

## FEDERATED MALAY STATES.

### PUBLIC WORKS DEPARTMENT ANNUAL REPORT FOR THE YEAR 1923.

#### 1.—STAFF.

On 4th January, 1923, Mr. W. Eyre-Kenny, Director of Public Works, proceeded on three months' leave prior to retirement, Mr. J. Strachan, Assistant Director of Public Works, taking over the acting duties, being confirmed as Director of Public Works with effect from 4th April, 1923.

Mr. Strachan in turn was, however, transferred to the post of Director of Public Works, Ceylon, and left the Federated Malay States for that island on the 3rd August, 1923.

Lt.-Col. J. P. Swettenham was appointed to act as Assistant Director of Public Works as from 4th January, 1923, being confirmed in the appointment on 4th April, 1923, taking over the duties of Acting Director of Public Works on Mr. Strachan's departure; Captain Sydney Smith, O.B.E., being appointed to act as Assistant Director of Public Works on 3rd August, 1923.

Mr. H. O. Robinson and Mr. F. R. Pearson, Executive Engineers, retired during the year and Major A. T. MacDermott, Senior Executive Engineer, left in September on six months' leave prior to retirement.

Mr. C. S. Downey and Mr. F. M. Corkill, Assistant Engineers, resigned during the year and Mr. E. E. Benest, Assistant Engineer Hydrographics, gave notice of his intention to resign, but did not actually leave the service until 4th January, 1924.

It is with regret that the deaths have to be recorded of:

Mr. A. Gidley	...	...	...	...	Assistant Engineer
Mr. A. B. Potts	...	...	...	...	Executive Engineer
Mr. J. S. Robinson	...	...	...	...	Assistant Engineer

Twenty-nine officers went on long leave and five returned from leave during the year, leaving a balance on leave at the conclusion of the year of 22. (Mr. Pearson retiring and Mr. Corkill resigning.)

The distribution of the staff is shown in Appendices "A" and "A<sup>1</sup>."

#### 2.—EXPENDITURE UNDER PERSONAL EMOLUMENTS.

Appendix "B" shows detailed expenditure under respective branches of Personal Emoluments for the year under review. From this table it will be observed that expenditure amounted to \$1,108,325 (exclusive of Temporary Allowances which in addition amounted to \$200,719) the saving under this head being \$223,556.

The total sum of money expended by the department throughout the whole year was \$8,677,346. (Appendix "M.")

The percentage of Administration to Expenditure was therefore 15.16; this percentage is high when compared to that of the years previous to the "slump," owing to the deletion from the Budgets of the many Special Service Works which would ordinarily have been included; but, on the other hand, the deletion of these Special Services has allowed the staff the opportunity of giving intensive supervision to Annually Recurrent Services and such Special Services as appeared in the Estimates. The result of such supervision has meant not only better work, but also the saving of a no less sum than \$1,960,114 under all heads.

These savings being \$851,789 in excess of the salaries paid to the whole staff.

It should not be forgotten, in connection with the 15.16 per cent. (cost of staff to value of work carried out) that this percentage is not by any means meticulously accurate.

The services of the officers of the department are constantly and continually being requisitioned to sit on Boards, carry out inspections, and to express their opinions upon subjects and matters which have no place in any Estimates. Much time is often devoted to the consideration of schemes and preparation of plans which never come to fruition; but for the purposes of comparison from year to year some such calculation is called for, and so long as the figures are read in the light of this explanation, they may be taken to be sufficiently accurate for the purposes desired.



## 3.—EXPENDITURE UNDER OTHER CHARGES.

Expenditure under Other Charges, Annually Recurrent is shewn in Appendix "C" and Other Charges, Special Services in Appendix "C<sup>1</sup>."

From these appendices it will be seen that the total expenditure under "C" amounts to \$692,516 and under "C<sup>1</sup>" to \$55,390, leaving savings of respectively, \$366,191 and \$7,670, a sum of \$3,397 being sought as a revote under "Other Charges, Special Services."

## 4.—REVENUE.

Revenue collected by the department was as follows:

Federal	...	...	...	...	...	...	\$ 3,985
Perak	...	...	...	...	...	...	19,049
Selangor	...	...	...	...	...	...	32,020
Negri Sembilan	...	...	...	...	...	...	5,131
Pahang	...	...	...	...	...	...	25,017
							<hr/> 85,202

In addition, revenue accruing from Public Works Department enterprises but being collected by other departments on behalf of the Public Works Department amounted to:

Federal	...	...	...	...	...	...	\$ 559,343
Perak	...	...	...	...	...	...	210,744
Selangor	...	...	...	...	...	...	207,801
Negri Sembilan	...	...	...	...	...	...	39,346
Pahang	...	...	...	...	...	...	5,911
							<hr/> 1,023,145

The Grand Total of Revenue thus being \$1,108,347.

## 5.—WORKS AND BUILDINGS.

The number, original cost and expenditure on Maintenance of Government Buildings was as follows:

State.	No. of Govt. buildings on 1st January, 1923.	Total Value of Govt. buildings on 1st January, 1923.	Cost of upkeep—current repairs vote.	Cost of upkeep—special.	Total upkeep for 1923.	Percentage of upkeep for 1923.	No. of Govt. buildings on 31st December, 1923.	Value of Govt. buildings on 31st Dec. 1923.
		\$	\$	\$	\$			\$
Perak ...	4,743	14,492,075	214,939	...	214,939	1.46	4,790	14,659,679
Selangor	2,439	12,621,457	255,298	6,260	261,558	2.07	2,451	12,814,596
Negri Sembilan	1,058	4,400,448	84,522	27,571	112,093	2.55	1,074	4,450,614
Pahang ...	914	1,722,304	50,358	6,553	56,911	3.30	929	1,788,280
Total ...	9,154	33,236,284	605,117	40,384	645,501	1.94	9,244	33,713,169

This Statement shows the actual cost to Government of the buildings erected. It is not to be read as indicating the real value of buildings at the present day, which would be much higher than the figure of \$33,713,169 shown in this table.

It will be noticed that the percentage of upkeep of all Government buildings worked out at the low figure of 1.94 per cent.

Appendix "D" shows total Provision, Expenditure, Balance and Savings not only for Maintenance of Buildings but also Minor Works and other Miscellaneous Services. Special Expenditure which took place on Works and Buildings under Revenue Account and Loan Account is shown in Appendices "D<sup>1</sup>" and "D<sup>2</sup>."

There were no works of any importance carried out under Revenue Account, and it will be seen from the Appendix that out of \$2,358,083 provided under Special Services Loan, only \$914,621 was expended, leaving unexpended balances of:

Federal	...	...	...	...	...	...	\$ 600
Perak	...	...	...	...	...	...	579,860
Selangor	...	...	...	...	...	...	765,645
Negri Sembilan	...	...	...	...	...	...	15,032
Pahang	...	...	...	...	...	...	82,325

The principal items under which work was put in hand are shown in Appendix "K."



## 6.—ROADS, STREETS AND BRIDGES (ANNUALLY RECURRENT).

The sum of money expended on Upkeep of Roads under "Annually Recurrent" is shown in Appendix "E."

The total sum of money provided being \$3,619,535 and the sum spent \$3,126,270.

The saving of \$493,265 is a very creditable achievement, especially so as large savings under Road Maintenance had also been made in the year previous.

Practically all roads throughout the whole of the Federated Malay States were inspected during the year by the writer and, speaking generally, their condition might be said to be fair. There were, however, instances of sections on which wear and tear were becoming apparent, and the attention of the State Engineers was directed towards these. In

## PERAK.

Grass is being allowed to grow up through the metalled portions of certain roads.

## SELANGOR.

Certain large sections of roads were closed for various reasons during the year.

## NEGRI SEMBILAN.

The road system was maintained in a high state of efficiency throughout the year.

## PAHANG.

One road had fallen below the standard of upkeep required.

The total mileage of roads upkeep during the year was:

Metalled	...	...	...	...	...	2,494 $\frac{1}{4}$ miles
Unmetalled	...	...	...	...	...	139 $\frac{3}{4}$ "
Bridle-paths	...	...	...	...	...	1,793 $\frac{3}{4}$ "

showing an increase of 52 miles and 10 chains in metalled roads and a reduction of 16 miles and 64 chains in unmetalled roads.

Appendix "G" shows details of road mileages.

Under "Roads, Streets and Bridges, Special Expenditure," there was but \$43,245 expended out of Revenue Account and \$427,695 out of Loan Account; details of which are given in Appendix "E<sup>1</sup>" and "E<sup>2</sup>."

The principal items under this expenditure were:

## PERAK.

Deviation of main road over Taiping-Kuala Kangsar Pass and the Kampong Degong road.

## SELANGOR.

Raising the road at the  $4\frac{1}{2}$  mile, Port Swettenham, and deviating the river to protect the 18th mile, Rawang road.

## NEGRI SEMBILAN.

The Tampin-Gemas Road and the construction of two bridges over the Sepang and Jimah Rivers on the Sepang-Port Dickson Road.

## PAHANG.

Completion of Cheneras Road and the continuation of the Karak-Mentakab Road.

It is hoped that the Tampin-Gemas Road will be completed and open for light traffic during the first half of the year 1924 and the Karak-Mentakab Road soon afterwards.

The question of the liability of Government as to upkeep of bridges was raised in the Supreme Court during the year.

Appendix "F" shows the total quantity of metal quarried by the department for road upkeep during the year.

The average cost in each of the four States for the upkeep of roads was:

Perak	...	...	...	...	\$1,247 per mile
Selangor	...	...	...	...	1,191 "
Negri Sembilan	...	...	...	...	1,205 "
Pahang	...	...	...	...	<u>1,070</u> "

## 7.—IRRIGATION AND DRAINAGE.

The following sums were expended under "Annually Recurrent" items:

	Provision.	Expenditure.	Saving.
Perak	\$121,400	\$97,397	\$24,003
Selangor	41,600	30,629	10,971
Pahang	2,500	710	1,790
	<u>\$165,500</u>	<u>\$128,736</u>	<u>\$36,764</u>

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The following figures in connection with the Krian Irrigation Works are of interest:

Maintenance and Supervision	...	...	\$ 88,672
Collected Water-rates	...	...	118,359
Showing a profit of			<u>\$29,687</u>

All works undertaken under "Irrigation, Special Services" were paid for out of Loan Account:

They were:

PERAK.			
Kenas ...	...	...	\$28,195
Krian Reservoir Improvements	...	...	5,786
Other small Irrigation Schemes	...	...	4,556

PAHANG.			
Pulau Tawar Scheme	...	...	12,538

NEGRI SEMBILAN.			
Construction of dams in the Terachi Valley			3,474

Had it not been for bad workmanship by a contractor at the beginning of the year, the Kenas Scheme would have been completed before the end of the year. As it is, work has had to be carried over to 1924.

At the Krian Reservoir, the work of grubbing out stumps and clearing the reservoir was put in hand as this could not be longer delayed.

The Hon. the Chief Secretary paid a visit of inspection to the reservoir during the year, proceeding from Pondoh Tanjong in a prahu down the River Kurau and thence across the reservoir to the spillway at Bukit Merah.

The Pulau Tawar Irrigation Scheme would have been brought into operation during the year had the system stood the necessary test of efficiency. Under this test certain sections of the scheme failed and it is feared that there will yet be some considerable delay and expenditure of further money before the scheme can be brought into operation.

The construction of dams in the Terachi Valley is but a small work, but it is hoped that great benefits will result when these works have been completed.

#### 8.—RIVERS.

##### IN PERAK.

Two hundred and seventy-five and three-fourth miles of clearing was carried out at a total cost of \$57,660.

##### IN SELANGOR.

Thirty-four and a half miles of clearing was carried out at a total cost of \$18,703.

##### IN PAHANG.

One hundred and thirty-three miles of clearing was carried out at a total cost of \$2,660. The work done in Pahang was not of a class comparable to that done in the other States.

##### IN NEGRI SEMBILAN.

No river clearing of any importance was carried out.

Therefore, a total of  $443\frac{1}{4}$  miles of river clearing was carried out at a total cost of \$79,023.

In Pahang the Perting River Dam was put in hand towards the end of the year for the prevention of silt. Mining in the Kenong Valley also gave some cause for apprehension and the miners were ordered to adopt remedial measures.

Silting, it is feared, is on the increase in other Pahang rivers and careful observations were made in order the better hereafter to be able to forestall any likely danger.

The Temiang Deviation, Seremban, fulfilled its purpose excellently throughout the year, and there was no indication of any flood whatsoever in Seremban.

In Selangor no actual floods were experienced in Kuala Lumpur, the flood channels of the River Klang being kept open throughout the year.

Silting, however, continued to take place between Kanching and Rawang and on the Rawang-Kuala Selangor Road, and at the present moment the bed of the river in these parts is above road level.

Some work upon the deviation of the river was carried out and it is hoped that by this means flooding of the roads will be ameliorated; but it is anticipated that more drastic measures will have to be taken hereafter.

Contour surveys were continued on the Selangor River above the bridge at Kuala Kubu and a plan and estimate was submitted during the year for a Sausage Dam which, when constructed, will act as a silt-trap.



At no time during the year did the waters of the Selangor River over-top the bunds, and so much of Kuala Kubu as remains was free of floods during the year.

In Perak, investigations were continued with a view to the preparation of a scheme for the prevention of floods in Ipoh. Plans were prepared for the bunding of the Choh River, but it is feared that vested interests will, perhaps, make this Scheme impossible.

#### 9.—WATERWORKS.

Existing Waterworks were maintained in a satisfactory condition throughout the year.

The capital cost of existing Water Supply systems and revenue received in each State was as follows:

		Capital Cost.		Expenditure on Maintenance.		Revenue.
Perak	...	\$3,155,377	...	\$90,250	...	\$134,453
Selangor	...	4,709,958	...	45,629	...	189,220
Negri Sembilan	...	731,157	...	19,515	...	30,190
Pahang	...	534,559	...	13,106	...	5,717
Total	...	\$9,131,051	...	\$168,500	...	\$359,580

The sums of money noted as Revenue above are actual; they do not include any figures for town supply, dipper fountains and waste-not taps or for flushing or fire purposes.

#### IN PERAK.

The whole pipe line which formerly ran alongside the Railway to Port Weld was taken up, cleaned and relaid. At Kuala Kangsar the reticulation system was improved and 8-inch and 7-inch diameter pipes were substituted for the 4-inch main from the intake to the reservoir, \$35,708 being spent upon this work.

\$15,896 was spent in Kinta in providing for the substitution of 11-inch and 10-inch mains in place of the 8-inch main and an 8-inch main in place of the 6-inch and 4-inch mains.

A small water supply to the Sultan Idris College, Tanjong Malim, was carried out at a total cost of \$20,945.

The sources of supply to Ipoh and other Kinta towns are drawn from the Kladang Range, the catchment area being very small.

Reconnaissance was undertaken during the year with a view to definitely fixing upon some source of supply which would not only give a far more reliable and adequate supply but would interfere with mining as little as possible. A report upon such reconnaissance dealing with the whole water supply of Kinta will, it is hoped, be put up at an early date during 1924.

#### IN SELANGOR.

Repairs were carried out to Maxwell Hill Reservoir, which repairs amounted almost to the reconstruction of the reservoir; the roof and supporting piers being removed and the floor and walls strengthened, at a cost of \$51,484.

The low-level intake filters, Nos. 4 and 5, were also thoroughly repaired during the year.

The consumption of water in Kuala Lumpur was 1,069,810,000 gallons, giving an average consumption of some 35 gallons per head per diem.

The new 20-inch main, totalling 39,560 feet, was completed in the middle of January; upon completion of this, the old 18-inch main, aggregating 40,885 feet, was taken up, cleaned and sent to Klang for use there. Some 23,851 feet of 3 and 4-inch extensions were also laid during the year.

Preliminary reconnaissance was also put in hand with a view to extending the sources of supply from the Sungei Sleh in the near future.

Consumption by Klang and Port Swettenham from the Ayer Kuning Reservoir was 92,266,718 gallons and from the Subang Reservoir 13,464,100 gallons.

Construction work on raising the Sungei Bharu and Ayer Kuning Dams made but slow progress during the year.

The 18-inch steel main above mentioned, from Kuala Lumpur, was laid along the Sungei Binjai road in place of the old 8-inch main, in order to augment the supply from Klang to Port Swettenham.

The 10-inch and 8-inch mains from Belfield Bridge, Klang, to Port Swettenham being completed.

#### IN NEGRI SEMBILAN.

The old 7-inch main from the now abandoned Gunong Angsi source of supply was salvaged, cleaned and sent to Kuala Pilah for the purpose of a gravitation supply there.

#### IN PAHANG.

All water supplies in Pahang appear either to be lacking in quality or wanting in quantity.

Steps will have to be taken in the near future with a view to improvement.



## 10.—HYDROGRAPHICS.

In the month of February a hydrographical survey was commenced at Tanjong Gila (Deepwater Point), Port Swettenham. Preliminary work occupied some months and then a series of accidents delayed boring operations further.

On the 1st November this work was handed over to the Chief Hydraulic Engineer for supervision and from that date onwards progress has been good.

Seventeen bores had been sunk up to the end of the year and progress had been made on soundings of the channel.

## 11.—ANTI-MALARIA.

The Engineering Staff of the Anti-Malaria Branch consisted of the Anti-Malaria Engineer and one Assistant Engineer stationed in Kuala Lumpur. The Branch is in executive charge of work in Kuala Lumpur, works in other places being done by the staffs of the State Engineers who consult with the Anti-Malaria Engineer when necessary concerning all works of any magnitude.

Surveys were continued and designs and estimates were prepared for some of the works for which provision had been made in the estimates; shortage of staff prevented more being done in this direction and it was not possible therefore to put all work in hand for which funds were available.

The quality of unglazed earthenware pipes used in underdrainage, as supplied by local makers, having become very poor, the branch undertook, successfully, the manufacture of such pipes. As a result local makers have now produced satisfactory pipes and are willing to supply them at favourable prices.

The Anti-Malaria Engineer visited all districts, with exception of the east of Pahang, with the Senior Health Officer, in connection with work of Mosquito Destruction Boards.

## PERAK.

Drainage of the hill area at Taiping continued. The good results of underdrainage of parade grounds and padang at the Subordinates' Settlement, Taiping, are noteworthy. Some work was done at Kuala Kangsar and Tanjong Malim.

## SELANGOR.

Drainage work continued at Kuala Lumpur and at Klang. The site of new Subordinates' Settlement in Kuala Lumpur was underdrained.

Schemes were prepared for further work.

## NEGRI SEMBILAN.

Drainage work was continued at Seremban and at Gemas.

Much useful improvement work was done under provision for Minor Works in the four States.

## 12.—FRASER'S HILL.

A sum of \$35,540 was provided under "Annually Recurrent" for the upkeep of roads, buildings, gardens, etc., at Fraser's Hill. Out of this sum \$30,138 was spent leaving a balance of \$5,402.

Under Special Services \$170,000 was provided, \$169,060 being spent, leaving a balance of \$940.

The principal works carried out under the Special Service Vote were the following:

One permanent type bungalow "Ledeghem."

Contracts for the construction of two semi-permanent bungalows were let, but work upon these did not make as satisfactory progress as might have been expected.

Two miles of new road were constructed to formation level and 25 chains of metal completed.

Work was commenced upon the construction of a Padang near the Simpang and a considerable amount of work was also done in remodelling the valley to the requirements of a Golf Course.

There were heavy rains towards the end of the year which caused considerable damage by slips, and efforts during the concluding months of the year were directed rather to consolidation and stabilisation of work carried out than to extension.

"Red Cross House," upon which progress was also slow, was paid for from Red Cross Funds.

Five Government Bungalows, including "Fraser's Bungalow," had been completed and opened at the close of the year and work was in hand upon "Red Cross Bungalow," "Hollebeke," "Dacres," "Clifford" and "Duberley."

One privately owned bungalow "The Retreat" was built by the Bishop of Singapore.

The Hon. the Chief Secretary visited the Hill on several occasions and took a deep personal interest in matters carried on there.



The total rainfall for the year was 80.99 inches there being 133 days on which no rain fell.

The driest month of the year was July (1.92 inches) and the wettest, January (13.62 inches).

The wettest day of the year was 8th January, with 2.71 inches of rainfall.

The temperature during the year ranged between 86° (November and December) as a maximum and 55° (March) as a minimum, the average temperature being, maximum 74° minimum 60°.

The month giving the lowest mean temperature for the year being January ( $65.5^{\circ}$ ).

### 13.—ELECTRICAL.

A separate report is being put up upon Electrical Installations in the Federated Malay States by the Chairman, Electrical Board.

#### 14.—STORES AND FURNITURE.

The cost of personnel running this branch amounted to \$41,680, whereas the value of business done amounted to \$172,669, and Revenue collected amounted to \$5,149.

During the year under review only such goods as were actually required to replace issues were purchased; \$37,344 worth of materials were procured through the Crown Agents and \$88,238 worth procured locally.

Up to the end of the year 81 Sets of Scheme "A" Furniture, 312 Sets of Scheme "B" Furniture and 13 Sets of Scheme "C" Furniture had been supplied.

All materials which had been in stock for over four years were sold during the year under review.

Materials purchased for the Proposed Hospital Buildings being taken on charge by the Stores and Furniture Branch.

15.—FACTORY.

The turnover for the year was the lowest recorded since the year 1915. This was brought about principally by the fact that but a few orders were given to the Factory for Structural Steel and Bridge work.

The capital of the Factory was increased during the year from \$213,984 to \$400,000.

Total loss in the year's work amounted to \$19,452; but this loss includes a sum of \$4,590, being part of the Executive Engineer's salary for the year 1922, which was not included in that year's account, and also a sum of \$3,777, being an overvaluation of unfinished work in 1922; allowance for these two sums brings the nett loss in the year's working down to \$11,085.

A total sum of \$48,841 was spent on Salaries of Staff.

Orders to the number of 1,768 were completed during the year, the value of which was \$212,089, and in addition 76 orders were carried over to the year 1924, expenditure upon which during 1923 amounted to \$23,043.

It should be borne in mind, with regard to the Factory, that it exists for the express purpose of carrying out Government work, and does not enter into competition with other firms for private work in the open market. It is possible, under these circumstances, that though actual loss may be shown in its working, yet might the indirect profit, arising from the fact that its existence compels outside firms to tender for Government work at moderately low figures, amount to a sum considerably in excess of the actual loss shown.

## 16.—DREDGER "KUANTAN."

The dredger "Kuantan" remained at Port Swettenham during the whole year and was not put into commission. The tug "Sri Tunda" and Hopper Barges were lent to the Federated Malay States Railways for work at Prai Docks, being returned at the end of the year.

## 17.—MECHANICAL TRANSPORT.

The department had in possession at the end of the year:

Motor Lorries ...	...	...	...	...	...	78
Steam Tractors ...	...	...	...	...	...	27
Steam Road Rollers ...	...	...	...	...	...	119
Motor Road Rollers ...	...	...	...	...	...	7
					Total ...	231



## 18.—GENERAL.

The health of the Staff throughout the year was satisfactory.

On the last day of the year there were working for the department :

10,490 Departmental Coolies and	
2,923 Artizans, etc. (Contractors' employees)	
Giving a total labour force of	13,413.

There was no shortage of labour and the cost of materials was not disproportionate ; cost of buildings erected being less than it was in 1921.

The Acting Director of Public Works visited every district in the Federated Malay States, save Pekan and Rompin.

The State Engineers and Branch Heads met in conference in the Director of Public Works' Office on three occasions during the year.

The Head of the Department sat on the following Boards during the year :

1. Electrical Board (Chairman)
2. Factory Board (Chairman)
3. Railway Board
4. Indian Immigration Committee
5. Malaria Advisory Board
6. Fraser's Hill Development Committee
7. Decrepit Asylum Committee
8. War Memorial Committee
9. Standardisation of Timber Committee.

The State of Perak has one mile of road to every nine square miles of territory.

Selangor has one mile of road to every four square miles of territory.

Negri Sembilan has one mile of road to every five and half square miles of territory.

Pahang has one mile of road to every 37½ square miles of territory.

Giving an average for the whole of the Federated Malay States of one mile of road to every 14 square miles of territory.

The officers of the department travelled by road on duty no less than 1,542,244 miles during the year.

The recruitment of suitable young unmarried officers with practical experience to fill vacancies presented some difficulty, and in addition the incidence of leave weighed somewhat heavily on the department during the year under review.

The staff worked with a will throughout the year and accomplished much satisfactory work—the savings of \$1,960,114 being a striking tribute to their continued industry and zeal.

## APPENDICES.

The following appendices are attached :

- A. Distribution of Technical Staff on 31st December, 1923.
- A<sup>1</sup>. Technical Staff seconded for Service.
- B. Personal Emoluments.
- C. Other Charges, Annually Recurrent.
- C<sup>1</sup>. „ Special Services.
- D. Works and Buildings, Annually Recurrent.
- D<sup>1</sup>. „ Special Services, Revenue Account.
- D<sup>2</sup>. „ Special Services, Loan Account.
- E. Roads, Streets and Bridges, Annually Recurrent.
- E<sup>1</sup>. „ Special Services, Revenue Account.
- E<sup>2</sup>. „ Special Services, Loan Account.
- F. Metal Output.
- G. Mileage of Roads and Paths Return.
- H. Water-works and Supplies.
- H<sup>1</sup>. River Investigations.
- H<sup>2</sup>. Surveys and Borings.
- J. Rainfall Records.
- K. Principal items of work undertaken during the year.
- L. Statement of Savings.
- M. Monetary Summary of total year's work.



## APPENDIX A.

## Distribution of Staff on 31st December, 1923.

	Head Office.	P. W. D. Factory.	A. A. to D. P. W.	Hydraulic.	Electrical.	Anti-Malaria.	Perak.	Selangor.	Negri Sembilan.	Pahang.	Fraser's Hill.	On Leave.	Total.
Director of Public Works...	1	...	...	...	...	...	...	...	...	...	...	...	1
Assist. Director of Public Works ... ..	1	...	...	...	...	...	...	...	...	...	...	...	1
Chief Hydraulic Engineer	...	...	...	1	...	...	1	1	1	1	...	...	1
State Engineers ... ..	...	...	...	...	...	...	1	...	...	...	...	4	5
Senior Executive Engineers	...	...	...	...	...	1	...	...	...	...	...	...	1
Anti-Malaria Engineer ...	...	...	...	...	...	1	...	...	...	...	...	...	1
Executive Engineers ... ..	1	1	...	1	...	...	4	5	3	2	1	10	28
Assistant Engineers ... ..	1	...	...	2	...	2	7	6	2	4	...	3	27
Chief Electrical Engineer	...	...	...	...	1	...	...	...	...	...	...	...	1
Executive Electrical Engineers ... ..	...	...	...	...	1	...	...	...	...	...	...	1	2
Assistant Electrical Engineers ... ..	...	...	...	...	2	...	...	...	...	...	...	...	2
Assistant Mechanical Engineer ... ..	...	...	...	...	...	...	...	...	...	...	...	1	1
Architectural Assistant to Director of Public Works	...	...	...	...	...	...	...	...	...	...	...	1	1
Assistant Architects ... ..	...	...	3	...	...	...	...	...	...	...	...	1	4
Total ... ..	4	1	3	4	4	3	13	12	6	7	1	21	79

## APPENDIX A-1.

## Seconded Staff.

Grade.	Johore.	Kedah.	Kelantan.	Trengganu.	Town Planning.	Sanitary Board, Kuala.	On Leave.	Total.
State Engineers ... ..	1	...	...	...	...	...	1	2
Executive Engineers ... ..	...	2	1	1	1	...	...	5
Assistant " ... ..	3	5	...	...	...	1	...	9
" Architects ... ..	...	1	...	...	...	...	...	1
Total ... ..	4	8	1	1	1	1	1	17



## APPENDIX B.

## Personal Emoluments.

—	Provision.	Expenditure.	Savings.
	\$	\$	\$
Head Office ... ..	695,479	594,799	100,680
Hydraulic Branch ... ..	28,801	13,310	15,491
Electrical Branch ... ..	120,290	102,966	17,324
Anti-Malaria Branch ... ..	27,355	22,742	4,613
Stores and Furniture ... ..	35,453	34,012	1,441
Perak ... ..	101,114	71,683	29,431
Selangor ... ..	179,303	153,771	25,532
Negri Sembilan ... ..	76,680	62,666	14,014
Pahang ... ..	67,406	52,376	15,030
Total ...	1,331,881	1,108,325	223,556

## APPENDIX C.

## Other Charges—Annually Recurrent.

—	Provision.	Expenditure.	Savings.
	\$	\$	\$
Head Office ... ..	27,317	21,858	5,459
Hydraulic Branch ... ..	84,000	22,292	61,708
Electrical Branch ... ..	312,100	205,093	107,007
Anti-Malaria Branch ... ..	17,850	10,992	6,858
Stores and Furniture ... ..	11,492	8,838	2,654
Perak ... ..	215,724	154,931	60,793
Selangor ... ..	233,350	174,089	59,261
Negri Sembilan ... ..	87,814	53,986	33,828
Pahang ... ..	52,520	26,087	26,433
Fraser's Hill ... ..	16,540	14,350	2,190
Total ...	1,058,707	692,516	366,191

## APPENDIX C-1.

## Special Services.

—	Provision.	Expenditure.	Balance.
	\$	\$	\$
Electrical Branch ... ..	176	156	20
Perak... ..	9,800	8,680	1,120
Selangor ... ..	27,483	22,848	4,635
Negri Sembilan ... ..	480	176	304
Pahang ... ..	2,798	2,278	520
Stores and Furniture ... ..	25,720	21,252	4,468
Total ...	66,457	55,390	11,067



## APPENDIX D.

## Works and Buildings—Annually Recurrent.

—						Provision.	Expenditure.	Savings.
						\$	\$	\$
Federal	...	...	...	...	...	116,280	103,799	12,481
Perak	...	...	...	...	...	411,075	318,437	92,638
Selangor	...	...	...	...	...	255,520	226,126	29,394
Negri Sembilan	...	...	...	...	...	160,950	137,094	23,856
Pahang	...	...	...	...	...	98,750	80,308	18,442
Fraser's Hill	...	...	...	...	...	3,000	366	2,634
Total						1,045,575	866,130	179,445

## APPENDIX D-1.

## Special Services—Revenue Account.

—						Provision	Expenditure.	Balance.
						\$	\$	\$
Federal	...	...	...	...	...	137,671	76,383	61,288
Perak	...	...	...	...	...	60,538	32,528	28,010
Selangor	...	...	...	...	...	45,766	38,072	7,694
Negri Sembilan	...	...	...	...	...	54,100	44,213	9,887
Pahang	...	...	...	...	...	6,410	4,352	2,058
Total						304,485	195,548	108,937

## APPENDIX D-2.

## Special Services—Loan Account.

—						Provision.	Expenditure.	Balance.
						\$	\$	\$
Perak	...	...	...	...	...	848,620	268,760	579,860
Selangor	...	...	...	...	...	1,030,360	264,715	765,645
Negri Sembilan	...	...	...	...	...	86,026	70,994	15,032
Pahang	...	...	...	...	...	146,477	64,152	82,325
Federal	...	...	...	...	...	246,600	246,000	600
Total						2,358,083	914,621	1,443,462



## APPENDIX E.

## Roads, Streets and Bridges—Annually Recurrent.

—							Provision.	Expenditure.	Savings.
							\$	\$	\$
Federal	...	...	...	...	...	...	26,950	25,980	970
Perak	...	...	...	...	...	...	1,357,550	1,142,496	215,054
Selangor	...	...	...	...	...	...	1,009,890	938,144	71,746
Negri Sembilan	...	...	...	...	...	...	721,200	584,371	136,829
Pahang	...	...	...	...	...	...	503,945	435,279	68,666
Total							3,619,535	3,126,270	493,265

## APPENDIX E-1.

## Special Services—Revenue Account.

—							Provision.	Expenditure.	Balance.
							\$	\$	\$
Perak	...	...	...	...	...	...	37,500	9,675	27,825
Selangor	...	...	...	...	...	...	49,680	33,570	16,110
Total							87,180	43,245	43,935

## APPENDIX E-2.

## Special Services—Loan Account.

—							Provision.	Expenditure.	Balance.
							\$	\$	\$
Perak	...	...	...	...	...	...	174,230	63,713	110,517
Selangor	...	...	...	...	...	...	59,840	49,027	10,813
Negri Sembilan	...	...	...	...	...	...	295,013	166,920	128,093
Pahang	...	...	...	...	...	...	229,390	148,035	81,355
Total							758,473	427,695	330,778



## APPENDIX F.

## Metal Output.

State.	Granite.	Laterite or Schist.	Limestone or Calcareous Schale.	River Metal.	Sandstone and Gravel.	Quartzite.	Total. Cubes.
	Cubes.	Cubes.	Cubes.	Cubes.	Cubes.	Cubes.	
Perak ... ..	42,618.50	5,473.00	34,025.50	1,070.00	6,685.00	2,831.00	92,703.00
Selangor ... ..	7,086.19	12,754.69	9,509.47	...	8,739.28	1,180.00	39,269.63
Negri Sembilan ... ..	7,124.00	5,631.00	...	150.00	510.00	683.00	14,098.00
Pahang ... ..	3,332.07	1,361.07	2,049.73	533.60	205.44	2,872.90	10,354.81
Total ...	60,160.76	25,219.76	45,584.70	1,753.60	16,139.72	7,566.90	156,425.44

1 Cube=3.703 Cubic Yards.

## APPENDIX G.

## Mileage of Roads and Paths Return.

State.	Cart Roads.						Bridle Paths and Roads.		
	Metalled or Gravelled.			Unmetalled.					
	1921.	1922.	1923.	1921.	1922.	1923.	1921.	1922.	1923.
	M. CH.	M. CH.	M. CH.	M. CH.	M. CH.	M. CH.	M. CH.	M. CH.	M. CH.
Perak ... ..	855 06	875 72	872 79	76 78	58 18	57 35	1,130 56	1,101 34	1,097 78
Selangor ... ..	796 06	776 67	786 10	48 17	46 21	47 68	151 25	146 51	147 26
Negri Sembilan ... ..	430 60	432 58	463 11	8 75	8 75	8 75	250 23	259 63	259 63
Pahang ... ..	358 08½	356 52	371 79	43 15	43 18	25 50	288 44	284 54	288 64
Total ...	2,440 00½	2,442 09	2,494 19	177 25	156 52	139 68	1,820 68	1,792 42	1,793 71



## APPENDIX H.

## Waterworks—Waterworks and Supplies.

—	Provision.	Amount allotted.	Amount expended.	Balance.	Saving.	Revotes foreseen or unforeseen.
	\$	\$	\$	\$	\$	\$
Perak ... ..	323,816	323,816	88,185	235,631	147,905	87,726
Kuala Lumpur ... ..	105,926	105,926	85,801	20,125	19,525	600
Klang ... ..	140,378	140,378	57,329	83,049	—	83,049
Total ... ..	570,120	570,120	231,315	338,805	167,430	171,375

## APPENDIX H-1.

## River Investigation—Drainage and Irrigation.

State.	Provision.	Amount allotted.	Amount expended.	Balance.	Saving.	Revotes foreseen or unforeseen.
	\$	\$	\$	\$	\$	\$
Perak ... ..	141,065	141,065	48,493	92,572	30,825	61,747
Selangor ... ..	12,705	25,400	22,323	3,077	3,077	—
Negri Sembilan ... ..	30,496	30,496	13,244	17,252	277	16,975
Pahang ... ..	17,381	17,381	13,241	4,140	317	3,823
Total ... ..	201,647	214,342	97,301	117,041	34,496	82,545

## APPENDIX H-2.

## Surveys and Borings.

—	Provision.	Amount allotted.	Amount expended.	Balance.	Saving.	Revotes foreseen or unforeseen.
	\$	\$	\$	\$	\$	\$
	70,000	70,000	2,473	67,527	27,527	40,000



APPENDIX J.  
Rainfall.

—	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
PERAK—													
Taiping ... ..	16.61	10.83	13.11	21.26	6.57	1.10	4.33	9.25	15.59	24.80	12.28	18.23	153.96
Ipoh ... ..	11.38	6.57	7.64	12.83	4.37	5.04	2.24	2.64	10.75	10.55	13.19	8.43	95.63
Kuala Kangsar ... ..	7.09	4.80	5.27	10.47	2.72	3.19	3.90	3.90	7.36	11.42	8.35	6.61	75.08
Parit Buntar ... ..	5.71	3.11	4.33	9.29	4.84	6.77	4.17	5.00	15.63	19.65	10.75	7.24	96.49
Tapah ... ..	11.46	22.09	8.66	16.26	9.57	5.67	3.46	6.61	10.55	27.56	13.19	11.57	146.65
SELANGOR—													
Kuala Lumpur ... ..	8.79	6.48	10.25	8.40	4.76	5.16	2.27	9.01	5.06	13.08	4.61	10.14	88.01
Klang ... ..	16.32	2.90	7.64	11.95	3.80	9.01	1.50	8.39	5.11	10.54	7.52	10.06	94.74
Kajang ... ..	7.40	6.05	9.86	5.28	4.44	2.17	1.28	4.35	6.14	9.45	8.80	7.61	72.83
Kuala Kubu ... ..	3.63	6.59	7.14	7.26	7.56	8.96	4.09	8.25	11.81	19.36	8.99	5.46	99.10
NEGRI SEMBILAN—													
Seremban ... ..	5.09	1.93	7.62	6.67	3.80	3.04	5.39	6.33	5.28	9.33	5.04	5.95	65.47
Kuala Pilah ... ..	7.61	3.38	12.63	8.05	7.05	2.79	3.24	8.67	2.74	9.25	9.21	8.68	83.30
Tampin ... ..	7.29	No rain	3.90	8.97	1.96	4.03	4.98	6.23	2.57	11.75	8.66	8.22	68.56
Port Dickson ... ..	8.89	1.83	3.84	6.59	4.36	6.54	8.14	5.83	7.45	8.92	9.96	10.47	82.82
PAHANG—													
Kuala Lipis ... ..	13.27	11.94	3.00	4.75	6.39	5.63	2.01	5.97	8.11	13.63	10.66	13.96	99.32
Raub ... ..	10.81	1.47	5.84	5.44	1.86	1.90	3.05	3.04	5.44	9.49	8.59	17.71	64.64
Bentong ... ..	8.44	3.47	6.02	8.74	4.08	4.15	1.87	2.19	3.75	11.70	6.80	10.50	71.71
Kuantan ... ..	14.60	0.02	7.77	3.90	8.27	6.46	2.70	5.69	4.96	13.54	9.94	39.28	117.13

The average rainfall for the year deduced from the above was  
in Perak ... .. 113.56 inches  
,, Selangor ... .. 88.67 „  
,, Negri Sembilan ... .. 75.04 „  
,, Pahang ... .. 88.20 „



## APPENDIX K.

## PRINCIPAL ITEMS UNDERTAKEN UNDER LOAN ACCOUNT.

## PERAK—

Additional Buildings to Training College, Tanjong Malim  
 Quarters, General List, Taiping  
 Wiring, Government Quarters and Buildings, Ipoh  
 Quarters, General List, Ipoh  
 Raja Muda's House, Telok Anson  
 Kenas Irrigation Scheme  
 Improvements to Krian Irrigation Reservoir  
 Improvements to Kuala Kangsar Water Supply  
 Improvements to Ipoh Water Supply

## SELANGOR—

Five Class VI Quarters for Teachers, Maxwell Road School  
 Quarters for Subordinates, Posts and Telegraphs Department  
 Quarters for Clerks, Imbi Road, Kuala Lumpur  
 Quarters for Clerks, Klang and Port Swettenham  
 Reconstruction, Maxwell Hill (high level) Reservoir  
 Improvement to Water Supply, Klang and Port Swettenham

## NEGRI SEMBILAN—

Wiring, Government Quarters and Buildings, Seremban  
 Coolie Lines, Seremban  
 Seaside Bungalow for H.H. Yang di Pertuan Besar  
 Construction of Gemas Road  
 New Overhead Bridge, Seremban

## PAHANG—

Five New School Buildings  
 New Clerks Quarters and Coolie Lines (various)  
 New Police Buildings, S. Lembing and Bebar  
 New Clerks Quarters, Lipis  
 Pulau Tawar Irrigation Scheme  
 Bentong (Perting) Tailings Dam  
 Mentakab-Karak Road  
 New Bridge, 82nd mile, Ginting Sempah Road

## APPENDIX L.

## Statement of Savings.

—	Provision.	Expenditure.	Balance.	Revotes foreseen and unforeseen.	Savings.
	\$	\$	\$	\$	\$
Personal Emoluments ... ..	1,331,881	1,108,325	223,556	...	223,556
Annually Recurrent, Other Charges ... ..	1,058,707	692,516	366,191	...	366,191
Annually Recurrent, Works and Buildings ... ..	1,045,575	866,130	179,445	...	179,445
Annually Recurrent, Roads, Streets and Bridges ... ..	3,619,535	3,126,270	493,265	...	493,265
Annually Recurrent, Irrigation and Drainage ... ..	165,500	128,736	36,764	...	36,764
Annually Recurrent, Anti- Malaria ... ..	117,800	81,562	36,238	...	36,238
Total A.R. ... ..	7,338,998	6,003,539	1,335,459	...	1,335,459
Special Services, Other Charges	66,457	55,390	11,067	3,397	7,670
Special Services, Works and Buildings ... ..	304,485	195,548	108,937	61,527	47,410
Special Services, Roads, Streets and Bridges ... ..	87,180	43,245	43,935	41,857	2,078
Special Services, Miscellaneous Services ... ..	49,636	15,129	34,507	...	34,507
Loan Account ... ..	4,506,543	2,021,547	2,484,996	1,980,703	532,990
Total S.S. ... ..	5,014,301	2,330,859	2,683,442	2,087,484	624,655
Temporary Allowance ... ..	...	207,571			
Stores ... ..	...	135,377			
GRAND TOTAL ... ..	12,353,299	8,677,346	4,018,901	2,087,484	1,960,114



# APPENDIX M.

## Summary.

	Engineering and Administration.			Annually Recurrent.				Irrigation and Drainage.	Anti-Malaria Works.	Special Services Revenue Account.				Miscellaneous Services.	Purchase of Stores.	Loan Account.	Totals.
	Personal Emoluments.	Temporary and Acting Allowances.	Total.	Other Charges.	Works and Buildings.	Roads, Streets and Bridges.	Total.			Other Charges.	Works and Buildings.	Roads, Streets and Bridges.	Total.				
Head Office ...	₹ 594,799	₹ 94,610	₹ 689,409	₹ 21,858	₹ 5,930	...	₹ 27,788	...	...	...	₹ 58,226	...	₹ 58,226	...	...	₹ 248,373	₹ 1,023,896
Hydraulic Branch ...	13,310	1,522	14,832	22,292	...	...	22,292	...	...	...	4,150	...	4,150	...	...	...	41,274
Electrical ...	102,966	15,048	118,014	205,093	...	...	205,093	...	...	156	...	...	156	...	...	96,418	419,681
Anti-Malaria ...	22,742	4,523	27,265	10,992	...	...	10,992	...	...	...	...	...	...	...	...	...	38,257
Fraser's Hill ...	...	...	...	14,350	366	12,933	27,649	...	2,489	...	...	...	...	...	...	169,060	199,198
Stores and Furniture	34,012	5,495	39,507	8,838	...	...	8,838	...	...	21,252	...	...	21,252	...	135,377	...	204,974
Perak ...	71,683	26,466	98,149	154,931	332,897	1,142,770	1,630,598	97,397	21,706	8,680	32,828	9,675	51,183	6,356	...	488,667	2,394,056
Selangor ...	153,771	35,190	188,961	174,089	309,535	950,917	1,434,541	30,629	43,074	22,848	51,779	33,570	108,197	2,644	...	512,014	2,320,060
Negri Sembilan ...	62,666	12,838	75,504	53,988	137,094	584,371	775,451	...	12,659	176	44,213	...	44,389	...	...	280,416	1,188,419
Pahang ...	52,376	11,879	64,255	26,087	80,308	435,279	541,674	710	1,634	2,278	4,352	...	6,630	6,129	...	226,499	847,531
Total ...	1,108,325	207,571	1,315,896	692,516	866,130	3,126,270	4,684,916	128,736	81,562	55,390	195,548	43,245	294,183	15,129	135,377	2,021,547	8,677,846

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