

SINGAPORE.

The following records are purely personal notes and observations taken during the years 1902 and 1903, a part of the time during which the Christmas Island Phosphate Company engaged me as their Medical Officer at Christmas Island.

On my arrival at Christmas Island towards the end of April, 1901, Beri-Beri was, and had been for some months past, rife among the Chinese coolies employed there, 119 deaths having occurred during the first four months of the year. The three following years of my stay there were marked by somewhat frequent epidemics, or, rather, recrudescences of Beri-Beri, as a large number of the Chinese coolies on the Island always showed some signs or symptoms of the disease.

The Chinese coolies employed on the Island may be roughly taken to be in number between 500 and 600, and they account for three-fourths of the entire population. The majority of these coolies are Sinkeh's, or new men imported direct from the Southern parts of China to Singapore, whence they are shipped, after passing through the hands of the brokers, to the Island. These Sinkeh's sign on a year's contract, and the majority of them, after working this out, return to Singapore; the result of which is that the coolie population of the Island is constantly changing, fresh importations occurring almost every month to replace the time-expired coolies returning to Singapore. Every coolie, prior to his coming to the Island, is examined by a medical man at Singapore, and any one of them showing signs or symptoms of Beri-Beri is rejected. It will thus be seen that exceptional opportunities and circumstances were present on the Island from which some information regarding Beri-Beri might be gathered.

As far as possible an attempt has been made in the following pages to put down all the observations and notes taken in the years 1902 and 1903 on initial attacks of Beri-Beri occurring among Chinese coolies who had never suffered from Beri-Beri prior to their living on the Island.



Results of examination of newly imported Coolies on their arrival at Christmas Island.

YEAR 1902.	
Number of Coolies imported during the year ...	328
Number who had had prior attacks of Beri-Beri ...	6
Knee Jerks exaggerated	75
Knee Jerks exaggerated and Numbness of Lower Extremity... ..	7
Knee Jerks exaggerated and Oedema of Lower Extremity... ..	11
Knee Jerks exaggerated Numbness and Oedema of Lower Extremity	5
Knee Jerks exaggerated and Tachycardia	2
Knee Jerks diminished	5
Knee Jerks diminished and Numbness of Lower Extremity... ..	1
Knee Jerks diminished, Numbness of Upper and Lower Extremity. Oedema of Lower Extremity	1
Knee Jerk absent	1
Numbness of Upper and Lower Extremity ...	1
Oedema of Lower Extremity	1
Numbness of Upper Extremity	1
Numbness and Oedema of Lower Extremity ...	1
Numbness of Lower Extremity	2
Coolies brought to the Island during my absence at the Supreme Court, Singapore	124

SIGNS AND SYMPTOMS OF EACH INDIVIDUAL CASE OF INITIAL ATTACKS OF BERI-BERI IN 1902 AMONG COOLIES IMPORTED TO CHRISTMAS ISLAND. TREATMENT AND RESULT OF TREATMENT OF SAME.

Treatments mentioned in the following tables:

TONIC	{ Acid nitrohydrochlor dil	M	10
	{ Tinct ferri perchlor	M	10
	{ Liq strychnine	M	5
	{ Spir chloroform	M	10
	{ Aq: ad. oz. t.d.s.		
CHLORINE	{ Potas chlor	grs.	3
	{ Acid hydrochlor	M	6
	{ Aq: ad. oz. t.d.s.		
DIURETIC	{ Potas acet	grs.	20
	{ Spir aether nit	M	20
	{ Tinc. scillae	M	15
	{ Succ. scoparii	M	60
	{ Aq: ad. oz. t.d.s.		
	Mag. sulph	grs.	30
	Potas acid tart	grs.	30
	Aq: ad. oz. t.d.s.		
	1 % sol nitroglycer	M	5
	Tinct digitalis	M	5
	Aq: ad. oz. as directed		

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUIES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Jan. 1902															
15	2 m'tns	..	P	.. P	P	..	.. P	..	..	P	..	Tonic	R	7	
38	?	..	.. P	P	P	..	..	..	..	..	..	..	..	R	17
48	?	..	P	.. P	P	..	..	P	..	P	..	..	..	R	28
53	?	..	.. P	..	..	..	..	..	..	..	..	..	..	R	29
57	?	..	P	.. P	..	..	..	..	..	..	..	..	..	R	17
60	?	..	P	.. P	..	..	..	..	P	..	..	..	..	R	14
67	?	?	?	?	?	?	?	?	?	?	?	?	?	D	$\frac{1}{2}$
84	?	..	P	.. P	P	..	..	..	..	P	..	Tonic	R	84	
88	?	..	.. P	P	P	P	..	..	..	P	..	..	..	R	10
90	?	..	.. P	P	P	P	..	..	..	..	..	..	..	R	32
(Bed 96) (Ticket missing)	?	?	?	?	?	?	?	?	?	?	?	?	?	D	?
101	3	..	P	..	..	..	P	..	..	..	P	..	Tonic	R	22
107	?	..	P	..	P	..	P	..	..	..	..	..	..	R	34
111	?	..	.. P	P	..	P	..	..	..	P	..	..	..	R	30
123	3	..	P	.. P	P	P	..	..	..	P	..	..	..	R	28
125	3	..	P	.. P	..	P	..	..	..	..	..	..	..	R	6
138	?	..	P	.. P	P	..	..	P	..	P	..	..	..	R	15
179	8	..	.. P	P	P	P	..	..	..	P	..	..	..	R	8
181	7	..	.. P	P	..	P	..	..	..	..	..	..	..	R	8
185	12	..	.. P	P	..	P	..	..	..	..	..	..	..	R	7
190	11	..	.. P	P	P	..	..	P	..	..	..	..	..	R	20
February															
210	?	..	P	..	..	P	P	..	..	..	P	..	..	R	38
212	?	..	..	.. P	P	..	..	..	..	P	..	..	..	D	1
214	?	..	..	.. P	P	..	P	..	..	..	..	..	..	R	59

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUIES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Feb. 1902 —cont.															
220	12 m'ths.	..	..	..	P	..	P	..	..	..	P	..	Tonic	R	10
223	?	..	P	..	P	..	P	..	..	..	P	..	..	D	1
225	8	..	..	..	P	..	P	..	..	..	..	..	..	R	9
228	11	..	..	..	..	..	P	..	..	..	P	..	..	R	16
231	2	..	..	P	P	..	..	P	..	..	P	..	..	R	28
239	8	..	..	..	P	..	P	..	..	..	..	..	..	R	4
243	24	..	..	P	P	..	..	P	..	..	P	..	..	D	2
247	4	..	..	P	P	..	..	..	P	..	P	..	..	R	29
249	4	..	..	P	P	..	..	..	P	..	P	..	..	R	133
251	4	..	..	P	P	..	P	..	..	..	P	..	Chlorine	R	38
252	?	..	P	..	P	..	P	..	..	..	P	..	..	R	23
258	2	..	..	P	P	P	..	P	..	..	P	..	..	R	142
265	?	..	..	P	P	..	P	..	..	..	P	..	..	R	17
284	?	..	..	..	P	P	P	..	..	..	..	..	..	R	21
295	2	..	P	..	P	..	P	..	..	..	..	..	Tonic	R	13
303	?	..	P	..	P	..	..	P	..	..	..	..	Mag.Sulph.	R	16
304	?	..	P	..	P	..	..	..	P	..	P	..	Tonic	R	9
315	6	..	P	..	P	P	..	P	..	..	..	..	..	R	10
333	5	..	P	..	P	P	P	..	..	..	P	..	..	R	23
336	2	..	..	..	P	P	P	..	..	..	P	..	..	R	7
March															
359	?	..	P	..	P	..	..	..	P	..	P	P	..	R	8
365	?	..	..	..	P	..	P	..	..	..	P	..	..	R	5
366	?	..	P	..	P	..	P	..	..	..	P	..	..	R	19
370	9	..	..	..	P	..	P	..	..	..	P	P	..	R	11
371	9	..	P	..	P	..	P	..	..	..	..	..	..	R	8

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSSENIA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Mar. 1902 —cont.															
372	10 mths.	..	..	..	P	..	P	..	..	..	P	..	Tonic	R	8
380	?	..	..	P	P	P	P	..	..	..	..	..	..	R	34
389	?	..	P	..	P	..	P	..	..	..	P	..	Chlorine	R	35
395	?	..	..	P	P	..	..	..	P	..	..	..	..	R	4
429	?	..	..	P	P	..	..	..	..	P	P	..	..	R	7
450	?	P	..	..	P	P	..	..	..	P	P	..	..	D	72
470	?	..	P	..	P	..	..	P	..	..	..	..	Tonic	R	14
April															
505	4	..	P	..	P	..	P	..	..	..	P	..	Chlorine	R	12
514	?	..	..	..	P	..	..	..	P	..	P	..	..	R	5
542	6	..	..	..	..	P	..	..	..	P	P	P	Tonic	D	18
553	?	..	P	..	..	P	..	..	P	..	P	..	..	R	12
557	?	..	P	..	..	..	P	..	..	..	P	P	..	R	2
572	5	..	..	..	P	..	P	..	..	..	..	P	..	D	62
588	?	..	..	..	P	P	P	..	..	..	P	..	Chlorine	R	43
594	1	..	P	..	..	P	..	P	..	..	P	P	Tonic	R	88
597	1	..	..	..	P	P	P	..	..	..	..	P	..	R	7
May															
619	7	..	..	..	P	..	P	..	..	..	P	..	Diuretic Mag. Sulp.	R	8
649	?	..	..	P	P	P	..	P	..	..	..	P	Tonic	D	142
June															
682	?	..	..	..	P	P	..	..	..	..	P	..	Chlorine	R	8
694	8 days	..	..	P	..	..	..	..	..	..	P	P	..	R	18
698	?	..	..	P	P	..	..	..	..	P	P	..	..	R	16
701	10 days	..	P	..	P	..	P	..	..	..	..	..	..	R	15
708	14 "	..	..	P	..	P	P	..	..	..	P	..	..	R	18

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMENESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSINGEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
June 1902 —cont.															
711	14 days	..	..	P	..	..	P	..	..	..	P	..	Chlorine	R	16
719	14 ..	..	..	P	P	..	P	..	..	..	..	..	..	R	8
744	? ..	..	P	..	P	..	..	P	..	..	..	..	..	R	4
749	10 ..	..	P	..	P	..	..	..	..	P	P	..	..	R	16
July															
757	3½ m'ths	..	P	..	P	P	P	..	..	..	P	..	..	R	5
768	3 ..	..	..	P	..	P	..	..	P	..	..	..	Diuretic	R	23
774	21 days	..	..	P	..	P	P	..	..	..	P	..	Chlorine	R	6
775	1 m'th	..	..	..	P	..	P	..	..	..	..	..	..	R	9
790	? ..	..	..	..	P	..	..	..	P	..	..	..	..	D	16
805	? ..	..	..	..	P	P	..	..	P	..	P	..	..	R	9
806	? ..	..	P	..	P	..	..	..	P	..	..	..	..	R	6
807	? ..	..	..	P	P	..	..	..	..	..	P	..	..	R	4
822	2 ..	..	P	..	P	P	..	P	..	..	P	..	..	R	8
824	2 ..	..	..	P	P	P	..	P	..	..	P	P	..	R	27
825	15 days	..	P	..	P	P	..	..	P	..	P	..	..	D	20
826	15 ..	..	..	P	P	P	..	..	..	..	..	..	..	R	10
831	2 m'ths	..	..	P	..	..	..	..	P	..	..	..	..	R	15
834	? ..	..	P	..	P	..	..	..	P	..	..	P	..	R	135
853	2 ..	..	..	..	P	..	..	..	..	..	..	P	..	D	14
August															
860	11 ..	..	..	P	..	P	..	..	P	..	..	..	..	R	118
863	1 ..	..	P	..	P	..	..	P	..	..	P	..	..	D	26
869	? ..	..	..	P	P	P	P	..	..	..	..	P	..	D	6
875	? ..	..	..	..	..	..	P	..	..	..	P	..	..	R	18
883	1 ..	..	..	..	P	P	..	..	..	P	..	..	..	R	32

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Aug. 1902 —cont.															
884	3 m'ths	P	..	..	P	..	P	..	..	..	..	..	Chlorine	R	17
893	15	..	P	..	P	P	P	..	..	..	P	P	Diuretic	R	18
898	?	..	P	..	P	..	P	..	..	..	P	..	"	D	15
900	1	..	P	..	..	..	P	..	..	..	..	..	Chlorine	R	18
901	2	..	..	P	P	..	P	..	..	..	P	..	..	R	18
902	?	..	P	..	P	..	..	..	..	..	..	..	..	R	29
907	2	..	..	P	P	P	P	..	..	..	P	..	..	R	18
908	?	..	P	..	P	P	P	..	..	..	..	..	..	R	70
916	2	..	P	..	P	..	..	..	..	P	P	P	..	R	33
918	1	P	P	..	P	..	..	..	P	..	..	..	..	R	15
920	?	P	..	P	P	..	P	..	..	..	..	P	..	R	17
923	4	..	..	..	P	..	P	..	..	..	..	..	..	R	12
929	1	..	P	..	..	P	..	P	..	..	P	..	..	R	33
930	2	..	..	P	..	..	..	..	P	..	P	..	..	R	14
931	15	..	..	P	P	..	P	..	..	..	..	..	..	R	10
940	2	..	..	P	P	..	..	..	P	..	..	..	..	R	14
941	?	..	P	..	P	..	..	..	..	..	P	..	..	R	14
942	1	..	P	..	P	..	..	P	..	..	..	..	..	R	9
953	2	..	P	..	P	..	..	..	..	P	P	..	..	R	8
957	1	P	..	P	..	..	..	..	P	..	P	..	..	R	11
965	2	..	..	..	..	..	..	..	P	..	P	..	..	R	22
967	2	..	..	P	P	P	P	..	..	..	..	..	..	R	22
968	?	..	P	..	..	P	..	..	P	..	P	..	..	R	8
970	1	..	..	P	..	..	iP	iP	..	..	P	..	..	R	5
974	13	..	..	..	P	P	P	..	..	..	P	..	..	R	7
977	1	..	P	..	P	..	P	..	..	..	P	..	..	R	17

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Aug. 1902 —cont.															
978	?	..	P	..	P	..	..	..	iP	iP	P	P	Chlorine	R	14
981	1 m'th	..	..	P	..	P	P	..	..	..	P	..	..	R	27
985	5	..	P	..	P	..	..	..	..	P	P	..	..	R	14
1003	3	..	P	..	P	..	P	..	..	..	P	..	..	R	8
1011	3	..	P	..	P	..	P	..	..	..	P	..	..	R	6
1021	2	..	..	P	P	P	P	..	..	..	..	..	..	R	49
1026	11	..	..	..	..	..	..	..	P	..	..	..	..	R	61
September															
1036	2	..	..	..	..	..	P	..	..	..	P	..	..	R	11
1042	?	..	P	..	P	..	..	P	..	..	..	..	..	R	13
1052	2	..	..	P	..	P	..	..	..	P	P	..	..	D	16
1061	2	P	P	..	..	P	..	P	..	..	P	..	..	R	8
1081	?	..	P	..	P	P	..	..	P	..	P	..	..	R	37
1088	14	..	P	..	P	..	P	..	..	..	..	..	Tonic	R	4
1111	2	..	P	..	..	..	..	..	..	..	P	..	..	D	3 $\frac{1}{2}$ hs.
1118	?	P	P	..	P	P	..	..	..	P	P	..	..	R	57
1123	3	..	..	..	P	P	..	..	..	P	..	..	Chlorine	R	32
1125	2	..	..	..	P	P	..	..	..	P	..	..	Tonic	R	27
1130	3	..	..	P	P	..	..	P	..	..	P	..	Chlorine	R	5
1131	3	..	P	..	P	..	P	..	..	..	P	..	..	R	13
1140	2	..	P	..	P	P	..	..	..	P	P	..	..	R	29
1144	2	..	P	..	P	..	P	..	..	..	..	..	..	R	37
1147	2	..	P	..	P	P	..	..	..	P	P	..	..	R	7
1149	2	..	P	..	P	P	..	..	P	..	..	..	..	R	98
1150	2	..	P	..	..	..	..	..	P	..	..	..	..	R	23

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYPSONIA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Sept. 1902 — <i>cont.</i> 1158 (Lost Knee) (Jerk in) (23 days)	2 m'ths	..	P	..	P	..	..	..	..	P	..	..	Chlorine	R	22
1165	3	..	P	..	P	..	P	..	..	..	..	..	..	R	21
1166	?	..	..	P	P	..	P	..	..	..	P	..	..	R	32
1174	?	..	..	..	..	P	..	..	P	..	P	..	Tonic	D	2
1185	?	..	P	..	P	P	..	..	..	P	..	..	..	R	18
1186	?	..	P	..	P	P	..	P	..	..	P	..	Chlorine	D	6
1187	2	..	..	P	P	..	P	..	..	..	P	..	..	R	17
October															
1190	2	..	P	..	P	P	..	..	P	..	..	P	..	D	12
1193	4	P	..	P	P	P	..	..	P	..	P	..	..	D	12
1197	2	..	..	P	P	..	..	..	P	..	P	..	..	D	4
1198	2	..	..	P	P	..	P	..	..	..	P	..	Diuretic	R	7
1208	2	..	..	P	P	..	..	..	..	P	P	..	Chlorine	R	21
1210	2	..	..	P	P	..	..	..	..	P	P	..	Diuretic	R	12
1213	12	..	..	..	P	..	P	..	..	..	..	..	Chlorine	R	9
1214	3	..	..	P	P	..	..	..	..	P	..	..	..	R	11
1224	?	..	..	P	P	..	P	..	..	..	P	..	(Diuretic Mg. Sulph.)	R	11
1229	?	..	..	P	P	..	P	..	..	..	..	..	Chlorine	R	3
1241	48	..	P	..	..	..	..	..	P	..	P	..	Tonic	R	7
1243	6	..	..	..	P	P	P	..	..	..	..	P	Chlorine	D	4
1249	12	..	P	..	P	P	..	..	P	..	P	..	..	R	8
1252	3	..	..	P	P	..	..	..	..	P	P	..	..	R	10
1261	3	..	..	P	P	..	..	..	P	..	..	..	..	R	15
1267	2	..	..	P	P	P	..	..	P	..	P	..	..	R	7
1271	?	..	P	..	P	..	..	..	..	P	..	..	Tonic	R	6

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUIES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPŒA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Oct. 1902 —cont.															
1274	4 m'ths	..	..	P	P	..	P	..	..	..	..	..	Chlorine	R	6
1277	10 days	..	..	P	P	..	P	..	..	..	P	..	..	R	8
1311	4 m'ths	..	..	P	P	..	..	..	..	P	..	..	Tonic	R	15
November															
1323	?	..	..	P	P	..	..	..	..	P	..	..	..	R	10
1347	?	..	..	P	P	..	..	..	..	P	P	..	Chlorine	R	9
1349	24	..	P	..	P	..	P	..	..	..	P	..	..	R	7
1363	17	..	..	P	..	..	..	..	..	P	P	..	..	R	9
1364	48	..	..	P	P	..	..	..	P	..	P	..	..	R	18
1365	12	..	..	P	P	..	..	..	..	P	P	..	..	R	6
1372	8	..	..	P	..	..	..	..	..	..	P	..	..	R	8
1406	15 days	P	..	P	P	..	P	..	..	..	P	..	..	R	12

R.—Recovered.

D.—Died.

P.—Condition presented.

Results Compiled from the Preceding Tables.

YEAR 1902.

(I.)—Periods of Incubation of Beri-Beri among Coolies with Initial Attacks, with the respective numbers for each period.

1—2 weeks	10
3 weeks—1 month	14
2 "	36
3 "	14
3½ "	1
4 "	8
5 "	3
6 "	3
7 "	2
8 "	4
9 "	2
10 "	1
11 "	4
12 "	5
13 "	1
14 "	1
15 "	2
17 "	1
2 years	2
4 "	2
?	65
TOTAL INITIAL ATTACKS, 181.	

(II.)—Signs and Symptoms found at the time of these Initial Attacks.

Numbness of Lower Extremity	74
Numbness of Upper and Lower Extremity ...	69
Oedema of Lower Extremity	145
Bruits	9
Reduplicated Heart Sounds	19
Tachycardia	64
Dyspnœa and Pain of Heart	108
Knee Jerks present	27
Knee Jerks diminished	20
Knee Jerks absent	38
Knee Jerks exaggerated	79
Knee Jerks I present and I absent	1
Knee Jerks I exaggerated and I diminished	1
TOTAL INITIAL ATTACKS, 181.	

YEAR 1902.—*cont.***(III.)—Treatment of Coolies with Initial Attacks.**

Treatment.	No. of Cases.	Relieved.	Died.	Percentage of Deaths to Total Treated.
Chlorine	110	98	12	10.909
Tonic	61	53	8	13.114
Diuretic... ..	5	4	1	20.000
Diuretic and Sulphate of Magnesium	2	2	...	...
Sulphate of Magnesium	1	1	...	...
? (Bed Ticket lost)	2	...	2	100.000

Results of examination of newly imported Coolies on their arrival at Christmas Island.

YEAR 1903.

Number of Coolies imported during the year	...	359
Number who had had prior attacks of Beri-Beri	...	20
Knee Jerks exaggerated	... ..	17
Knee Jerks exaggerated and Oedema of Lower Extremity.		6
Knee Jerks exaggerated, Numbness and Oedema of Lower Extremity.		1
Knee Jerks diminished	... ..	3

SIGNS AND SYMPTOMS OF EACH INDIVIDUAL CASE OF INITIAL ATTACKS
OF BERI-BERI IN 1903 AMONG COOLIES IMPORTED TO CHRISTMAS
ISLAND. TREATMENT AND RESULT OF TREATMENT OF SAME.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Jan. 1903															
8	?	..	..	..	P	P	..	..	..	P	P	..	Diuretic	R	8
43	2 m'ths	..	..	P	P	P	..	..	..	P	P	..	Chlorine	R	100
52	2	..	P	..	..	P	..	..	..	..	P	..	..	D	1
53	7	..	..	..	P	..	..	..	..	P	P	..	..	R	11
75	?	..	..	P	P	..	..	..	..	P	P	..	..	R	15
February															
101	2	..	..	P	P	..	..	..	P	..	P	..	..	R	123
105	2	..	..	P	P	..	..	(Rt) (P)	(Lt) (P)	..	P	..	..	R	184
123	?	P	P	..	P	..	..	..	..	P	P	..	..	R	12
133	2	..	..	P	P	P	..	..	..	P	P	..	..	R	97
175	?	..	..	P	P	P	..	..	..	P	..	P	..	R	6
178	2	..	..	P	P	..	..	..	..	P	..	..	..	R	6
193	3	..	..	P	P	..	..	..	..	..	P	..	..	R	7
196	3	..	..	P	P	..	..	..	P	..	P	..	..	R	49
205	6	..	..	P	..	P	..	..	P	..	P	..	..	R	32
207	3½	..	..	P	P	..	..	..	P	..	P	..	..	R	4
208	8	..	..	P	..	P	..	..	P	..	..	..	..	R	5
210	3½	..	..	P	P	P	..	..	..	..	..	..	..	R	4
212	4	..	..	P	..	..	..	..	P	..	P	..	..	R	4
220	3	..	..	P	P	..	..	..	P	..	P	..	..	D	16
March															
225	?	P	..	P	P	..	..	..	P	..	P	..	..	R	12
228	3	..	..	P	P	P	..	..	P	..	P	P	..	D	25
236	4	..	..	P	P	..	..	P	..	..	..	..	..	R	26
240	12	..	..	P	P	P	..	..	P	..	P	..	..	R	107
241	1	..	P	..	..	P	..	P	..	..	P	..	..	R	19

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNEA.	REPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Mar. 1903 —cont.															
246	7 m'ths	..	..	P	P	..	..	..	..	P	..	..	Chlorine	R	78
253	5	..	P	..	P	P	..	..	..	P	..	..	..	R	18
254	?	..	..	P	..	..	..	..	P	..	P	..	..	D	6
264	4	..	..	P	P	P	P	..	..	..	..	..	..	R	26
275	4	..	..	P	..	P	..	..	P	..	P	..	..	R	37
280	8	..	P	..	P	P	..	..	P	..	P	..	..	R	15
284	2	..	..	P	P	P	..	..	..	P	P	..	..	R	78
291	4	..	..	P	P	P	..	..	..	P	P	..	..	R	22
295	5	..	..	P	P	P	..	P	..	..	P	..	..	R	105
297	4	..	P	..	..	..	..	..	P	..	P	..	..	K	14
298	3	..	..	P	P	P	..	..	..	P	P	..	..	R	81
300	4	..	..	P	P	P	..	..	..	P	P	..	..	R	23
305	4	..	..	..	P	P	P	..	..	..	P	..	..	R	20
307	4	..	P	..	P	P	P	..	..	..	P	..	..	R	28
309	4	..	P	..	..	..	P	..	..	..	P	..	..	R	28
311	1	..	P	..	P	P	..	..	..	P	P	..	..	R	35
313	4	..	P	..	P	P	P	..	..	..	P	..	..	R	35
314	4	..	..	P	P	P	..	P	..	..	P	..	..	R	8
316	4	..	..	P	P	..	..	P	..	..	P	..	..	R	21
317	4	..	..	P	P	..	..	P	..	..	P	..	..	R	12
323	12	..	..	..	P	..	P	..	..	..	P	..	..	R	7
325	3	..	..	P	P	P	..	..	P	..	P	..	..	R	29
327	10	..	..	..	P	P	..	..	P	..	P	..	..	R	22
328	10	..	..	P	P	P	..	..	..	P	P	..	..	R	12
329	3	..	..	P	P	P	P	..	..	..	P	..	..	R	29
330	7	..	..	P	..	P	..	..	P	..	P	..	..	R	9

R—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Mar. 1903 —cont.															
333	5 m'ths.	..	..	P	P	P	..	P	..	..	P	..	Chlorine	R	8
336	3	..	P	..	..	P	P	..	..	..	P	..	..	R	8
337	3	..	..	P	P	..	P	..	..	..	..	..	..	R	8
339	10	..	..	P	P	..	..	..	P	..	P	..	..	R	14
340	3	..	..	P	..	P	P	..	..	..	P	..	..	R	23
344	3	..	..	P	P	P	..	P	..	..	P	..	..	R	53
345	3	..	..	P	P	..	..	..	..	P	P	..	..	R	8
346	9	..	..	P	..	..	..	..	..	P	P	..	..	R	26
347	5	..	..	P	P	P	..	..	..	P	P	..	..	R	8
351	3	..	..	P	P	..	..	..	..	P	P	P	..	R	99
355	4	..	..	P	P	..	P	..	..	..	P	..	..	R	25
356	2	..	..	P	P	P	..	..	..	P	P	..	..	R	76
360	4	..	..	P	P	..	..	P	..	..	P	..	..	R	13
363	4	..	..	P	P	P	..	..	..	P	..	..	Belladon.	R	11
364	?	..	..	..	P	P	P	..	..	..	..	..	Chlorine	R	14
365	4	..	..	P	P	P	..	..	..	P	P	..	..	R	23
373	9	..	..	..	..	P	..	..	..	..	P	..	Belladon.	R	22
374	?	..	..	P	P	..	..	..	..	..	..	..	Chlorine	R	16
375	9	..	P	..	P	..	..	..	..	P	P	P	Diuretic	R	49
377 Bed Ticket lost	?	?	?	?	?	?	?	?	?	?	?	?	?	D	63
378	4	..	..	P	..	..	..	P	..	..	P	..	Chlorine	R	21
379	4	..	..	P	P	P	P	..	..	..	P	..	Belladon.	R	9
380	4	..	..	P	P	P	P	..	..	..	P	..	..	R	58
387	4	..	..	P	..	..	P	..	..	..	P	..	Mag. Sulph.	R	8
392	1	..	..	..	P	P	..	..	..	P	..	..	..	R	7

R.—Recovered,

D.—Died,

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Mar. 1903 —cont.															
396	4 m'ths.	..	P	..	P	P	..	P	..	..	..	..	Mag.Sulph	R	25
398	9	..	P	..	P	P	..	P	..	..	P	..	..	D	4
400	5	..	P	..	..	P	P	..	..	..	..	..	Belladon.	R	15
402	4	..	..	..	P	P	..	..	..	P	P	..	..	R	16
404	8	..	..	P	P	P	..	..	..	P	..	..	Mag.Sulph.	R	9
412	5	..	..	P	P	P	..	..	..	P	..	..	Belladon.	R	15
414	5	..	..	P	P	P	P	..	..	..	P	..	Mag.Sulph.	R	14
418	5	..	..	P	P	P	..	..	P	..	P	..	..	R	17.
419	5	..	..	P	P	P	..	..	..	P	P	..	..	R	51
426	2	..	P	..	..	P	..	..	..	P	P	..	Ol. Ricini	R	5
430	5	..	..	P	P	P	P	..	..	..	P	..	Mag.Sulph.	R	13
432	18	..	..	..	..	P	..	..	P	..	P	..	..	D	2
436	10	..	..	P	..	P	..	..	..	P	P	..	..	R	49
439	9	..	..	P	P	P	..	..	P	..	P	..	..	R	18
443	5	..	..	P	P	..	..	P	..	..	P	..	..	R	9
444	4	..	..	..	..	P	..	..	..	P	P	..	..	R	25
447	$\frac{1}{2}$	..	P	..	P	..	..	..	..	P	P	..	..	R	9
April															
467	9	..	..	P	P	P	P	..	..	..	P	..	..	R	6
475	10	..	..	..	P	P	P	..	..	..	P	..	..	R	8
477	5	..	P	..	P	..	..	..	..	P	P	..	Diuretic	R	8
493	1	..	..	P	..	P	..	..	P	..	P	..	Mag.Sulph.	D	2
500	8	..	..	P	..	P	..	..	..	P	P	..	..	R	5
504	4	..	..	P	P	P	..	..	P	..	P	..	..	R	95
534	5	..	..	P	P	P	..	..	..	P	..	..	..	R	15
548	1	..	P	..	P	P	..	..	P	..	P	..	..	D	3

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSINGEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
April 1903															
552	?	..	P	..	P	P	..	P	..	..	..	..	Mag. Sulph.	R	47
563	3m'ths	..	P	..	P	P	..	..	P	..	P	..	..	R	31
May															
574	1	..	P	..	P	..	..	..	P	..	..	..	..	R	16
582	3	..	P	..	P	..	..	..	..	..	..	..	..	R	3
583	21 days	..	P	..	P	..	..	..	P	..	..	..	..	R	3
603	14 ..	..	..	P	P	..	..	..	P	..	P	..	..	R	20
611	?	..	P	..	P	P	..	..	..	P	..	P	..	R	63
612	1 m'th	..	..	P	..	P	..	..	P	..	P	..	..	R	36
613	1	..	..	P	P	P	P	..	..	..	P	..	..	R	12
615	2	..	P	..	P	P	..	..	..	P	..	..	..	R	43
618	2	..	..	P	..	P	..	..	P	..	..	..	..	R	39
619	2	..	..	P	..	P	..	P	..	..	P	..	..	R	60
625	10	P	P	..	..	P	..	..	P	..	P	..	..	D	1
626	?	..	P	..	..	P	..	..	..	..	P	..	..	R	33
666	20 days	..	..	P	P	P	..	..	P	..	P	..	..	R	19
672	4m'ths	..	P	..	P	P	..	..	..	P	P	..	..	R	8
677	5	..	P	..	..	P	..	P	..	..	P	P	..	D	1
June															
694	?	..	P	..	..	P	..	..	..	P	P	..	..	R	190
695	1	..	P	..	..	P	..	P	..	..	P	..	..	R	19
696	1	..	P	..	P	..	..	..	..	P	P	..	..	R	11
697	4	..	..	P	..	P	..	..	..	P	P	..	..	R	43
702	2	..	..	P	..	P	..	..	..	P	P	..	..	R	64
703	4	..	..	P	P	P	..	..	..	P	P	..	..	R	59
704	?	..	P	..	..	P	..	..	P	..	P	..	..	R	11

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMENESS OF LOWER EXTREMITY.	NUMENESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSINGEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
June 1903 —cont.															
716	12 m'ths	..	..	..	..	P	..	..	..	P	P	..	Mag. Sulph.	R	6
740	2	..	..	P	..	P	..	..	..	P	P	..	..	R	39
752	2	..	..	P	..	P	..	..	P	..	..	..	..	R	110
753	4	..	..	P	P	..	..	..	..	P	..	..	..	R	7
767	4	..	..	P	..	P	..	..	P	..	P	..	..	R	32
771	2	..	..	..	..	P	..	..	P	..	..	..	..	R	28
783	1	..	P	..	P	P	..	..	P	..	P	..	..	R	25
791	1½	..	..	..	P	P	..	..	..	..	..	..	..	R	17
795	1½	..	..	..	P	P	..	..	..	P	P	..	..	R	26
July															
809	2	..	..	P	..	P	..	..	P	..	P	..	..	R	86
813	2	..	..	..	..	P	..	..	..	P	P	..	..	R	3
833	2	..	..	..	P	P	P	..	..	..	P	..	..	R	5
836	3	..	..	P	..	P	..	..	P	..	P	..	..	R	185
840	4	..	P	..	P	P	..	..	..	P	P	..	..	R	134
844	3	..	..	P	..	P	..	..	P	..	P	..	..	R	16
851	3	..	..	P	P	P	..	..	P	..	P	..	..	R	6
862	3	..	..	P	..	P	..	..	P	..	P	..	..	R	128
863	3	..	P	..	..	P	..	..	P	..	P	..	..	R	11
876	3	..	..	P	..	P	..	..	..	P	P	..	..	R	53
878	4	..	..	P	..	..	..	..	P	..	..	..	..	R	7
885	2½	..	P	..	..	P	..	..	..	P	P	..	..	R	12
887	2½	..	..	P	..	P	..	P	..	..	P	..	..	R	37
895	2½	..	..	P	..	P	..	..	..	P	..	..	..	R	15
909	12	..	..	P	..	P	..	..	..	P	P	..	..	R	17
918	2	..	..	P	..	P	..	..	P	..	P	..	..	R	65

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
July 1903 —cont.															
923	3 m'ths	..	..	P	..	..	..	..	P	..	..	..	Mag. Sulph.	R	164
931	2	..	..	P	..	P	..	P	..	..	P	..	..	R	41
932	4	..	..	P	P	P	..	..	P	..	P	..	..	D	6
August															
938	2	..	..	P	..	P	..	..	P	..	P	..	..	R	64
939	2	..	..	P	P	..	..	..	P	..	P	..	..	R	64
940	2	..	P	..	F	P	..	..	..	P	P	..	..	R	8
950	2	..	P	..	P	P	..	..	P	..	P	..	..	R	21
963	3	..	..	P	P	P	..	..	P	..	..	..	..	R	113
975	3½	..	..	P	P	P	..	P	..	..	..	..	..	R	17
987	2½	..	..	P	..	P	..	P	..	..	P	..	..	R	63
991	2½	..	..	P	P	P	..	..	P	..	P	..	..	D	2
995	2½	..	P	..	..	..	..	..	P	..	P	..	..	R	44
1003	8	..	..	P	P	..	..	..	..	P	P	..	..	R	14
1005	2½	..	P	..	..	P	..	..	P	..	P	..	..	R	17
1006	2	..	..	P	P	..	..	..	P	..	..	..	..	R	14
1011	12	..	..	..	P	P	..	..	..	P	P	..	..	R	28
1019	3	..	..	P	..	P	..	..	P	..	P	..	..	R	12
1020	8	..	..	P	..	P	..	..	..	P	P	..	..	R	12
1022	3	..	..	P	..	P	..	..	..	P	P	..	..	R	17
1029	3	..	..	P	..	P	..	..	..	P	P	..	..	R	15
1034	3	..	..	P	..	P	..	P	..	..	P	..	..	R	87
1035	?	..	P	..	..	P	..	..	..	P	P	..	..	R	10
1044	8	..	..	P	..	P	..	..	..	P	P	..	..	R	12
1045	3	..	..	P	P	P	..	..	..	P	P	..	..	R	43
1046	8	..	..	P	..	P	..	..	..	P	P	..	..	R	11

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUISES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Aug. 1903 —cont.															
1052	3½ m'ths	..	..	..	..	P	..	..	..	P	P	..	Mag. Sulph.	R	7
1088	1 day	..	..	P	..	P	..	..	P	..	P	..	..	D	5
September															
1103	5 m'ths	..	..	P	P	..	..	..	P	..	..	..	..	R	3
1121	6	..	P	..	..	P	..	..	P	..	P	..	..	R	28
1145	5	..	..	P	P	..	..	..	..	P	P	..	..	R	7
1150	2 days	..	..	P	..	P	..	P	..	..	P	..	..	R	13
October															
1172	4 m'ths	..	..	..	..	P	..	..	P	..	P	..	..	R	45
1183	5	..	P	..	..	P	..	..	..	P	P	..	..	R	58
1185	8	..	P	..	..	P	..	..	P	..	P	..	..	R	39
1186	5	..	..	..	..	P	..	..	..	P	P	..	..	R	5
1191	2	..	..	..	..	P	..	..	..	P	P	..	..	R	14
1199	5	..	P	..	..	P	..	P	..	..	P	..	..	R	35
1209	5	..	P	..	..	P	..	..	P	..	P	..	..	R	6
1236	6	..	P	..	..	P	..	P	..	..	P	..	..	R	38
1238	6	..	P	..	..	P	..	P	..	..	P	..	..	D	20
November															
1244	1½	..	..	..	..	P	..	..	..	P	P	..	..	R	17
1267	2½	..	P	..	..	P	..	..	P	..	..	..	..	D	13
1297	6	P	P	..	..	P	..	..	..	P	P	..	..	R	18
1303	8½	..	..	P	P	P	..	..	P	..	P	..	..	R	40
1320	5 yrs.	..	..	P	P	P	..	..	..	P	P	..	..	D	26
1324	6 m'ths	..	P	..	P	P	P	..	..	..	..	..	..	R	8
December															
1331	6	..	..	..	P	P	..	..	..	..	P	..	..	D	1

R.—Recovered.

D.—Died.

P.—Condition presented.

ADMISSION BOOK NUMBER.	CHRISTMAS ISLAND DURATION.	BRUIES.	NUMBNESS OF LOWER EXTREMITY.	NUMBNESS OF UPPER AND LOWER EXTREMITY.	OEDEMA OF LOWER EXTREMITY.	TACHYCARDIA.	KNEE JERK EXAGGERATED.	KNEE JERK DIMINISHED.	KNEE JERK ABSENT.	KNEE JERK PRESENT.	DYSPNOEA.	REDUPLICATED HEART SOUNDS.	TREATMENT.	RESULT OF TREATMENT.	DAYS IN HOSPITAL.
Dec. 1903 —cont.															
1334	1½ m'ths	..	..	P	..	P	..	..	..	..	..	..	Mag. Sulph.	D	26
1336	7	..	..	P	..	P	..	..	..	P	P	..	..	R	37
1351	18	..	P	..	P	P	..	..	..	P	P	..	..	R	26
1361	3	..	..	P	P	..	..	..	P	..	P	..	Nitroglyc. Digit.	D	16
1383	3	..	P	..	P	P	..	..	P	..	P	..	Mag. Sulph.	D	47
1408	1½	..	..	P	..	P	P	..	..	..	..	..	..	R	11
1409	2	..	P	..	P	P	..	..	P	..	P	..	..	R	61
1413	14	..	..	P	..	..	..	..	..	P	P	..	..	R	4
1414	3	..	P	..	..	P	..	..	..	P	P	..	..	R	10

R.—Recovered.

D.—Died.

P.—Condition presented.

Results Compiled from the Preceding Tables.

YEAR 1903

(I.)—Periods of Incubation of Beri-Beri among Coolies with Initial Attacks with the respective numbers for each period.

1 Day	1
2 "	1
1 to 2 Weeks	4
3 Weeks—1 Month	11
1½ "	5
2 "	28
2½ "	8
3 "	31
3½ "	4
4 "	35
5 "	20
6 "	7
7 "	4
8 "	9
8½ "	1
9 "	6
10 "	6
12 "	5
14 "	1
18 "	2
5 Years	1
?	15
TOTAL INITIAL ATTACKS, 205.	

(II.)—*Signs and Symptoms found at the time of these Initial Attacks.*

Numbness of Lower Extremity	...	...	...	57
Numbness of Upper and Lower Extremity	...			122
Oedema of Lower Extremity	...	...	...	117
Bruits	...	...	...	4
Reduplicated Heart Sounds	...	...	...	6
Tachycardia	...	...	...	154
Dyspnœa and Pain of Heart	...	...	...	164
Knee Jerks present	...	...	...	76
Knee Jerks diminished	...	...	...	26
Knee Jerks absent	...	...	...	67
Knee Jerks exaggerated	...	...	...	24
Knee Jerks 1 diminished and 1 absent	...	...		1

TOTAL INITIAL ATTACKS, 205.

YEAR 1903—*cont.***(III.)—Treatment of Coolies with Initial Attacks.**

Treatment.	No. of Cases.	Relieved.	Died.	Percentage of Deaths to Total Treated.
Sulphate of Magnesium	126	111	15	11.904
Chlorine	66	62	4	6. 06
Belladonna	7	7	...	...
Diuretic... ..	3	3	...	...
Nitroglycerine and Digitalis	1	...	1	100.000
Castor Oil	1	1	...	...
? (Bed Ticket lost)	1	...	1	100.000

Period of Incubation of Total Initial Attacks of Beri-Beri among Coolies during 1902 and 1903, with the respective numbers for each period.

1 Day	1	.259 %
2 ,,	1	.259 %
1 to 2 weeks	14	3.626 %
3 wks. to 1 month	25	6.476 %
1½ month	5	1.295 %
2 ,,	64	16.580 %
2½ ,,	8	2.072 %
3 ,,	45	11.658 %
3½ ,,	5	1.295 %
4 ,,	43	11.139 %
5 ,,	23	5.959 %
6 ,,	10	2.590 %
7 ,,	6	1.554 %
8 ,,	13	3.367 %
8½ ,,	1	.259 %
9 ,,	8	2.072 %
10 ,,	7	1.813 %
11 ,,	4	1.036 %
12 ,,	10	2.590 %
13 ,,	1	.259 %
14 ,,	2	.518 %
15 ,,	2	.518 %
17 ,,	1	.259 %
18 ,,	2	.518 %
2 years	2	.518 %
4 ,,	2	.518 %
5 ,,	1	.259 %
?	80	
TOTAL INITIAL ATTACKS, 386		PERCENTAGES FOR THE VARIOUS PERIODS.

From the above table the largest number of Initial Attacks occurred at Periods of Incubation ranging from 1 to 4 months, the maximum number taking place at 2 months.

The percentages quoted above are correct, proportionately only, as the 80 whose periods of incubation were unknown, were included when these figures were worked out.

Signs and Symptoms of Beri-Beri found at the time of Initial Attacks among Coolies during the years 1902 and 1903.

Numbness of Lower Extremity	131	33.937 %
Numbness of Upper and Lower Extremity	191	49.481 %
Oedema of Lower Extremity	262	67.875 %
Bruits	15	3.886 %
Reduplicated Heart Sounds	25	6.476 %
Tachycardia	218	56.476 %
Dyspnœa and Pain of Heart	272	70.466 %
Knee Jerks present	103	26.683 %
Knee Jerks diminished	46	11.917 %
Knee Jerks absent	105	27.202 %
Knee Jerks exaggerated	103	26.683 %
Knee Jerks 1 present and 1 absent ...	1	.259 %
Knee Jerks 1 exaggerated and 1 diminished	1	.259 %
Knee Jerks 1 diminished and 1 absent ...	1	.259 %
TOTAL INITIAL ATTACKS, 386.		PERCENTAGES FOR VARIOUS PERIODS.

Remarks on the Preceding Table.

Tachycardia was found in 56.476 % of the number of those attacked, and it varied in degree. The highest rate per minute recorded was 150, the pulse being taken after the coolie had been sitting down for half-an-hour, and while he continued sitting.

Reduplicated heart sounds were few in number, and bruits were fewer still.

206 had knee jerks present or exaggerated, as contrasted with 151 cases with knee jerks diminished or absent.

Numbness, dyspnoea with pain of heart, oedema and tachycardia were the signs and symptoms most frequently met with, predominating in their written order; the dyspnoea and tachycardia, however, were in many cases found in conjunction.

**Treatment of Coolies with Initial Attacks of Beri-Beri
during the years 1902 and 1903.**

Treatment.	No. of Cases.	Relieved.	Died.	Percentage of Deaths to Total Treated.
Chlorine	176	160	16	9.09
Sulphate of Magnesium	127	112	15	11.811
Tonic	61	53	8	13.114
Diuretic	8	7	1	12.500
Diuretic and Sulphate of Magnesium	2	2	...	...
Belladonna	7	7	...	...
Nitroglycerine and Digitalis	1	...	1	100.000
Castor Oil	1	1	...	...
? (Bed Ticket Lost)	3	...	3	100.000

When Venæsection was indicated, the Median Basilic was opened and amounts of blood ranging from 2 to 20 oz. were extracted. Favourable results, however, were only temporary, as every case thus treated ultimately terminated fatally.

Regarding the treatment medicinally of these cases of Beri-Beri, two drugs and one combination of drugs have been tried on a sufficiently large number of cases to justify comments and comparison, viz. : Chlorine—Sulphate of Magnesium—Nerve and Blood Tonics; the remaining drugs mentioned in the above table can hardly be judged by the figures quoted, as they were used by themselves in a comparatively small number of cases, and were in many cases also adjuncts to the three principal treatments before-mentioned.

For the suggestion of the Chlorine treatment I am solely indebted to Dr. DURHAM, who was investigating Beri-Beri on Christmas Island for some months. For the last year or more all these Beri-Beri cases treated in hospital were put on a gargle of Condy's three times a day, for this suggestion also I have to thank Dr. DURHAM.

From the figures in the table of the Treatment and Results of Treatment of Beri-Beri, Chlorine and Sulphate of Magnesium stand first in efficacy, and it seems that the best results are obtained from attention to the Alimentary Tract, viz. :—

- (1.) Local Antiseptics to the Pharynx.
- (2.) Intestinal Antiseptics.
- (3.) Regular Defæcation with an occasional Hydrogogue.

Attention may be drawn here to the Sanitary and Dietary conditions of the Island.

Those of the former are excellent in every way, those of the latter, as regards the working coolies are open to criticism. Tables for last January the figures of which may be taken as a fair average, are given below, showing the amounts of foodstuffs supplied to the working coolies and hospital patients.

It may be mentioned that the supply of fresh vegetables on the Island is practically nil.

Table showing the equivalent in grains of Nitrogen and Carbon of the amounts of the various foodstuffs supplied per diem per man to the Working Coolies in January last, 1904.

	Amount in lbs. (Avoir.)	Grains of Nitrogen.	Grains of Carbon.
Rice... ..	1.417	96.356	3868.410
Dried Beans and Peas ...	.180	44.640	486.000
Dried and Salt Fish ...	.119	23.800	103.530
Fresh Pork... ..	.216	22.896	888.408
Lard ... ..	.050	.250	322.500
Dried and Salt Vegetables	.200	2.800	84.000
Fresh Vegetables ... ..	.030	.420	12.600
Potatoes and Yams ...	.111	2.442	85.470
Onions ... ..	.039	.546	16.380
Flour Cake... ..	.002	.240	5.400
TOTAL ...	2.364	194.390	5872.698

The Nitrogen appears deficient, Carbon excessive.

Table showing the equivalent in grains of Nitrogen and Carbon of the amounts of the various foodstuffs supplied per diem per man to the Hospital Patients in January last, 1904.

	Amount in lbs. (Avoir.).	Grains of Nitrogen.	Grains of Carbon.
Pulot Rice ... ..	.243	16.524	663.390
Dried Beans and Peas ...	.800	198.400	2160.000
Sugar ... ..	.364	...	1073.800
Pork ... ..	.107	11.342	440.091
Wild pigeons ... ..	.101	23.735	91.910
Potatoes ... ..	.054	1.188	41.580
Onions (Raw) ... ..	.059	.826	24.780
Tinned Pineapple ... ..	.031	.434	13.020
Milk ... ..	.996	44.820	597.600
Flour ... ..	.140	16.800	378.000
Total	2.895	314.069	5484.171

Table Showing Numbers of Re-admissions and First Admissions for Beri-Beri per Month in the Hospitals at Christmas Island, and the Deaths amongst each during

1902 and 1903.

	Re-admissions for Beri-Beri.	Deaths occurring amongst each month's re-admissions but not necessarily in the same month.	Number of Coolies with initial attacks of Beri-Beri.	Deaths occurring from initial attacks not necessarily in the same month.
1902.				
January	63	4	21	2
February	61	2	23	3
March	59	3	10	1
April	25	2	11	2
May	12	...	2	1
June	10	...	9	...
July	17	1	15	3
August	49	7	38	3
September	74	24	24	4
October	55	7	20	4
November	49	3	8	...
December	18	1	...	...
	492	54	181	23
1903.				
January	9	3	5	1
February	14	...	14	1
March	106	16	73	5
April	33	1	10	2
May	38	...	15	2
June	18	...	16	...
July	22	...	19	1
August	44	3	24	2
September	15	1	4	...
October	21	2	9	1
November	30	3	6	2
December	28	6	10	4
	378	35	205	21
TOTAL FOR THE TWO YEARS	870	89	386	44

386 initial attacks amongst 661 (the total number of imported coolies 687 minus the 26 who had had an attack or attacks of Beri-Beri prior to their arrival at Christmas Island), places the incidence rate of Beri-Beri at 58.396%.

Figures taken from the preceding Table comparing the Death Rate of Initial Attacks to that of Re-admissions.

Years	...	...	...	...	...	1902	1903	1902 and 1903
Number of Initial Attacks treated	...	...	...	...	...	181	205	386
Number of Re-admissions treated	...	...	...	...	...	492	378	870
Percentage of Deaths to Initial Attacks treated	...	...	...	...	...	12.707	10.243	11.398
Percentage of Deaths to Re-admissions treated	...	...	...	...	...	10.975	9.253	10.229

The individual number of re-admissions treated may be taken roughly to be about one-third of the total number (870) of re-admissions treated, which would bring the percentage of Deaths to total individual cases treated to 30.689, and not 10.229 as in the above table. From this it would appear that in the large majority of cases an initial attack of Beri-Beri is not fatal.

**Conditions found Post-mortem in 86 Cases of Beri-Beri, from
May 2nd, 1901, to February 4th, 1902.**

Bad Stomatitis (r Noma) ...	...	...	...	...	...	2.325 %
Dropsy of Pericardium ...	...	...	...	...	...	100.000 %
Dilated and Hypertrophied Heart	...	...	...	...	...	98.837 %
Ascites ...	...	...	...	...	...	50.000 %