc.	...	23

A few samples of water were examined and reports forwarded.

Central Mortuary, Sepoy Lines.

Total Number of autopsies	292
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Tan Tock Seng Hospital.

Total number of autopsies 915

Return showing immediate cause of death:—

Beri-beri	...	...	...	...	42
Pellagra	...	...	...	...	1
Plague Bubonic	...	...	...	...	3
Lobar Pneumonia	...	...	...	...	76
Cerebro-spinal Meningitis	...	...	...	...	7
Encephalitis lethargica	...	...	...	...	2
Accidents, etc.	...	...	...	...	59
Malaria	...	...	...	...	81
Tuberculosis	...	...	...	...	117
Enteric fever	...	...	...	...	27
Dysentery	...	...	...	...	125
Suppurative Peritonitis	...	...	...	...	32
Other septic conditions	...	...	...	...	53
Diseases of Nervous system	...	...	...	...	52
" Respiratory system			...	...	48
" Circulatory system			...	...	45
" Blood	...	...	...	...	1
" Alimentary system	...	...	...	...	54
" Genito-urinary system			...	...	42
Neoplasm	...	...	...	...	33
Syphilis	...	...	...	...	2
Anchylostomiasis	...	...	...	...	5
Splenic Anæmia	...	...	...	...	4
Heat stroke	...	...	...	...	1
Senility	...	...	...	...	1
Too decomposed	...	...	...	...	1
Unknown	...	...	...	...	1

Remarks.—It may be of interest to carry forward this table which I submitted last year showing the death-rate of the patients who enter Tan Tock Seng Hospital for treatment.

<i>Year.</i>	<i>Total No. p.m.</i>	<i>Malaria.</i>	<i>Dysentery.</i>	<i>Tuberculosis.</i>	<i>Beri-beri.</i>
1907	1,083	212	212	152	50
1910	1,743	352	299	187	134
1914	1,050	90	221	165	65
1917	922	99	177	139	103
1920	1,306	182	188	277	14
1921	1,530	205	238	318	75

The noticeable features are the increase in the Beri-beri death-rate since over-polished rice again became available and the continued rise in the number who succumb to Pulmonary Tuberculosis.

Return of Laboratory, General Hospital Penang for 1921.

Months.	Blood Film.	Stools.	Urine.	Sputum.	Smear for Gonococci.	Smear for L. Bacilli.	Wasserman reaction.	Widal tests.	Fluid from knee and Pleura.	Diphtheria Bacilli.	Total.
January ...	72	60	128	20	3	1	...	1	...	...	285
February ...	70	50	99	15	2	...	...	1	...	...	237
March ...	118	70	112	41	9	...	...	1	...	...	351
April ...	103	111	79	35	5	1	...	...	...	...	334
May ...	130	117	112	21	7	...	...	2	...	...	389
June ...	152	69	88	18	9	2	3	1	...	...	342
July ...	130	72	91	10	17	1	5	...	...	...	326
August ...	137	70	109	21	15	...	6	1	...	...	359
September ...	94	90	52	24	20	2	11	2	2	...	297
October ...	72	76	82	15	9	1	6	...	...	...	261
November ...	108	88	76	14	16	...	8	1	2	1	314
December ...	110	60	95	30	18	2	9	1	...	...	325
Total ...	1,296	933	1,123	264	130	10	48	11	4	1	3,725

Sd. J. C. TULL,
Government Pathologist.

MEDICAL DEPARTMENT, LABUAN.

REPORT BY DR. CLEVERTON, *Medical Officer, Labuan, S. S.*

Population and Health.

Table showing estimated population, with the birth and death rates, for the year 1919 to 1921:—

Year.	Population.	Births.	Deaths.	Birth-rate.	Death-rate.
1919	... 6,922 (estimated)	219	140	31·63	20·22
1920	... 6,970 "	206	152	29·55	21·80
1921	... 5,909 (Census)	203	199	34·35	33·67

The population of Labuan has decreased by 639 since the 1911 Census. The neighbouring oilfield in Miri, Sarawak, has attracted a great number of Chinese and natives from Labuan.

The birth rate was highest during the 4th Quarter, and death rate was highest during the 3rd Quarter. Of the total number of deaths, Malaria accounted for 46, Pneumonia 5, Debility and Age 27, Convulsions 38, Phthisis 35, Others 48.

The following table shows the infantile mortality under one year of age:—

Year.	Deaths.	Per cent to Total death rate.	Per cent to Total birth rate.
—	—	—	—
1919	... 29	20·71	13·24
1920	... 31	20·39	15·04
1921	... 53	26·60	26·10

Malaria.

Sixty-one cases were admitted to Hospital during the year as against 60 in 1920. One hundred and seventy-three cases were treated as out-patients against 172 in 1920. Of the total number of deaths, 46 were attributed to this disease as against 30 in 1920.

A sum of \$964.38 was spent by the Rural Board in connection with Anti-malarial work.

Beri-Beri.

No cases were treated under this diseases in the year under review nor were there any cases treated in 1920. In 1919 only one case was treated in Hospital. In 1917 there were 42 cases treated in Hospital.

Venereal Diseases.

Thirty-six cases were treated in Hospital during the year as against 8 cases in 1920. Thirteen cases were treated as out-patients.

Pulmonary Tuberculosis.

There were 6 cases treated in Hospital during the year as against 10 in 1920. Two of these cases died. Of the total number of deaths 35 were from this-disease, showing a death rate of 17·58 as against 25·65 in 1920.

Dysentery.

There were 5 admissions with one death as against 5 with no deaths, in 1920. Of these 5, two came direct from an estate in Brunei, and 2 from Sarawak (Lawas and Trusan). The remaining case was a prisoner, who had suffered previously from dysentery in British North Borneo.

Port Health Work.

Steamers tongkangs and prows, 23 in number, were inspected and pratique granted.

Police Force:—

	1920.	1921.
Number of admissions to Hospital ...	69	112
„ „ out-patients ...	81	334
„ „ admissions for Malaria ...	28	38
„ „ out-patients ...	10	42

Prisoners:—

Number of admissions to Hospital ...	19	14
„ „ out-patients ...	17	42
„ „ admissions for Malaria ...	6	7

Out-Patients.

One thousand one hundred and fifteen cases were treated as out-patients as against 752 in 1920.

The nationalities were as follows.—Forty-seven European, 18 Eurasian, 129 Chinese, 692 Malay, 193 Indian, 36 other nationalities. The chief diseases treated were Malaria, Bronchitis, Constipation, Dyspepsia, Roundworm, Scabies, Injuries and Ulcer.

An out-patient department was started in the town of Victoria in July. This accounts for the increase under this head. Many minor maladies are treated there.

Vaccination.

One hundred and eighty-four children were vaccinated during the year as against 193 in 1920. Of these 171 were successful.

Meteorological.

The North-east monsoon blew from January to the end of March. During April the prevailing wind was due North. From May to November the South-west monsoon prevailed. In December the North-east monsoon started. The total rainfall during the year was 3,415.9 m.m. as against 3,458.0 m.m. in 1920.

The North-east monsoon was again the drier monsoon, the first 4 months of the year showing a far smaller rainfall than any other four months. The driest month was August. The wettest month was July when 458.0 m.m. fell. The greatest rainfall of the year was 124.0 m.m. on the 5th December. The greatest rainfall of the year was 124.0 m.m. on the 5th December.

The maximum temperature was	93.0 on 11th May, 1921.
„ minimum „ „	71.0 3rd and 9th April and 28th August.
The maximum mean temperature was	86.6
„ minimum „ „ „	75.8
„ mean temperature „	81.2

Hospital.

The total number of admissions during the year was 278 as against 234 in 1920. Only one European was admitted during the year. There were 14 deaths giving a percentage mortality to the total treated of 4.79 as against 5.32 in 1920.

Operations.

Ten operations were performed under chloroform of which 2 were major.

SINGAPORE.

Return of the Statistics of Population for the Year 1921.

			Europeans.	Eurasians.	Malays.	Chinese.	Indians.	Other Nationalities.	TOTAL.	
Number of inhabitants in 1921	...	...	6,064	5,360	53,818	314,523	32,180	5,914	417,859
" Births during the year 1921			187	209	2,314	8,718	789	98	12,315	
" Deaths " 1921			55	132	2,199	10,533	1,064	128	14,111	
" Immigrants " 1921		}	Not available.							
" Emigrants " 1921										
Number of inhabitants in 1920	...	...	7,369	6,025	53,935	283,274	35,807	4,901	391,311
Increase	...	...	...	...	117	31,249	3,627	1,013	26,548
Decrease	...	...	1,305	665	...	...	...	...	...

Meteorological Return for the Year 1921.

	TEMPERATURE.						RAINFALL.		WINDS.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Millimetres.	Degree of Humidity.	General Direction.	Average Force.	
	°F	°F	°F	°F	°F	°F	M. M.	%			
January	141.6	70.6	85.8	73.2	12.6	79.7	421.50	83	Not recorded.	Do.	
February	141.6	70.5	86.6	73.2	13.4	80.4	213.75	81			
March	150.1	71.0	88.1	74.2	13.9	81.7	226.50	81			
April	154.0	70.2	88.5	74.9	13.6	83.1	202.75	81			
May	...	74.0	84.5	77.9	6.6	81.4	175.25	85			
June	...	67.5	83.1	71.7	11.4	81.2	143.50	83			
July	...	69.9	85.0	77.9	7.1	82.6	156.00	80			
August	...	67.3	85.0	78.4	6.6	81.9	152.50	80			
September	...	60.0	86.4	77.5	8.9	80.0	212.00	82			
October	...	71.0	84.1	77.1	7.0	79.7	384.75	81			
November	...	70.0	84.0	76.6	7.4	81.2	257.25	83			
December	152.1	68.5	84.2	76.4	7.8	81.1	122.00	82			
Mean			

MALACCA.

Return of the Statistics of Population for the Year 1921.

	Europeans.	Eurasians.	Malays.	Chinese.	Indians.	Other Nationalities.	TOTAL.	
Number of inhabitants in 1921	447	1,770	86,452	45,811	18,854	265	153,599	
„ Births during the year 1921	10	86	4,021	1,406	430	151	6,104	
„ Deaths „ 1921	1	43	2,382	1,295	663	84	4,468	
„ Immigrants „ 1921	}	No data available.						
„ Emigrants „ 1921								
Number of inhabitants in 1920	385	1,948	99,803	44,891	9,499	543	157,069	
Increase	62	..	..	920	9,355	..	..
or Decrease	..	178	12,351	..	..	278	3,470

Meteorological Return for the Year 1921.

	TEMPERATURE.						RAINFALL.		WINDS.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Millimetres	Degree of Humidity.	General Direction.	Average Force.	
	F.	F.	F.	F.	F.	F.	M.M.	%			
January	130.0	—	86	72	14	—	254.50	86	N.E.		
February	127.0	—	87	73	14	—	98.00	84	N.E.		
March	129.0	—	87	74	13	—	180.50	80	N.E.		
April	139.0	—	88	74	14	—	133.00	82	N.E.		
May	138.0	—	87	74	13	—	276.00	83	N.E.		
June	134.0	—	87	74	13	—	272.00	85	N.E.		
July	135.0	—	87	73	14	—	128.00	80	N.E.		
August	139.0	—	87	73	14	—	229.00	83	N.E.		
September	129.0	—	86	73	13	—	268.00	83	N.E.		
October	125.0	—	87	74	13	—	276.00	83	N.E.		
November	123.0	—	86	74	12	—	227.00	84	N.W.		
December	126.0	—	88	73	15	—	95.00	82	N.		
Mean	...	—	...	...	...	—	...	..	—

LABUAN.

Return of the Statistics of Population for the Year 1921.

	Europeans.	Eurasians.	Malays.	Chinese.	Indians.	Other Nationalities.	TOTAL.
Number of inhabitants in 1921	25	15	4,095	1,614	148	46	5,909
„ Births during the year 1921	1	...	121	72	8	1	203
„ Deaths „ „ 1921	...	1	149	45	2	2	199
„ Immigrants „ „ 1921	}	No data available.					
„ Emigrants „ „ 1921							
Number of inhabitants in 1920	17	49	4,760	1,868	204	72	6,970
Increase	8	...	...	...	...	...	...
or							
Decrease ... ..	...	34	665	254	90	26	1,061

Meteorological Return for the Year 1921.

	TEMPERATURE.						RAINFALL.		WINDS.		REMARKS.
	Solar Maximum.	Minimum on Grass.	Shade Maximum.	Shade Minimum.	Range.	Mean.	Amount in Millimetres.	Degree of Humidity.	General Direction.	Average Force	
		F.	F.	F.	F.	F.	M. M.	%			
January	146.6	72.9	85.0	75.9	9.1	80.4	133.5	80	N.E.	2	
February	147.3	73.6	84.9	75.0	9.9	79.9	317.2	82	N.E.	2	
March	147.9	73.9	86.5	75.8	10.7	81.1	193.6	79	N.E.	2	
April	149.4	74.1	88.3	76.4	11.9	82.3	175.4	75	N.	2	
May	142.7	74.9	88.0	76.2	11.8	82.1	403.5	78	W.	2	
June	143.9	74.1	87.7	76.4	11.3	82.0	262.7	77	S.W.	2	
July	140.2	73.7	87.4	75.3	12.1	81.3	458.0	79	S.W.	2	
August	144.2	73.9	87.6	77.0	10.6	82.3	128.0	76	S.W.	2	
September	143.7	74.0	86.7	74.9	11.8	80.8	319.5	78	S.W.	2	
October	146.1	74.4	86.6	75.4	11.2	81.0	427.0	80	S.W.	2	
November ... ..	...	74.0	85.5	75.9	9.6	80.7	202.5	80	S.W.	2	
December	150.6	73.7	85.8	76.3	9.5	81.0	395.0	80	N.E.	2	
Mean	145.7	73.9	86.6	75.8	10.7	81.2	Total. 3,415.9	78.6	Prevail- ing S.W.	2	