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REPORT

ON THE

SANITARY ADMINISTRATION

OF THE

PUNJAB

FOR THE YEAR 1877.

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REPORT

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1878.

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Proceedings of the Hon'ble the Lieutenant-Governor of the Punjab in the Home (Medical) Department,—No. 190, dated 13th January 1879.

Read—

Report of Sanitary Commissioner for the year 1877.

THE Sanitary Report for the year 1877, though of considerable interest, presents few features calling for special remark at the present time. The year was exceptionally healthy, more so than any regarding which vital statistics have been recorded in this Province, and it would seem that climatic influences and the meteorological conditions of the year had a very marked effect upon the ordinary forms of epidemic disease.

2. The year which has just closed, 1878, has unfortunately been of an altogether different character, and the mortality from remittent, intermittent, and relapsing fevers, dysentery and small-pox has been exceedingly great; probably, so far as present statistics show, as unhealthy as the year 1877 was the reverse.

3. Such being the case, the meteorological conditions of 1878 having differed in some important particulars from those of 1877, the Lieutenant-Governor will reserve any conclusions which he may desire to draw from the facts contained in the present report until he has received from the Sanitary Commissioner the report for the year 1878, when the very important subject of climatic influence on epidemic and malarious diseases may be more profitably discussed.

4. It is with great satisfaction that the Lieutenant-Governor has observed that the Sanitary Commissioner has, during both years, given his most careful attention to the subject of fever mortality in the Punjab. The reports of inspections of various towns and municipalities have been from time to time submitted as they were written, and orders have been passed upon them, the remarks of the Sanitary Commissioner being conveyed to the local authorities. Much good has, in this way, been done, and the Lieutenant-Governor fully recognises the zeal and energy with which Dr. Bellew has conducted the duties of his office.

By order of the Hon'ble the Lieutenant-Governor,

LEPEL GRIFFIN,

Secretary to Government, Punjab.

Printed at the Punjab Government Civil Secretariat Press, Lahore.—17-1-79—218.

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Statement No. VII.—Showing the total of all Vaccine Operations in the Province of the Punjab during the three months ending 31st March 1877 .....

Report on Vaccine Operations in the Punjab for the year ending March 1878 .....

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REPORT

ON THE

SANITARY ADMINISTRATION OF THE PUNJAB FOR 1877.

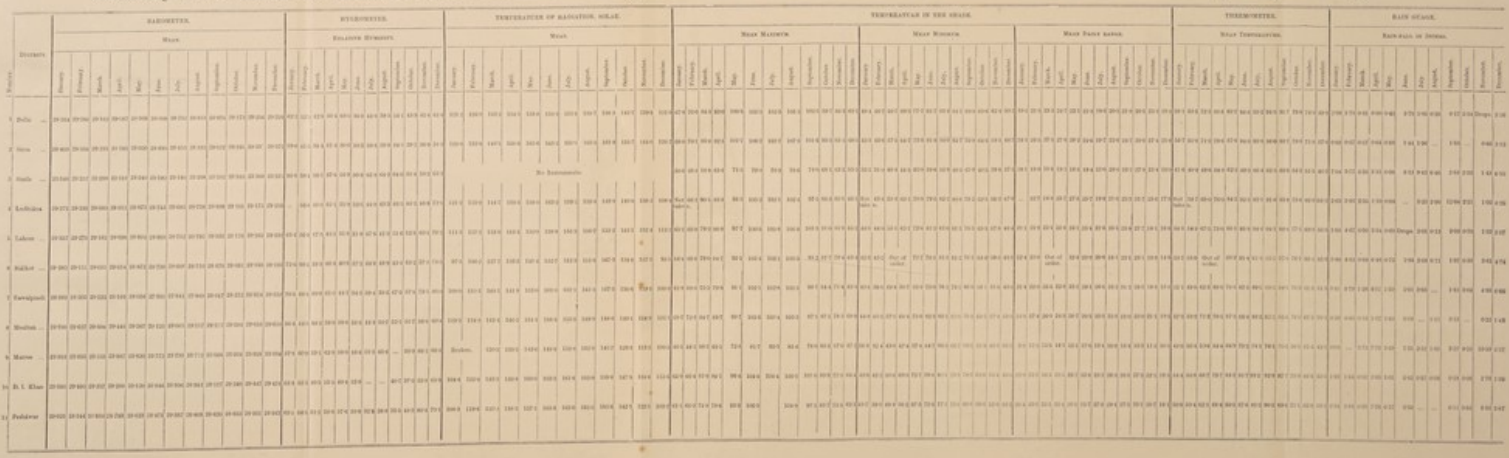
SECTION I.

METEOROLOGY.

Meteorological statements; table of rain-fall in each district and table of rainy days and maximum fall in any one day.

1. I append a tabular statement similar to that given last year, showing the meteorological observations in all those districts of the Province (11 in number) where they are recorded. Along with it are annexed two other tabular statements, one showing the rain-fall in each month at the 32 district stations for the period from the year 1873 to 1877 inclusive, and the other showing the number of days in which rain was measured in 1877, together with the maximum rain-fall in any one day of that year.

Monthly Abstract of the Meteorological Observations registered in the undermentioned Districts of the Province during the year 1877.



Comparative Statement of rain-fall in 32 sadr stations in the Punjab

Number.	STATIONS.	JANUARY.					FEBRUARY.					MARCH.					APRIL.					1873.	1874.
		1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.		
1	Delhi ...	0·6	1·1	0·1	...	1·6	...	...	1·3	0·1	1·6	0·3	1·0	...	1·6	0·5	...	...	...	...	0·4	2·9	1·1
2	Gurgaon ...	0·4	0·3	...	...	1·8	...	...	1·1	0·2	1·5	1·0	0·1	...	2·4	0·7	...	...	...	0·2	0·9	2·1	0·9
3	Karnál ...	0·6	0·5	0·3	...	2·7	0·1	0·4	4·7	...	3·0	0·3	1·8	...	2·0	1·1	...	...	..	0·8	0·8	3·6	1·0
4	Hissar ...	...	0·4	0·1	...	0·2	...	...	2·1	...	1·7	0·2	1·0	...	0·3	2·0	...	...	...	...	1·7	1·2	0·7
5	Rohtak ...	0·3	...	...	...	0·6	...	0·4	1·5	...	0·6	...	1·5	...	0·4	1·1	...	...	...	0·1	0·7	0·4	...
6	Sirsa ...	...	0·7	...	...	1·2	...	0·5	0·5	...	0·5	...	2·2	...	0·6	0·4	..	...	...	0·2	0·8	1·5	...
7	Umballa ...	0·2	0·4	0·1	...	3·8	...	0·9	2·9	0·1	3·2	...	1·7	...	0·6	0·5	...	...	...	0·9	0·8	0·9	1·3
8	Ludhiána ...	0·4	2·3	...	...	2·0	...	1·4	1·6	0·6	2·3	1·6	0·6	...	2·5	2·5	...	0·1	...	1·9	1·1	4·0	0·2
9	Simla ...	1·6	0·4	1·1	...	1·0	0·8	3·5	4·3	1·7	0·9	4·0	4·7	...	2·3	11·2	0·4	0·7	...	4·1	12·7	5·0	3·4
10	Jullundur ...	0·5	2·2	...	0·4	4·3	...	2·1	2·4	1·3	4·5	...	1·3	..	2·2	1·8	0·1	...	...	2·7	1·6	0·1	..
11	Hoshiárpur ...	0·4	2·8	...	0·6	4·7	...	2·4	2·6	0·9	3·1	1·3	1·7	0·2	2·7	1·6	0·2	0·3	...	3·9	2·0	0·9	...
12	Dharmsála ...	7·4	3·6	3·1	3·1	9·0	0·9	9·9	5·5	2·5	5·3	2·4	6·6	1·6	4·5	5·2	0·3	0·4	0·5	4·6	6·6	6·0	0·3
13	Amritsar ...	0·1	1·9	...	0·2	3·9	...	1·0	1·9	...	6·0	0·2	1·4	...	0·8	0·5	...	0·1	...	1·3	3·3	1·4	...
14	Gurdáspur ...	0·4	0·9	...	0·9	4·8	...	1·3	1·3	..	5·7	...	1·2	0·2	3·4	1·5	...	...	...	0·6	1·8	0·5	...
15	Siálkot ...	0·1	1·6	...	0·5	2·6	0·7	0·6	2·2	0·2	6·0	2·1	1·1	...	1·6	1·0	...	0·4	...	1·5	7·3	2·7	...
16	Lahore ...	...	2·0	...	...	1·6	...	0·9	2·1	...	3·8	...	1·0	...	0·9	0·6	...	...	...	0·6	2·5	1·5	...
17	Gujránwála ...	0·1	1·8	...	0·2	3·3	0·1	1·6	1·7	0·5	4·6	0·9	2·4	...	2·2	0·9	...	0·1	...	3·1	1·9	2·3	...
18	Ferozepore ...	...	1·1	...	0·3	0·8	...	0·4	0·6	0·2	1·1	0·2	0·6	...	1·3	0·3	...	...	...	0·3	1·4	0·3	...
19	Rawalpindi ...	1·9	3·8	0·3	3·4	5·6	2·0	0·4	2·6	1·9	5·4	1·4	3·7	1·1	3·5	1·1	0·1	2·1	0·2	2·8	4·7	3·2	0·9
20	Jhelum ...	0·2	1·9	0·8	0·7	9·2	0·1	0·1	0·6	1·3	5·3	0·5	2·2	0·5	1·6	0·6	...	0·1	...	1·6	2·0	1·1	0·2
21	Gujrat ...	0·9	2·6	0·2	0·6	4·5	0·1	1·7	1·4	1·4	5·4	0·8	2·3	0·2	3·3	0·7	..	3·0	...	2·8	2·5	1·8	0·7
22	Shahpur ...	1·3	1·2	...	0·2	1·0	0·2	...	1·7	0·9	3·2	0·3	0·4	0·1	1·6	1·0	...	0·7	...	1·2	2·2	2·1	...
23	Mooltan ...	0·5	0·6	...	...	0·2	...	...	...	...	0·5	...	0·6	...	...	0·7	...	...	...	...	0·4	1·9	...
24	Jhang ...	0·5	0·7	...	0·1	0·3	..	0·2	0·2	...	1·4	0·2	0·4	..	1·2	1·1	...	0·5	...	0·1	2·8	1·4	...
25	Montgomery ...	0·1	0·6	...	...	1·8	...	0·2	0·8	...	7·8	...	0·1	...	0·3	3·0	0·1	...	...	...	0·4	1·6	...
26	Muzaffargarh ...	...	0·3	...	...	0·5	...	...	...	...	1·2	...	1·4	...	...	0·3	..	...	...	...	1·3	2·1	...
27	D. I. Khan ...	1·0	1·1	...	0·2	1·9	...	0·7	3·3	0·3	2·2	0·8	1·6	0·5	1·0	...	...	1·8	...	1·3	1·8	1·7	...
28	D. G. Khan ...	1·7	0·3	...	0·3	0·8	...	...	0·5	0·2	0·4	...	0·6	...	...	0·7	...	...	...	...	0·4	2·5	...
29	Bannu ...	1·7	2·1	...	0·6	1·9	0·4	0·4	3·0	0·6	1·7	0·7	1·7	1·2	3·0	0·4	...	1·0	...	0·4	3·0	1·7	...
30	Pesháwar ...	2·7	4·8	...	2·6	3·2	1·0	...	3·3	0·8	2·5	1·8	1·4	1·4	2·8	1·1	0·5	0·6	...	1·2	6·2	2·3	...
31	Abbott-abad ...	4·5	4·3	0·6	2·4	3·1	1·6	1·0	7·5	1·8	6·7	2·8	6·2	2·1	4·7	4·5	0·8	2·7	0·6	2·1	8·6	5·2	0·8
32	Kohát ...	1·7	6·0	...	2·0	1·8	0·6	0·2	3·0	0·8	3·3	1·1	1·1	1·4	3·7	2·0	0·1	0·3	...	1·5	0·5	2·0	...
	Aggregate rain-fall for the Province ...	31·8	54·3	6·7	19·3	85·7	8·6	32·2	68·2	18·3	102·4	24·9	55·6	10·5	59·0	50·6	2·6	14·9	1·3	41·8	85·1	67·9	11·5

during each month of the years 1873, 1874, 1875, 1876 *and* 1877.

May.			June.					July.					August.					September.					Number.
1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	
0·5	2·7	0·4	0·2	3·5	0·3	3·0	4·4	2·1	10·1	3·4	5·5	0·9	4·2	3·8	6·8	1·0	0·1	8·5	3·4	29·6	5·4	0·2	1
1·9	0·6	0·9	1·1	8·7	...	1·7	4·8	24·9	15·2	8·7	13·5	1·4	4·6	2·7	5·2	2·2	0·1	8·3	3·7	28·2	6·6	1·8	2
2·4	1·2	3·0	1·1	7·6	0·4	0·5	6·5	20·8	18·7	7·9	9·2	2·7	7·2	3·5	8·6	3·5	0·8	6·1	7·1	14·1	1·5	0·8	3
0·3	1·0	2·3	0·4	1·5	0·4	1·3	3·5	4·1	3·7	4·5	12·6	2·4	3·2	2·1	5·9	...	0·5	1·2	0·7	11·8	3·7	...	4
0·3	0·8	1·6	0·4	5·2	0·1	3·5	3·3	10·8	6·4	2·5	8·1	0·4	2·5	0·6	3·7	...	...	4·1	1·0	22·0	3·6	2·6	5
0·4	1·1	0·7	1·3	0·9	0·3	1·2	2·1	4·0	3·8	4·9	6·0	2·2	3·5	4·8	3·0	...	...	1·1	1·0	9·5	4·6	2·1	6
0·2	2·0	0·2	...	10·5	0·8	0·2	2·9	19·7	19·5	4·2	10·0	2·8	7·6	6·7	12·5	4·6	1·1	6·8	3·4	12·8	6·5	2·0	7
1·7	0·9	0·5	0·1	1·9	0·3	0·1	1·3	11·3	7·0	4·4	5·2	4·5	5·0	1·7	8·9	1·4	2·8	2·9	2·6	17·7	1·3	12·0	8
5·2	7·4	5·5	1·1	6·6	8·0	3·3	6·9	22·6	17·5	21·9	22·0	11·2	18·4	11·8	24·9	25·0	7·4	6·4	5·6	11·8	7·4	3·0	9
2·4	0·1	0·4	0·4	4·5	0·8	1·5	1·6	5·7	3·5	7·1	12·4	2·7	6·3	2·8	17·8	3·3	1·5	4·8	6·8	24·1	2·7	12·1	10
0·7	1·2	1·1	0·2	5·2	2·8	0·5	4·2	9·7	9·4	8·0	11·8	7·5	8·6	10·5	13·7	8·8	0·8	4·7	4·7	15·0	3·9	14·2	11
3·2	1·3	7·0	2·1	19·9	10·5	1·8	6·1	50·1	53·8	57·4	57·6	13·9	37·2	49·0	47·1	48·5	7·0	10·4	15·9	23·7	14·3	14·8	12
1·3	0·6	1·4	0·1	3·3	0·9	...	2·0	3·8	5·3	8·2	19·0	2·2	7·9	3·1	16·7	5·9	0·7	4·6	0·1	12·2	1·0	3·9	13
1·7	0·1	1·2	...	6·0	0·5	0·1	1·0	11·5	3·1	15·3	20·6	2·9	4·0	3·2	23·6	7·6	0·8	2·6	2·4	10·5	0·6	6·5	14
0·4	1·5	0·5	...	2·6	0·6	1·3	1·4	10·3	8·2	17·8	32·0	2·1	11·0	7·9	22·4	5·1	0·6	9·2	2·5	4·0	5·8	1·8	15
1·0	0·3	0·4	0·4	2·0	0·9	0·7	...	8·6	4·4	3·2	14·5	1·9	4·0	3·3	14·5	1·9	...	4·4	1·4	9·7	1·5	1·6	16
1·5	1·3	0·4	0·1	2·7	1·0	0·4	...	3·7	4·3	21·2	20·7	2·2	10·5	4·3	15·2	2·4	0·6	4·5	2·8	3·1	0·4	0·5	17
0·3	0·3	2·0	0·7	3·0	0·7	0·7	0·6	10·3	3·7	5·3	6·8	2·1	7·1	2·0	12·5	2·8	0·4	2·2	1·4	9·6	0·2	2·1	18
1·4	1·5	1·4	...	5·7	0·9	1·2	1·7	9·6	12·1	9·4	10·0	3·1	7·1	7·4	14·3	5·8	2·1	2·8	6·0	12·0	1·5	1·7	19
0·7	1·7	0·5	...	2·3	0·2	1·8	1·3	3·3	5·5	6·7	6·7	2·8	5·4	4·2	11·7	3·9	0·8	1·6	3·2	5·8	0·8	0·9	20
0·9	2·0	0·8	0·1	2·9	0·9	0·7	1·6	3·2	3·3	7·4	23·3	1·7	10·7	4·1	12·0	5·0	2·1	3·5	4·1	7·0	...	0·5	21
0·6	0·9	0·3	0·5	1·5	0·6	1·8	1·7	1·7	5·2	1·9	3·1	0·1	4·1	3·4	0·9	3·9	0·5	4·0	2·2	3·7	0·2	...	22
0·6	...	1·0	...	0·2	...	1·3	...	1·9	7·7	1·1	3·5	1·5	2·2	0·6	1·1	0·9	...	...	...	0·5	...	8·2	23
...	0·1	3·1	...	0·5	...	0·2	0·8	10·4	4·1	4·1	1·4	3·4	2·6	2·0	0·5	1·7	...	...	0·2	3·4	0·9	1·5	24
...	...	1·6	...	3·7	...	0·7	0·3	1·5	2·3	0·2	1·8	3·8	2·0	2·3	...	4·6	...	0·1	0·3	0·7	0·9	...	25
...	...	0·6	...	0·1	...	0·6	...	1·7	3·1	...	1·8	...	1·2	1·8	0·7	5·3	0·5	...	...	4·2	...	6·0	26
...	...	1·1	...	...	...	1·5	0·4	2·6	4·4	0·5	1·0	0·3	2·9	3·0	2·0	2·4	...	0·1	...	4·4	0·4	0·1	27
1·4	...	0·4	...	...	...	1·4	0·1	1·4	5·2	2·4	3·6	...	1·8	3·1	1·5	3·6	0·5	...	0·4	1·5	...	0·9	28
0·2	0·3	2·3	...	0·7	0·4	1·0	2·5	0·9	3·3	3·4	2·7	0·7	3·4	10·2	2·3	2·1	1·0	..	...	3·9	0·8	0·1	29
0·8	...	...	0·1	...	...	0·5	...	1·8	2·4	4·9	2·1	...	0·9	5·4	4·6	2·8	...	0·2	0·5	0·4	0·3	...	30
4·2	2·9	5·4	0·5	3·6	2·1	0·9	5·7	8·1	7·4	7·9	12·7	3·3	9·0	11·2	12·2	15·8	3·1	1·3	2·6	7·1	2·1	2·7	31
3·4	0·2	2·6	...	1·0	0·2	1·2	3·4	2·2	7·8	3·9	4·8	0·7	2·7	10·3	4·7	2·1	1·0	2·1	0·6	9·1	1·2	0·8	32
39·6	34·0	50·6	10·9	117·8	34·6	36·4	72·1	302·3	271·4	259·7	366·0	87·4	208·8	192·8	331·5	183·9	36·8	108·5	86·6	333·1	80·1	105·4	

Comparative Statement of rain-fall—concluded.

Number.	STATIONS.	October.					November.					December.					Total.					Number.
		1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	1873.	1874.	1875.	1876.	1877.	
1	Delhi ...	1·3	...	0·2	2·0	5·1	...	...	...	...	...	0·6	...	...	...	3·0	28·7	24·0	42·2	21·3	18·2	1
2	Gurgaon ...	3·5	...	0·4	3·4	2·4	...	...	...	...	...	0·2	...	...	...	3·5	46·1	31·6	45·5	30·8	19·8	2
3	Karnál ...	0·2	...	...	1·4	2·1	...	...	...	...	0·4	0·5	0·2	...	...	3·1	40·5	40·8	38·4	20·1	27·0	3
4	Hissar ...	0·8	...	0·1	1·9	...	...	...	...	...	0·9	0·2	...	...	...	1·2	11·3	10·1	25·2	20·8	16·4	4
5	Rohtak ...	0·5	...	...	1·3	1·9	...	...	...	...	0·3	...	...	...	...	2·2	19·0	15·1	30·1	17·6	15·3	5
6	Sirsa ...	0·7	...	0·7	3·8	...	...	...	...	...	0·7	0·3	...	...	...	3·2	12·4	13·9	19·3	17·5	13·9	6
7	Umballa ...	...	...	...	1·6	1·3	...	...	...	...	0·7	1·6	0·2	0·3	...	4·4	36·8	44·6	33·8	26·5	23·7	7
8	Ludhiána ...	1·1	...	1·0	0·7	2·1	...	...	...	...	0·8	...	...	0·5	...	5·6	26·4	17·7	36·1	14·6	37·5	8
9	Simla ...	0·4	...	1·0	2·5	2·2	...	...	0·3	...	1·3	3·2	...	0·6	...	1·9	63·9	54·2	79·1	75·7	65·2	9
10	Jullundur ...	0·5	...	0·8	0·5	0·8	...	...	...	...	1·4	0·5	...	0·3	...	6·9	18·9	23·2	55·7	27·1	39·6	10
11	Hoshiárpur ...	0·5	...	1·0	1·2	0·5	...	...	...	...	1·0	0·9	...	0·6	...	7·1	27·4	37·0	44·6	35·5	47·8	11
12	Dharmsála ...	1·3	...	2·0	2·6	4·3	0·3	...	0·1	...	5·4	2·3	...	1·9	...	11·7	120·7	159·4	156·6	140·8	96·3	12
13	Amritsar ...	0·5	...	1·2	1·9	1·1	...	...	...	...	2·5	0·8	...	0·6	...	5·0	19·4	16·2	43·0	30·7	32·5	13
14	Gurdáspur ...	...	...	1·9	1·4	0·4	...	...	...	...	2·4	0·9	...	0·1	...	8·9	20·9	18·1	55·1	35·3	37·9	14
15	Siálkot ...	0·8	0·2	0·7	0·6	0·5	...	...	0·3	...	4·2	0·8	...	0·5	...	4·4	37·7	25·1	48·9	50·1	32·4	15
16	Lahore ...	...	...	1·3	1·1	0·5	...	...	...	...	1·2	0·3	...	0·5	...	2·5	19·2	15·0	33·2	21·5	16·6	16
17	Gujránwála ...	0·7	...	1·9	1·8	0·7	...	...	...	0·1	2·8	0·3	...	0·6	...	6·0	23·2	20·0	46·2	33·1	23·9	17
18	Ferozepore ...	1·7	...	...	0·6	...	...	...	...	...	0·9	0·6	...	...	...	3·5	23·1	12·2	29·0	13·5	15·2	18
19	Rawalpindi ...	1·1	...	1·9	0·7	2·8	0·4	...	0·6	2·2	4·5	0·4	...	4·1	0·3	6·5	30·0	42·1	48·8	34·8	40·6	19
20	Jhelum ...	0·2	...	0·7	1·6	3·8	...	...	0·5	0·6	2·9	0·7	...	0·7	...	6·1	13·1	19·7	28·9	22·3	36·2	20
21	Gujrat ...	...	...	1·1	3·1	1·9	...	...	0·3	0·2	1·7	0·1	...	0·9	...	7·4	21·2	24·7	32·3	42·4	30·8	21
22	Shahpur ...	1·3	...	...	1·4	...	...	...	0·8	0·8	3·1	0·8	...	0·7	...	2·3	16·3	14·6	11·0	16·0	15·4	22
23	Mooltan ...	...	...	...	...	...	...	...	0·3	0·5	...	0·5	...	0·1	...	1·1	7·0	9·7	3·7	6·2	13·6	23
24	Jhang ...	0·5	...	...	...	...	...	...	...	0·4	0·5	0·8	...	0·1	...	2·0	16·4	8·6	8·3	6·1	16·9	24
25	Montgomery ...	0·4	...	...	...	...	...	...	0·2	0·2	1·0	0·9	...	...	...	1·3	6·7	9·5	1·9	8·5	21·0	25
26	Muzaffargarh ...	...	...	0·2	0·9	...	...	...	...	0·1	...	0·8	...	0·2	...	1·2	5·8	6·7	5·3	8·7	11·6	26
27	D. I. Khan ...	0·1	...	...	1·2	0·1	...	...	..	0·4	1·8	1·6	...	0·6	...	2·0	9·8	12·6	11·3	9·7	11·7	27
28	D. G. Khan ...	...	...	...	0·4	...	...	...	0·3	1·1	0·2	1·5	...	0·3	...	1·3	8·9	9·6	7·9	10·6	5·7	28
29	Bannu ...	0·1	...	0·1	0·3	0·1	0·2	...	0·5	0·2	2·9	...	...	1·2	0·2	2·1	9·1	19·4	16·2	12·2	18·7	29
30	Peshawar ...	0·3	...	1·0	1·0	0·4	0·3	...	1·5	1·6	8·0	...	...	0·7	0·2	4·1	11·9	15·1	18·6	15·9	25·5	30
31	Abbott-abad ...	1·7	...	3·8	4·0	6·2	0·1	...	3·3	2·4	9·8	1·6	...	4·7	0·5	10·2	37·2	39·8	56·1	52·3	69·3	31
32	Kohát ...	0·5	...	1·3	3·0	1·9	0·5	...	1·2	1·6	13·0	0·6	...	0·3	0·9	4·1	14·1	27·3	28·5	23·0	35·1	32
	Aggregate rain-fall for the Province	20·7	0·2	24·3	47·9	43·1	1·8	...	10·2	12·4	76·3	24·3	0·4	21·1	2·1	135·8	813·1	837·6	1,140·8	901·2	931·3	

2. From this table it will be seen that in the districts of Ludhiána, Jullundur, Hoshiárpur, Amritsar, Gurdáspur, Rawalpindi, Jhelum, Mooltan, Jhang, Montgomery, and in all the frontier districts except Dera Gházi Khan, the aggregate rain-fall during 1877 was in excess of the average of the 4 preceding years. The excess was most marked in the districts of Mooltan, Jhang and Montgomery, where an aggregate fall of 13·6, 16·9, and 21 inches respectively was measured against the corresponding average annual rain-fall of 6·65, 9·85 and 6·65 inches respectively, for the preceding four years.

Table shews the districts in which the aggregate rain-fall during 1877 was in excess of the average of the 4 preceding years.

In Shahpur, Gujrat, Sirsa, and the hill sanitarium of Simla the normal fall obtained, but in the remaining districts, particularly Delhi, Gurgaon, Umballa, and the hill sanitarium of Dharmsála, it was considerably below the average.

In some the normal fall obtained, in others it was considerably below the average.

Table showing the number of days on which rain was measured in 1877, *also the maximum rain-fall on any one day.*

Number.	Sadr stations.	January.	February.	March.	April	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Maximum rain-fall on any 1 day.
1	Delhi ...	3	2	3	4	2	3	3	1	1	4	..	3	29	3·7
2	Gurgaon ...	2	2	4	3	3	4	3	1	2	2	..	4	30	2·2
3	Karnál ...	6	5	4	1	3	3	4	2	1	5	1	5	40	5·0
4	Hissar ...	2	5	2	5	3	4	4	1	..	..	2	2	30	1·3
5	Rohtak ...	1	2	2	2	5	3	1	..	2	3	1	1	23	2·2
6	Sirsa ...	4	2	3	4	4	5	4	..	1	..	2	3	32	2·6
7	Umballa ...	7	5	1	3	1	2	4	1	3	3	1	5	36	2·2
8	Ludhiána ...	4	4	3	2	1	2	3	2	2	1	1	4	29	6·3
9	Simla ...	2	2	8	10	9	8	9	8	5	6	2	5	74	3·2
10	Jullundur ...	4	4	3	4	3	4	4	2	2	2	2	5	39	2·5
11	Hoshiárpur ...	7	6	3	4	3	2	6	2	2	1	1	5	42	9·5
12	Dharmsála ...	9	8	7	8	11	8	8	8	10	6	5	8	96	4·6
13	Amritsar ...	7	6	2	6	6	4	4	1	2	3	4	4	49	2·8
14	Gurdáspur ...	5	5	3	5	4	3	4	1	3	2	4	3	42	5·0
15	Siálkot ...	5	5	3	4	2	3	6	1	2	3	4	3	41	4·5
16	Lahore ...	4	5	4	6	3	...	3	..	3	1	3	4	36	1·3
17	Gujránwála ...	6	6	3	5	2	...	2	1	2	3	3	4	37	3·2
18	Ferozepore ...	2	1	2	2	5	2	4	1	2	..	3	3	27	1·9
19	Rawalpindi ...	7	7	3	9	5	4	5	2	4	6	9	9	70	2·1
20	Jhelum ...	8	7	3	3	2	2	5	2	3	7	5	4	51	3·7
21	Gujrat ...	6	7	3	7	3	3	5	2	2	4	3	4	49	4·2
22	Shahpur ...	4	6	3	7	2	1	1	1	...	...	4	5	34	2·1
23	Mooltan ...	1	1	1	1	1	...	2	...	2	...	...	4	13	6·0
24	Jhang ...	2	3	1	6	4	2	5	...	2	...	1	4	30	1·5
25	Montgomery ...	3	4	4	2	5	1	4	...	...	...	2	3	28	3·8
26	Muzaffargarh ..	1	1	1	4	1	...	...	1	3	...	...	2	14	3·0
27	Dera Ismail Khan ...	4	5	..	6	4	1	2	...	1	1	5	5	34	0·9
28	Dera Gházi Khan ...	1	2	2	2	2	1	...	1	1	...	1	3	16	0·9
29	Bannu ...	4	4	1	4	3	2	2	1	1	1	4	5	32	2·4
30	Peshawar ...	5	4	1	4	...	...	...	...	...	2	9	8	33	2·8
31	Abbott-abad ...	6	8	5	12	7	4	4	3	6	11	12	12	90	3·1
32	Kohát ...	3	7	4	1	6	2	3	3	3	3	10	9	54	4·0

3. The heaviest falls of rain, it will be observed, occurred at Ludhiána, Hoshiárpur and Mooltan. At Hoshiárpur 9·5 inches, and at Ludhiána 6·3 inches fell on one and the same day, 3rd September; whilst at Mooltan, a few days later, on the 8th, a fall of 6 inches was measured, an amount almost equal to the average annual fall at this station, and but little less than half the fall during the whole of this year.

Heaviest falls of rain on any one day occurred at Ludhiána, Hoshiárpur and Mooltan.

4. The most notable feature in the circumstances of the climate of the Punjab during the year 1877 is the unusually plentiful fall of rain in the aggregate for the twelve months. This is quite contrary to the popular belief which accounts the year 1877 as one of the most arid and rainless that the province has experienced for several years. The explanation lies in the fact that the principal rain-fall occurred out of season and thus escaped the general observation, whilst the rain-fall of the usual monsoon season was below the ordinary fall to a very extraordinary degree, and consequently attracted a more general notice. This will be seen by reference to the figures showing the aggregate rain-fall in the above comparative statement. This statement further shows that the aggregate rain-fall of 1877 exceeded the mean aggregate fall of the preceding 4 years by a small amount, and also exceeded that of each individual year of the series excepting only 1875, in which the aggregate rose to the high figure of 1140·8 inches. The table also shows very clearly the exceptional character of the climate for the year, so far as its rain-fall is concerned, by indicating its distribution by months. Up to May inclusive, it will be seen, the monthly rain-fall in every instance largely exceeded the mean fall in those months for the preceding four years, whilst from June to September inclusive, it fell short of the normal quantity to a very extraordinary degree; the total fall for the four months in 1877 being only 301·7 inches against 731·1 inches, the mean total of those months for the preceding four years. The remaining three months again show a fall greatly in excess of the normal amount.

Contrary to popular belief, the rain-fall during 1877 was plentiful.

Explanation lies in the fact that the principal rain-fall occurred out of season, and thus escaped the general observation.

5. In a general sense the climate of the Punjab may be considered as on the whole a salubrious one, except at the change of season from hot to cold weather, and particularly towards the close of the monsoon, when fevers of the continued, remittent, and intermittent forms prevail very widely and with greater or less intensity of type in accordance with specially influencing circumstances of atmospheric and hygienic or sanitary condition. And with this increase in the general prevalence of fevers there is almost always a corresponding rise in the prevalence of bowel complaints as gauged by the mortality returns.

Punjab climate may be considered in the whole salubrious except at change of season.

Table showing relation between rain-fall and mortality from Cholera, Fevers, Bowel complaints

Months.	1869.					1870.				
	Aggregate rain-fall.	Total deaths from				Aggregate rain-fall.	Total deaths from			
		Cholera.	Fevers.	Bowel complaints.	All causes.		Cholera.	Fevers.	Bowel complaints.	All causes.
January	53·1	18	13,596	1,262	28,615	9·5	29	23,396	1,831	35,024
February	22·7	32	9,930	837	23,518	9·4	31	16,148	1,154	26,333
March	178·4	51	8,730	1,111	23,680	77·3	16	15,854	1,223	27,066
April	9·7	76	8,869	1,677	24,126	15·1	33	14,561	1,496	26,360
May	1·7	144	15,168	3,349	38,616	3·9	53	18,267	1,981	31,926
June	60·0	194	13,534	2,643	30,928	131·7	87	15,885	1,600	27,101
July	275·4	797	11,582	1,797	24,026	198·0	52	13,734	1,761	24,174
August	115·4	3,238	15,807	2,660	31,003	253·8	43	15,595	2,559	26,173
September	207·8	2,391	24,010	4,054	39,283	80·2	48	31,307	3,910	44,604
October	20·6	2,033	56,623	5,259	73,049	9·0	22	44,221	3,914	57,582
November	0·1	204	59,917	3,704	71,248	...	24	36,332	3,303	48,867
December	6·7	80	35,180	2,600	45,729	12·5	31	29,793	2,517	43,716
Total ...	951·6	9,258	2,72,946	30,953	4,53,821	800·4	469	2,75,093	27,249	4,18,926

Months.	1874.					1875.				
	Aggregate rain-fall.	Total deaths from				Aggregate rain-fall.	Total deaths from			
		Cholera.	Fevers.	Bowel complaints.	All causes.		Cholera.	Fevers.	Bowel complaints.	All causes.
January	54·3	1	17,170	1,225	28,060	6·7	4	21,584	1,088	34,176
February	32·2	1	12,637	735	21,676	68·2	4	18,534	880	30,524
March	55·6	3	12,543	768	22,107	10·5	4	15,419	829	26,563
April	14·9	12	11,265	901	19,933	1·3	10	16,224	1,443	28,705
May	11·5	9	15,617	1,642	27,633	39·6	41	17,856	1,860	31,655
June	117·8	10	13,327	1,408	23,709	34·6	316	16,133	1,540	28,313
July	271·4	6	11,265	1,369	21,183	259·7	747	14,310	1,620	26,776
August	192·8	11	14,682	1,845	25,678	331·5	1,515	15,164	2,333	29,407
September	86·6	16	16,379	1,762	26,988	333·1	2,117	27,595	3,634	45,767
October	0·2	3	23,274	1,763	34,615	24·3	1,358	48,698	5,838	70,018
November	...	4	20,932	1,562	31,879	10·2	129	39,807	3,976	54,650
December	0·4	2	21,540	1,427	33,252	21·1	1	28,501	2,508	40,654
Total ...	837·7	78	1,90,631	16,407	3,16,713	1140·8	6,246	2,79,825	27,549	4,47,208

Note.—The above table shows the aggregate amount of rain-fall

Aggregate number of deaths from fevers and bowel complaints considerably below that of the previous years, as will be seen from the Statement shewing relation between rain-fall and mortality from different diseases from 1869 to 1877.

6. In the year under review, however, the aggregate number of deaths registered from these two classes of diseases is markedly below that for the two preceding years, and considerably less also than the mean of the eight preceding years, as will be seen from the subjoined tabular statement.

and all causes during the years 1869-1877, *also averages for the years* 1869 *to* 1876.

1871.					1872.					1873.				
Aggregate rain-fall.	*Total deaths from*				Aggregate rain-fall.	*Total deaths from*				Aggregate rain-fall.	*Total deaths from*			
	Cholera.	Fevers.	Bowel complaints.	All causes.		Cholera.	Fevers.	Bowel complaints.	All causes.		Cholera.	Fevers.	Bowel complaints.	All causes.
7·6	17	21,430	1,570	34,479	60·2	12	15,146	1,185	26,179	31·8	4	17,075	1,100	26,889
100·4	14	16,450	1,082	27,831	33·4	22	12,667	872	22,661	8·6	2	12,781	726	21,859
4·3	22	15,839	1,181	28,815	46·2	18	13,169	973	24,577	24·9	4	13,717	867	25,349
13·1	46	16,614	1,555	30,768	30·0	98	11,827	1,562	24,424	2·6	10	12,291	1,003	23,598
31·9	46	17,032	1,623	31,647	44·0	1,073	15,553	2,521	33,139	67·9	11	15,613	1,396	30,196
199·1	50	15,290	1,762	28,285	93·5	978	15,859	1,830	32,544	10·9	14	14,857	1,309	26,762
270·4	26	14,281	2,055	25,881	329·0	489	11,229	1,606	23,931	302·3	28	11,195	1,171	20,712
128·0	21	16,434	2,221	27,848	268·3	2,859	17,862	2,833	35,757	208·8	4	13,595	1,751	24,335
42·9	20	20,858	2,402	32,297	117·4	2,424	43,836	3,348	63,680	108·5	50	29,955	2,933	42,901
0·5	18	19,166	2,414	30,703	4·9	660	45,019	2,781	59,141	20·7	17	32,292	3,227	45,534
..	38	19,069	1,959	30,261	0·5	92	37,416	2,314	48,969	1·8	2	25,838	2,404	37,256
31·7	51	21,085	1,854	34,563	16·1	2	25,128	1,520	35,606	24·3	2	20,700	1,753	31,762
829·9	369	2,13,548	21,678	3,63,378	1043·5	8,727	2,64,711	23,345	4,30,608	813·1	148	2,19,909	19,640	3,57,153

1876.					*Mean for the* 8 *years* 1869-1876.					1877.				
Aggregate rain-fall.	*Total deaths from*				Aggregate rain-fall.	*Mean total deaths from*				Aggregate rain-fall.	*Total deaths from*			
	Cholera.	Fevers.	Bowel complaints.	All causes.		Cholera.	Fevers.	Bowel complaints.	All causes.		Cholera.	Fevers.	Bowel complaints.	All causes.
19·3	4	19,815	1,477	30,327	30·3	11	18,651	1,342	30,469	85·7	2	22,411	1,442	32,447
18·3	7	13,570	984	22,150	36·6	14	14,090	909	24,569	102·4	2	16,985	871	25,809
59·0	2	12,771	906	21,895	57·0	15	13,505	982	25,007	50·6	2	16,569	890	26,492
41·8	6	11,973	1,033	20,730	16·1	36	12,953	1,334	24,830	85·1	3	14,011	1,007	23,527
34·0	8	13,588	1,551	23,871	29·3	173	16,087	1,990	31,085	50·6	7	18,012	1,851	30,237
36·4	236	14,182	1,562	24,561	85·5	236	14,883	1,707	27,775	72·1	3	21,329	2,075	33,991
366·0	1,096	12,712	1,440	23,730	284·0	405	12,539	1,602	23,802	87·4	2	17,770	1,628	28,153
183·9	1,396	17,475	2,217	31,060	210·3	1,136	15,827	2,302	28,908	36·8	1	15,769	1,412	25,382
80·1	1,421	53,465	4,539	71,972	132·1	1,061	30,926	3,323	45,936	105·4	4	14,938	1,391	24,752
47·9	1,277	87,052	5,045	1,05,400	16·0	674	44,543	3,780	59,505	43·1	1	18,623	1,576	29,509
12·4	280	57,186	3,808	71,083	3·1	97	37,062	2,879	49,277	76·3	2	21,214	1,759	33,909
2·1	3	37,497	2,709	50,065	14·4	21	27,428	2,111	39,418	135·8	...	21,650	1,762	36,724
901·2	5,736	3,51,286	27,271	4,96,844	914·7	3,879	2,58,494	24,261	4,10,581	931·3	29	2,19,281	17,664	3,50,932

registered in 32 sadr stations in the Punjab.

7. The inference drawn from an examination of this table is, that a dry monsoon produces a healthy year. The total registered mortality during 1877 is 145,912 less than that of the year before, and 59,649 less than the mean total mortality of the preceding eight years.

Inference to be drawn from the above table is, that a dry monsoon produces a healthy year.

8. By reference to the subjoined table showing the compartive rates of some of the chief articles of diet during the years from 1871 to 1877 inclusive, it will be seen that wheat was cheaper in 1877 in twenty out of the thirty-two district stations of the province than its mean price for the preceding six years, but that, as compared with 1876, it was dearer in all the district stations except three, namely Ferozepore, Montgomery and Pesháwar, in which it was cheaper. In fourteen of the district stations

Statement showing comparative rates of some of the chief articles of diet during the year from 1871 to 1877.

Table showing the comparative rates of some of the chief articles

Number.	Stations.	Wheat.																Wheat.	
		1871.		1872.		1873.		1874.		1875.		1876.		Mean for the years 1871 to 1876.		1877.		1871.	
		Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.
1	Delhi ..	21	15	20	13	19	13	19	15	21	9	25	4	21	9	20	...	10	10
2	Gurgaon ...	20	9	19	1	18	9	19	12	20	14	25	2	20	10	20	6	10	6
3	Karnál ...	22	1	21	10	21	5	21	11	23	14	24	11	22	9	19	15	11	3
4	Hissar ...	19	3	16	13	20	13	19	6	21	6	22	14	20	1	20	4	12	...
5	Rohtak ...	20	15	19	9	19	15	19	4	21	14	24	10	21	...	19	9	13	10
6	Sirsa ...	20	14	18	8	22	15	22	2	21	5	23	2	21	8	22	5	15	9
7	Umballa ...	23	9	21	6	21	6	23	11	23	15	22	8	22	12	21	15	14	3
8	Ludhiána ...	25	13	22	4	25	2	25	12	25	8	25	7	25	...	24	3	7	7
9	Simla ...	14	12	13	14	14	6	16	14	16	15	16	4	15	8	14	9	9	5
10	Jullundur ...	26	8	23	5	25	1	26	9	25	2	24	10	25	3	23	9	11	3
11	Hoshiárpur ...	27	13	23	8	24	7	26	7	25	11	25	9	25	9	23	11	10	1
12	Dharmsála ...	24	8	20	15	18	13	18	13	18	15	17	6	19	14	14	14	16	...
13	Amritsar ...	23	7	21	14	24	10	23	11	25	4	26	...	24	2	23	11	12	11
14	Gurdáspur ...	26	6	24	3	26	12	26	12	25	4	23	9	25	8	22	13	7	12
15	Siálkot ..	21	9	20	2	22	14	22	10	23	13	25	3	22	11	22	8	9	13
16	Lahore ...	21	11	20	9	22	7	23	4	23	4	25	4	22	12	24	6	12	11
17	Gujránwála ...	19	13	19	2	21	8	21	1	22	9	23	13	21	5	22	13	10	14
18	Ferozepore ...	22	3	20	10	23	13	25	1	24	10	27	4	23	15	27	11	8	10
19	Rawalpindi ...	17	14	17	1	17	12	23	5	29	...	32	6	22	14	29	11	6	8
20	Jhelum ...	19	8	20	4	18	13	23	...	29	5	30	5	23	8	27	5	7	12
21	Gujrat ...	20	9	20	6	20	10	22	...	25	3	27	4	22	11	24	11	8	15
22	Shahpur ...	16	8	18	8	21	10	24	6	26	14	28	15	22	13	27	9	7	13
23	Mooltan ...	17	9	19	3	20	6	18	12	21	10	21	14	19	14	21	5	9	9
24	Jhang ...	18	...	20	15	22	8	21	8	22	8	24	11	21	11	24	...	9	9
25	Montgomery ...	18	...	19	...	22	7	21	1	20	12	26	11	21	5	28	1	8	14
26	Muzaffargarh ...	18	6	20	11	21	13	19	12	22	13	21	12	20	14	21	3	6	11
27	Dera Ismail Khan ...	18	...	19	10	23	3	26	4	32	15	33	1	25	8	28	4	7	6
28	Dera Gházi Khan ...	11	...	21	2	20	8	20	5	22	15	22	1	19	10	20	14	7	6
29	Bannu ...	20	2	24	13	30	10	38	7	46	6	45	12	34	6	39	10	6	9
30	Pesháwar ...	13	14	15	13	18	6	21	4	24	1	25	13	19	14	26	8	7	15
31	Abbott-abad ...	16	5	14	14	15	15	16	11	19	14	27	5	18	8	25	1	8	8
32	Kohát ...	15	2	15	15	20	12	26	3	30	7	35	5	23	15	32	8	10	9

NOTE.—16 Chattaks

rice was cheaper in 1877 than its mean price for the preceding six years, but as compared with 1876, it was dearer or of equal price in twenty, and cheaper in only 11 districts. Dál was cheaper in 1877 in only seven district stations, as compared with the mean price for the preceding six years, but, as compared with 1876, it was dearer or of equal price in all the stations except Jhang alone, in which it was cheaper.

Food dear in the Punjab during 1877.

9. Food then, supposing all other grain and articles of diet to show the like comparative rates, it may be said, has been dear in the Punjab during the year under review, prices being for the most part much above those of last year, and on the whole higher also than the average of the preceding six years.

of diet during the years from 1871 *to* 1877 *inclusive.*

Rice.													Dal Urd and Moong (Phaseolus Radiatus and Mungo).												
1872.		1873.		1874.		1875.		1876.		Mean for the years 1871 to 1876.		1877.		1871.		1872.		1873.		1874.		1875.		1876.		Mean for the years 1871 to 1876.		1877.		Number.
Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	
9	11	10	11	9	11	9	14	11	4	10	5	8	13	19	1	17	15	23	9	20	11	20	9	27	6	21	8	20	9	1
9	3	9	7	8	9	9	7	11	...	9	11	9	5	20	4	19	12	24	7	21	12	21	14	26	10	22	7	19	12	2
10	8	11	8	10	14	11	5	13	1	11	7	10	...	18	9	17	8	24	8	22	1	19	2	23	10	20	14	17	10	3
10	8	10	10	10	1	11	13	11	1	10	15	10	9	17	14	18	14	30	13	24	10	24	...	34	12	25	2	24	8	4
11	15	11	3	10	2	12	...	14	6	12	3	9	8	19	6	21	10	29	14	23	15	23	3	30	8	24	12	22	2	5
11	15	9	11	9	13	10	2	10	9	11	4	10	15	17	9	18	...	27	8	24	...	17	7	30	7	22	8	23	3	6
10	6	12	7	12	8	13	5	14	4	12	13	12	9	19	2	15	12	22	15	26	1	22	15	27	1	22	5	20	15	7
7	7	8	14	10	7	11	10	12	5	9	11	11	6	17	13	16	10	24	7	23	12	20	7	23	12	21	2	18	11	8
7	14	8	14	9	4	10	6	10	6	9	5	8	1	11	6	10	5	14	8	15	1	13	14	13	14	13	3	12	1	9
10	13	10	7	11	...	10	13	11	3	10	14	9	12	15	9	14	7	20	10	21	8	18	10	21	13	18	12	17	9	10
8	8	9	12	10	8	9	12	10	5	9	13	9	12	16	6	14	6	20	6	20	14	18	5	21	1	18	9	17	...	11
13	7	15	3	14	3	14	11	15	4	14	13	12	13	12	12	10	6	14	13	16	5	15	10	14	8	14	1	12	6	12
12	6	14	1	12	5	13	8	13	13	13	2	12	1	17	2	15	13	24	2	24	1	22	1	24	8	21	4	18	13	13
7	13	7	7	8	...	7	10	9	5	8	...	8	15	15	1	12	11	18	12	20	9	17	8	17	2	16	15	15	11	14
7	2	7	14	7	10	7	2	7	2	7	12	7	7	16	15	13	14	20	1	20	15	19	12	21	...	18	12	17	2	15
12	8	15	12	13	...	13	2	13	15	13	8	14	5	14	15	13	3	19	7	20	11	18	10	20	10	17	15	16	13	16
9	11	15	3	12	9	12	7	11	7	12	...	13	8	14	3	11	14	16	15	19	2	18	1	19	12	16	11	17	6	17
8	2	9	4	11	13	9	14	10	5	9	11	10	8	18	4	15	6	24	6	26	2	24	6	28	2	22	12	21	10	18
6	3	6	7	6	2	7	4	7	15	6	12	5	14	15	13	14	13	14	6	15	15	18	9	19	6	16	8	12	12	19
8	4	9	3	8	6	9	8	9	4	8	11	9	5	19	8	16	7	16	13	20	3	22	6	22	1	19	9	17	...	20
10	9	11	11	11	9	11	4	12	4	11	1	11	...	14	9	12	1	15	11	16	14	16	10	16	15	15	7	14	11	21
6	12	9	1	8	...	6	8	8	15	7	13	5	2	15	1	14	..	14	5	16	5	18	1	17	14	15	15	17	14	22
10	2	10	9	10	2	9	14	10	1	10	1	8	1	14	12	13	12	18	1	18	3	17	11	18	6	16	13	15	14	23
9	5	10	14	10	2	10	...	10	2	10	...	11	1	15	1	16	...	18	3	17	1	16	13	18	1	16	14	19	3	24
8	...	9	4	8	3	9	..	9	8	8	13	9	9	13	9	11	4	14	13	16	13	15	12	16	10	14	13	15	2	25
7	1	10	5	11	7	12	11	10	5	9	12	9	2	11	4	10	5	12	4	14	5	13	9	13	6	12	8	12	12	26
7	9	7	11	10	...	9	3	8	13	8	7	9	10	16	6	15	12	14	5	13	13	16	8	17	6	15	11	14	5	27
7	13	11	9	11	3	9	15	10	...	9	10	9	14	11	4	10	13	13	4	13	5	14	1	13	14	12	12	13	5	28
6	13	7	12	7	15	8	1	8	4	7	9	8	6	15	6	13	1	12	12	14	5	18	8	20	3	15	11	14	3	29
8	6	8	5	10	6	11	9	10	2	9	7	10	...	12	11	13	3	13	14	13	2	16	14	18	1	14	10	11	15	30
8	1	8	...	8	9	8	11	11	8	8	14	13	14	14	1	14	7	13	8	11	3	15	3	18	...	14	6	11	10	31
9	5	11	11	12	7	12	15	12	6	11	9	12	4	14	11	12	10	13	14	15	8	23	5	21	15	17	...	12	6	32

or 32 ounces = 1 Ser.

' Average and minimum rates of principal articles of diet given below.

10. The average and minimum rates current subjoined table :—

Table shewing the average and minimum rates of

Number.	Districts.	Average rate per rupee of																					
		Wheat 2nd quality.		Gram.		Jau (Barley).		Makki (Indian-corn.)		Jowár (Sorghum Vulgare).		Bájra (Penicillaria spicata).		Rice.		Dál Urd (Phaseolus radiatus).		Dál Mung (Phaseolus mungo).		Meat.		Milk.		Dahi (coagulated milk)	
		Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.
1	Delhi ...	20	...	28	12	35	2	36	...	30	...	27	9	8	13	18	5	22	12	10	7	15	5	10	7
2	Gurgaon ...	20	6	28	14	28	2	25	11	20	8	23	15	9	5	17	7	22	...	8	11	14	12	12	11
3	Karnál ...	19	15	29	1	28	8	25	5	26	...	20	2	10	..	14	12	20	8	8	8	15	5	11	5
4	Hissar ...	20	4	33	12	35	10	19	...	35	15	29	1	10	9	18	2	30	13	8	...	18	8	12	12
5	Rohtak ...	19	9	31	...	24	1	25	...	26	11	27	...	9	8	19	8	24	12	8	...	17	15	14	14
6	Sirsa ...	22	5	43	...	44	...	...	...	40	13	32	7	10	15	17	5	29	...	8	...	19	5	16	2
7	Umballa ...	21	15	31	12	32	5	26	6	30	9	19	13	12	9	19	...	22	14	6	12	13	12	9	1
8	Ludhiána ...	24	3	37	...	35	8	32	13	33	9	27	5	11	6	16	2	21	3	8	...	14	15	13	8
9	Simla ...	14	9	18	14	21	4	14	12	21	2	17	14	8	1	10	6	13	12	4	8	9	8	8	13
10	Jullundur ...	23	9	35	13	41	3	34	13	30	15	27	13	9	12	15	14	19	4	7	...	12	5	9	2
11	Hoshiárpur ...	23	11	32	8	33	3	27	14	29	11	23	3	9	12	15	8	18	8	6	6	16	11	13	13
12	Kángra ...	14	14	18	15	19	3	17	1	...	...	...	...	12	13	12	2	12	10	6	...	16	13	15	5
13	Amritsar ...	23	11	36	2	40	9	33	5	36	6	22	12	12	1	17	11	19	15	7	13	18	9	11	1
14	Gurdáspur ...	22	13	31	7	29	9	25	1	26	9	18	12	8	15	16	...	15	5	7	15	13	6	9	12
15	Siálkot ...	22	8	30	2	32	6	28	8	27	7	25	15	7	7	15	10	18	10	8	...	15	9	10	14
16	Lahore ...	24	6	37	14	43	10	35	6	33	11	25	13	14	5	16	...	17	10	6	13	14	6	10	12
17	Gujránwála ...	22	13	32	7	40	...	27	5	26	8	24	15	13	8	15	6	19	6	8	...	14	13	12	...
18	Ferozepore ...	27	11	41	15	49	14	39	...	37	7	36	5	10	8	20	7	22	13	7	...	15	1	10	2
19	Rawalpindi ...	29	11	24	3	35	11	37	4	29	12	36	11	5	14	11	5	14	2	6	4	12	5	8	4
20	Jhelum ...	27	5	28	6	34	7	32	5	34	4	32	13	9	5	14	13	19	2	8	...	13	13	10	2
21	Gujrat ...	24	11	30	1	37	2	28	13	33	1	32	...	11	...	13	13	15	8	8	4	13	12	11	12
22	Shahpur ...	27	9	31	6	34	14	27	10	28	13	31	5	5	2	15	5	20	6	8	..	14	...	12	1
23	Mooltan ..	21	5	28	6	30	11	27	1	26	11	25	13	8	1	16	9	15	3	7	8	15	10	10	1
24	Jhang ...	24	...	36	3	36	13	...	...	24	14	28	12	11	1	18	3	20	2	8	...	15	3	12	15
25	Montgomery ...	28	1	42	2	42	5	20	6	27	14	...	...	9	9	15	8	14	12	8	...	19	5	13	10
26	Muzaffargarh ...	21	3	23	14	30	2	...	...	24	13	27	3	9	2	13	5	12	3	6	...	12	2	9	13
27	Dera Ismail Khan ...	28	4	35	9	40	3	38	15	35	11	34	1	9	10	14	7	14	3	6	7	17	9	16	5
28	Dera Gházi Khan ...	20	14	25	10	29	2	17	15	31	11	29	8	9	14	12	14	13	11	5	11	13	12	10	...
29	Bannu ...	39	10	40	9	52	13	50	6	50	3	37	15	8	6	13	9	14	13	4	8	16	2	12	6
30	Pesháwar ...	26	8	19	7	49	9	27	8	34	8	29	11	10	...	11	13	12	1	5	15	15	3	11	15
31	Hazára ...	25	1	17	1	31	5	34	2	25	...	24	1	13	14	11	10	11	9	8	...	16	1	14	...
32	Kohát ...	32	8	26	15	47	4	43	6	43	9	45	10	12	4	10	...	14	12	6	...	15	5	12	08

NOTE.—16 Chattaks or

during 1877 in the 32 districts of the Punjab for the principal articles of diet are shown in the

principal articles of diet during the year 1877.

Minimum rate per rupee of																																			
Ghi (clarified butter).		Wheat 2nd quality.		Gram.		Jau (Barley).		Makki (Indian corn).		Jodr (Sorghum Vulgare).		Bájra (Penicillaria spicata).		Rice.		Dál Urd (Phaseolus radiatus).		Dál mung (Phaseolus mungo).		Meat.		Milk.		Dahi (coagulated milk).		Ghi (clarified butter).	
Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chartak.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.	Sers.	Chattaks.
1	10	12	...	13	8	17	...	35	...	14	...	14	...	7	5	11	1	11	...	8	...	12	...	8	...	1	4								
1	13	11	2	13	11	13	6	13	8	14	...	11	8	7	1	9	9	10	13	8	...	12	8	10	...	1	3½								
1	14	12	4	15	3	14	2	13	...	14	12	10	...	6	...	9	8	11	...	8	...	12	...	9	...	1	6								
2	...	11	3	16		16	3	9	...	16	...	13	12	6	...	9	8	12	9	8	...	11	...	8	...	1	7								
1	12¼	11	11	14	6	13	4	25	...	15	7	14	2	6	...	9	...	11	5	8	...	14	...	13	...	1	5½								
1	14 15/16	13	1	18	1	17	13	...	...	17	9	15	...	7	8	10	...	13	8	8	...	14	13	10	7	1	5								
1	13	14	1	16	4	16	...	16	8	16	8	10	6	8	...	11	13	11	8	6	6	12	...	8	...	1	7½								
1	12½	14	13	16	14	18	...	18	1	17	1	14	4	9	2	10	1	11	3	7	12	13	2	12	1	1	8								
1	9	11	2	12	3	13	4	10	...	15	...	13	...	4	8	8	...	9	...	4	8	8	...	8	...	1	8								
1	11½	15	6	16	12	40	...	20	8	20	4	17	...	8	...	10	10	10	14	7	...	12	...	8	8	1	9								
1	13	15	12	16	..	18	...	16	...	17	8	16	...	7	12	10	...	10	...	6	4	15	...	12	10	1	10								
1	11	11	9	13	2	13	2	13	10	...	...	...	...	9	3	9	11	8	15	6	...	16	...	14	...	1	10								
1	10	14	8	17	9	17	13	18	2	18	11	16	...	9	12	10	11	11	3	6	...	16	...	10	...	1	7								
1	10½	14	1	16	6	13	12	15	12	12	12	16	...	7	8	9	4	9	8	7	8	12	...	9	...	1	8								
1	15	13	4	16	3	16	13	15	5	15	5	13	12	6	...	10	...	10	12	8	...	14	...	9	8	1	11½								
1	10½	13	11	17	7	19	8	16	8	17	...	14	14	9	3	9	2	9	13	6	...	11	6	8	13	1	7								
1	11½	13	11	17	3	17	15	16	1	17	12	14	2	9	...	9	...	11	8	8	...	11	10	9	10	1	10¼								
1	12	16	...	18	1	21	10	22	...	20	...	18	8	6	...	13	...	12	11	7	...	13	...	8	...	1	6								
2	1	16	10	15	4	21	11	20	1	20	13	19	14	5	...	7	12	9	2	5	...	11	8	7	12	1	13½								
1	12	15	9	15	8	18	...	16	..	19	...	18	...	7	...	10	1	11	8	8	...	13	...	9	14	1	9								
2	...	13	13	16	4	16	12	16	12	17	8	17	8	9	...	9	10	10	2	8	...	13	...	11	...	1	10½								
1	11½	17	12	12	8	20	...	18	8	19	8	18	6	4	12	10	8	12	8	8	...	12	...	11	...	1	9								
1	10½	15	...	16	...	22	3	22	...	21	10	17	1	7	...	10	13	10	...	6	8	13	8	8	12	1	7								
1	12¼	15	6	19	13	23	2	...	...	20	4	18	10	9	8	12	8	12	8	8	...	13	9	10	14	1	9								
1	11½	16	12	20	12	25	8	18	...	20	...	...	...	7	...	10	...	10	...	8	...	16	...	10	...	1	7¾								
1	7¾	16	..	17	...	23	8	...	...	20	...	20	...	8	...	10	...	8	...	6	...	10	...	8	...	1	4								
1	9 1/12	18	13	20	10	26	14	25	...	22	8	20	...	8	4	12	8	10	...	6	4	15	10	14	6	1	7¼								
1	8	16	1	16	7	19	13	16	5	21	1	18	8	8	12	9	11	9	1	5	...	13	12	9	11	1	5								
1	11½	25	6	21	8	30	4	30	3	30	...	19	2	7	8	7	8	8	7	4	8	15	10	11	14	1	9½								
1	14	18	14	12	13	35	3	16	14	26	...	19	7	8	1	6	6	7	4	5	8	14	...	11	1	1	12								
2	3	14	..	13	...	21	..	17	8	20	...	16	...	8	...	7	...	6	14	8	...	16	...	14	...	2	2								
1	11½	19	8	13	10	29	...	25	8	25	8	26	...	12	...	6	12	9	...	6	...	13	12	11	...	1	9								

32 ounce = 1 ser.

Remarks on food supply as extracted from the reports of Deputy Commissioners.

11. The following particulars relating to food supply are derived from the reports of Deputy Commissioners of the several districts. In those not specially noticed there was nothing particular to record :—

In Gurgaon spring harvest not below the average. The autumn failed altogether.

In Gurgaon the out-turn of the spring harvest was not below the average. The autumn harvest, however, failed altogether, and even in irrigated lands watered by canals and wells the crops were very light. So much surplus grain had, however, been stored in past years that, notwithstanding large exports to the Deccan, North-Western Provinces and Rajputána during the last six months, the stock of grain left in the district is believed to be still amply sufficient for the supply of its wants. Some deaths from starvation have occurred, but these have resulted not from the scarcity of food but from want of the means wherewith to buy it.

In Karnál food-supply less than in the preceding year.

In Karnál it appears that the food supply was actually less than in the preceding year, and the prices of grain have been steadily higher.

In Hissar autumn crops failed.

Owing to the complete failure in the Hissar district of the autumn crop of 1876 the price of food grains was so seriously affected in the following year that for some time a famine was thereatened. Fortunately, however, these apprehensions were dispersed and prices became steady on large importations arriving from adjacent districts, and principally from Rohtak.

In Rohtak also.

In Rohtak also the autumn crops failed and the food supply in consequence ran short.

In Sirsa scarcity prevailed, but during first 6 months of the year the rates were much cheaper than those of the corresponding period of the past year.

"The rates current" in Sirsa, says the Deputy Commissioner "during the first six months of the year (1877) were much cheaper than those of the corresponding period of the past year, in consequence of which the annual average price of the food supply was not much affected by the present scarcity."

In Ludhiána prices varied owing to famine in Southern India.

In Ludhiána, the prices have varied considerably owing to the famine in southern India and the consequent export of food grain supplies from this district.

In Simla the out-turn of harvests was fair.

The out-turn of the harvests in Simla was fair. The prices of food grains were high, but the supply at these prices was sufficient.

Spring harvest in Jullundur fairly good. Autumn harvest failed owing to drought.

The spring harvest of 1877 in Jullundur was fairly good notwithstanding that the rain fell unseasonably over a great part of the district. There was no autumn harvest owing to drought, but sugar-cane, which was in danger from this cause, almost entirely recovered itself in the rains which fell in September and early October. Indian corn which had been planted late as a second sowing produced a considerable harvest, though much below the average quantity. Prices of food grains were, and are still, very high in comparison to previous years. This is due to the two causes—of want of rain-fall in season, and of large exportation to the famine-stricken districts in the North-Western Provinces or lower down country. The out-turn was below the average; nevertheless the local supply would have been abundant to keep prices steady but for the external demand.

In Hoshiárpur the food supply sufficient till autumn.

The food supply in Hoshiárpur was generally sufficient till autumn, when there was scarcity in some parts of the Dasúya collectorate. During the last months of the year prices were very high and considerable amount of suffering was entailed on the lowest class.

Autumn crop in Kángra insufficient to meet demand.

Owing to the dryness of the season the autumn crop in Kángra was insufficient to meet the demand of the district during the past year, but the necessary supply was imported from the plains to make good the difference. Prices still range much above the level of the same period in 1876.

In Siálkot the out-turn was about a quarter of a full crop.

In Siálkot the out-turn was about a quarter of a full crop, and a very large amount of the grain had to be imported from other districts, but on the other hand there were very large exports from this district to Jummoo, and this also affected the food supply of the district.

In Lahore the food supply was good.

The food supply in the Lahore district was good. Grains were cheap during the early months of the year, but as the year advanced the exports to famine-stricken districts affected the price, and since August last they have remaind very high.

In Rawalpindi not good.

The out-turn in Rawalpindi was not good on account of the absence of rain.

In Jhelum great scarcity.

In Jhelum there was great scarcity owing to the failure of the autumn crops for want of rain, but principally owing to the great quantities of grain exported to the famine-stricken districts in Madras.

In Gujrat plentiful.

The food-supply in Gujrat was plentiful.

In Shahpur good.

The out-turn in Shahpur was good, but in September and October prices rose. The people of the district, however, have not suffered much as the supply was abundant and the future prospects are good.

In Mooltan out-turn equal to demand.

In Mooltan the out-turn of the spring and autumn crops was sufficient for the requirements of the district. The spring crops, which promised to be about a quarter above, had fallen slightly below the average, and the autumn crops were almost the same. At the beginning of the present official year (April) the stock of grain on hand was considerably reduced by large exports of wheat to the famine-stricken districts. This was, however, counterbalanced to a certain extent by imports from adjacent districts. The exports towards Karrachi ceased at the beginning of September and were succeeded by consignments to the east, which continued till the 4th October and caused a rise in the price of wheat.

In Jhang below demand.

In Jhang district the food supply was below the demand.

In Montgomery prices low during first 8 months of the year.

In Montgomery the prices were exceptionally low during the first eight months of the year, but in the middle of August, owing to the fear of scarcity in northern India, the tide turned, and prices have since been very high.

In Muzaffargarh spring crop fair; autumn crop good.

A fair spring and a good autumn crop were realized in Muzaffargarh, but some little damage was caused by rain.

Autumn crops failed in D. G. Khan; considerable distress amongst the poorer classes.

The autumn crops failed in Dera Gházi Khan. Prices were double those of an ordinary year, and there was considerable distress amongst the poorer classes.

In Bannu both crops failed.

In Bannu the gram crop was almost totally destroyed by excessive rains, and the same cause deteriorated the wheat and barley. This was followed by a failure of the rains and of the autumn crops. There was also a large export down the Indus. Prices which were very low at the beginning of the year rose till October, when on the occurrence of favorable rain for sowing they again fell, and at the close of the year wheat was at 21 seers. It is believed that there is enough wheat stored to last two years.

In Hazára spring crop below average in consequence of unseasonable rain, the autumn crop entirely lost for want of rain.

The out-turn of the spring crop in Hazára was considerably below the average in consequence of unseasonable storms of heavy rain and hail, while the autumn crops were almost entirely lost for want of rain, the out-turn being estimated at only one-sixth of the average.

In Kohát the out-turn was small in quantity and poor in quality..

In Kohát the out-turn was very small in quantity and poor in quality. The spring crops were greatly damaged by untimely rains and hail storms, while the out-turn of the autumn crops was comparatively scanty, the result of drought.

SECTION II.—EUROPEAN ARMY.

No remarks.

SECTION III.—NATIVE ARMY.

No remarks.

SECTION IV—JAILS.

Jail statistics.

12. Statistics of 31 jails in the Punjab province during the year 1877.

Aggregate prison population for the year	12,116
Daily sick per 1000 of average strength	29
Admitted to hospital from all causes per 1000 of the average strength	1,503
Deaths	411
Ratio of deaths per mille to strength	34

Daily sick per mille in the several jails of the province.

13. The number daily sick per mille of average strength (see statement No. I annexed) was remarkably low in the jails of Delhi, Karnál and Gujrat. In the Karnál jail it was only 5, and in the others it was 7 and 12 respectively. On the other hand, the number was excessively high in the Rúpar and Jhang jails, in which it rose as high as 90 and 83 respectively. In the Ferozepore and the Lahore Central jails, the number was 43 and 42 respectively, and in the remaining jails it varied between 17 and 36.

In the Jhang jail the daily sick per mille of average strength was 154 in the month of January; in the four following months the numbers ranged from 73 to 90, but again rose to 121 and 125 in June and July; in August the number suddenly fell to 55, and with a slightly fluctuating rise during the next three months suddenly fell to only 17 in December. The total deaths during the year (*vide* statement No. IV) were only 4 out of an average strength of 180. These figures are entirely exceptional in the jail experience of the year, as will be seen by reference to the accompanying statement No. I, and seem to require explanation. Judging from the monthly mortality returns of the Jhang district there was no such very sudden and increased prevalence of sickness amongst the free population as is here indicated amongst the prisoners. The highest mortality of the year was in January, *viz.*, 460, and the numbers gradually fell from that figure to 314 in May. In the two following months the numbers were 388 and 314 and then dropped to 264 and 283, again rising to 340, 435 and 417 during the three last months of the year.

STATEMENT No. I.

Statement showing the General statistics of sickness and mortality in the jails of the Province of the Punjab, and the average number daily sick in each month of the year 1877.

No.	Jails.	Average strength.	Daily sick per 1,000 of Average strength in each month of the year.												Daily sick per 1000 of average strength for the year.
			January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November	December.	
1	Delhi ...	364	3	7	6	6	8	7	10	9	8	7	8	7	7
2	Gurgaon ...	161	20	26	37	49	38	35	40	4	19	15	17	3	25
3	Karnál ...	216	7	6	4	5	2	3	2	...	2	10	15	6	5
4	Hissar ...	208	87	19	48	34	63	24	10	14	19	34	34	1	32
5	Rohtak ...	231	32	34	20	39	22	26	31	21	13	12	6	7	22
6	Sírsa ...	167	29	28	34	21	19	16	39	16	14	18	31	33	25
7	Umballa ...	562	23	18	18	24	35	24	10	12	20	31	27	27	22
8	Rúpar ...	1,965	87	76	87	89	95	97	78	86	77	97	91	116	90
9	Ludhiána ...	232	31	26	22	27	25	32	44	42	37	48	46	26	34
10	Jullundur ...	308	33	36	22	26	29	40	26	22	20	23	28	30	28
11	Dharmsála ...	103	32	27	24	21	17	8	15	22	24	39	10	14	21
12	Amritsar ...	396	55	25	20	24	24	22	32	40	50	42	32	33	33
13	Gurdáspur ..	262	20	25	21	14	2	15	22	13	23	23	13	16	17
14	Siálkot ...	309	40	35	52	34	34	29	31	39	33	36	32	38	36
15	Lahore Central Jail ...	1,673	35	34	25	32	37	39	52	54	46	48	46	55	42
16	Do. District Jail ...	329	...	...	...	...	13	26	24	23	28	39	44	26	19
17	Do. Female Jail ...	136	14	24	10	20	17	20	38	40	58	49	50	36	31
18	Gujránwála ...	335	35	53	49	46	42	26	24	15	13	20	18	43	32
19	Ferozepore ...	264	67	68	45	30	23	43	38	37	27	56	45	33	43
20	Rawalpindi ...	683	29	39	39	20	6	5	9	10	16	29	25	23	21
21	Jhelum ...	195	35	31	35	22	23	23	23	16	16	27	15	17	24
22	Gujrát ...	239	4	17	13	8	5	8	15	19	16	18	11	8	12
23	Shahpur ...	231	15	10	16	12	15	30	25	24	32	25	12	9	19
24	Mooltan ...	550	64	40	30	23	25	15	13	12	13	20	39	36	28
25	Jhung ...	180	154	75	73	84	90	121	125	55	60	76	67	17	83
26	Montgomery ...	342	39	29	21	10	18	17	21	21	16	18	11	18	20
27	Dera Ismail Khan ...	433	11	15	25	33	38	35	28	37	30	32	22	28	28
28	Dera Gházi Khan ...	284	35	43	43	62	33	28	38	43	31	33	23	14	36
29	Bannu ...	129	40	30	15	24	20	25	17	18	14	22	28	24	23
30	Peshawar ...	469	10	20	11	14	18	23	15	11	21	45	32	14	20
31	Kohát ..	160	27	35	27	26	39	34	27	35	39	34	27	42	33
Average for the year ...		12,116	36	31	29	28	28	29	30	26	27	33	29	26	29

Statement showing number of admissions into Hospital from different diseases, and deaths therefrom.

14. The number of admissions into Hospital from different diseases, and the deaths therefrom, will be found in the three subjoined statements :—

STATEMENT No. II.

Statement showing the number of admissions into Hospital in the year 1877 *distributed under* 14 *heads.*

No.	Jails.	Average strength.	Number of Admissions into Hospital.														Total from all causes.	Admitted per 1000 of the average strength from all causes.
			Cholera.	Small-pox.	*Fevers.* Typhus.	Enteric.	Relapsing.	Intermittent and remittent.	Dysentery and Diarrhœa	Hepatitis.	Spleen disease.	*Respiratory diseases.* Pneumonia.	Bronchitis.	Phthisis pulmonalis.	Scurvy.	All other causes.		
1	Delhi ...	364	...	...	...	...	...	43	5	...	...	2	...	...	...	32	82	225
2	Gurgaon ...	161	...	...	...	...	...	24	27	...	2	4	1	...	...	151	209	1,298
3	Karnál ...	216	...	..	...	...	...	57	7	..	6	10	3	3	1	47	134	620
4	Hissar ...	208	...	...	...	...	...	107	10	6	1	5	7	1	...	53	190	913
5	Rohtak ...	231	...	..	...	...	...	95	21	1	20	1	11	...	...	90	239	1,035
6	Sirsa ...	167	...	...	...	...	...	44	2	...	...	...	3	...	...	79	128	766
7	Umballa ...	562	...	...	...	...	...	85	38	...	3	...	5	...	...	172	303	539
8	Rúpar ...	1,965	1	...	...	...	...	3,941	701	...	10	116	97	15	4	3,282	8,167	4,156
9	Ludhiána ...	232	...	...	...	...	...	139	55	...	...	1	6	1	...	68	270	1,164
10	Jullundur ...	308	...	...	...	...	...	73	16	2	3	...	7	...	...	120	221	718
11	Dharmsála ...	103	...	...	...	...	...	58	28	...	...	2	1	7	...	5	101	981
12	Amritsar ...	396	...	...	...	...	...	87	10	...	3	3	6	2	...	97	208	525
13	Gurdáspur ...	262	...	...	...	...	...	40	10	...	...	4	1	3	...	52	110	420
14	Siálkot ...	309	...	...	...	...		67	38	...	5	2	1	...	...	175	288	935
15	Lahore Central Jail ...	*1,673	...	...	...	...	...	1,100	388	...	36	51	59	7	8	709	2,358	1,409
16	Do. District Jail ...	329	...	...	...	...	...	335	54	...	3	6	2	...	1	73	474	1,441
17	Do. Female Jail ...	136	...	...	...	...	...	120	19	...	3	1	3	...	12	41	199	1,463
18	Gujránwála ...	335	...	...	...	...	...	183	71	...	5	...	25	...	...	117	401	1,197
19	Ferozepore ..	264	...	...	..	...	...	156	21	...	7	5	5	...	...	118	312	1,182
20	Rawalpindi ...	683	...	...	...	...	...	464	41	...	1	25	16	...	...	116	663	971
21	Jhelum ...	195	...	...	...	...	..	125	18	...	3	2	5	1	1	42	197	1,011
22	Gujrat ...	239	...	...	...	...	...	39	12	...	2	...	4	...	..	68	125	523
23	Shahpur ...	231	...	...	...	...	...	80	19	...	1	1	7	...	...	47	155	671
24	Mooltan ...	550	...	...	...	...	...	228	90	1	...	29	23	...	...	54	425	773
25	Jhang ...	180	...	...	...	...	...	64	19	1	...	8	19	...	1	67	179	994
26	Montgomery ...	342	...	...	...	...	...	71	26	...	...	16	38	...	...	74	225	658
27	Dera Ismail Khan ...	433	...	...	...	...	...	244	44	...	3	4	60	1	...	182	538	1,242
28	Dera Gházi Khan ...	284	...	1	...	...	...	223	38	...	9	3	19	...	..	202	495	174
29	Bannu ...	129	...	...	...	...	..	75	36	...	...	3	7	1	5	53	180	1,395
30	Peshawar ...	469	...	...	...	...	...	353	14	...	1	...	4	...	1	89	462	985
31	Kohát ...	160	...	...	...	...	...	68	19	...	3	1	13	...	2	65	171	1,069
	Total ...	12,116	1	1	...	...	...	8,788	1,897	11	130	305	458	42	36	6,540	18,209	1,503

STATEMENT No. III.

Statement showing the prevalence of Cholera in each month, and the distribution of the disease, in the Jails of the Province of the Punjab during the year 1877.

No.	Jails.	Average strength.	Number of Admissions into Hospital in each month.												Total admission of the year.	Admitted per 1000 of the average strength.	Total deaths of the year.	Died per 1000 of the average strength.
			January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.				
1	Delhi	364	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	Gurgaon	161	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	Karnál	216	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	Hissar	208	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	Rohtak	231	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	Sirsa	167	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	Umballa	562	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	Rúpar	1,965	...	...	...	...	...	...	...	...	...	1	...	...	1	0·51	1	0·51
9	Ludhiána	232	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10	Jullundur	308	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11	Dharmsála	103	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	Amritsar	396	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13	Gurdáspur	262	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14	Siálkot	309	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15	Lahore Central Jail ...	1,673	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	Do District Jail ...	329	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	Do Female Do ...	136	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18	Gujránwála	335	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19	Ferozepore	264	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20	Rawalpindi	683	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21	Jhelum	195	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22	Gujrat	239	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
23	Shahpur	231	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24	Mooltan	550	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25	Jhang	180	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
26	Montgomery	342	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
27	Dera Ismail Khan ...	433	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28	Dera Gházi Khan ...	284	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	Bannu	129	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
30	Peshawar	469	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
31	Kohát	160	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Total ...	12,116	...	...	...	...	...	...	...	...	...	1	...	...	1	0·08	1	0·08

STATEMENT No. IV.

Statement showing the Mortality in each Jail, the causes of deaths, and the ratio of the deaths to strength during the year 1877.

No.	Jails.	Average strength	Cause of Deaths																	Total deaths of the year	Died per 1000 of the average strength	
			Cholera	Small-pox	Fevers				Apoplexy	Dysentery & Diarrhœa	Hepatitis	Spleen disease	Respiratory Diseases		Heart diseases	Phthisis pulmonalis	Scurvy	Wounds & Accidents	All other causes		Cholera	All causes
					Typhus	Enteric	Relapsing	Intermittent & Remittent					Pneumonia	Bronchitis								
1	Delhi ...	364	...	...	...	..	...	4	...	...	..	...	2	...	1	...	...	...	1	6	...	16
2	Gurgaon ...	161	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	..	...	1	...	6
3	Karnál ...	216	...	...	...	...	...	...	..	...	...	...	5	...	...	1	...	...	3	9	...	42
4	Hissar ...	208	...	...	...	...	...	...	...	1	...	...	1	...	...	1	...	...	3	6	...	29
5	Rohtak ...	231	...	...	...	...	...	...	...	...	...	...	1	...	...	..	..	1	...	2	...	9
6	Sirsa ...	167	...	...	...	..	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	6
7	Umballa ...	562	...	...	...	...	...	2	1	4	...	...	...	1	...	...	...	...	7	15	..	27
8	Rúpar ...	1,965	1	...	...	...	...	13	2	44	...	...	33	...	1	12	...	4	49	159	0·51	81·92
9	Ludhiána ...	232	...	..	...	...	...	...	...	1	...	...	...	...	...	...	...	...	3	4	...	17
10	Jullundur ...	308	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	2	4	...	13
11	Dharmsála ...	103	...	...	...	...	...	2	...	2	...	...	...	...	...	...	...	...	...	4	...	39
12	Amritsar ...	396	...	..	...	...	...	5	1	4	...	...	1	..	...	...	...	...	5	16	...	40
13	Gurdáspur ...	262	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	...	11
14	Siálkot ...	309	...	...	...	...	...	1	...	5	...	2	...	...	...	...	...	...	...	8	...	26
15	Lahore Central Jail ...	1,673	...	...	...	..	...	6	...	28	...	...	16	...	...	3	...	1	19	73	...	44
16	Do. District Jail	329	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17	Do. Female Jail	136	...	...	...	...	..	1	...	...	...	...	...	1	...	...	...	...	1	3	...	22
18	Gujránwála ...	335	...	...	...	...	...	8	...	5	...	...	...	1	...	...	...	...	7	21	...	63
19	Ferozepore ...	264	...	..	...	...	...	1	...	3	...	...	2	...	1	...	...	...	1	8	...	30
20	Rawalpindi ...	683	...	...	...	...	...	7	...	3	...	...	5	...	...	...	...	1	3	19	...	28
21	Jhelum ..	195	...	...	...	...	...	2	...	...	...	...	...	1	...	...	...	...	...	3	...	15
22	Gujrat ...	239	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	1	1	...	4
23	Shahpur ...	231	...	...	...	...	...	...	...	1	...	...	1	1	...	...	...	...	...	3	...	13
24	Mooltan ...	550	...	...	...	...	...	1	...	3	...	...	4	...	...	...	...	...	6	14	...	25
25	Jhang ...	180	...	...	...	...	...	...	...	1	..	...	2	...	...	..	...	...	1	4	...	22
26	Montgomery ..	342	...	...	...	...	...	...	1	2	...	...	3	1	...	...	...	...	2	9	...	26
27	D. I. Khan ...	433	..	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	1	..	2
28	D. G. Khan ...	284	..	...	...	..	...	...	1	1	...	..	2	...	...	...	...	...	3	7	...	25
29	Bannu ...	129	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
30	Peshawar ...	469	...	...	...	...	...	1	...	...	...	...	...	2	...	...	..	1	1	5	...	11
31	Kohát ...	160	...	..	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	13
	Total ...	12,116	1	..	...	...	...	53	6	109	...	2	80	11	3	17	...	8	121	411	0·03	34

In all the jails of the province only one death occurred from cholera.

15. There was only one case of cholera in all the jails of the province. It occurred in the month of October in the Rúpar jail, and proved fatal. There occurred also a single case of small-pox; the subject, a prisoner in the Dera Gházi Khan jail, recovered.

Deaths from fever, dysentery and diarrhœa.

From fever and from dysentery and diarrhœa 53 and 109 deaths are registered against 98 and 172 respectively in the preceeding year. Of the fever deaths (all returned under the heads of intermittent and remittent) 39 occurred, in the proportions noted with each, in the following five jails, namely, in Rúpar 13, Amritsar 5, Lahore Central 6, Gujránwála 8, and Rawalpindi 7.

Of the 109 deaths from dysentery and diarrhœa no less than 72 occurred in the Rúpar and the Lahore Central jails, namely 44 in the former and 28, in the latter.

Deaths from pneumonia very high in Lahore Central and Rúpar jails.

The deaths from pneumonia were also very high in these two jails, namely 33 and 16 respectively, or taken together somewhat more than one half of the whole mortality from this cause in all the jails of the province collectively.

Deaths from phthisis pulmonalis exceptionally high in Rúpar jail, and the fact calls for special inquiry.

Again, of the 17 deaths registered from phthisis pulmonalis no less than 12 occurred in the Rúpar jail alone. The statement No. IV shows the incidence of this mortality to be exceptionally high in the Rúpar jail, and the fact calls for special inquiry into the condition of the jail and the circumstances of the prisoners confined in it, with the view to ascertaining the causes of this unusual prevalence of and mortality from the several diseases above named. The Rúpar jail showed a very high death rate last year also, namely 80 per mille of average strength.

Mean death rate of the jails per mille of average strength compared with that of the 50 principal towns.

16. The mean death rate per mille of the average strength of the jails of the province was 34, against 36 in the preceding year. The mean death rate per mille of population of the fifty principal towns of the province (in which as a rule registration is very carefully carried out and is reliable) for the same years is 33 and 48 respectively, the extra mortality in 1876 being due to the xceptional prevalence and fatality of fevers in the districts of Jullundur, Hoshiárpur, &c., as is explained n section VI of this report.

Highest death rate of all the jails in that of Rúpar and Gujránwála.

17. Of all the jails, those of Rúpar and Gujránwála show the highest death rate, *viz.*, 82 and 63 respectively, whilst those of Dera Ismail Khan, Gujrat, Sirsa and Gurgaon show the very low rates of 2, 4, 6, and 6 respectively. In the Kohát and the Lahore district jail no death occurred. In the rest of the jails, the death rate varied from 44 to 9 per mille of average strength.

No. of jails visited by Sanitary Commissioner during tour of inspection.

18. In the course of my inspection tour I visited the jails of Delhi, Ferozepore, Gurgaon, Umballa Hissar, Rohtak, Sirsa, Karnál and Rúpar jail No. II. In none of them did I observe anything calling for special remark. Of the Ferozepore jail, I give below an extract from my inspection report submitted to Government:—

"The jail at Ferozepore stands on one side of the road leading from the city to the cantonments and at about a mile distance from the former. Its licensed capacity is for 422 prisoners. It held on the day of my visit 260 convicts, of whom 3 were females.

"There were 15 men in Hospital, *viz.*, 13 for fever, 1 for dysentery and 1 (a newly admitted convict) for primary syphilis. The general appearance of the prisoners was healthy, and they wore the winter clothing which has been recently issued. The kitchens were in good order, and the water of the prison well was carefully filtered in a regular filter house before being issued for use. The douche baths, of which there are three sets, for Hindus, and Mussulmáns, and out-casts, were in good order and furnished with 22 rose jets for each of the first two classes and 6 for the other.

"The latrines were roofed and furnished with earthen gumlás set on the floor prepared with a layer of dry earth. They were in good order and entirely free from offensive smells. In fact the jail throughout was in a scrupulously clean and tidy condition."

SECTION V.—GENERAL POPULATION, VITAL STATISTICS.

Revised forms prescribed by the Government of India.

19. The revised forms of statistical returns prescribed by the Government of India Resolution before mentioned are appended to this report.

They are as follows:—

I.—Births registered in the districts of the Punjab.

II.—Deaths registered in the districts of the Punjab.

III.—Deaths registered in the districts of the Punjab during each month of the year.

IV.—Deaths registered in the districts of the Punjab according to age.

V.—Deaths registered in the districts of the Punjab according to classes.

VI.—Deaths registered from different causes in the districts and towns of the Punjab.

VII.—Deaths registered in the districts of the Punjab from cholera during each month of the year.

VIII.—Deaths registered in the districts of the Punjab from small-pox during each month of the year.

IX.—Deaths registered in the districts of the Punjab from fevers during each month of the year.

X.—Deaths registered in the districts of the Punjab from bowel complaints during each month of the year.

Labor involved in compiling them by no means light.

20. The Resolution above referred to and its enclosures did not reach my office until the 21st May 1877, by which time four months of the vital statistics had been posted in the old registers. In order to introduce the revised set of forms in my report for this year, it became necessary to devote my office establishment to undo what had already been done, and commence posting *de novo* in the new registers. This in itself gave rise to much extra work and trouble, whilst the labour involved in giving the information required in statements VII to X, as mentioned in paras. 4 and 5 of my letter No. 2125 dated 5th July 1877 to the address of the Secretary to Government, Punjab, was by no means light.

Difficulty experienced in classifying accurately the number of villages with their population subordinate to the several police stations.

21. Considerable difficulty was experienced in classifying accurately the number of villages with their population subordinate to the several Police stations, and though the work has been now accomplished, I am glad to say without any extra expense to the State, I think there is in a few instances room for doubt as to the perfect accuracy of the figures, more especially in the column of population, although no pains have been spared to make the returns as correct as possible.

It has been found that the number of Police stations and the villages comprised in them vary from year to year, owing to the occasional abolition of some Police stations, and the consequent redistribution of villages from one circle to another.

Whatever increase that has occurred in the population of the Punjab since the census of 1868 may be reckoned to excess of births over deaths.

22. The population of the Punjab (under registration) according to the census of 1868 was 17,487,125 and of this total the town population was 1,922,680, and the rural 15,564,445. With reference to the former, my predecessor, Docter DeRenzy, when submitting to Government the results of the census of the municipal towns as censused in 1875-76, said: "It is to be regretted that owing to the boundaries of towns as censused in 1868 not coinciding with those which were recognized in the present census, it is not possible in many cases to draw any safe conclusion as to whether there has been an increase or decrease of population." It does not appear, however, that this Province, as a whole, has suffered much from emigration, nor do I think that its numbers have been augmented to any appreciable extent by immigration; so that whatever increase, if any, has occurred, may be reckoned as a consequence of the births on the whole exceeding the deaths.

No accurate basis for calculating increase of population can be hoped for till a new census of the province is taken.

23. In London, the death-rate is calculated on the population enumerated in April 1871, and every year raised at the rate of increase which prevailed (*viz.*, 10 per cent.) between 1861 and 1871. But no such accurate basis of calculation can be hoped for here till a new census of the province is taken.

24. In the review by the Hon'ble the Lieutenant Governor of the Report of the Sanitary Commissioner, Punjab, for 1872, it is stated that— "Judging from the increase of population between the census of 1856 and the census of 1868, the general population must have increased by about 9 per cent. since 1868." Now if we, after taking into consideration the generally insanitary condition of the Province and the consequent high rate of mortality that usually prevails in it, adopt the same rate of increase, *i. e.*, 9 per cent., not for the 5 years up to 1872, as was assumed by His Honor, but for the 10 years up to 1877,—then the increased population in 1877 (under registration) will be 19,060,966 instead of that enumerated in 1868 *viz.*, 17,487,125.

If the increase of population be calculated at about 9 per cent. since 1868, then the provincial average death rate, which is 20 per mille, would fall to 18, which indicates defective registration as a whole.

Therefore the provincial average rate of mortality, which, during the year under review is 20 per mille, calculated on the basis of the population (under registration) enumerated in the census of 1868, would, if calculated on the above assumed population, fall considerably below even that figure, *viz.* 18 per mille. This is sufficient to indicate the still very defective state of registration, as a whole, in this province.

25. But, on the other hand, in the fifty principal towns in which registration may be said to be very fairly accurate, the results are of a more satisfactory nature. The returns show their aggregate birth and death-rates to be as follows :—

Registration in the 50 principal towns fairly accurate.

For the four years from 1871 to 1874 calculated on the census of 1868.

Year.	Average birth-rate for 50 principal towns per mille of population.	Average death-rate for 50 principal towns per mille of population.	
1871	31	31	
1872	31	41	
1873	31	38	
1874	39	32	
Mean for 4 years	33	35	

For the three years from 1875 to 1877 inclusive, calculated on the census of 1875-76.

1875	40	43	
1876	38	48	
1877	38	33	
Mean for 3 years	39	41	

These figures in the last table, which have been, as above stated, calculated on the town population enumerated in 1875-76, indicate, notwithstanding the death-rate being somewhat in excess of the birth-rate, a decided progressive increase of population and a more careful registration than has been attained in previous years. And this, as to the former, because the excessive and unprecedented mortality from fevers which occurred last year, and to a less extent the year before, has caused an exceptional advance in the death-rate of the town population taken as a whole, and has moreover been followed by a slight decrease in the aggregate birth-rate, as will be seen by reference to the above tabular statement. This decrease in the birth-rate was very marked in some of the towns which had suffered most severely during the fever epidemics of 1875 and 1876. The causes of this decline in the birth-rate will be more particulary referred to in section X, general remarks.

Although the death-rate is somewhat in excess of the birth-rate, the returns show a decided progressive increase of population and more careful registration.

26. In the undermentioned towns of the districts noted below, the results of birth registration show that their *per mille* birth-rate did not exceed 25. This in the case of those towns which suffered most severely during the fever epidemics of 1875 and 1876 may be fairly attributed to a real decline in the birth-rate. But in the case of those towns which did not so suffer, it may be laid to the charge of defective registration. Those towns included in this last category are distinguished by an asterisk.

Names of towns in which the per mille birth-rate did not exceed 25.

List of municipal towns, according to districts, in which the birth-rate did not exceed 25 per mille in 1877.

No.	Name of District.	Name of municipal town.	No.	Name of District.	Name of municipal town.
1	Umballa	Rúpar.			
2	Jullundur	A'dampur.	18	Amritsar	Majítha.
3		Kartárpur.	19		Rámdás.
4		Ráhon.*			
5		Núrmahal.	20	Montgomery	Montgomery.*
6		Nakodar.	21		Dipálpur.*
7		Máhilpur.	22	Muzaffargarh	Jatoi.
		Mahaspur.			
8	Hoshiárpur	Dasúya.	23	Jhang	Jhang.*
9		Mukerián.*			
10		Una.*	24	Siálkot	Zafarwál.
11		Anandpur.	25		Sankhatra.
			26		Nárowál.
12	Kángra	Haripur.*	27	Jhelum	Jhelum.*
13		Núrpur.*			
14	Gurdáspur	Gurdáspur.	28	Dera Ismail Khan ...	Bhakkar.*
15		Bahrámpur.	29		Tánk.*
16		Shahpur.	30		Leiah.*
17		Darmán.	31	Kohát	Kohát.*

27. But in the remaining 150 towns (after deducting the 31 towns noted above from the total number of 181 municipal towns in the province in which registration is compulsory) there were 56 in which the birth-rate ranged between 40 and 58 per mille. In 24 other towns it varied from 35 to 39 per mille, and in the remaining 70 towns it ranged from 26 to 34 per mille; as will be seen by reference to the tabular statements heading each district in section IX of this report.

In the remaining municipal towns the birth-rate was over 25.

28. The number of deaths from all causes registered in 1877 was 350,932, and the death-rate was 20 per mille of the population enumerated in the census of 1868.

Health of province unusually good.

Making allowances for increase of population and for defective registration (the one progressively advancing and the other annually improving), the year 1877 may be fairly considered to have been in reality an unusually healthy one, as it certainly is supposed to have been in the popular estimation.

29. The following table, which gives the principal causes of death, shows the total mortality of the province during the ten years since registration was fairly established :—

Table showing mortality from different causes from 1868 to 1877 inclusive.

Table showing the mortality from different causes in the Punjab during the ten years from 1868 to 1877 inclusive.

Year.	Cholera.	Small-pox.	Fevers.	Bowel complaints.	All other causes.	Total.	Death-rate per mille of population.
1868 ...	532	24,222	151,337	17,823	73,871	267,785	15
1869 ...	9,258	53,169	272,946	30,953	87,495	453,821	26
1870 ...	469	27,163	275,093	27,249	88,952	418,926	24
1871 ...	369	25,534	213,548	21,678	102,249	363,378	21
1872 ...	8,727	23,728	264,711	23,345	110,097	430,608	25
1873 ...	148	25,699	219,909	19,640	91,757	357,153	20
1874 ...	78	12,026	190,631	16,407	97,571	316,713	18
1875 ...	6,246	13,594	279,841	27,550	119,977	447,208	26
1876 ...	5,736	10,254	351,286	27,271	102,297	496,844	28
1877 ...	29	12,296	219,281	17,664	101,662	350,932	20

It will be seen by the table that the total mortality of 1877 was less than that of any other year of the series except the first (which was only the 2nd year of registration) and 1874, which last was recognized also as an unusually healthy year.

30. There was no epidemic of cholera during the year under review; some districts of the province, however, suffered from epidemic small-pox, and the mortality caused by it was 12,296 or 2042 more than last year.

No epidemic of cholera.

Total deaths from small-pox.

The deaths registered from fevers and bowel complaints show a considerable decrease when compared with the numbers for the two preceding years. And this decline, as might be expected, is attributed by Civil Surgeons to the very limited rain-fall during the monsoon, and the consequent dryness of the soil and atmosphere.

Deaths from fevers and bowel complaints.

Decrease of deaths from these two diseases attributed to limited rain-fall.

Deaths from other causes.

There were 96,586 deaths registered under " other causes " against 97,550 in the preceding year. The deaths from injuries amounted to 5,076.

December the unhealthiest month during the year.

31. Compared with the other months of the year, December was the most unhealthy, the death-rate for that month being 25·20. In the other months the death-rate ranged between 16·14 and 20·75, except in January, June and November, when the rate per mille was 22·26, 23·32, and 23·27 respectively.

High mortality amongst children under one year of age.

32. The mortality amongst children under one year of age, as will be seen on reference to statement No. IV, was very high. The average ratio per thousand living, of both sexes, was 4·28, and amongst those of one year and under six years of age the ratio was 3·58. The excess of male over female deaths under the two above mentioned ages was 6051 and 4268, or in the proportion of 116 male to 100 female deaths.

Decided improvement in the registration system.

33. Taking the registration figures as a whole, and making due allowance for the inefficient agency that is employed for this purpose, I am glad to be able to report that there is evidence of a decided and considerable improvement in the performance of the duty. I would again urge for the consideration of Government, the advisability and great advantage of extending the system of birth registration over all the remaining rural circles of the province.

Recommends that birth registration be now extended to all the rural circles in the province also.

34. During my inspection tour it was remarked to me, on more than one occasion, by the head men of villages, that they did not see the use of our keeping up registers of deaths when we took no account of the births; and from what I learned of the disposition of the people on this point, I think the time has arrived when the system of birth registration may be without difficulty generally extended and worked in conjunction with that of death registration, for the chaukidárs who now report deaths can just as easily report births also.

Although much improvement is apparent in the progress of registration, still the work is far from well done.

35. Though I have said that much improvement is apparent in the progress of registration, I must at the same time point out that the work is still far from being well done, as will be seen by reference to annual form No. VI, in which the rural districts of Hissar, Jhang, Dera Gházi Khan, Pesháwar, Hazára and Kohát show the absurdly low death-rates of 9, 12, 13, 8, 13 and 7 respectively. Registration in all these districts is habitually defective, and the fact was brought to notice in my report for last year. Whatever difficulties there may be in the case of the frontier districts, there can be no such excuse in the cases of Hissar and Jhang.

Suggestions for making the agency at present employed for registration more efficient and trustworthy.

36. In the course of my inspection tour I found that the registers in some of the towns and rural circles were carelessly kept, contained several errors and irregularities, and bore evidence of having been hastily filled in by different hands. These faults are mostly owing to the fact that the registrars are in many instances employed also as municipal clerks, or clerks in the courts of Honorary Magistrates, and look upon the duty of registration as of only secondary importance. This should not be so.

In order to secure a careful and reliable registration the duty should be entrusted to a properly qualified official whose whole time can be devoted to the work, at least in municipalties of the 1st class, and in no case should the registrar of vital statistics be hampered in the discharge of his special registration duties by the demand from him of other work of the nature above indicated.

Table showing the action taken under the registration bye-laws.

37. The following statement shows the number of persons who were fined for neglecting to register births and deaths in those towns where the registration bye-laws have been made legally compulsory.

Table showing the working of the Municipal bye-laws regarding the registration of Births and Deaths during the year 1877.

No.	Districts.	Municipality.	No. of persons fined for neglecting to register births.	No. of persons fined for neglecting to register deaths.	Aggregate of fines inflicted. Rs.	A.	P.	Remarks.
1	Delhi ...	Delhi	...	...	...	...	...	
2		Do. Suburbs	...	...	...	...	..	
3		Sonepat	...	...	...	...	...	
4		Ballabgarh	...	...	...	...	...	
5		Faridabad	...	...	...	...	...	
6		Najafgarh	...	...	...	...	...	
7	Gurgaon ...	Farukhnagar	...	...	...	...	...	
8		Rewári	...	...	...	...	...	
9		Firozpur	...	...	...	...	...	
10		Palwal	...	...	...	...	...	
11	Karnal ...	Karnál	...	...	...	...	...	
12		Kunjpura	...	6	9	...	...	
13		Púndri *	...	...	...	...	...	
14		Kaithal	2	...	3	...	...	
15		Pánipat	...	...	...	...	...	
16	Hissar ...	Hissar	...	...	...	...	..	
17		Hánsi	...	...	...	...	...	
18		Bhiwáni*	1	...	..	4	...	
19		Fatahabad	...	...	...	...	..	
20		Rattia	...	...	...	...	...	
21		Tohána	...	...	...	...	..	
22	Rohtak ...	Rohtak	...	2	...	8	...	
23		Beri	4	...	5	8	...	
24		Bahádurgarh	...	...	...	...	...	
25		Gohána	1	3	...	10	...	
26		Jhajjar	15	4	8	...	...	
27		Kharkhauda	...	2	...	12	...	
28	Sirsa ...	Sirsa	...	...	...	...	...	
29		Fázilka	1	...	...	8	...	
30		Ellenabad	...	...	...	...	...	
31		Fánia	...	...	...	...	...	
32		Rori	...	...	...	...	...	
33	Umballa ...	Umballa	1	4	5	...	...	
34		Jagádhri	...	3	...	3	...	
35		Bàriya	...	...	...	...	...	
36		Ládwa	...	...	...	...	...	
37		Pehowa	...	...	...	...	...	
38		Shahabad	...	...	...	...	...	
39		Thánesar	...	2	...	2	...	
40		Rádaur	...	...	...	...	...	
41		Sadhaura	...	4	...	4	...	
42		Kharar	...	...	...	...	...	
43		Rùpar	...	...	...	...	...	
44	Ludhiana ...	Ludhiána	3	3	3	2	...	
45		Raekot	...	...	...	...	...	
46		Jagraon	11	...	9	8	...	
47		Máchiwára	...	...	...	...	...	
48		Khanna	...	...	...	...	...	
49		Bilolpur	...	...	...	...	...	
50	Simla ...	Simla	...	...	...	...	...	
51	Jullundur ...	Jullundur	9	2	2	8	...	
52		Do. Suburbs						
53		Aláwalpur	...	...	...	...	...	
54		Kartárpur	1	...	...	8	...	
55		A'dampur	...	...	...	...	...	
56		Bunga	...	3	...	12	...	
57		Ráhon	...	...	...	...	...	
58		Nawashahr	...	...	...	...	...	
59		Phillour	...	...	...	...	...	
60		Núrmahal	...	...	...	...	...	
61		Nakodar	...	...	...	...	...	
62		Mahatpur	...	...	...	...	...	
		Carried forward ...	49	38	50	1	...	

Table showing the working of the Municipal bye-laws regarding the registration of Births and Deaths during the year 1877—continued.

No.	Districts.	Municipality.	No. of persons fined for neglecting to register births.	No. of persons fined for neglecting to register deaths.	Aggregate of fines inflicted. Rs.	A.	P.	Remarks.
		Brought forward ...	49	38	50	1		
63	Hoshiarpur ...	Hoshiárpur	5	3	2	2	...	
64		Do. Suburbs						
65		Hariána	2	3	2	8	..	
66		Garhdiwàla	...	1	...	4	...	
67		Dasúya	8	8	3	7	...	
68		Tánda and Urmar... ...	2	...	...	10	...	
69		Mukerián	...	...	...	...	...	
70		Una	3	1	5	8	...	
71		Andandpur	3	...	...	12	...	
72		Miáni	4	...	1	8	...	
73	Kangra ...	Kángra	1	...	...	4	...	
74		Dharmsála						
75		Sujánpur Tíra	...	...	...	...	...	
76		Haripur	...	2	...	8	...	
77		Jawálamukhi	4	4	11	4	...	
78		Núrpur	...	1	...	8	...	
79	Amritsar ...	Amritsar	17	...	9	14	...	
80		Majítha	...	...	...	...	..	
81		Jandiála	...	...	...	...	...	
82		Rámdás	...	...	...	...	...	
83		Tarn Táran Khás ...	...	...	...	...	...	
84		Vairowál	...	1	1	...	...	
85	Gurdaspur ...	Gurdáspur	...	...	...	...	...	
86		Dínanagar	2	1	1	12	...	
87		Bahrámpur	...	...	...	...	...	
88		Kalánaur	...	...	...	...	...	
89		Pathánkot	...	...	...	...	...	
90		Sujánpur	1	...	...	8	..	
91		Dalhousie Saintarium ...	...	...	...	...	...	
92		Narot	3	2	3	8	...	
93		Shahpur	...	...	...	...	..	
94		Sukhuchak	...	1	1	...	...	
95		Darman	...	...	...	...	...	
96		Kot Naina	...	...	...	...	...	
97		Batála	...	...	...	...	...	
98		Srígovindpur	...	...	...	...	...	
99		Fatahgarh	...	2	1	...	...	
100		Dera Nának	3	...	...	12	..	
101	Sialkot ...	Siálkot	...	...	...	...	...	
102		Daska	...	...	...	...	...	
103		Jámki	...	...	...	...	...	
104		Mitránwála	...	...	...	...	...	
105		Kila Sobha Singh ...	...	...	...	...	...	
106		Pasrúr	...	...	...	...	...	
107		Zafarwál	1	1	...	6	...	
108		Sankhatra	...	...	...	...	...	
109		Chawinda	...	...	...	...	...	
110		Nárowál	...	...	...	...	...	
111	Lahore ...	Lahore	16	4	13	6	...	
112		Do. Suburbs	...	...	...	...	...	
113		Chunián	...	...	...	...	...	
114		Kasur	...	...	...	...	...	
115		Khem Karn	...	...	...	...	...	
116	Gujranwalla ...	Gujránwála	6	2	2	12	...	
117		Wazirabad	...	...	...	...	...	
118	Ferozepore ...	Ferozepore	9	2	6	6	...	
119	Rawalpindi ...	Ráwalpindi	9	18	5	10	...	
120		Murree Sanitarium ...	...	...	...	...	...	
121		Pindigheb	6	4	12	...	...	
122		Makhad	1	...	...	4	...	
123		Hazro	1	...	4	...	...	
124		Attock	...	...	...	...	...	
		Carried forward ...	156	99	143	6	...	

Table showing the working of the Municipal bye-laws regarding the registration of Births and Deaths during the year 1877—concluded.

No.	District.	Municipality.	No. of persons fined for neglecting to register births.	No. of persons fined for neglecting to register deaths.	Aggregate of fines inflicted. Rs.	A.	P.	Remarks.
		Brought forward ...	156	99	143	6		
125	Jhelum ...	Jhelum	...	...	...	...	...	
126		Chakwál	...	...	...	...	...	
127		Talagang	...	4	2	12	...	
128		Pind Dádan Khan ...	...	...	...	...	...	
129	Gujrat ...	Gujrat	...	...	...	...	...	
130		Jalálpur	...	...	...	...	...	
131		Kunjáh	2	...	2	...	...	
132		Dinga	...	...	...	...	...	
133	Shahpur ...	Shahpur	...	...	...	...	...	
134		Sahiwál	...	...	...	...	...	
135		Ghirot	...	...	...	...	...	
136		Bhera	1	...	...	8	...	
137		Miáni	...	...	...	...	...	
138		Khusháb	2	...	2	...	...	
139	Mooltan ...	Mooltan	35	27	43	2	...	
140		Do. Suburbs						
141		Shujabad	6	1	3	6	...	
142		Karor	...	...	...	...	...	
143		Talamba	...	...	...	...	...	
144		Jalálpur	...	...	...	...	...	
145		Dunyapur	...	...	...	...	...	
146	Jhang ...	Jhang	...	1	1	...	...	
147		Maghiána	...	...	...	...	...	
148		Shorkot	...	...	..	...	...	
149		Ahamadpur	...	...	...	...	...	
150		Chiniot	...	...	...	...	...	
151	Montgomery ...	Montgomery	...	...	...	...	...	
152		Kamália	...	...	...	...	...	
153		Pákpattan	...	...	...	..	...	
154		Sayadwála	...	...	...	...	...	
155		Dipálpur	...	...	...	...	...	
156	Muzaffargarh ...	Muzaffargarh	2	1	2	...	...	
157		Khangarh	...	...	...	...	...	
158		Shahr Sultán	1	...	...	8	...	
159		Jatoi	...	...	...	...	...	
160		Alípur	...	1	...	8	...	
161		Sitpur	...	...	...	...	...	
162		Khairpur	...	...	...	...	...	
163	Dera Ismail Khan ...	Dera Ismail Khan	2	...	...	12	...	
164		Kuláchi	6	1	6	8	...	
165		Bhakkar	1	...	...	8	...	
166		Leiah	...	4	4	..	...	
167		Tánk	...	...	...	...	...	
168		Mankera	1	1	...	4	...	
169		Kot Sultán	1	...	...	4	...	
170		Karor	...	...	...	...	...	
171	Dera Ghazi Khan...	Dera Ghází Khan	16	9	7	10	...	
172		Jámpur	...	...	...	...	...	
173		Dájal	1	...	1	...	...	
174		Bájanpur	...	...	...	...	...	
175		Kot Mithan	...	...	...	...	...	
176	Bannu ...	Edwardes-abad	1	...	1	...	...	
177		Laki						
178		Isa Khel	...	...	...	...	...	
179		Kálabágh	...	...	...	...	...	
180	Peshawar ...	Pesháwar	14	30	15	4	...	
181	Kohat ...	Kohát	...	...	...	...	...	
		Total ...	248	179	238	4	...	

In the above statement the towns marked with an asterisk are those in which the registration bye-laws have apparently remained a dead letter; no fines having been inflicted for the neglect to register births since they came into force amongst them, and in all of them the birth-rate being more or less below the provincial standard.

SECTION VI.—CHIEF DISEASES OF THE YEAR.

A—CHOLERA.

History of the chief diseases.

The Province enjoyed complete immunity from epidemic cholera.

38. The province enjoyed complete immunity from the ravages of epidemic cholera. Of the twenty-nine deaths registered under this head, only four, after subsequent inquiry and careful investigation, were pronounced to be genuine, as will be seen from the subjoined statement, which shows the diffusion of the disease chronologically and locally, as also the real cause of death assigned after special inquiry.

Statement showing the real cause of death in 29 cases registered under the head of cholera during 1877, after special inquiry.

No.	District.	Police station.	Town or village.		Deaths. M.	Deaths. F.	Deaths. Total.	Age.	Duration of illness.	Date of death.	Disease to which death is attributed by district authorities.
1	Gurgaon	...	Rewári	T	...	1	1	14 years	6 hours	6th July	More probably from sun-stroke.
		...									
2	Ditto	Firozpur	Bhagwán	...	1	...	1	24 ,,	...	30th May	Ordinary illness (Pleurisy and Hepatitis).
3	Rohtak	...	Kharkhauda	T	...	1	1	20 ,,	3 hours	1st Jany	The deceased was confined of a son 13 days before her death, and had eaten sweetmeat mixed with gum, &c.
4	Sirsa	Rání	Allo	...	...	1	1	20 ,,	...	6th August	Fever and pain in stomach.
5	Umballa	...	Jagádhri	T	1	...	1	60 ,,	1 day	21st May	The death was really from cholera.
6	Ludhiána	...	Raekot	T	1	...	1	55 ,,	4 days	4th Feby	Colic and not cholera.
7	Jullundur	...	Núrmahal	T	...	1	1	10 ,,	2 ,,	14th Novr	Fever with diarrhœa.
8	Kángra	...	Sujánpur	T	...	1	1	22 ,,	1 day	15th Jany	Indigestion, having suffered from insanity for a year.
9	Ditto	...	Jawálamukhi	T	1	...	1	30 ,,	1 ,,	20th ,,	Indigestion and pain in sides.
10	Amritsar	...	Majitha	T	1	...	1	12 ,,	1 ,,	5th June	Purging and vomiting and fever.
11	Ditto	...	Amritsar	T	...	1	1	20 ,,	3 hours	2nd Octr	Ditto ditto.
12	Gurdáspur	Kot Naina	Langa	...	1	...	1	25 ,,	6 days	1st Septr	Diarrhœa; was suffering from fever for 1 year.
13	Ditto	Ditto	Miánwáli	...	1	...	1	40 ,,	4 ,,	24th August	Pain in stomach.
14	Ditto	...	Sujánpur	T	1	...	1	50 ,,	1 day	20th June	Heat apoplexy.
15	Ditto	Mádhopur	Mádhopur	...	1	...	1	50 ,,	1 ,,	11th May	Fever and diarrhœa.
16	Ditto	Dinanagar	Marara	...	...	1	1	40 ,,	1 ,,	17th Mar	Vomiting. Was suffering from fever for six months.
17	Ditto	...	Narot	T	1	...	1	25 ,,	4 days	21st Feby	Fever.
18	Siálkot	...	Pasrúr	T	1	...	1	36 ,,	2 ,,	7th May	Vomiting and purging, the result of too much eating.
19	Lahore	...	Sharakpur	T	1	...	1	50 ,,	1 day	25th July	Vomiting and diarrhœa. The deceased was in bad health for 3 months.
20	Ditto	Kanganpur	Kals	...	...	1	1	26 ,,	1 ,,	17th May	Indigestion prior to death and had been suffering from fever.
21	Ditto	...	Khem Karn	T	...	2	2	20 & 22 ,,	2 days	1st & 7th Apl	Diarrhœa.
22	Ditto	...	Lahore	T	1	...	1	50 years	1 day	28th April	Colic and general debility.
23	Gujránwála	...	Rámanagar	T	1	...	1	50 ,,	2 ,,	7th May	Fever.
24	Ditto	...	Jaláipur	T	1	...	1	14 ,,	6 hours.	11th Novr	Cholera; 2.
25	Rawalpindi	Sangjáni	Usmángarh	...	1	...	1	35 ,,	Ditto	20th May	Colic and indigestion.
26	Jhelum	...	Pind Dádan Khan	T	1	...	1	50 ,,	2 days	27th Septr	Cholera; 3.
27	Ditto	...	Chakwál	T	1	...	1	45 ,,	9 hours	2nd June	No disease specified; only the death was not from cholera.
28	Bannu	...	Edwardes-abad Cantt		1	...	1	...	1 day	17th Septr	Cholera; 4.
			TOTAL ...		19	10	29				

Reasons for supposing that the deaths registered from cholera in the above statement were genuine.

39. An examination of this statement does not produce in my mind any confidence in the accuracy of the real cause of death assigned in those cases in which the subsequent inquiry resulted in an alteration of the originally assigned cause, and I am content to believe that they were all cases of genuine cholera. Because the disease is well known to and easily recognized by the natives, and because it is much more likely that their first and unbiassed impressions should be correct than that the opinions of out-siders, derived from an official inquiry instituted in most cases several days, if not weeks, after the deaths occurred, should be so. And this, because in most instances (except where medical officers personally and directly make the enquiry) the officials employed in the investigation are no better qualified by professional attainments to form an opinion than those making the original report.

Whatever the value of the statement may be, it is given in this place to show the results of the inquiries which are made as a rule by this office on the receipt of all reports of isolated cases of cholera occurring in any part of the province in order to be fore-armed as to the approach of the disease in the epidemic form.

B.—SMALL-POX.

Small-pox.

40. The total registered mortality from small-pox was 12,296 against 10,254 in the preceding year, and giving a death-rate of 0·70 per mille of the population.

Of this total of deaths 2,394 occurred amongst children under one year of age; 9,385 amongst those over one year and under twelve, and only 517 amongst adults.

Chart shewing the rise and fall of the disease during each week of the year.

41. From the chart appended to this report, contrasting the weekly fluctuation of small-pox deaths during the year under review with that of the past year, it will be seen that the disease gradually increased in virulence from the first week in October to the last week of the year, when it appears to have attained its maximum of 709 deaths. The prevalence of the disease during each quarter of the year was as follows:—

1st Quarter	...	...	...	...	2,103
2nd „	...	...	...	...	4,086
3rd „	...	...	...	...	1,800
4th „	...	...	...	...	4,307

Districts in which the deaths from this disease were above 2 per mille per annum.

42. In the districts of Bannu, Dera Ismail Khan, and Gurgaon, the deaths from this disease were above 2 per mille of the population. In Bannu the death-rate was no less than 5·48 per mille, but in the remaining districts of the province, with the exception of Delhi, Rohtak, Karnál, Montgomery, Mooltan and Muzaffargarh, it did not exceed one per mille.

The towns most severely affected.

Sharp outbreak of the disease in the village of Sisána, district Rohtak.

43. The towns most severely affected were Delhi, Farukhnagar, Bhiwáni, Rohtak, Jhajjar, Amritsar, Chiniot and Dera Ismail Khan. In the beginning of the year a very sharp outbreak of the disease was reported to have occurred in the village of Sisána, police station Kharkhauda, in the Rohtak district.

Gurgaon still suffering most terribly from the disease.

44. In connection with this epidemic I may here state that Gurgaon is still suffering most terribly from the disease, no less than 3006 deaths having been registered from the beginning of the current year to the week ending 6th April (1878), giving a death-rate of 16 per mille of population.

Statistics of this office seem to show that in those districts where vaccination has been accepted the disease has steadily declined.

45. It is clearly manifest from the statistics compiled in this office for the past eight or nine years, that in those districts where vaccination has been readily accepted, the mortality from small-pox has steadily and markedly declined, and I am glad to observe in the reports received from Civil Surgeons and Deputy Commissioners, that in the majority of the districts vaccination is being vigorously extended, and meets with comparatively little opposition except in a few localities at opposite extremes of the province, namely in the frontier districts—generally in the one direction, and in those of Karnál, Delhi, Rohtak, Gurgaon and Hissar in the other.

Tables showing results of vaccination in each of 4 principal districts in which the measure is readily accepted and persistently opposed, respectively.

46. The subjoined tables shows at a glance the results of vaccination during the last ten years in each of four principal districts in which the measure is readily accepted and persistently opposed, respectively:—

Results of Vaccination in four principal districts where it is accepted by the people.

Districts.	Deaths registered from small-pox during the years									
	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877
Jullundur ...	605	4,339	1,498	118	380	1,103	141	77	34	8
Gujránwála ...	1,610	480	47	573	695	138	87	73	70	45
Hoshiárpur ...	1,028	3,222	1,344	92	439	789	117	177	30	11
Gurdáspur ...	949	4,163	622	181	1,479	1,983	80	230	26	8

Results of Vaccination in four principal districts where it is opposed by the people.

Districts.	Deaths registered from small-pox during the years									
	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877
Gurgaon ...	1,599	7,139	420	775	1,878	945	1,022	2,741	1,263	1,611
Karnál ..	589	770	1,195	1,212	473	939	2,292	1,184	580	984
Rohtak ...	258	2,937	484	369	141	866	551	217	19	1,023
Hissar ...	141	722	712	1,545	92	409	920	546	123	466

47. The Civil Surgeon of Amritsar, in his sanitary report for 1877, remarks that a dangerous custom prevails in that city in connection with small-pox. It is that of "Devipúja," which consists in taking through the streets in procession to some temples cases of small-pox on the 9th day of the eruption. The procession always attracts a crowd of followers, and is a most effectual means of spreading the disease. This custom is universally observed amongst Hindús, and in some localities by Mussulmans also; and I fear some time must yet elapse before we can expect them to overcome the superstitious reliance they place in the goddess, or deviate from the time-honored observances of their forefathers. For the attainment of this desirable end time and patience are necessary; but meanwhile we may fairly hope, by a continued vigorous prosecution of the operations of the Vaccination Department, to reduce to a minimum the risks attaching to the practice of so dangerous a custom. As in the past, so in the future, we may look with confidence to progress in the decline in the prevalence of small-pox in exact proportion to the progressive extension of vaccination—successful vaccination. Too much care and pains cannot be taken to ensure the prompt and certain success of the operations performed. From personal experience I am confident that much of the opposition of the people to the measure (where it is opposed) is owing to the occurrence of mishaps and failures, and the consequent disappointment and sometimes loss caused by them. And this is, I believe, the result of employing untrained or badly trained men as vaccinators, as is the case in most of the rural districts, and not a few of the towns.

Custom of "Devipúja" in Amritsar.

48. To remedy the evils arising from this cause it would, I think, be advisable to rule that no vaccinator be employed in any dispensary, or any municipal town, unless he has received a certificate of qualification from the Superintendent General of Vaccination.

Suggestions for making vaccination more popular.

I think too that much good might be effected by consulting the wishes and feelings of the people in the matter of the class of men employed as vaccinators amongst them; for in the districts where dispensary compounders and dressers are employed on this duty, they not only fail to secure the confidence and respect of the people, but not infrequently actually do injury to the cause through want of skill, and through carelessness in the proper discharge of the duty. In municipal towns men put forward or selected by the municipal authorities might be with advantage specially trained to this work under the orders of the head of the department.

49. It has been mentioned to me by Deputy Surgeon General G. H. Ray, Lahore circle, that he has been informed by natives that much of the backwardness evinced by respectable native families to entrust their children to the hands of the Government vaccinators would be overcome if respectable native midwives (*dái*) were trained to the work. My own inquiries on the subject confirm the belief that by the employment of such an agency, always carefully selected and well trained, many children would be reached who are now carefully kept away from the Government vaccinators, whilst the operation itself would be popularized and spread with much more expedition, and less of ill-will and objection than it now meets with in many parts. As an experiment, women of the class named might be trained for some of the larger towns and cities in communication and consultation with the municipal committees.

Employment of respectable midwives as vaccinators.

I refrain from further remark on this subject, as a full account of the operations of the vaccine department for the year 1877-78 is, in pursuance of orders received from the Government of India, appended as Section VII to this report.

C.—FEVERS.

50. The registered mortality in the Punjab from the great death cause of the province, namely fevers, was 219,281 in the year under review, against 351,286 in the preceding year, or in the ratio of 12·54 per mille of population against 20·09.

Total registered mortality from fevers.

51. The maximum number of deaths in any one month of the year was 22,411 in January, and the minimum 14,011 in April. These figures contrast very favorably with those of the preceding year, in which the monthly mortality from this class of disease rose suddenly from an average of 14,511, calculated on the total fever deaths registered from January to August inclusive, to the unprecedented number of 87,052 in October, due to entirely exceptional causes, as will be mentioned further on.

Monthly maximum and minimum mortality.

52. The average weekly mortality for the year was 4217, and it will be seen at a glance from the chart (herewith annexed) which shows the fluctuation of the fever wave by weeks, that, unlike the preceding year, there was in the year under review no conspicuous rise or fall in any one week throughout the entire period after the

Average weekly mortality will be seen on reference to the chart.

Table showing the registered periods of mortality from fevers in the undermentioned towns and rural circles for 1877.

Towns or Rural Circles.	Population.	Fever Deaths.			I.	II.	III.	Remarks
		Infants.	Adults.	Total.	Died in 15 days or less.	Died in from 16 to 30 days.	Died in over 30 days.	
Hariána Town ...	7,802	24	46	70	35	11	24	
„ Rural Circle ...	61,825	15	42	57	34	14	9	For January 1878.
Garhdiwála Town ...	3,874	*17	17	34	18	5	11	* 14 died in 1st period and 3 in 2nd.
„ Rural Circle ...	47,868	25	51	76	54	11	11	For January 1878.
Dasúya Town ...	8,675	2	13	15	12	1	2	Do. do.
„ „ ...	...	22	76	98	76	10	12	
„ „ ...	...	112	136	248	146	60	42	For the year 1876.
„ „ ...	...	477	377	854	481	154	219	Do. 1875.
„ Rural Circle ...	45,833	10	61	71	45	13	13	For January 1878.
„ „ ...	...	...	735	735	413	166	156	
„ „ ...	...	...	2,442	2,442	1,731	389	322	For the year 1876.
„ „ ...	...	...	2,397	2,397	1,702	426	269	Do. 1875.
Batála Town ...	26,929	82	193	275	141	63	71	
„ „ ...	...	310	664	974	587	268	119	For the year 1876.
„ Rural Circle ...	65,605	255	505	760	396	234	130	
Pánipat Town ...	24,500	187	126	313	192	55	66	
„ Rural Circle ...	41,210	123	366	489	214	142	133	
Raya „ „ ...	25,105	35	156	191	129	38	24	
Gohána „ „ ...	105,753	626	891	1,517	1,033	286	198	
Baranda „ ...	5,124	26	55	81	48	4	29	
Butana „ „ ...	42,038	30	50	80	62	9	9	
Mundlána „ ...	5,109	28	67	95	64	22	9	
Karnál Town ...	24,015	202	361	563	381	40	142	
„ Rural Circle ...	48,279	58	405	463	268	92	103	
Thánesar „ ...	11,411	85	130	215	150	39	26	
Shahabad Town ...	11,660	*16	34	50	31	2	17	* 15 died in the 1st period and 1 in the 2nd.
Umballa „ ...	26,258	130	158	288	169	96	23	
„ Rural Circle ...	65,067	1	36	37	25	9	3	
Kharar Town ...	4,847	*39	39	78	51	17	10	* 32 died in the 1st period. 5 in 2nd and 2 in 3rd.
„ „ ...	...	*111	80	191	95	79	17	For the year 1876 * 64 died in 1st period, 42 in 2nd and 5 in 3rd.
„ Rural Circle ...	64,379	5	21	26	18	4	4	
Kuráli Town ...	3,965	*24	109	133	69	34	30	For January 1878 * 15 died in 1st period, 7 in 2nd and 2 in 3rd.
„ Rural Circle ...	...	2	23	25	13	7	5	Ditto ditto.
Baláchor Circle ...	58,121	19	39	58	40	1	17	Ditto ditto.
Garhshankar Circle ...	75,396	11	35	46	23	9	14	Ditto ditto.
Máhilpur „ ...	87,522	16	37	53	26	21	6	Ditto ditto.
„ „ „ ...	...	516	706	1,222	689	274	259	
Hoshiárpur „ ...	132,619	35	77	112	63	15	34	For January 1878.
Total ...	...	3,676	11,756	15,432	9,724	3,120	2,588	

disease had once subsided from the high rates prevailing in the months of October and November 1876 to the normal rate in the last week of January 1877.

Districts in which the fever death-rate was very high.

The fever death-rate, however, was very high in the districts of Muzaffargarh, Jullundur, Gujranwâla, Lahore, Mooltan and Amritsar, in which it ranged between 15 and 19 per mille of population. In the remaining districts the death-rate ranged between 5 and 14. The rate of mortality in the towns was highest in Lahore, Karnál, Wazirabad, Delhi, Ferozepore and Amritsar, in which it ranged between 19 and 23 per mille.

Decline of the fever mortality attributed to diminished rain-fall of the monsoon &c.

53. From a comparison of the experience of the year under review with that of the preceding year, it appears, without much room for doubt, that the prime factor in the circumstances that have operated to produce so marked a decline in the mortality from fevers in 1877, as against the enormously high rate which prevailed during the preceding autumn, is the very greatly diminished rain-fall of the monsoon, and the consequent very dry condition of the soil and atmosphere during that season, coupled with the absence of the usual river floods and rain-water lodgments on the surface of certain extensive tracts of country.

Inquiry into the cause of high mortality from fevers, as requested by His Honor the Lieut. Governor.

54. In the course of my tour of inspection, according to the request of the Hon'ble the Lieutenant-Governor, I took advantage of the many opportunities presenting to make particular inquiry into the causes of the wide-spread prevalence and high rate of mortality from fevers in this province, with the object of preventing, if possible, their frequency and mitigating their fatality. With these purposes in view, I made a careful inspection of the several towns and villages " en route " (detailed reports on each of which I from time to time during my tour submitted to Government) and examined the registers of vital statistics in all the municipalities and rural circles visited. I also noted such other circumstances of local peculiarity and general conditions of life as seemed to me to bear directly on the subject.

Result of inquiry described after inspection of several towns and villages.

55. The results of my inquiry I now proceed to describe at length, premising only that owing to the almost entire absence of professionally authenticated records, I found considerable difficulty in arriving at a clear conception of the real state of affairs, and not less difficulty in distinguishing, if perchance I have succeeded in doing so, the several principal types of disease which go to make up the fever mortality of this province. My first endeavour was to ascertain as a starting point, so far at least as the circumstances would permit, the relative proportions of the several kinds of fever included together in the aggregate of the deaths registered, under that generic term, so as to distinguish on the one hand those which are dependent for their origin and growth upon changes in the condition of the climate and soil, or upon the vicissitudes in the action of meteoric agents, from those on the other which are produced and spread abroad by causes of an opposite character and connected more intimately with the modes and means of human life, or perhaps in some cases more properly the struggle for it. How far I have succeeded in this the sequel must prove, though I must say I feel none the less satisfied with the justness of my deductions notwithstanding that they are not backed so fully as is desirable by the force of statistical figures, because I consider that the teachings of experience, coupled with the weighing of facts and the results of careful inquiry, are for all practical purposes sufficiently reliable.

The broad facts of the case may be stated as follows :—

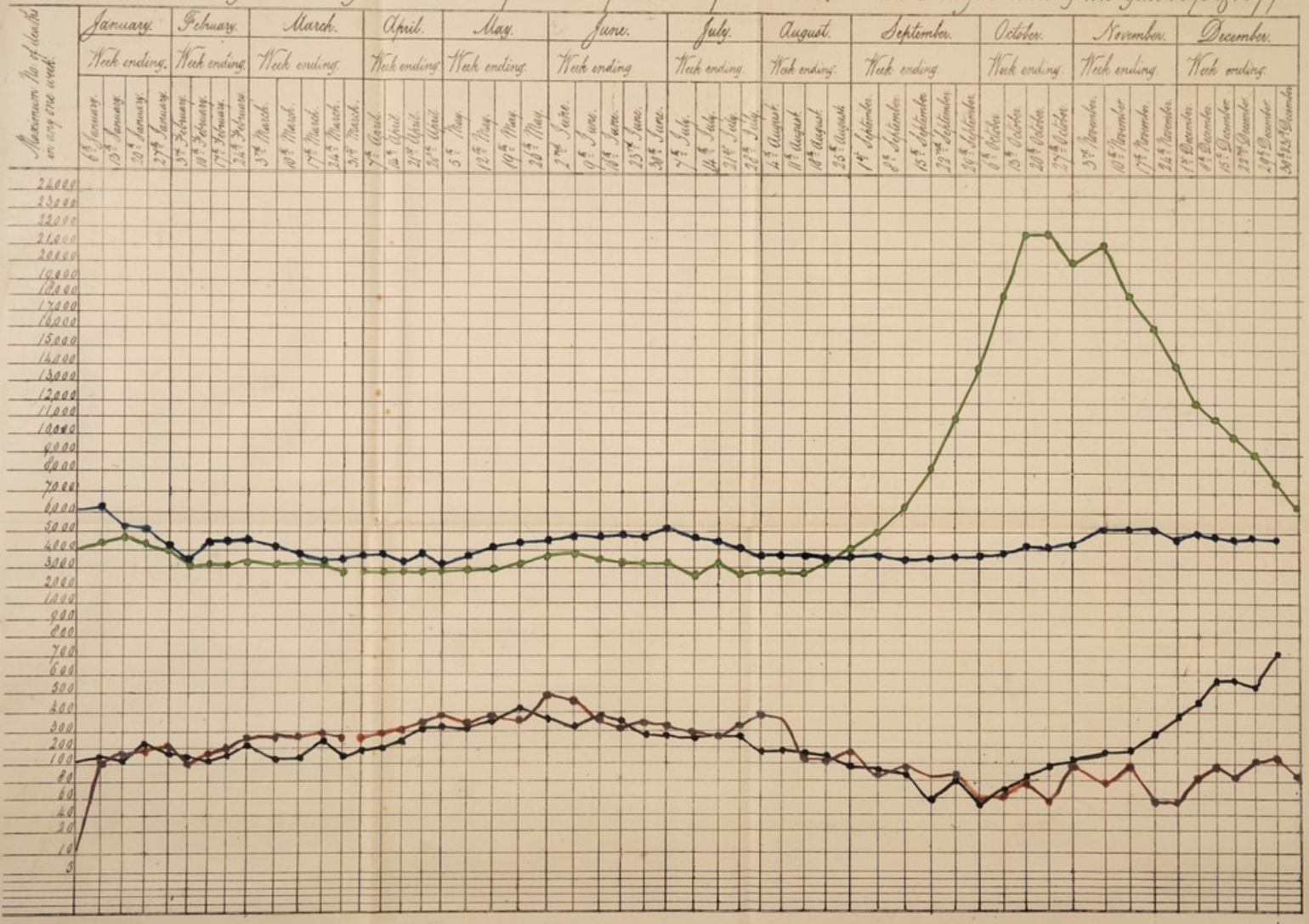
General opinion everywhere that the decline in fever mortality is due to the dryness of the soil.

56. Everywhere in the tracts visited, and they comprised a wide sweep round the eastern half of the province, the registers for 1877 showed a very marked decline in the numbers of deaths from fevers as against those registered in the preceding year, and I everywhere heard the same remark, and with but little variation in words, namely, " We have had no sickness this year, as there have been no rains, and the whole country is dried up." Omitting a few exceptional localities on the line of the Western Jumna Canal and elsewhere, in which the soil is more or less constantly water-logged, these words were generally applicable to all parts of the province. For the usual monsoon rains had, as a fact, been dislocated in the period of their fall, and the year was characterized in general terms by a cold and wet winter and spring instead of the ordinary hot, steamy, and at intervals, rain-soused seasons of the hot weather and autumn months, with their concomitant river floodings and surface drainage inundations.

Largest portion of the mortality from fevers was recorded within and up to 15 days of illness, as will be seen from subjoined statement.

57. An examination of the registers further showed that by far the largest portion of the mortality from fevers was recorded as having occurred within and up to fifteen days of illness. This will be seen by reference to the subjoined tabular statement, in which the duration of illness has been ranged under three periods, namely, within and up to fifteen days, between fifteen and thirty days, and more than thirty days. The table has been compiled from the death registers of a few unimportant municipal towns and rural circles taken without selection as they came in the course of inspection, and may be accepted as an index to the duration of fatal fevers, or the periods of fever mortality generally as it is throughout the province. I say this because, though I did not tabulate their statistics at the time of inspection, the labour and time required for the purpose not being available, I could see from my examination of the registers that they all told much the same story in respect to this point of fever mortality, under the head of " duration of illness," which also is generally confirmed in all registers by a marginal note to the effect—" died after (so many) days of illness."

Chart showing the weekly distribution of Small-pox, and fever deaths in the Panjab during the year 1876 & 1877



Note. The black and red lines indicate the smallpox line waves. the former for 1877 the latter for 1876
The blue and green ds: ds: fever ds: Do: 1877 do 1876

58. It must be here remembered, and there can be no doubt about the matter, that all the deaths registered under the head of "fever" are not in reality fever deaths in the proper acceptation of the term. A certain undeterminable number of them are, as a matter of fact, merely deaths resulting from some acute local inflammatory affection of one or other of the great viscera, and they are entirely distinct from those resulting from the effects of purely idiopathic fevers. I believe, however, that they form a very insignificant proportion of the whole, because, as a rule, deaths from such diseases as acute nephritis, hepatitis, peritonitis &c. &c., which are attended by a greater or less amount of symptomatic fever as a prominent character of the illness, are registered under their several proper headings, as "pain in kidneys," "pain in liver," "pain in belly," &c. &c., whilst in the registers of some districts this class of deaths is distinguished by the compound terms "fever and pain in side," "fever and cough," "fever and diarrhœa," "fever and pain in belly," &c. &c. Wherever such terms have been met with they have been excluded from the numbers quoted in the above table.

A certain undeterminable number of deaths registered under the head of fevers are without doubt merely deaths resulting from some acute local inflammatory affection of one or other of the great viscera.

59. Of the total of 15,432 deaths from fever given above, no less than 3676 or 23·8 per cent. of the whole occurred in infants from a few days old (in a few instances) to five years of age, and by far the greatest number of them took place within fifteen days of illness.

23·8 of the total fever mortality, as shown in the statement, occurred in infants.

Of the total deaths included in the first, or fifteen-day column, the largest number took place between the 9th and 15th days of illness; of those in the second, or thirty-day column, the greater number occurred from the 16th to the 20th day of illness; whilst the third column includes cases in which the duration of illness extended over thirty days, or generally from six weeks onwards to six months or more, and for the most part represents chronic cases which have ultimately succumbed to the various sequelæ of intermittent and remittent fevers of long duration.

60. Owing to the absence of all record on the point it is imposible to ascertain from the mortuary registers, with any approach to accuracy, the kind or the type of the "fever" in the several instances of death registered under that heading; and of course it is equally impossible to arrive at any even approximate estimate of the prevalence of any one form over another by comparison of the periods at which they terminated fatally. This much, however, may be gathered from the figures in the above table, namely, that fevers of the continued kind are far more prevalent and fatal in this province than is commonly supposed, as is shown by the returns of a year singulary free from the prevalence of fevers of the malarious kind. The amount of difference between the figures of a malarious and non-malarious year will be seen by reference to the above table where the fever deaths for 1875 and 1876 (both malarious years) are given for the town and rural circle of Dasúya (the town itself is surrounded by swamps and marshes, and generally is in a most insanitary condition, and is situated most favorably for the development of malarious fevers) for comparison with those of 1877, a non-malarious year; see also the figures for the town of Kharar, 1876 and 1877.

Difficulty of ascertaining with any approach to accuracy the type of fever prevalent.

Fevers of the continued kind far more prevalent and fatal in this province than is commonly supposed.

It may be also taken as somewhat near the fact, that of the deaths registered as having occurred within fifteen days of illness, or between that limit and thirty days, a small proportion only were the result of local inflammatory affections entirely independent of fever as such, and that the greatest portion by far were the natural termination of ordinary remittent and continued fevers brought to a fatal issue, naturally, or by the occurrence either of some inter-current local inflammation or some other lesion due to the operation of special or accidental causes; whilst others again, in greater or less number, the proportion of which depends on the existence of epidemic seasons and other special factors and agencies, are the consequences of fevers of the true typhus, enteric, and relapsing types, as the case may be.

61. Beyond the details noted in the above table, I claim for its figures no statistical value whatever, but I do think that, such as they are, they suffice to indicate to some extent, although in no exact measure, the different kinds of the fever mortality of which in the aggregate, and without an attempt at classification, we have such very high numbers in this province. That is to say, comparing the mortality of malarious and non-malarious years, they serve to distinguish the mortality ascribable to continued or specific fevers as against that ascribable to intermittent and malarious fevers, a point of no small importance when we come to consider the extent to which in either case they are preventible, or come to devise measures for their prevention.

The figures, such as they are, serve to distinguish the mortality ascribable to continued or specific fevers as against that ascribable to intermittent and malarious fevers.

62. In England, according to Murchison, the rate of mortality of the four continued fevers (typhus, relapsing, enteric, and simple) taken collectively is 15·75 per cent., or in the proportion of one death in 6·34 cases. The same authority gives the rate of mortality of typhus at 18·92 per cent., or one in 5·28 cases, and the period of its mortality at between the twelfth and fourteenth days, as a mean. The rate of mortality of enteric fever is not much lower, namely 17·26 per cent., or in the proportion of one death in 5·79 cases, but the period of mortality ranges between the second and fourth weeks, though in this country

Rate of mortality in England of the four continued fevers, according to Murchison.

it is by no means uncommon for death to occur between the first and second weeks, and occasionally even in less than a week. The rate of mortality of relapsing fever is only 1·84 per cent. in England, or in the proportion of one death in fifty four cases, but in this country it is, I am satisfied from my own experience, very much higher, and I should say not much below that of typhus, though I can produce no statistics in support of the assertion. Febricula, or simple continued fever, also is rarely fatal in England, at least in its uncomplicated form; the same cannot be said for it in this country, perhaps, because of its being comparatively seldom altogether without some sort of complication.

English rate taken as a standard of comparison for the fever deaths that occur in this country.

63. In the absence of other available data, I take the above rates as a standard of comparison in this country, merely giving to febricula the same rate and period of mortality as is given above to relapsing fever, though I know that sometimes, as in epidemic seasons, it is very much higher. Indeed on such occasions the fever itself undergoes so great changes and variations that it is in many instances not to be distinguished from typhus or enteric, or relapsing fever, as the case may be, and into one or other of which it may merge. Applying these rates then to the above table some idea may be formed of the wide prevalence of this class of fevers, inasmuch as it appears that, with the exceptions before mentioned, all the deaths in the first two columns of fifteen and thirty days respectively, may be reckoned as attributable to one or other form of the continued fevers when those of the malarious kind are not epidemic or "in season," as it is taken for granted they were not in 1877. The question naturally arises as to which of these forms the mortality is mainly due. To this I can make no satisfactory answer based upon an array of facts, but the circumstances of the case in general will, I think, be found to present evidence sufficient to serve as a safe guide in the formation of a correct opinion, and this I shall endeavour to elucidate in the sequel.

Continued fevers.

64. My own experience in this province leads me to the belief that all the ordinary recognized forms of the continued fevers are vastly more common amongst the people of this country than we have any just conception of. Practically we see nothing of these fevers as, there is no doubt, they exist amongst the people, because we never come in contact with them in their homes, and they themselves are seldom brought to our dispensaries or hospitals. In fact we never even hear of their existence, except on the occasions when, as in the case of typhus and relapsing fevers, they break out in epidemic form over some extensive or populous district. But these fevers are of common occurrence, and the latter especially so, as may be imagined from the diversity of names under which it is described. The common bilious remittent or yellow fever of the Punjab, the relapsing or famine fever as it is more generally called, is familiar to the people in all parts of the province, and it often spreads over wide districts in the epidemic form, commonly proving fatal by the development of jaundice, or pneumonia, or diarrhœa, &c.

Typhus or spotted fever.

65. Typhus or spotted fever may be considered to be quite as frequent and wide-spread as the yellow or relapsing fever, and the two are sometimes found prevailing together side by side in one and the same epidemic. I have myself, on two different occasions, seen genuine typhus and relapsing fevers prevailing together in one and the same epidemic, each running its own course distinctly, though during each of the epidemics the two different forms became so mixed by a community of symptoms that it was in many instances difficult to say to which specific form a particular case belonged. These two kinds of fever are always found amongst the poor, and are I think more common in the villages and rural districts than in the towns, except when they are epidemic.

Enteric fever.

66. Of the existence of enteric fever in this province as an endemic there can be no sort of doubt. In fact it has its home in every town and village of the country, and every where only waits the occurrence of some accidental exciting cause, or the conjunction of certain requisite or favoring conditions of climate, soil and domestic habitude, to burst out into activity. This is the fever which works its way into the houses of the rich and poor alike without distinction. It is frequently accompanied by a very fœtid diarrhœa, and not infrequently by bilious vomiting as well, and from the former symptom is called by the native *tap-o-dast* and *tap-o-ishál*.

Simple continued or ardent fevers and the common agues and remittents also endemic in this province.

67. Simple continued or ardent fever, *tapi-muhrica* of the natives, and the common agues and remittents, or malarious fevers as they are termed, are also endemic in the province, and are met with at all seasons and in all places as a matter of course. These fevers are more influenced by meteoric and climatic vicissitudes, and by the changes wrought through them in the conditions of the atmosphere and soil, than are those which owe their origin and spread by contagion or infection to the action of a specific virus, as is the case in the continued fevers above mentioned. They are sometimes, during seasons of an "epidemic atmosphere," so complicated by a variety of divergent symptoms in different cases that it is very often impossible to distinguish one form of fever from another, intermittents quickly changing into remittents, and they in turn developing into continueds, these last generally of a low typhoid, or asthenic character, and all more or less fatal either immediately or ultimately according to the nature of the epidemic. In such seasons these simple continued fevers, from the great variety of forms that they assume, may be considered as a connecting link or neutral ground between the periodic malarious fevers and the continued specific fevers, since they

are equally often found to grow out of the one kind and to merge into the other kind. But really, owing to the great diverstiy of forms in which they are met with, and to the varying characteristic symptoms of different epidemics, the whole subject of fevers is involved in much confusion, and it is further obscured and mistified by the contradictory descriptions of different observers, who, as is frequently the case, have gained their experience under either very different or entirely opposite conditions.

68. Be this as it may, however, apart from it all is the stern fact that fevers constitute the main cause of the mortality of the province, and are the prime source of the bulk of the sickness amongst its people. Moreover they are not all of one kind, nor produced by the same causes.

Fevers constitute the main cause of mortality in this province.

The different kind of fever prevalent divisible into two great classes, viz: malarious and specific.

The origin and growth of one is dependent upon meteoric and climatic influences; of the other to certain conditions of daily life and economy.

I have already alluded to the different kinds of fever as divisible into the two great classes of malarious and specific, according as, on the one hand, they depend for their origin and growth upon meteoric and climatic influences, and according as, on the other, they owe their development and spread to certain conditions of daily life and economy. I proceed now to describe the prevalence and circumstances therewith connected, of each of these classes separately, in order the more clearly to understand the direction in which action should be taken in the matter of devising measures of prevention.

69. In the mortality returns of the province the deaths from fevers are registered under that single generic term without distinction of type or form, and the aggregate figures, therefore, are of no use as an index to more than the actual registered mortality from that one class of diseases. But practically there is no great difficulty in estimating roughly the relative frequency of periodic or malarious fevers from those of the continued or specific kind. By comparing the statistics of successive years, and noting the points of agreement which may be apparent in those whose seasons were marked by the ordinary succession of the normal meteorological phenomena as against the points of difference in those in which they were distinguished by some remarkable divergence from the natural sequence of such events, we arrive at a means of roughly gauging the affects of season and climate upon the prevalence and fatality of this class of diseases, more especially in those districts where local peculiarities of site and life combine to offer conditions favorable to the deleterious action of the weather upon the public health.

By comparing the statistics of several years a rough gauge of the effects of season and climate upon the prevalence and fatality of this class of diseases is arrived at.

The natural deductions from the results of a comparison such as that above indicated is this, namely, that fever mortality in its rise and fall is more intimately connected with the succession of the seasons, as such, than by the mere fluctuation in quantity of the regular seasonal rain-fall, though any great dislocation in this periodic rain-fall, or any great divergence from the normal sequence of the other usual phenomena of climate, is quickly followed by corresponding change in the fever mortality; and further, that this mortality, though not distinguishable into kinds, is also very remarkably influenced by the physical conditions of the soil as well as by the surrounding circumstances of life.

70. By an examination of the "table showing the relation between rain-fall and mortality from fevers &c.," appended to section I of this report, it will be seen that during the eight years from 1869 to 1876 inclusive, the fever mortality of the province invariably rose by a sudden bound of several thousand deaths in the month of September after the fall of the monsoon rains, and in accordance with the usual experience quite independent as to whether those rains fell from June to August or July to September; that the higher mortality continued through the autumn months, thus rendering this the most unhealthy season of the year in respect to the prevalence of fevers; further, that this higher mortality declined with tolerable uniformity through the winter and spring months, till the minimum was reached in the succeeding March and April; and that after this there followed an alternate rise and fall in the mortality till the establishment of the next monsoon, when again in September the great and sudden annual bound upwards took place. It will be seen also that the increase in the annual aggregate fever mortality bears no fixed or definite relation to the increase in the aggregate annual rain-fall; the altogether exceptional increase in 1876 being due to extraordinary mortality from malarious fevers in two or three particular localities in which special causes were in operation; namely, in Jullundur, Hoshiárpur and Gurdáspur districts, where, owing to the natural formation of the country and accidental obstructions to its free surface drainage, the monsoon rains and floods sunk through the light porous super-soil, and more or less thoroughly water-logged the subsoil over a very wide extent of country. The case of these three districts affords good examples of the injurious influence exercised upon the general health by faulty sanitary conditions of soil coupled with unwholesome state of weather, as evinced in the rapid increase and fatality of malarious fevers in them under a combined operation of the two causes; a combination of the two factors being apparently necessary to the production of such issue, neither the one or the other alone being found to produce the same results.

After the fall of the monsoon rains the fever mortality invariably rose by several thousands, as will be seen from the table showing the relation between rain-fall and mortality from fever &c., appended to section I of this report.

71. Referring again to the table of rain-fall and mortality in section I, let us examine the statistics of 1877, and compare them with those of the preceding eight years, as shown in the column of their means. Here the great divergence from the ordinary course is found not in a diminished rain-lfal taken in the aggregate

Other facts deduced from the table above referred to.

for the year, but in the partial transfer of the monsoon rains to the cold-weather months of December, January and February, together with a more copious and general distribution of the fall throughout the other non-monsoon months, as compared with their several mean rain-falls for the series of eight preceding years.

As with the rain-fall so with the fever mortality. The great difference here too is not so much in the aggregate amount, making allowance for the exceptional rise in 1876, as in the manner of its distribution. Instead of the sudden bound upwards regularly experienecd in September, October and November, after the monsoon rains, we have here a gradual and moderate rise through those months to the end of the year, the total fever mortality of each month being far below that of the same months in the preceding eight years, except 1871 and 1874, which were both remarkably healthy years. In 1877 the mortality for September fell so low as 14,938, the lowest figure for any month of the year, against 30,926, the mean of the preceding eight years.

Further, it will be observed, the fever mortality of the first four months of the year 1877 declined steadily from the high figures of the epidemic of the previous autumn, and as usual again alternately rose and fell during the months preceding the monsoon, though in each of the first six months of the year the mortality is considerably in excess of the mean for those months in the series of preceding years. This excess may be partly set against the extension of the epidemic of 1876 into the first months of 1877, and partly against the consequences of an unusually rainy winter and spring coupled with high prices and wide-spread poverty. A similar excess is observed in the fever mortality of the first four months of the current year 1878, in correspondence with an unseasonable rain-fall, very greatly in excess of the mean of the series of preceding years, as is shown in the subjoined statement of aggregate rain-fall and fever mortality for the first four months of 1878.

Statement showing aggregate of rain-fall at 32 *district stations and total fever mortality registered in the Punjab during the first four months of the year* 1878.

Detail.	January.	February.	March.	April.
Fever deaths registered in whole province ...	19,507	16,519	17,735	17,925
Rain-fall registered in 32 district stations in inches ...	31·5	84·1	7·3	75·9

The great points to be noticed in this table are the almost entire absence in 1877 of the ordinary monsoon rains, and the consequent diminished mortality from fevers and all other causes alike during the succeeding autumn months; and the generally very largely increased rain-fall in the winter and spring months with the corresponding rise in fever mortality, as compared in either case with the means of the same seasons during the eight preceding years. All this, however, only shows that the increased prevalence of fevers after the periodical rains is very steady and marked. It does not indicate anything regarding the kind of fevers then prevailing. But we know from experience that they are mostly of the kind called "malarious," and that they are as a rule largely prevalent only in the autumn and winter months. The other kinds of fever we know too from experience are most common in the winter and spring months, but they may and do prevail more or less frequently through all seasons of the year, which may be said also of the malarious fevers, though in their case not to the same extent as in that of the specific forms.

Beyond this general statement I have no data to lead me to a more definite or exact conclusion in respect to the relative prevalence of the two classes of fevers. Nor, so far as the practical treatment of the question is concerned, is any such required.

The important truth expressed by His Honor the Lieutenant Governor in the review of the Punjab Sanitary Report for last year, that the recoveries from fever are far more numerous proportionally than those from cholera even in epidemic seasons, yet leave in the system the seeds of many complaints and weaken the constitution ever afterwards.

72. In the review of the Report, on the Sanitary Administration of the Punjab for last year, the Hon'ble the Lieutenant Governor was pleased to observe:—

"Too much attention cannot be directed, in the opinion of the Lieutenant-Governor, to the subject of the prevalence of fever during the autmun months in this province. The mortality under this head is so great that from cholera becomes altogether insignificant when compared with it even in years of cholera epidemic; while the cases of recovery, which do not appear in the returns are infinitely more numerous proportionally than recoveries from cholera, and yet leave in the system the seeds of many complaints and weaken the constitution ever afterwards."

The closing words of the paragraph express a very important truth, and point to the untold amount of mischief wrought by these fevers. There is no doubt that the injury inflicted on the constitution by a severe attack of fever in this country, more especially of the malarious kind, if not fatal at an early date, is always of a very serious nature, and in many instances of life-long duration, thus reducing otherwise sound and robust constitutions to the condition of broken-down invalids incapable of seriously "roughing it," and as a rule "knocked over" by any trivial and suddne change in the weather, or in the circumstances of ordinary daily life.

73. The evidence I have adduced in the foregoing pages will have made clear the fact of the dependence of these autmun fevers upon the monsoon rains and circumstances of atmospheric condition then obtaining; and, further, examples have been cited to show that the severity of their prevalence and virulence of type are very largely influenced by insanitary conditions of locality and soil. As to the former case, the only safe-guards of any value in a preventive sense are such as will be adopted by each individual for personal protection, according to the requirements of time, place, and person as may be thought suitable and attainable under the light of education and the guidance of common sense. These protective measures I shall refer to further on.

Safe-guards to be adopted when the fever mortality is dependent upon climate influences.

But as to the other case in which circumstances of site and soil constitute the graver cause of evil, the remedy must be sought for by a special study and investigation of each case separately, and whatever other provisions should be deemed necessary as the result of such inquiry, a good drainage and efficient conservancy must under any circumstances and in all places be insisted upon so far as practically attainable, as the prime and indispensable requisites, not only for the preservation of a wholesome water-supply and pure breathing air, but for the maintenance of the sound health and comfort of the community at large. These two objects, a pure drinking water and a pure breathing air, should be the recognized aims of general sanitation in all parts of the province, and they should be the special care of municipal authorities; the people, where found necessary in consequence of their ignorance, or carelessness, or inability, being treated in the gross as an unreasoning, improvident, and incapable subject, and provided for, in these matters at least, at the public cost for the public weal. How far this may be required will be seen further on in the description of the condition of the towns.

Safe-guards to be adopted when site and soil constitute the graver cause of evil.

The question whether malarious fevers are increased by canal-irrigation.

74. In the paragraph succeeding the one above quoted, His Honor further remarks :—

"The question whether these malarious fevers are increased by canal-irrigation is one of considerable importance. The Lieutenant-Governor is, however, of opinion that irrigation, if accompanied by proper drainage of the soil, does not produce what is called malaria, but that where the drainage is insufficient, the soil may become saturated with moisture and produce that unhealthy condition of the climate which is attributed to canal-irrigation, but which should be more properly set down to want of drainage. The highest mortality was in the Jullundur district where there is no canal-irrigation whatever, but where, owing to certain peculiarities in the physical formation of the country, aided probably by the embankments of the grand trunk road and railway crossing the natural drainage line at right angles, the successive heavy rains of two or three unusual seasons caused the country to become water-logged. The water line in the wells rose several feet and the whole country became in the most insanitary condition that could well be conceived. The same results from want of drainage are seen in the case of canal-irrigation in many villages of the Western Jumna canal which has been decimated by the same description of fever. But unless sufficient drainage system accompanies their progress, canals necessarily become the source of malarious disease."

75. In connection with this subject, and with the view to ascertain what influence is exercised upon the general health by canal-irrigation, I have had the two subjoined comparative statements prepared from the records in my office. The tables show in juxta position the birth and death statistics for the eight years from 1870 to 1877 in ten principal towns situated on, or irrigated from canals, and in ten others not so circumstanced, and the fever mortality is shown throughout in red figures. The figures in the "all causes" column represent the total registered mortality, and the figures in the "fevers" column only that portion registered under fevers. Thus in Delhi in 1870 the total registered mortality was 4445, of this total 2257 deaths were registered under fevers and the remaining 2188 under different other causes, the two together consistituting all causes.

Two statements appended herewith with a view to ascertain what influence is exercised upon the general health by canal-irrigation.

Birth and death statistics respectively of ten principal towns in the Punjab situated on canals

TOWNS ON

Number.	NAMES OF TOWNS.	Population.	1870. Total births.	1870. Total Deaths. Fevers.	1870. Total Deaths. All causes.	1871. Total births.	1871. Total Deaths. Fevers.	1871. Total Deaths. All causes.	1872. Total births.	1872. Total Deaths. Fevers.	1872. Total Deaths. All causes.	1873. Total births.	1873. Total Deaths. Fevers.	1873. Total Deaths. All causes.	1874. Total births.	1874. Total Deaths. Fevers.	1874. Total Deaths. All causes.
1	Delhi ..	1,15,992	6,232	2,257	4,443	4,918	2,216	4,977	4,780	2,535	5,962	4,784	2,896	6,118	5,208	2,302	5,293
2	Sonepat ..	13,637	377	227	488	396	245	385	388	213	371	319	240	434	415	311	487
3	Rohtak ..	14,994	*a* 328	164	321	294	138	398	290	132	338	170	119	272	490	222	456
4	Hissar ..	14,162	*b* 150	341	613	326	207	621	330	287	544	302	263	396	498	226	482
5	Hánsi ..	12,210	337	259	596	487	319	705	425	309	534	250	232	368	495	164	413
6	Karnál* ..	24,015	*c* 469	459	966	533	341	816	493	417	970	258	211	495	768	331	820
7	Pánipat ..	24,590	*d* 533	328	916	985	310	1,269	1,097	504	1,129	904	539	1,100	1,020	424	855
8	Batála ..	26,929	*e* 237	369	583	337	187	402	467	456	1,195	581	307	991	809	219	553
9	Amritsar ..	1,36,166	2,622	2,194	3,844	3,100	1,960	2,558	3,522	1,923	3,511	5,071	2,356	6,436	6,878	2,764	5,552
10	Lahore ..	92,035	*f* 1,478	1,530	2,202	2,424	1,310	2,231	2,120	2,958	4,331	1,291	1,557	2,112	2,544	1,314	2,295
	Total ..	4,74,640	12,703	8,229	15,074	13,830	6,433	14,362	13,923	9,743	18,885	14,030	9,572	18,632	19,125	8,256	17,219

TOWNS AWAY

1	Rewári ..	25,190	*g* 901	271	963	1,212	292	1,096	1,123	297	1,221	1,080	344	1,542	1,195	293	824
2	Umballa ..	26,258	..	177	307	..	234	374	292	582	1,174	643	302	682	973	381	849
3	Ferozepore ..	15,168	451	268	619	816	256	707	741	263	763	538	222	745	761	149	437
4	Jullundur ..	35,222	*h* 489	333	592	535	197	454	516	294	1,073	1,370	534	12,80	1,714	333	972
5	Hoshiárpur ..	13,138	*i* 154	200	607	500	132	430	565	189	789	473	312	500	520	107	369
6	Mooltan ..	29,448	953	441	861	1,313	331	1,215	1,501	210	1,000	1,286	291	829	1,332	360	896
7	Gujránwála ..	20,262	396	212	474	701	208	693	657	367	986	694	262	667	790	211	647
8	Siálkot ..	32,989	885	709	1,251	1,115	303	1,015	1,074	414	1,019	1,053	532	1,211	1,229	329	854
9	Gujrat ..	17,401	465	267	701	726	202	679	611	197	543	774	202	530	866	127	427
10	Rawalpindi ..	20,802	*j* 245	474	892	702	327	927	694	369	746	619	275	793	622	242	769
	TOTAL ..	2,35,978	4,939	3,457	7,269	7,620	2,572	7,590	7,774	3,262	9,316	8,530	3,136	8,780	10,002	2,436	7,036

a for 47 weeks only.
b „ 46 „ „
c „ 50 „ „
d „ 24 „ „
e „ 24 „ „
f „ 47 „ „
g „ 31 „ „
h „ 34 „ „
i „ 21 „ „
„ 39 „ „

* The sudden increase in the number of births registered at Karnál after 1873
† In Ferozepore the canal was opened in 1876. If we deduct the figures for
‡ In Jullundur owing to the natural formation of the country, the soil six years comes to only 1¹ per mille.
* With the alterations made in Ferozepore and Jullundur fever death-rates, will be reduced to 34 per mille for the whole series.

and ten principal towns away from canals for the years from 1870 *to* 1877 *inclusive.*

CANALS.

1875.			1876.			1877.			TOTAL.			MEAN FOR 8 YEARS.				
Total births.	Total Deaths. Fevers.	Total Deaths. All causes.	Total births.	Total Deaths. Fevers.	Total Deaths. All causes.	Total births.	Total Deaths. Fevers.	Total Deaths. All causes.	Total births.	Total Deaths. Fevers.	Total Deaths. All causes.	Birth-rate per mille of population.	Death-rate per mille of population. Fevers.	Death-rate per mille of population. All causes.	Percentage of deaths from fever to deaths from all causes.	CHARACTER OF THE SOIL.
5,499	2643	5,816	5,750	1,973	4,922	6,195	2,432	6,015	43,366	13,237	43,548	47	21	47	44	Very porous.
429	193	361	365	232	373	418	206	312	3,107	1,676	3,213	28	17	29	51	Clay and sand.
574	184	503	674	235	503	522	236	526	3,342	1,429	3,321	28	12	28	42	Do. Do.
467	213	627	509	224	507	429	210	488	3,093	2,015	4,283	26	18	38	47	Porous and sandy
541	218	503	489	242	469	378	153	287	3,512	2,063	3,881	36	20	40	50	Do. Do.
836	896	1,396	738	630	1,404	844	648	987	4,829	4,019	8,060	25	21	42	50	Water-logged.
1,164	262	1,154	1,116	283	712	1,107	836	795	7,926	2,282	7,926	43	17	40	41	Clay and sand.
990	690	1,366	668	1,005	1,373	749	287	548	4,748	3,513	6,921	23	16	32	51	Alluvial clay.
6,155	4,534	8,447	5,230	6,715	9,710	4,710	2,691	5,548	37,289	25,187	45,606	34	23	42	55	Sandy alluvium.
3,229	2,375	3,993	3,020	3,226	4,936	3,069	2,194	3,137	19,273	16,504	25,337	26	21	34	65	Alluvial clay.
19,894	13,454	24,374	18,550	15,082	24,913	18,412	9,256	18,643	1,20,467	72,136	1,52,102	35	21	40	59	

FROM CANALS.

1,190	347	1,358	1,280	241	816	1,211	235	873	9,191	2,200	8,693	48	11	43	26	Sandy and porous.
1,022	381	944	1,120	502	1,177	1,083	262	738	5,133	2,521	6,246	32	13	39	45	Stiff clay.
632	276	693	449	1,067	1,319	460	312	503	4,808	2,813	5,779	40	23	48	56	Sandy alluvium.
1,621	638	1,596	1,338	3,732	4,868	977	481	836	8,569	6,849	11,672	31	24	41	64	Do. Do.
511	181	587	529	602	998	437	160	382	3,689	1,573	4,662	37	15	44	34	Do. Do.
1,300	386	1,007	1,452	428	1,085	1,274	333	918	10,511	2,830	7,814	45	12	33	37	Stiff clay.
852	379	808	794	649	1,061	791	277	590	5,675	2,585	5,926	35	16	26	44	Sandy alluvium.
1,245	517	1,105	1,602	724	1,617	1,116	285	735	8,810	3,926	8,807	33	15	33	44	Stiff clay.
827	182	547	820	303	742	806	160	381	5,895	1,640	4,550	42	12	33	36	Alluvium with sand.
793	293	756	773	356	916	716	318	811	5,164	2,314	6,595	31	13	40	35	Stiff clay.
10,013	3,719	9,401	9,648	8,364	14,58	8,911	2,813	6,767	76,437	29,661	70,746	37	16	37	38	

is owing to the attention of the municipality having been directed by this office to the previously existing neglect of birth registration in that town.
that year and 1877 then the mean fever death-rate for the preceding six years comes to only 16 per mille.
became water-logged after the unusually heavy rains of 1875 and 1876. If we deduct the figures for these two years then the mean fever death-rate for the other

the mean fever death-rate for the ten towns away from canals will consequently be 13 instead of 16 per mille, and in the same way, the "all cause" death-rate of 37

76. An inspection of the above tables will show at a glance that the towns situated on or near canals have a uniformly higher "fever" death-rate, and in the aggregate a higher "all causes" death-rate also than the towns situated away from canals; and further, that on the whole they have a somewhat lower birth-rate than the towns in the latter category, although the difference in this respect is not so conspicuous as that between the death-rates of the two opposite classes. Thus the mean death-rate from "all causes" in canal towns is 40 per mille of population against 37 in the non-canal towns, and even this figure would be reduced to 34 per mille after making due allowance for the exceptional mortality in Ferozepore and Jullundur in consequence of the opening of canals in the former, and of the occurrence of floods in the latter in 1875 and 1876. But in the case of "fevers" alone, the mean death-rate of the canal towns is 21 against 16 of the others, or against only 13 per mille after deducting the exceptional mortality of Ferozepore and Jullundur, as explained in the foot notes attached to the tables.

Towns situate on or near canals have a uniformly higher fever death-rate than those situate away from canals.

These differences in the mean birth and death-rates in the two opposite classes of towns are not to be rejected as unreliable on the score of defective registration, because, taken on the whole, registration is very carefully attended to in all these municipal towns, and has been so more or less steadily from the first. Besides whatever shortcomings there may have been in the matter of registration, they would not be confined to one set alone, but would naturally be common to both clases, and the best proof of this is found in the very marked changes observed in the statistics of both classes of towns where they are the result of special causes, as is explained in each instance in the several foot notes. The statistics are, I consider, reliable, and the tables themselves instructive, and certainly worth a careful study.

77. The real cause of the differences above noted is to be looked for outside the circle of registration, and is to be found in some special agency of unerring, or at all events uniform operation, as is asserted very plainly by the tables themselves. For allowing that the difference in the mean death-rate from "all causes" in the two classes of towns is a mere accident, attributed to whatever cause it be, it furnishes no explanation of the reason why the difference should not (as in reality it does not) uniformly run through the individual death-rates of the several towns of the two opposed series. Nor does it explain the reason why the "all causes" and the "fever" death-rates in the towns on canals should show such a marked disproportion as compared with those in the towns away from canals.

The real cause of the differences above noted is to be found in some special agency of unerring or at all events uniform operation, as is asserted very plainly by the tables themselves.

Had the "all causes" death-rates in the individual canal towns shown a uniformity in their excess over the like death-rate in the several non-canal towns, there would be reason to look for a like uniformity in all the circumstances and conditions of climate and soil of the two classes, which it is known does not exist. On the contrary, there are certain circumstances and certain conditions of soil common to the one class of towns which are absent from the other, and this difference in the physical qualities of the two different classes is exemplified by their effects upon the general health as set forth in the vital statistics of the towns of the two classes respectively. Thus it is shown by these statistics that the deaths from one class of diseases, fevers, are in canal towns uniformly in excess of the same sort of deaths in towns away from canals, and that in the former class their proportion to the total deaths from "all causes" is far higher than it is in the towns of the other class. For instance, while the fever deaths in the towns on canals are 52 per cent. of the total mortality or in the proportion of 21 in every 41 deaths from "all causes," they are only 38 per cent. of the total mortality or in the proportion of 13 "fever deaths" in every 34 deaths from "all causes" in towns away from canals (that is, after making the deductions noted for Ferozepore and Jullundur); or in general terms one-half the entire mortality in canal towns is from fever, whereas in towns away from canals only one-third of the total mortality is from that class of diseases.

78. The last column of each of the above tables shows the per-centage of "fever deaths" to deaths from "all causes." The contrast is very marked and the fact is instructive. It is quite clear from the evidence of the above tables that the class of diseases registered under the term "fevers" causes greater mortality in the towns on canals than in those away from them. How is this fact to be explained otherwise than by the other great fact distinguishing towns on canals from those not so situated? That is to say, canals really do exercise a decided influence in increasing the prevalence of fevers as guaged by the registered mortality therefrom.

Canals really do exercise a decided influence in increasing the prevalence of fevers as gauged by the registered mortality therefrom.

79. It does not appear from the above tables that the mortality in any one town, whether canal or non-canal, has been very much affected one way or the other from year to year on the whole by merely meteorological influences, or the changes effected by them in the conditions of the soil, except in the instances of Ferozepore and Jullundur, where special causes immediately produced special effects.

The tables show that meteorological influence has not affected the mortality in any one town, whether canal or non-canal except in the instances of Ferozepore and Jullundur, where special causes immediately produced special effects.

In Ferozepore the new canals were opened out in 1875 and 1876, and the country was also to some extent inundated by the rain-water floods of those years. The consequences of these altered conditions in the soil and atmosphere were immediately apparent in a very remarkable increase in the "fever" and all "causes" mortality of 1876. In this year the total of deaths from fever was 1,067 and of all causes 1,310 against 239 and 661 respectively, the means of the preceding six years. In 1877 the figures again fell to 312 and 503 respectively.

In Jullundur, where the surface drainage had been obstructed by the construction of certain public works, the heavy monsoon rains of 1875 and 1876 caused the subsoil to become more or less water-logged, and the consequent effect of the altered circumstances upon the general health were very marked

and immediate. In 1875 and 1876 the deaths from "fevers" and "all causes" were 838 and 1,596 and 3,732 and 4,868 respectively, against 359 and 876 the means of the preceding years from 1870 to 1875 inclusive, whilst in 1877 the figures again fell to 481 and 836 respectively, the special causes in either case no longer existing in that year.

The nature of the influence which acts directly upon the prevalence of fevers in places situated on or near canals difficult to set down.

80. In short, the two tables contrasted together bring out the fact that canals do exercise a direct influence upon the prevalence of fevers in the direction of their greater development and fatality as compared with the prevalence and fatality of such diseases in places where there are no canals. What the nature of this influence may be, it is not easy, in the face of the conflicting opinions on the subject, to set down in a form at once acceptable to the judgment and reason of all parties. Yet it is a matter of the first importance to come to a definite conclusion on this question, in order that we may enter upon the task of combating the evil effects found to be produced upon the general health by the presence of canals, armed with the safest reasons for the adoption of an intelligible line of action in the employment of practical measures of prevention or cure.

Reasons for supposing that the extra humidity of the soil and atmosphere produced by their presence is the special influence.

81. The special influence which has been above shown to be exercised by canals upon the increase of fever prevalence and mortality, in so far as it relates to fevers of the so-called malarious kind, is, in my opinion, due mostly, if not indeed entirely, to the extra humidity of the soil and atmosphere produced by their presence. And the way in which this humidity acts is by producing a "chill" and its direct consequence "fever," of kind and degree varying in accordance with the controlling circumstances of each case. Doubtless the precise nature of the action of this agent is materially affected as to activity and virulence by special or local conditions of soil, climate, conservancy and individual state of health and preservation, as well as by sudden and great changes in the natural course and sequence of the seasons and their normal meteoric accompaniments. Indeed these two different kinds of agencies, *viz.*, local conditions and atmospheric changes are occasionally found to operate together under some newly altered or accidental combination of circumstances, and then the results are of a very striking nature, as was exemplified in 1875-76 by the flooding and water-logging of the Jullundur district (described in the previous pages), when fevers suddenly burst out amongst the people and raged with unexampled virulence for many months; until indeed the special causes which produced them had to the most extent disappeared, and circumstances had somewhat returned to their former condition. With this return to the old state the fever mortality subsided to its former level.

Of another kind, in point of character and continuance, are the condition and experience of the city of Karnál, and many of the villages on the line of the Western Jumna canal. Here, owing to the natural formation of the country, the free drainage of the soil is very seriously obstructed and the land in consequence is permanently water-logged. Fevers of the malarious kind are never absent from the country; and though in common with other places, Karnál and its canal villages have their season of autumnal fever increase, they are not affected to the same extent by atmospheric changes as are other localities in which the soil is not so thoroughly sodden, whether they be traversed by canals or not. So marked and wide-spread are the peculiar injurious effects of this water-logged condition of the soil upon the general health of this locality that it has long been notorious as one of the most unhealthy tracts in the whole Punjab. Its inhabitants are noted for their physical inferiority and proneness to diseases of the spleen, liver and kidneys, whilst the men are popularly supposed to be, if not impotent, at least sterile, and in consequence they are not generally acceptable as husbands outside their own tracts.

By reference to the above tables it will be seen that the Karnál statistics show that town to be the most unhealthy of all the canal towns. Its birth-rate is only 25 per mille of population, whilst its death-rate from "all causes" is 42 per mille, and of this 21 per mille is from "fever" alone, which is equivalent to 50 per cent. of the deaths from all causes. It is instructive to compare these results with the corresponding returns for the canal-irrigated town of Pánipat, which has about the same population as Karnál and is situated about 20 miles to the south of it, but at a distance of 3 or 4 miles from the canal instead of directly on it as is Karnál. Panipát has a birth-rate of 43 per mille and death-rate from all causes of 40 per mille, of which 17 per mille is from "fever alone, equivalent to 41 per cent. of the total mortality. Here the soil is a stiff alluvial clay with a moderate admixture of sand and it is not water-logged. The figures though they compare favorably with those of Karnál, in turn fall proportionately short in comparison with the corresponding returns for Rewári, a non-canal town of about the same population as the two above mentioned. The birth-rate of Rewári is 48 per mille of popu.ation and its total death-rate 43 per mille, of which only 11 per mille is from "fever," thus giving a per-centage of only 26 fever deaths in the mortality from "all causes." In the other non-canal towns the per-centage of fever deaths to deaths from "all causes" is much higher, though still on the whole considerably less than it is in the canal towns.

Special registration of villages in the Karnál and Delhi districts situated on the Western Jumna canal as ordered by the Secretary of State for India.

82. In execution of the orders of the Secretary of State for India, communicated to the Government of India in despatch No. 81 dated London 12th August 1875, a total of fifty villages situated on the Western Jumna canal (25 in the Karnál and 25 in the Delhi district) have been recently censused and brought under special registration, for the purpose of hereafter obtaining a reliable record of the results on the health of the people of the works which have been sanctioned and are in progress for the improvement of the Western Jumna canal. The results, whatever they may prove

in the future to be, cannot be ascertained for many years to come, meanwhile it behoves us to adopt such other preventive and precautionary measures as may seem advisable until the *great* defect of the country has been remedied by the efficient drainage of the soil, which it is expected will be effected by the superior alignment of the new works.

83. The returns for Amritsar and Lahore show a very high percentage of fever deaths; in the one case 5 and in the other 15 higher than the rate for Karnál. The explanation of this is not very clear, though I am inclined to attribute it to the effects of greater intensity and suddenness in the alterations of night and day temperature as a consequence of the difference in the character of the soil in the two localities; the risk of chill by evaporation from the inpervious and only vicariously irrigated surface soil of the first two places being probably more sudden and intense than the more equable and steady evaporation from the permanently saturated soil of the latter place. The people in the one place being habitually and constantly exposed to a certain and regular range in the moisture and temperature of the air and soil, whereas those in the others are exposed to the like changes in a very irregular way and to a very varying extent, whilst too they are by no means constant in their nature, the one set in fact becoming as it were, acclimatized by habitude and the other not so favored.

Explanation of the cause of high per-centage of fever deaths in Lahore and Amritsar not very clear.

84. Be this, however, as it may, I have no doubt in my own mind as to the direct and exciting cause of fevers of the kind called malarious. I believe they are in the first instance always produced by a "chill," which suddenly checks the action of the skin and thus upsets the balance in the harmonious operations of the several great excretory organs of the body, a disturbance which of itself produces shock to the nervous system. Like the chill itself, the "shock" may or may not have been at the time perceptible. But whether perceptible or not, the intensity and duration of this shock varies in different cases, and is controlled by a variety of circumstances all more or less intimately connected with the health condition of the individual, and the compensating efforts made by the system to readjust the disarranged balance of its normal functions. In some cases the shock is so slight as to occur unnoticed. In others it is so severe as to produce immediate collapse which is in no respect distinguishable from that of cholera, and between these extremes every kind and degree of shock is met with.

Direct cause of malarious fevers always produced by a "chill."

85. But there are other circumstances also which in connection with chill contribute to the production of these fevers, and their action is mainly in the direction of determining the character and form of the fever so produced. What the exact nature of these circumstances is, it is not easy to define. It would seem, however, that some of them are connected with modifications in the conditions and normal relations of the various meteorolgical phenomena which collectively constitute the weather, and which communicate to certain epidemic seasons the peculiar features which are commonly recognized as their distinguishing atmospheric characteristics, such as heat, moisture, heaviness, stillness, oppressiveness &c. of the air, electric disturbance, absence of ozone, wind, cloud &c. &c.; others again are connected with conditions of locality and modes of life, and, though of infinite variety, are reducible under the heads of drainage, conservancy and personal hygiene; by which last I mean due attention to the requirements for maintaining sound health, in point of clothing, diet, shelter and habits and occupations &c. These various circumstances in their effects exercise a two-fold action both as predisposing and exciting causes of disease, and in the case of fevers are very often found, by the preponderance of one or other element of mischief, to change the entire character of the disease.

Other circumstances also in connection with chill which contribute to the production of these fevers.

Thus an epidemic of fever of the so-called malarious kind, which in the first instance was produced by atmospheric agencies acting both directly and through the medium of the soil, may also be sometimes, and is, as a matter of experience, very quickly transformed by the action of local sanitary defects into an epidemic of quite a different kind, in which fevers of a continued and distinctly specific type predominate. This occurred in the fever epidemic of Jullundur in 1876, where I saw intermittents, and remittents, and continueds of the enteric type, all prevailing side by side together in all parts of the town. In this case there were the manifest evils of over-crowding, defective conservancy, impure air, and contaminated water, combined with the poverty, ignorance, faulty clothing, shelter, and diet of the people, to explain their terrible sufferings and loss of life under the exposure for a few months to the effects of sudden rain-water floods and supersaturation of the soil.

But the same faults and defects, the same predisposing conditions, are to be found in greater or less degree in all the towns of the province almost without exception they are in fact inherent to the country, and they constitute the factors which, apart from those specially confined to the weather and specially productive of increase in the frequency of malarious fevers, contribute largely as exciting causes to the production of the other great class of fevers with which this province is always afflicted, *viz.*, the specific continued fevers, typhus, yellow and enteric.

86. I have said that the faults and defects of general sanitation which contribute largely as exciting causes in the production of typhus, yellow, and enteric fevers are common to almost every town of the province. But I am bound to say here that in the course of my tour of inspection I found everywhere in the municipal towns that, as a rule, very considerable improvements had been effected in their sanitary circumstances, as the results of an annually progressive and more earnest attention to their requirements on this score, though of course in many instances there was still much left to be done.

Remarks on general sanitation of municipal towns.

In fact, taken as a whole, the municipal towns may be considered to be now for the most part free from the very glaring sanitary defects under which they all laboured to a greater or less extent a few years ago. That is to say, sanitary defects of a remediable character, in so far as concerns their physical surroundings and general outward appearance, have been removed or greatly improved in almost all the municipal towns. But it is far otherwise the moment we step aside from their main thoroughfares and centres of public resort, upon which alone it seems the municipal authorities have lavished their funds and devoted their attention. If we enter the bye-ways and dwelling quarters of the citizens, where from anything that can be seen of sanitary improvements the existence of a municipal committee would in some instances not even be suspected, we shall be met at every turn by abundant explanations why fevers prevail, not only in a violent and fatal epidemic form under the persistence for a time of certain peculiar and periodical atmospheric conditions favourable to their development and growth, but also why they should never be entirely absent from localities so well suited to their permanent abode by the very nature of their circumstances and elements of insalubrity

Sanitary defects in the bye-ways and dwelling quarters of the citizens.

It is in these dwelling quarters of the towns and cities, over-crowded, unventilated, unsewered and often undrained, that fevers originate and find a congenial habitat. It is here that the towns-people are born, and live, and die in an atmosphere, which by the very nature of the case, is always more or less highly charged with impurities, and which, it would appear from the facts, is never by any chance respired in its naturally pure state, the state in which it bestows health and life. They exist, that is to say, in an atmosphere, polluted, if not poisoned, by an endless category of contaminations; polluted by the impurities derived from the effete breath and exhalations of individuals of both sexes and all ages and in various states of health and ill health, and all crowded together in a narrow compass, tier upon tier within close walls; polluted by impurities derived from the exhalations of a sewage saturated soil, and a surface covered in many instances with introdden ordure and other refuse of sorts; and by impurities derived from the floors of crowded and untended cattle sheds, as well as from the bodies of hundreds and thousands of closely herded cattle and sheep, and beasts of burden in like proportion.

87. Sanitary defects such as these are found in a concentrated form in all the towns and cities of the province, and they are also, though perhaps to a less extent, the evils that pervade the interiors of village sites everywhere; whilst the latter in addition suffer from the disadvantage of as yet having made no material progress towards the sanitary improvement of their immediate external surroundings. Besides these, the same faults of diet, dress, dwelling, and habits of life prevail alike in both the great classes of the population, the rural and the urban, though their deleterious effects on the general health and robustness of body are more apparent in the towns-man, stinted in the quantum of his fresh air, than in the rustic who enjoys a purer and freer supply of that necessary of life.

Sanitary defects as those above described are found in all the towns and cities of the province.

Indeed, when we consider that, in reference only to the air of a place, the process of respiration is performed from 16 to 20 times a minute throughout the term of life, whether sleeping or waking, and that on its proper and perfect execution depends the purification of the blood and maintenance of the vital functions in a healthy and vigorous condition, we can easily understand how all-important an element in the preservation of sound health is a pure or wholesome breathing air; and this without for the moment taking into account the several very important items of food, clothing, shelter and daily habits of life or occupations as they affect the individual. To secure a pure and wholesome breathing air for the people, therefore, should be the prime object of all sanitary measures undertaken for the improvement of the general health of the people. And in pursuing this object we have the satisfaction of knowing that the very action required for the purpose of preserving the purity of the natural life-sustaining element of the general atmosphere, will also at the same time to a very considerable extent secure the common water-supply from its most frequent sources of pollution and its most deleterious forms of contamination; and at the same time also in many other respects vastly improve the domestic comfort, health and general well-being as well of the individual as of the community at large.

To secure a pure and wholesome breathing air for the people should be the prime object of all sanitary measures.

The various causes which combine to poison the air of native towns and cities have been above alluded to, and it has also been pointed out how these most insanitary and unwholesome conditions produce just the circumstances in which the specific fevers not only find a congenial soil, but the very elements of their actual generation and spread. The over-crowding, insufficient food, want of clothing and generally filthy surroundings of the poor classes of this country, and they form a very large proportion of the general population, are the chief causes which combine with the sanitary defects above mentioned to produce amongst them, not only in the towns and cities, but also in the villages, the several specific fevers, *viz.*, enteric, typhus, and yellow, from which they so largely suffer both in the epidemic and sporadic form.

88. To take in at a glance the generally insanitary conditions of native towns and the extent to which they, through such agencies, foster the production and growth of not only fevers but other equally fatal diseases, it is only necessary to pass briefly in review the main features of their construction, plan, and interior economy.

Chief features in the construction of the generality of Punjab towns.

The generality of Punjab towns consist of a collection of brick houses and mud huts massed together in very unequal proportions and in no regular or systematic order in point of intercommunication and ventilation. For purposes of mutual security and support against external fœs, the outskirts were originally either protected by a surrounding wall more or less strongly fortified and guarded by gates, or else the

General external and internal appearance of towns.

houses on the outer edges of the town were close set and presented blank walls to the exterior, with occasional gaps for ingress and egress. In either case these relics of the insecurity and anarchy of former times are now utilized as octroi barriers, police provisions against robbers, &c. The interior of the town generally presents a confused assemblage of houses and huts divided off into a few large blocks by the intersection of the main bazárs and public roads; and these blocks are generally subdivided into close set clusters of houses which are built on each side of tortuous and branching blind alleys, and are piled up story upon story till, at the fourth or fifth, the roofs of opposite houses nearly touch; and also into settlements of mud huts which are crowded together upon the spaces between the more substantial blocks or on their outskirts towards the town walls. In the former set the streets and passages are paved with bricks set on end, and the pavement slopes from each side to a shallow gutter running down the middle line of the road; in the latter set there is no such provision at all, and the roads, passages and open spaces are the mere unprotected ground, with no sort of arrangement for drainage, whilst the general surface is worn into rough ruts and dips by traffic, and is irregularly excavated in all directions for building material. Towards the centre of the town the ground slopes up into a more or less considerable eminence formed by the debris and foundation walls, &c., of successive generations of tenements built upon the same site, and it is upon these parts that the brick pavements are carried most carefully into the narrowest passages and recesses, and fitted accurately to side walls and door-ways, &c., not so much as road-ways for foot passengers and cattle, but mainly as channels for surface drainage and as a protective covering to the loose substructure from the destructive effects of rain floods and ordinary wear. In these parts the houses are all built of brick and mortar, and some of them have wells sunk within their own premises, whilst there is generally one in common to every eight or ten or more houses forming one street or alley. The waste water of these wells as well as the house sewage is either caught in open sinks built in the street against the houses, or else it is discharged through a drain pipe in the wall on to the pavement, to trickle across its surface to the gutter in the middle of the road-way. The sinks are in some towns emptied from time to time by the municipal conservancy establishment, and the contents carried out in *pakhals* (leather bags carried on bullocks) and discharged on to the ground at appointed sites in the suburbs; but generally they are emptied morning and evening through a vent in the bottom on to the street. In this case the contents flow broad-cast into the mid-line gutter above described and thus find their way much diminished by absorption and subsidence through chinks and fractures in the pavement, as well as by the passage to and fro of wayfarers, on to the bare unprotected surface of the streets and waste spaces on the lower levels around, there to lodge and evaporate or to be trodden down and scattered by the traffic; or else they are borne along in open drains and emptied into the ditch outside the town walls, or else into some other hollow or waste spot further away in common with the sewage of the public bazárs and thoroughfares.

No provision made for drainage.

Their wells.

I have said that in the quarters occupied by the mud huts no provision is made for the drainage of the streets and passages, and I may now add that neither is any provision made for their proper conservancy; nor is it attempted to protect the ground from being dug into and excavated for building material, and the hollows thus made being used as receptacles for all manner of refuse, filth and ordure. The consequence is that the inequalities of the ground are covered with puddles of sludge and filled with heaps of litter, dung and refuse of sorts, which lie level with the surface, and under a festering sun emit sickening exhalations after every wetting from rain or flood. Further, this sludge and the rotten muddy contents of adjoining pits mixed with the fresh earth of others dug along side are often used in the repair of old huts, or in the construction of the walls of new ones, and the material is eked out by the addition of brick bats, broken pottery and the skulls, horns, and larger bones of cattle &c. Walls so constructed naturally possess little cohesion and are always tumbling down after rain (the roofs are always supported on upright props of wood inside and not on the walls themselves), and gaps are everywhere seen filled in with loose bricks, bundles of rag, shreds of pottery &c. But these are not their worst defects. From the very nature of the materials of which they are composed they are a constant source of unwholesome, if not positively poisonous exhalations, for by reason of their porous substance they at one time absorb vapours and gases to give them off at another; thus during the hours between sunset and sunrise the walls will absorb, on the outside, dew and other vapours floating in the atmosphere, and on the inside the gases and exhalations given off from the bodies of the occupants and the cattle herded with them, whilst during the hours between sunrise and sunset they will yield up these absorbed vapours and gases mixed with the exhalations derived from the decomposable and decomposing substances of which they themselves are so largely composed. After exposure to a hot sun in succession to rain the exhalations from these walls are so pungent and abundant as to render the whole atmosphere of the locality very sensibly disagreeable to the residents, and almost unendurable to strangers, whilst under ordinary circumstances they are never quite free from perceptible odour. Though the walls are usually well and smoothly plastered on the inside with a mixture of mud and cowdung, and in well kept huts present a neat enough appearance, they are in reality often very unwholesome from want of sufficiently frequent renewal of the plaster. I have frequently, in fact almost always, on entering such huts found the atmosphere of the interiors more or less strongly unpleasant owing to the over-crowding of the inmates and want of proper ventilation.

Their conservancy arrangements.

89. Such are the chief features in the construction of the generality of Punjab towns and villages. In those that are supervised by municipal committees, a great deal has been done during recent years towards improving the original defects of street conservancy, and in providing a generally superior system of sanitation than any previously in vogue; but, as I said before, these improvements have hardly as yet penetrated into the dwelling quarters and private residences of

The sanitary improvements made in those towns supervised by municipal committees have hardly yet penetrated into the dwelling quarters and private residences of the people.

the people. It is true that as regards the removal of solid ordure, house sweepings, and street refuse, matters are managed on the whole satisfactorily, but it is very different with the liquid sewage, in the dwelling quarters more especially. In fact, as said above, it is true that the pavements in these quarters have been generally well looked to, and efficiently drained by open surface gutters, and that an organized system of conservancy has also been to some extent brought into operation in them, but there is yet a great deal to be done to bring the system into satisfactory order. The surface drains and gutters as generally seen are very inefficient sewage carriers, partly by reason of their loose construction, which allows of very free soakage and rapid silting, and partly on account of the deficient supply of water used for flushing when it is so used at all; and also partly owing to their rapid wear and breakage under traffic where they occupy the mid-line of the road-way. So that practically the sewage of the dwelling quarters becomes expended in the courts and alleys either by soakage into the sub-pavement soil, or evaporation in the gutters, or dispersion under foot by traffic of men and beasts. Of the magnitude of this evil some idea may be formed by calculating the quantity of water raised from the wells daily and poured into the surface of the ground either as urine, or kitchen sullage, or bath-room waste. On an average each native house expends from 4 to 6 *gharrahs* of water, or about from 12 to 18 gallons a day. That is to say, this quantity of water is daily carried into each house of a town and there expended, and comparatively very little of it ever findsits way out-side the town walls through the ordinary drains, because it is either soaked up by the ground as it is thrown on to it, or else it is absorbed by the drains in its passage along their porous channels. In fact unless washed out by flushing this sewage never even reaches the main drains of the town, except perhaps when a large number of sinks discharge their contents at once into the several converging gutters. With these facts, if we remember that in most towns the soil under and about the foundations of the houses consists of a more or less deep stratum of the debris and ruins of former edifices and habitations, it is not difficult to understand why, on the one hand, the liquid sewage should disappear under ground, and why, on the other, many of the wells in towns of ancient date are more or less brackish, and not unfrequently so much so as to be entirely undrinkable. It is by no means an uncommon thing to find all, or almost all, the wells inside such towns too brackish for drinking use, or gradually becoming so, whilst those close round about outside the walls yield what is considered sweet and wholesome water; thus proving that the former owe their bad qualities and progressive deterioration to contamination by percolation through a highly polluted and sewage-charged stratum of composite and porous soil, made up of decayed walls, rubbish, ashes, and refuse matters of all sorts. With such a condition of the subsoil is very often coupled a most unsatisfactory condition of that on the surface, the result of neglected or imperfectly discharged conservancy—that is domestic conservancy—for in those houses in which the privy is not constructed on the roof it is stowed away in some corner of the basement, whilst the cow-stalls and stables are either also so situated, or else are close by in some court-yard adjoining. Thus in both cases the ground very soon becomes saturated with an offensive muck which it is almost impossible to thoroughly cure short of complete reconstruction on altered lines.

Of this nature are the great causes which, in towns and villages alike, operate to taint the air of the place; and though evils serious enough in themselves they are not quite so very intense as one might be led to conclude without due consideration, for it must be borne in mind that as a general rule during hours of day light the people as well as the cattle are much out of doors, and that the former habitually go out-side the walls for offices of nature. Were it not for these salutary customs no native town could possibly be at all habitable for any length of time under the existing conditions of their municipal economy and conservancy.

The arrangements made during past years for protecting the wells from pollution.

90. A great deal has been done under my predecessor during past years to protect the wells used for drinking purposes from the many sources of pollution to which they were formerly exposed, and now it is quite an exception to find in any municipal town of the province a single well which is not more or less efficiently guarded from surface drainage &c., by a platform or parapet. But no measures of prevention in this direction can guarantee against contamination by means of subsoil percolation. For this dangerous evil, so far as it exists in towns, and I may say also in villages, I believe the only sure and practical remedy is a thorough and regular conservancy; and this can only be attained under the actual circumstances of the case by the proper organization and intelligent employment of an efficient establishment of scavengers. The task I know is in view to the requirements of the province generally one of vast magnitude, and which can only be worked out to a successful issue by the individual exertions of municipal committees and village councils, in recognition of the fixed principle that cleanliness is next to godliness, and in its adaptation to the special requirements of each separate locality. It is this division of the task, and the immediate benefit to be derived from its proper execution in each individual case, which encourages the hope of the ultimate attainment at no distant date of the object aimed at through the enlightened and harmonious and intelligent action of the natives themselves.

No need of expensive engineering works to remedy the existing sanitary defects.

91. For this purpose I do not see that there is, except perhaps in a few exceptional instances in which the circumstances favor, any need in the existing conditions and the present state of the civilization and customs of the country for the undertaking of any uncertain experiments in the shape of complicated and expensive engineering works, which are neither understood nor appreciated by the people, and are, as we usually

introduce them, as little adapted to their modes of life as they are in harmony with the incongruous constructions in the midst of which they would be set; on the contrary I think the work can be accomplished thoroughly and easily by the amplification and fuller development of an agency already everywhere on the spot, and this too without the introduction of any violent reform or foreign innovation.

Suggestions for improving the sanitary condition of towns and villages without the introduction of any violent reform or foreign innovation.

There is a numerous class of the people whose special and hereditary duty it is to scavenge, and they are universally employed in towns and villages for the performance of the conservancy duties that may be in each case considered necessary by the local authorities or private persons. But they are nowhere employed to any thing like the extent that they should be, nor are their services utilized to the best or fullest advantage. No where are they set to the work required of them in any systematic manner, and neither are they treated with the consideration and fairness they deserve. In many instances the pay fixed by the authorities for municipal sweepers is absurdly inadequate, ranging from one and a half to three rupees a month. Of course the men take the money, and as their supervision is on a par as to deficiency with their pay, they render even less than an adequate return in point of labour and service. I am aware of no valid reasons why the municipal authorities and village councils should not take charge of the entire conservancy arrangements of their respective spheres At present in the case of the former their attention is not as a rule carried beyond the public roads and bazars and business resorts, whilst the real dwelling quarters of the people are left to the personal or individual management of the residents; and as a consequence are habitually more or less neglected. As to the villages, it is the exception to find one possessing a fixed sweeper establishment paid from the public funds. There should be no difficulty either in town or village in collecting a house contribution to defray the expenses of the conservancy establishment.

Such establishments on a scale adequate to the requirements of each case, and properly organized and supervized would easily—after they had once been put into good repair—keep the sinks and surface gutters and drains in proper order, as well as the privies, streets, and passages. They would in fact perform the conservancy service of the place in a far more efficient manner than has hitherto been done, and with, as a consequence, the greatest benefit to the people in point of domestic comfort, and the general salubrity of their surroundings. And with these blessings of a wholesome air and clean dwelling place some of the most active and pernicious agencies in the production of the specific fevers, as well as in the predisposition to the action of malarious influences, would be banished from the scene.

92. To an efficiently worked conservancy then we must look as the main remedy aganist the origin and growth of both specific and malarious fevers. By its means will be enjoyed the advantages of a purer breathing air and purer drinking water,—blessings which are not possibly attainable under the many faults and errors of the existing system. It is vain to entertain the idea of providing the native towns, except in a few exceptional instances, with a system of water-borne sewerage such as is common in Europe. It is better at once to accept and realize the necessity for the removal of such matters by hand or other labor, and to devise such measures for the prosecution of the work in the most perfect, expeditious and economical manner as may be found to be best suited to the requirements of each place. In the last report of my inspection I submitted to Government some simple rules (herewith subjoined) for the improvement of village conservancy, the same principles, with such modifications as may be rendered necessary by the special requirements of the case, I would recommend for the guidance of all municipalities:—

Efficiently worked conservancy the main remedy against the origin and growth of both specific and the malarious fevers.

Rules for the improvement of village conservancy.

1*st*.—For storing village filth and refuse matters of all sorts on fixed sites defined and protected by low boundary walls, at a distance of at least 200 yards from the walls. Their number might correspond with that of the village lambardárs, who might superintend the partition of the mass when required as manure for the fields, &c.

2*nd*.—For protecting all wells and tanks or ponds from pollution from whatever cause arising, and in the case of the latter from dung heaps formed on their banks or in the vicinity.

3rd.—For preserving the open ground round about the village from collections of dirt or filth of any kind, and from the excavations of its soil.

4*th*.—For filling up and levelling all hollows or pits not absolutely necessary as drainage reservoirs, and the maintenance of these latter free from deposits of filth and rubbish.

5*th*.—For the burial of the carcases of dead cattle at a suitable distance from the village, and the demarcation of limits within which offices of nature shall not be performed.

6*th*.—For the maintenance of cleanliness in the village streets and cattle pens and yards.

93. It has been already stated in the preceding pages that the gross fever mortality of the province is attributable to two classes of fevers, the one being mainly produced by the action of atmospheric influences and their effects upon the physical condition of the soil, and the other being generally generated by errors of living, such as over-crowded and unventilated dwellings, defectively sewered and drained habitations, &c., in conjunction with insufficient and unwholesome food, hard work and general hardships. The improvements above referred to would prove equally advantageous in checking the growth and prevalence of both kinds of fevers.

Efficient conservancy the main but not the sole remedy for checking the prevalence of fevers.

But this matter of conservancy, though in my opinion the main, inasmuch as it is of general application in its action and results, is not the sole remedy to which it is necessary to pay attention with the view to checking the prevalence and fatality of fevers. There are several others of scarcely less importance, but as they affect the individual directly and solely, their adoption and the advantages therefrom to be derived can only be hoped for as the very gradual result of increased knowledge and improved conditions of life. Diet and shelter, each in its way, is a most important factor in the predisposition to, and direct cause of sickness; but more important than either is the item of dress, especially in a climate such as that of the Punjab, or of very many spots in its wide area, with its sudden alteration and high ranges of temperature and atmospheric moisture.

Precautionary measures to be adopted to afford protection from the effects of "chill."

94. As before mentioned, "chill" is considered to be the prime cause of malarious fevers, and consequently the preventive and precautionary measures to be adopted should be such as are known to offer protection, if not immunity, from its effects. In the first rank amongst them are warm clothing, and the avoidance of passive and protracted exposure to night air or alternations of night and day temperature. A more extended use of woollen clothing, or quilted cotton, amongst the people is the very first requisite towards their being put in a fair position to cope successfully with this class of diseases, combined, of course, with proper house shelter and common sense habits of prudence, such as putting on an extra wrap at sundown or during exposure to night air, &c. But so long as the people go about naked, or with their bodies unprotected against the weather, so long will they perish wholesale and suffer needlessly from this class of fevers. Similar remarks also apply to the fevers of the other class. Their prevention or diminution in frequency is only to be effected by the continuous aid of individual effort in support of general measures of public recognition and application in respect to conservancy and sanitation, coupled with whatever tends to banish, or at least mitigate, the straits of poverty with its concomitants of squalor, ignorance and carelessness. For the attainment of this end, education, prosperity, and the practical experience of years in municipal government and administration is necessary. But this in no way interferes with the propriety of immediate action in the direction of conservancy and sanitation as above indicated. I have already said that the Municipal Corporations have during the past few years very greatly improved the sanitary condition of their towns, and it devolves on them now to press forward in the same onward course, and to include within the bounds of their immediate control every thing within their municipal limits so long as it is in any way directly connected with the subject of the public welfare and health. That there is enough to do in this matter the sketch above given of the condition of Punjab towns will have made sufficiently clear, without any further enlargement on the subject in this place.

D.—BOWEL COMPLAINTS.

Total deaths—bowel complaints.

95. During the year under review 17,664 deaths were registered from bowel complaints against 27,271 in the previous year, and it is a noteworthy fact that of the 35,246 villages in the province only 6,672 returned deaths from this class of diseases.

The minimum and maximum mortality during any one month of the year.

The minimum mortality in any one month of the year was 871 in February, and the maximum 2,075 in June. In none of the districts did the ratio of deaths per 1,000 of the population come up to 2, except in Gurgaon in which it was 2·08. Next to fevers the diseases classed under bowel complaints cause the greatest portion of the total mortality of the province, and like fevers they are in a great measure caused by the operations of atmospheric and telluric agencies acting in combination. The total deaths registered under this head during the years 1869 to 1877 inclusive will be seen by reference to the table showing the relation between rainfall and mortality which is appended to section I of this report.

Deaths from bowel complaints, like that of fevers, increase in point of prevalence and fatality after the fall of the monsoons.

96.—From the columns of means it will be seen that the minimum mortality from this class of diseases occurs during the months of February and March, and the maximum during the months of September and October. It will also be seen by a comparison of the returns of the series of years up to 1876 inclusive, that the last five months of the year have uniformly a much higher mortality than the first seven months, thus indicating a constant relation in point of prevalence and fatality to the monsoon rains. But in 1877 (as in 1874 which was also noted as a remarkably healthy year) the seasons of prevalence of these diseases are considerably altered, and the mortality of the two above periods becomes more nearly equalized by the transference of much of the mortality of the autumn months to that of those of the monsoon and period immediately preceding, the highest monthly mortality of the whole year occurring in May and June.

Districts in which the highest mortality from bowel complaints was registered.

97.—The places in which the highest mortality from bowel complaints was registered during 1877 are the following, *viz*:—Farakhnagar, Rewarí, Firozpur and Palwal, all in Gurgaon district, Kaithal in Karnal district, Hoshiarpur and Urmar Tanda in the Hoshiarpur district, Pind Dádan Khán in the Jhelum district, and Bherá in the Shahpur district, the per mille ratio in them being above 5 and under 9.

E—INJURIES.

Deaths from Suicide.

98.—The following table shows the different modes resorted to for committing suicide in 1877 and 5 previous years.

Year.	Hanging.	Drowning.	Poisoning.	Falling from heights.	Gun-shot wound.	Stabbing.	Cutting throat.	Causes not statd.	Total. Males.	Total. Females.	Total. Total.
1872	97	75	25	3	4	5	2	16	103	124	227
1873	115	76	43	3	4	2	...	15	115	145	258
1874	Details		...	not given		...	...	...	116	134	250
1875	95	40	27	3	2	1	1	23	90	102	192
1876	103	38	29	4	2	..	2	11	87	102	189
1877	99	32	43	4	2	2	1	12	100	97	197

Female suicides preponderate over the male.

99.—From the above it appears that in this province the female suicides on the whole preponderate over the male, the proportion of 1877 alone being less, whereas in England it is quite the reverse. There the ratio is 5 males to every 2 females.

Deaths from accidents.

100.—The subjoined statement shows in detail the different causes of deaths registered under the general heads of accidents.

	Males.	*Females.*	*Total.*
Drowning	984	722	1,706
Crushed under and falling from roofs, trees &c.	904	441	1,345
Burns	149	112	261
Hurt caused by kicks of horses ...	80	23	103
Killed by lightning	46	4	50
Causes not stated	15	9	24
Other causes	81	25	106

Under "drowning" the female mortality exceeds the male as usual in the district of Gurgaon, Delhi and Rohtak.

Deaths from snake-bite.

101.—832 deaths were registered under the head of snake-bite against 828 in the preceding year, About half of the total mortality from this cause occurred in the districts of Lahore, Gujránwála, Kángra, Muzzaffargarh, Mooltan, Jhelam and Rawalpindi. In the two former alone 95 and 73 deaths respectively were registered, or about ⅛th of the whole mortality from this cause.

Deaths from Hydrophobia.

102.—From Hydrophobia 157 deaths were reported; the number registered in the 5 previous years are as below:—

1872	84
1873	129
1874	173
1875	162
1876	161

SECTION VII.

See Vaccination Report, attached.

SECTION VIII.

Does not apply to this province.

SECTION IX.—SANITARY WORKS—CIVIL.

MUNICIPALITIES.

Number of municipalities in which registration bye-laws are compulsory.

Those in which it is not compulsory.

103. There were at the end of the year under review 200 towns in this province constituted under Act XV of 1867 or Act IV of 1873. In 178 of these the municipal bye-laws regarding compulsory registration of births and deaths were in force. In the remaining 22 (noted below) registration is not compulsory. It is to be hoped that by the end of the current year the provisions of the bye-laws will be rendered legally compulsory in them also.

Number.	District.	Towns.	Number.	District.	Towns.
1	Ferozepore ...	Zíra.	12	Gujranwala—(*continued.*)	Sohdra.
2		Fatahgarh.	13		Akálgarh.
3		Makhu.	14		Rámnagar.
4		Dharmkot.	15		Háfizabad.
5		Kot Isa Khan.	16		Jalálpur.
6		Muktsar.	17		Pindi Bhatián
7	Lahore ...	Sharakpur.	18	Hazara ...	Abbott-abad.
8		Khudián.	19		Nawashahr.
9		Patti.	20		Baffa.
10	Gujranwala ...	Eminabad.	21		Haripur.
11		Kila Didár Singh.	22	Peshawar ...	Shankargarh.

Provincial statement showing income and expenditure of all municipal towns by districts.

104. The following provincial statement, compiled from the returns received from district officers, shows the aggregate income and expenditure of all municipal towns by districts:—

Table showing the Income and Expenditure of the Municipalities

Names of Districts.	Assets.			Disburse						
	Balance from previous year.	Actual income for the year.	Total.	Conservancy.	Paving.	Roads and bridges.	Drainage or sewerage.	Water supply, including clearing and repairing of wells, tanks, &c.	Widening of streets.	Construction of latrines.
Delhi	27,151	2,76,324	3,03,475	28,844	...	34,005	723	724	...	32
Gurgaon	11,365	54,487	65,852	5,400	6,906	5,641	132	2,619	...	...
Karnál	9,587	39,130	48,717	6,329	2,235	940	137	524	340	...
Hissar	29,743	57,813	87,556	11,175	1,542	2,433	411	4,781	...	...
Rohtak	8,577	32,831	41,408	4,004	...	1,725	49	1,028	100	...
Sirsa	9,552	37,103	46,655	3,924	56	472	...	1,187	73	...
Umballa	16,591	57,204	73,795	9,991	2,165	3,803	1,358	650	...	132
Ludhiána	22,500	60,140	82,640	9,794	1,539	1,195	1,453	731	...	...
Simla	...	...	...	...	...	...	...	...	...	...
Jullundur	15,420	61,193	76,613	11,668	2,074	5,651	4,170	509	...	37
Hoshiárpur	16,433	45,934	62,367	10,577	2,934	280	4,358	859	12	173
Kángra	5,810	17,426	23,236	1,306	946	2,432	...	783	...	...
Amritsar	93,988	3,29,999	4,23,987	58,274	2,619	9,718	35,000	4,214	6,080	1,861
Gurdáspur	3,190	51,092	54,282	6,607	3,803	1,885	1,311	445	...	166
Siálkot	7,627	38,585	46,212	4,558	1,986	1,191	2,330	1,125	...	...
Lahore	34,219	2,09,597	2 43,816	25,181	7,115	28,150	7,730	323	1,110	100
Gujránwála	15,313	40,777	56,090	5,383	4,230	2,609	2,586	1,016	24	...
Ferozepore	17,536	49,622	67,158	4,533	797	10,856	735	4,643	...	118
Rawalpindi	32,966	73,779	1,06,745	9,737	2,868	24,498	2,050	1,708	...	122
Jhelum	18,410	48,958	67,368	5,869	1,419	3,970	30	4,960	...	443
Gujrat	5,116	17,790	22,906	4,041	833	1,040	290	278	...	421
Shahpur	15,779	35,162	50,941	3,642	2,454	698	2,323	1,239	...	583
Mooltan	46,365	94,370	1,40,735	15,949	2,458	12,789	1,129	2,776	...	242
Jhang	6,850	32,040	38,890	5,502	1,155	385	247	620	...	50
Montgomery	9,313	9,446	18,759	1,933	147	2,200	79	612	...	420
Muzaffargarh	8,412	16,132	24,544	2,628	1,543	4	...	454	...	...
Dera Ismail Khan	25,920	47,785	73,705	10,848	450	794	121	149	...	53
Dera Gházi Khan	6,040	38,285	44,325	12,217	1,398	4,042	1,338	655	...	44
Bannu	9,413	21,630	31,043	3,723	1,273	630	183	305	...	...
Pesháwar	..	1,08,535	1,08,535	16,567	362	4,288	18,653	942	525	...
Hazára	1,929	11,180	13,109	2,025	3,226	645	280	175	...	...
Kohát	3,007	12,199	15,206	1,038	...	381	1,227	...	...	...
Total ...	5,34,122	20,26,548	25,60,670	3,03,267	60,533	1,69,350	90,433	41,034	8,264	4,997

in each district of the Punjab during the year 1877.

MENTS.									
Repairs of latrines.	Vaccination.	Epidemic charges.	Dispensaries.	Police.	Schools.	Miscellaneous.	Total expended.	Balance unexpended.	REMARKS.
6	645	...	8,887	65,950	5,484	1,42,670	2,87,970	15,505	
72	256	...	6,119	10,578	6,520	2,370	46,613	19,239	
195	...	...	2,076	15,850	2,134	6,218	36,978	11,739	
353	...	...	6,130	15,779	1,202	6,478	50,284	37,272	
776	4	10	1,824	7,442	2,032	6,928	25,922	15,486	
19	...	230	3,266	5,915	2,922	12,340	30,404	16,251	
627	290	...	4,928	13,535	1,587	13,272	52,338	21,457	
235	102	...	2,787	12,731	4,294	9,662	44,523	38,117	
...	...	...	...	...	...	...	...	...	Not entered, owing to inaccuracies in statement, and also on account of the receipt and expenditure being given for the official instead of the calender year.
668	...	448	5,087	15,490	3,915	10,094	59,811	16,802	
431	25	...	3,959	9,707	3,339	7,511	44,165	18,202	
...	...	...	1,926	3,033	1,089	4,306	15,821	7,416	
1,453	508	...	21,642	53,608	10,438	68,733	2,74,148	1,49,839	
...	...	...	5,889	10,354	7,254	8,861	46,575	7,707	
...	...	...	3,783	11,001	3,572	13,477	43,023	3,189	
681	605	514	6,861	40,644	5,389	51,875	1,76,278	67,538	
23	...	...	2,700	8,975	5,172	9,537	42,255	13,835	
24	...	...	4,416	7,001	3,392	10,122	46,637	20,521	
62	60	...	9,791	12,549	3,550	13,345	80,340	26,405	
...	...	...	4,177	10,018	1,868	22,279	55,033	12,335	
178	...	...	1,718	5,938	1,149	1,480	17,366	5,540	
89	...	...	2,772	9,318	3,325	5,763	32,206	18,735	
268	...	...	4,428	19,131	3,685	22,561	85,416	55,319	
176	...	...	6,030	5,443	2,775	11,227	33,610	5,280	
8	...	...	1,483	2,519	519	1,746	11,666	7,093	
31	...	...	1,812	3,855	473	6,296	17,096	7,448	
20	...	...	5,124	8,491	3,348	30,268	59,666	14,039	
87	...	...	2,418	6,284	4,379	4,371	37,233	7,092	
31	...	...	998	6,692	1,297	5,859	20,991	10,052	
...	145	652	6,465	28,113	1,828	28,643	1,07,183	1,352*	The gross income of the Peshâwar municipality was Rs. 1,08,535, but owing to there being a deficit balance of Rs. 2,011 in the previous year, that amount has been deducted from the net income for the present year. This has been done in order to make the provincial totals tally.
92	...	...	...	3,682	501	1,234	11,860	1,249	
...	...	...	287	3,063	445	3,279	9,720	5,486	
6,605	2,640	1,854	1,39,783	4,32,689	98,877	5,42,805	19,03,131	6,57,539	

Detail of expenditure on sanitary works.

105. The expenditure for sanitary purposes amounted to Rs. 6,84,483 or 33·73 per cent. of receipts; thus for—

Conservancy	Rs.	3,03,267 or	14·9 per cent.
Paving	„	60,533 or	2·8 do.
Roads and bridges and streets	„	1,77,614 or	8·7 do.
Drainage and sewerage	„	90,433 or	4·4 do.
Water supply; tanks, &c.	„	41,034 or	2·02 do.
Construction and repairs of latrines	„	11,602 or	0·5 do.

Attention paid to sanitary reform in most of the large cities and municipal towns, very satisfactory.

106. This is satisfactory, in so far as it shows, in comparison with past years, a steady increasing attention to the requirements of sanitary reform in all parts of the province.

In most of the large cities and municipal towns throughout the province, the work of sanitary improvement is going on with commendable earnestness. My predecessor's "address" referred to in para. 171 of my report for last year has been widely distributed in both the Hindi and Persian characters. No less than 22,000 copies were indented for. During my cold weather tour, I made it a rule whenever opportunity offered to address, not only the representative and influential men of the town or city, but those of the citizens who in each place accompanied me in my tour of their town, on the importance of sanitary reforms generally, and the advantages of attention to domestic hygiene especially. In most places my audience constituted a goodly number of the people, and as my mode of imparting knowledge to them was by means of friendly conversation, and my statements were illustrated by reference, as examples, to matters of every-day domestic life, it was not difficult to reach their understanding. There is no doubt, from the intelligent reception of all I said, that the people do really take an interest in the matter of public sanitation, and are willing to see their present insanitary mode of life altered for the better, though they are not prepared for any violent change, or any personal resposibility in the matter. Everywhere they freely admitted the advantage of cleanliness, and expressed their wish to see themselves ridded of the filth around them; but where every body assisted in its formation and no body moved to get rid of it, they felt individually helpless, and they resigned themselves to the superior force of the circumstances controlling them.

The people do really take an interest in the matter of public sanitation.

107. From what I have seen of the way in which municipal funds are expended, I think there is in some instances room for much improvement in the manner of distributing this expenditure. It should be a recognised rule, and one acted up to, that all matters of direct sanitary improvements or benefit should have precedence of all others not of that character: such as ornamental improvements and additions, tree planting, &c. And where civil stations happen to be within municipal limits, they should not have expended upon them more than their fair share of the municipal funds to the advantage of the few, who in no way, or only to a comparatively trifling extent, contribute to them, and at the expense of the many from amongst whom the funds are mainly raised.

Remarks on the manner in which municipal funds should be expended.

108. I append herewith copy a of letter No. 1813, dated 6th June 1878 (together with that of its enclosure No. 1,619, dated 10th May 1878), to my address, received from the Secretary to Goverment, Punjab, Public Works Department, which shows what steps have been taken during the year, towards the commencement of the water supply projects of the undermentioned places:—

Letter from Secretary to Government, Public Works Department, showing the steps taken towards the commencement of water supply projects.

Copy of a letter No. 1813, *dated 6th June* 1878, *from Secretary to Government, Punjab, Public Works Department, to the Sanitary Commissioner, Punjab.*

With reference to Sanitary Commissioner's No. 1,397, dated 1st May 1878, furnishes the following information in regard to the water supply works at the several stations mentioned.

DELHI.

Delhi.

Reference is requested to the accompaying copy of this office, No. 1619, dated 10th May 1878, to address of the Secretary to Government, Punjab, Civil Department.

Copy of a letter No. 1619, *dated* 10*th May* 1878, *from Secretary to Government, Punjab, Public Works Department, to Secretary to Government, Punjab, Civil Department.*

With your letter No. 1737 of the 25th April 1878, you forwarded to the Public Works Department the letter of the Commissioner of Delhi, Colonel Davies, No. 97 of the 20th April. with accompanying letter of the Deputy Commissioner, Mr. T. W. Smyth, No. 100 of the 15th, regarding the project for water supply of the city of Delhi.

2. Mr. Symth's letter gives a brief summary of the course that has been followed with respect to this work.

3. But the cause of the present delay is not adverted to. The water is to be drawn from a series of wells in the bed of the Jumma, in the same manner as in the Lahore scheme. (The Delhi project, as correctly observed by the Commissioner, Colonel Davies, was the earlier of the two.)

4. After some discussion of the proposed position for the supply wells, it was decided that they should be in a line nearly parallel to the river bank, and close to it, instead of running out (as at first designed) into the main stream.

5. The quantity and quality of the water which these wells could supply had to be ascertained.

6. The probable quantity they will yield cannot be determined with certainty. But the yield of the experimental well (which is very satisfactory in this respect), multiplied by the proposed number of wells, would make an ample supply.

7. It cannot of course be assumed that the wells of the whole series, not far apart from each other, will each yield as much as the single trial well standing by itself. But there is reason to believe that these wells, supplied as they will be by very direct and not very distant infiltration from the river, will furnish the quantity required. And if necessary the number can be increased. In the absence of *data* for a conclusion of greater certainty this has been accepted.

8. With respect to the quality of the water, doubts have been raised.

9. The first enquiry on this point was directed to eight wells already existing on or near the bank of the river, in the neighbourhood of the proposed position for the water supply wells. These were so various in quality that no useful guidance was furnished by them. The water in several of them was very bad. But as the character of each of these bad wells might be due to special local contamination, attention was directed with more confidence to the result of examination of the new trial well.

10. Para. 13 of Mr. T. W. Smyth's letter above referred to, states that "during the summer of 1876 the water supplied to the European troops within the fort was drawn from the experimental well, and was favorably reported on by the Medical Officer and the Officer Commanding the station, and recent analysis by the Chemical Examiner of the water taken from this well and from borings along the proposed site of the wells shows that it is of good quality."

11. The analysis referred to has not been received by the Government, and no reply has yet been received to the calls for report on the examination of the water in this trial well.

12. The twelfth Annual Report of the Sanitary Commissioner with the Government of India contained an unfavorable notice of this experimental well. (Page 159, Table XIV. and foot note). And attention was drawn to it by the same special report in which this notice was contained, being republished in the Indian Annals of Medical Science for January 1877 (Volume XIX., No. XXXVIII. Page 141.)

13. The Superintending Engineer, Colonel Mackesy, after an inspection of the place, reported thus, in paras. 2 and 3 of his letter No. 4,653 of 18th December 1877.

"The western Jumna canal is now nothing more or less than a sewer of the most offensive character, at its point of discharge (see annexed tracing); its discharge now runs along the ink dotted line close behind D., the site of the experimental well; it formerly ran between Salimgarh and the palace. The surface of the water in the experimental well, at the time of my visit (4th December 1877), was covered with a foul scum, very plainly indicating contamination, and I am given to understand that the result of a recent analysis of this water unmistakably points to sewage contamination.

"I am strongly of opinion that no wells should be sunk in the river lower than the point of discharge of the canal; for the down stream series of we'ls would always be liable to similar contamination. In fact, I think it would be well if the source of supply could be removed above the Kudsia bastion, for the island in which the wells are to be sunk is covered with a dense grove of shrub wood planted by the Forest Department, and this serves as a convenient latrine for the neighbouring inhabitants, the dhobis and the bathers."

14. On this the Government requested (No. 39, dated 4th January 1878) the opinion of the Commissioner and of the Municipal Committee on this question with respect to the proposed position of the water supply wells. And the Commissioner was reminded in the same letter that the report of the analysis of the water of the experimental well was still awaited. In reply to one of the calls for this information an analysis was sent (Commissioner Delhi No. 183, dated 27th August 1877). But it was pointed out in reply (No. 600C, dated 13th September 1877) that what was sent was a copy of the analysis of No. 1 of the eight old wells before mentioned, not of the new experimental well. And further, as this experimental well is not quite in the line of the proposed wells, enquiry was made whether there had been any examination of water drawn from the actual line of the proposed wells, by Norton's pumps, or otherwise. Reply has not yet been received regarding either.

15 The Deputy Commissioner, Mr. T. W. Smyth, in his letter No. 91 of 4th April 1878, considers that the objections raised by the Superintending Engineer, are not of sufficient importance to call for any change of the plan, and that the defects pointed out can be easily remedied. A reference is made in one of the extracts, forwarded with the Deputy Commissioner's letter, to an analysis of the experimental well by the Chemical Examiner. But this, as above mentioned, has not been received.

16. The Government of India, in Public Works Department, letter No. 254M.W. of 21st February 1878, drew attention to the foul condition of the Salimgarh channel owning to a city sewer which, as the Superintending Engineer of the Western Jumna Canal explained in his No. 199 I of 30th March, in reply to a reference made to him on the subject, discharges itself into the canal near its mouth.

17. The Superintending Engineer of the 2nd Circle, Mr. Anderson, in his memo. of 8th April 1878, addressed to the Commissioner (forwarded to this office with his letter No. 1513 of the same date), refers to a special meeting of the Municipal Committee held on the 27th February to consider this project, and observes :—

"The site selected for the water supply wells under Salimgarh is not a good one. This has been agreed to by the Municipal Commissioners, and a new site approved of."

18. The Commissioner has not noticed this in his letters.

19. It would not be right, under the circumstances thus described, for the Government to accept the project for the water supply of Delhi, as it stands, without further question. And with reference to Civil Department No. 1595, dated 15th April, the application for the loan cannot be made till a satisfactory conclusion is arrived at, with regard to the character of the source of supply. A further communication is also awaited from the Superintending Engineer 2nd Circle, regarding certain parts of the project.

20. The Commissioner has again been addressed on the subject of the site of the wells and analysis of the water.

RAWALPINDI.

Rawalpindi.

"The scheme proposed for bringing water from the Rawal stream, at a point near the Murree road, about 10 miles from Rawalpindi, which is a good scheme, was found too expensive. The estimated cost was two lakhs, and the municipality could not undertake the responsibility for the interest of a loan for this amount. Attention was accordingly again directed to the character of the existing supply, and the requirements of the city. The water in the city wells has been found to be of good quality, but insufficient in quantity. To augment the supply it was proposed to have a group of wells outside the city, at a place where the water is not far from the surface. Trial is now being made of one well at this place."

SIMLA.

Simla.

"The water supply works are in the hands of the Superintending Engineer of the Simla Imperial Circle, under the direct orders of the Government of India, not under the Punjab Government. The scheme has been completed and approved by the Government of India. Preparatory work is being executed for the construction of the reservoir near the Church, and for parts of the line of supply. And tenders have been invited for the execution of the main works."

LAHORE.

Lahore.

"The contract has been given and the work begun."

PESHAWAR.

Peshâwar.

"The water supply works are under the Military Works Branch of the Public Works Department, under the direct orders of the Government of India. The works are well advanced. At present the supply is being brought for the cantonment. A branch is meant to be taken afterwards to the city."

Brief history of sanitary progress and general health of municipal towns in the several districts of the province, epitomized from reports of Deputy Comrs. and Civil Surgeons.

109. The following is a brief history of the sanitary progress in the municipal towns, and the general health in the several districts of the province, epitomized from the reports received from Civil Surgeons and Deputy Commissioners for the year 1877.

DELHI DISTRICT.

No. of municipal towns in the district.	Names of Municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Delhi and its suburbs ...	1,60,553	2,54,436	59,246	54	45
	Sonepát	13,637	11,167	1,815	31	23
5	Ballabgarh	6,671	3,858	1,015	43	32
	Farídabad	7,583	3,941	742	57	40
	Najafgarh	4,309	2,922	1,516	50	28

Details of sanitary works.

A number of side-drains and urinals have been constructed, and all the usual measures of sanitation, such as cleansing out wells and drains, &c., have been carried out. The sanitary improvements made in other towns of this district have not been recorded, but from the statement showing the expenditure of each municipality, it appears that a considerable sum has been spent by every one of them on roads and bridges. Ballabgarh expended Rs. 339 on drainage and sewerage; and Farídabad Rs. 32 in construction of latrines. The principal streets in the minor municipalities are being gradually metalled and stagnant pools are being filled up, as funds are available.

Water supply; drainage; and conservancy.

The water supply and drainge projects for Delhi city remain in their former condition. The projects for improving these, which have been bandied about from one Government office to another, seem no nearer completion then they were many years ago.

The roads are daily swept and watered, and great care and attention are bestowed on the planting and tending of road side trees. Eighty new conservancy carts of an improved pattern have been constructed and brought into use, wiht a view to the prompt removal of filth daily. It has been ordered that the sweepers are to take the gates nearest their several wards. Further remarks on this subject will be found in my summarised inspection reports.

Health of the district.

Unusually good up to end of October when small-pox began to prevail. Malarious fevers were at a minimum. The usual cases of typhoid fever, which is supposed to be endemic in Delhi, were observed; whooping cough was prevalent at the beginning of hot weather.

Registration of births and deaths.

The state of registration in the towns of Delhi, Ballabgarh, Farídabad and Sonepat may be said to be tolerably accurate. In Delhi the lists kept at the different gates of the corpses carried out, and at the burying places and burning *ghâts* of those received there, form an admirable check on the death registers. In the other towns mentioned these registers are tested by the Assistant Surgeon or Native Doctor in charge of the dispensaries there by an occasional house to house visitation in certain selected mohallas. Arrangements have been made for the registration of births and deaths in all the villages in the district, and especially in those villages bordering on the Western Jamna Canal, in which a census has recently been taken, in pursuance of orders from the Secretary of State for India, for the purpose of "obtaining a reliable record of the results on the health of the people, of the works which have recently been sanctioned for the improvement of the Western Jumna Canal." The Deputy Commissioner frequently examines the rgisters of deaths kept at police stations, and tests their corrections by personal enquiries in villages when on tour.

GURGAON DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population during 1877.	Death-rate per mille of population during 1877.
			Rs.	Rs.		
4	Rewári	25,190	33,487	10,685	48	35
	Farukhnagar	10,594	6,219	2,263	43	35
	Palwal	13,553	8,120	3,877	56	36
	Fírozpur	10,530	6,761	3,945	49	42

Details of sanitary works.

In the municipal towns, all wells used for drinking purposes were thoroughly cleaned and repaired. In each town also a considerable sum was spent for conservancy and paving. Some of the latrines in Rewári and Furakhnagar were repaired.

Water supply ; drainage ; conservancy, &c.

The water supply of Rewári, Palwal and the Civil Station of Gurgaon, says the Civil Surgeon, is neither good nor abundant ; and Farukhnagar suffers from these causes, there not being a single well within the city which yields wholesome drinking water ; all are more or less impregnated with chloride of sodium (common salt). There are eight wells outside the city, which are used for drinking water, and the nearest of them is about half a mile distant. In the Civil Station of Gurgaon there is but one well yielding drinkable water. In the town of Rewári there are eighteen wells, but only eleven are used for drinking purposes.

The drainage and general cleanliness of the chief towns, as far as can be observed, is fair. The conservancy arrangements are well attended to, and ample establishment for conservancy purposes is maintained and efficiently looked after. All refuse matter is collected in carts and baskets, and deposited in trenches and pits at a good distance away from the town. Burning and burying grounds exist in all directions of each of the towns at distances varying from about a quarter of a mile to a mile. The Deputy Commissioner observes that these grounds are often too near the main public roads, and should be removed to a greater distance from them. Further remarks on this subject will be found in my summarised inspection report.

General health.

Very good. The prevailing diseases were ague and fever of the ordinary type, and bowel complaints. Mortality among infants was high from a disease returned as " masán " or convulsions.

Registration of births and deaths.

Births and deaths are now registered in all the villages in this district. The Deputy Commissioner remarks that the rules drawn up by Mr. Stone, District Superintendent of Police, were promulgated under orders from the Commissioner about seven months ago, and during his annual tour, he took the opportunity of calling for the village registers, and comparing them with those kept by the Police Department. They are still not very accurately kept up, but attention has been everywhere directed to the subject.

KARNAL DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
5.	Karnál	24,015	16,286	3,774	35	41
	Pánipat	24,500	11,622	3,787	45	3
	Kaithal	15,799	8,134	2,750	34	18
	Púndri	5,433	1,361	257	19	19
	Kunjpura	5,049	1,727	132	47	36

Details of sanitary works.

Attention has been paid to conservancy, and a considerable sum has been expended on paving in the towns of Pánipat and Kaithal. Latrines have been repaired in the towns of Karnál and Púndri. A new latrine in which stone slabs will be made use of, in accordance with my suggestion, will now be constructed at Karnál.

Water supply ; drainage ; conservancy.

The water suply of Karnál and Kaithal is from wells and tanks. The drainge of the towns themselves is described as good and they are reported fairly clean. The refuse matter is disposed of by removal on donkeys to a sufficient distance from the towns.

General health.

Good. Karnál suffers when there is a heavy rain-fall. The town itself is reported to be very unhealthy, partly owing to water lodging in several places round about the town and becoming stagnant, and partly to the close proximity of the canal, which being above the level of the country, prvents the drainage of the sewage from the town. Kaithal town is one of the healthiest places in the district.

Registration of births and deaths.

The same arrangements as last year are in force. In Karnál and Kunjpura where the octroi is collected by direct management, the octroi chapprassies at the gates are furnished with a closed tin box and a number of tin counters of different colors.

A large counter, color black, for men.
Do. do. do. yellow, do. women.
A small counter, color black, for boys.
Do. do. do. yellow, do. girls.

Whenever a dead body is carried out through his gate, the chapprasie drops the proper counter through the chink into his box, and at the end of the week these are compared with the register of deaths. Notice has been issued to the other municipalities that the owners of the houses will be held responsible for reporting deaths to the registrar within three days.

With regard to births, it has been arranged, that the gang masters are to take daily reports from the sweepers under them as to the births that take place in their respective wards, and the parents are also held responsible for reporting the births personally.

For registration of births and deaths in the district, Mr. Stone's system of checking the police registration is being introduced.

HISSAR DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
6	Hissar	14,162	11,962	4,176	30	34
	Hánsi	12,210	5,230	1,714	31	23
	Bhiwáni	33,220	37,694	13,690	40	33
	Fatahabad	3,084	1,581	325	25	35
	Rattia	3,120	644	312	24	20
	Tohána	3,445	702	478	51	32

Details of saintary works.

In the town of Hissar all the principal roads were repaired. Four latrines were repaired. All the drains and water-courses were cleaned and put in proper order. Eight of the principal wells which supply drinking water were cleaned and repaired. An extra conservancy establishment was also entertained. At Hánsi and Bhiwáni likewise all the drains were cleaned and silt removed and the usual annual repairs to roads, water-courses and latrines were made; a few excavations were also filled in. At the latter town two sections of the public road were paved with brick-on-end at a cost of Rs. 1,168. Artesian boring operations were commenced on a new spot, as the previous experiment had failed. At Fatahabad the roads as well as the drains were properly repaired. The other two towns are very small and poor, and it was not practicable to effect much there, but the sum of Rs. 374 was spent on roads.

Water supply : drainage ; conservancy.

The drinking water wells are kept clean and the water is considered good, wholesome and abundant. The drainage is good. Cleanliness is strictly maintained in the large towns by the municipal sweepers. At Fatahabad four sweepers were added to the conservancy establishment. The sewage and town sweepings are removed in conservancy carts, of which four are for the removal of liquid matter, and the contents of cess-pits and sinks.

General health.

Fair. Small-pox severe ; the autumnal fever prevailed, but not to any serious extent.

ROHTAK DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for the year 1877.	Expenditure for sanitary purposes for 1877.	Brith-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
6	Rohták	14,994	6,873	2,741	35	35
	Jhajjar	12,456	6,825	2,448	37	29
	Beri	9,205	8,414	1,277	46	24
	Bahádurgarh	7,127	4,009	484	46	25
	Kharkhauda	4,185	2,096	240	34	33
	Gohána	7,296	4,614	492	31	32

Details of sanitary works.

The measures adopted consisted of the cleanning of streets, latrines, &c., repairs to metalled roads. The tank known as Buhawála in the Jhajjar municipality was thoroughly repaired at a cost of Rs. 500, and a considerable sum was spend in the towns of Rohtak, Jhajjar, Beri and Buhádurgarh on drainage and sewerage. In the latter town Rs. 119 was spent in the construction af a water course. As a rapid means of sanitation a "self-acting conservancy cart" was purchased by the Municipal Committee of Rohtak from Allahabad, but after a fair trial of the cart it has been found altogether useless for the purpose of collecting town refuse, for which it was intended.

Water supply ; drainage and conservancy.

The water supply is derived from wells and ponds; most of the former are very indifferently protected from receiving back refuse water, whilst the latter receive all the drainage of the vicinity during the rains. The qualitly of the water is brackish in places. The refuse of the town of Rohtak with the ordure collected from the latrines is buried in trenches outside the town, going to form manure.

General health.

Fair. Small-pox prevailed epidemically throughout the cold weather.

Registration of births and deaths.

This subject appears to have received sufficient attention, and the accuracy of the entries are checked by Members of the Municipal Committees.

SIRSA DISTRICT.

No of municipal towns in the district	Names of municipal towns.	Population according to census of 1875.	Estimated income during the year 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
5	Sirsa	12,807	19,404	3,416	31	27
	Fázilka	4,346	14,599	1,735	22	15
	Ellenabad	3,299	1,930	296	34	27
	Ránia	4,917	895	192	36	26
	Rori	2,728	275	92	34	22

Details of saintary works.

In the towns of Sirsa and Fázilka, Rs. 574 and 613 repectively were expended on repairing and cleaning wells.

Water supply ; drainage and canservancy.

The water supply of towns in this district is chiefly procured from wells and tanks, and is ample. The drainage is fairly satisfactory, and is fairly clean. In all the towns, due attention is paid to the conservancy arrangements. The Sirsa town refuse is removed by carts to a distance about a mile from the town.

General health.

Very good. No epidemics occurred.

Registration of births and deaths.

The means adopted to check the registers are from inquiry and inspection of records.

UMBALLA DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
11	Umballa	26,254	16,350	6,237	41	28
	Jagádhri	12,522	12,858	2,977	32	21
	Thánesar	7,111	3,403	231	29	28
	Shahábad	11,660	3,043	923	32	15
	Rúpar	10,261	7,101	2,565	12	16
	Sádhaura	11,167	3,268	844	39	22
	Búriya	8,197	3,000	592	35	23
	Ládwa	4,121	2,600	775	32	17
	Kharar	4,847	2,752	1,288	30	25
	Pehowa	3,569	1,600	624	36	27
	Radaur	4,098	1,229	370	41	23

Details of sanitary works.

Not given; but it is clear from the above table that a large sum in each of the towns of this district has been spent on them.

Water supply; drainage; conservancy.

Remarks on this subject will be found in my summarised inspection report, section X. The Deputy Commissioner remarks:—

As regards village sanitation we are almost helpless as far as improvement goes; until some legislation is initiated in this direction, the villagers will not desert the old beaten track handed down to them from time immemorial. No means exist for village conservancy, and the inhabitants themselves are utterly callous and lukewarm in the matter, and no penalties attach to neglect of cleanliness in villages. There is of course no attempt whatever at sanitation in villages, houses are unventilated, the alleys or streets are narrow to a degree, and there is no drainage provision whatever. Unless improvements on this score are enforced by legislation, the matter must be left until a more advanced stage of civilization rouses the rural population to self action * * * * Something would be gained even if we had 2 or 3 regularly paid sweepers in each village, and the larger and more prosperous villages ought certainly to afford this necessary luxury.

Mr. Macnabb, the Commissioner, in forwarding the above report remarks:—

As regards village sanitation, I believe nothing can be done beyond giving the villagers the following instructions through the tahsildárs:—

1*st*. No dust heap should be allowed within 50 paces of the houses of the village, or within 100 paces of the tank.

2*nd*. Tanks for drinking water for men should be kept separate from those for animals, and both should be kept separate from the drainage from the village. This is attended to in some villages, but not in the majority.

3*rd*. No one should be allowed to ease themselves within 100 paces of the houses of the village, a circle being marked out by mud pillars round the village for this purpose.

4*th*. The villagers should unite in filling up the mud holes in the village streets with earth.

And he concludes thus:—

If rules somewhat like the above were promulgated by the tahsildárs, and enjoined on the people by them and the district officers when on tour, a marked improvement would, I believe, be effected in the majority of villages without any extra expense.

This is satisfactory, apart from the common sense of the remarks, as showing that the Commissioner himself has no misgivings as to the success of so simple a measure of village conservancy.

General Health.

Good—No epidemic disease prevailed.

Registration of births and deaths.

The Amritsar bye-laws regarding registration of births and deaths have been proclaimed throughout the town by beat of drum. Printed notices also have been distributed to each mohalladár, holding them reponsible for the supply of accurate daily information. The sweepers also employed in each house have been held responsible for giving the above information, and it is believed that the registration of births and deaths is fairly satisfactory.

LUDHIANA DISTRICT.

No. of Municipal towns in the district.	Names of Municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for Sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
6	Ludhiána	36,955	43,137	9,007	43	36
	Raekot	8,262	2,098	859	47	38
	Jagraon	6,893	8,155	2,316	78	64
	Khanna	3,660	3,190	901	36	37
	Máchhiwára	6,224	2,555	1,467	27	24
	Bilolpur	3,059	1,005	397	32	34

Details of sanitary works.

No details given; but from the statement showing the income and expenditure it appears that the usual cleaning and repairs of all wells, latrines, &c., were made during the year. Rs. 989 and Rs. 376 were spent in the towns of Ludhiána and Máchhiwári on account of paving. And judging from the expenditure incurred for the conservancy arrangements of each town, it is evident that the municipal committees are taking a lively interest in sanitary matters.

Water supply; drainage; conservancy.

No changes have been effected either in the water supply or system of drainage in any of the towns of this district. Most of the town refuse is carried away in carts by the agriculturists for manure, but there is no regular organized system of refuse disposal. The large masonry drain of the town of Ludhiána serves both as a receptacle for house sewage and as a rain water drain. It is in consequence nearly always foul, as all drains of this kind must be without a regular water supply. Mr. Wakefield, the Deputy Commissioner of Ludhiána, remarks:—

The system of drainage is a total failure, deep drains being provided which cannot be properly flushed. The mere sweeping them with the addition of a little water from wells only increased the evil and made it pestilential and offensive to those living on the edges of these drains. I have stopped the use of the drains for refuse, which is carted dry.

No bounds for the prevention of nuisances had been set up. I have caused pillars in kacha mud to be set up all round the town and station of Ludhiána, and people committing nuisances within those bounds are prosecuted.

The pestilential swamp caused by the Búda nalla under the town of Ludhiána must be a cause of disease, and must be taken in hand as a preliminary measure. All emptying of drains, washing clothing &c. has been stopped, as the people use the water for drinking purposes, and if kept sweet, this water is much better than that of the drinking wells of the town, which contains too large a quantity of ammonia and nitrogen.

As regards mofassil (district) conservancy there was *none*, and I am carrying out the same system as in town, of having pillars 200 yards from the village, outside which all refuse, except cowdung, must be thrown and within which the committal of nuisances is interdicted.

General health.

There has been no epidemic disease, but intermittent fever has prevailed throughout the year. The mortality was high, as is usual in the autumn months.

Registration of Births and Deaths.

In addition to the measures already reported on for checking the registers of births and deaths men have been appointed to visit burial places and report on new graves in cases where it appears that the death has not been registered.

SIMLA DISTRICT.

No. of Municipal towns in the district.	Names of Municipal towns.	Population according to census of 1869.	Estimated income during 1877 (for 9 months from April to December 1877.)	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
1	Simla sanitarium	14,848	57,289	8,101	5	14

Detail of sanitary works.

Not given. The subjoined correspondence, published in the Punjab Government Gazette, dated 4th April 1878, shows what it is proposed to do in this direction. I may, however, here state in anticipation that the works are now well in hand, and as regards the conservancy, arrangements and improvements were completed before the commencement of the season and influx of visitors from the plains:—

No. 246 *dated Simla,* 25 *February* 1878, *from Captain R. P. Nisbet, Deputy Commissioner and President, Municipal Committee, Simla to the Commissioner and Superintendent, Umballa Division.*

1. I have the honor to submit for the consideration of Government, a Resolution passed by the Municipal Committee, Simla, at a special meeting held on the 19th December 1877.

2. This Resolution conveys the wish of the Municipal Committee to undertake, subject to the necessary sanction and assistance of Government, the construction of works to increase largely the water-supply of Simla, to build a public market, to arrange for the better conservancy of the station, and also to make improvements by removing part of the present main bazár, and arranging for the extension of the native town in other directions.

3. The Municipal Committee have received from the Government of India the offer of a gift of 5 lakhs of Rupees towards the completion of the works before mentioned, the necessity of which has been endorsed by Government, if the Committee on their part will expend an additional 7 lakhs.

4. I annex to this letter a report furnished by a special Committee under the orders of the Imperial Government, forwarded to the Government of India, Home Department, under a letter dated 26th November 1877. In this report, the nature and extent of the improvements proposed, and the means of the Simla Municipal Committee to bear their share of the cost to the extent of 7 lakhs of rupees, are shown. The conclusions arrived at in that report are accepted by the Municipal Committee and they will endeavour to act on it and carry out its proposals.

5. It will be borne in mind that the projects of improvements herein referred to are estimated to cost twelve lakhs of rupees, of which 5 lakhs are a grant from the Government of India, and for the remaining 7 lakhs I append an application from the Municipal Committee for a loan to that extent.

6. I now submit further remarks on each head under which expenditure is to be incurred, and these, with the report of the special Committee already referred to, will give, I trust, a complete idea of the scheme of operations for the next two years, after which any further statement that is necesary can be submitted.

7. The several works mentioned, if steadily carried out, ought to be of incalculable benefit in restoring the prestige of this sanitarium, which has undoubtedly suffered from the fact that local improvements have not kept pace with the abnormal growth of the native population, and from the way that the native town has sprung up and extended in the very heart of the station, with its poorly built houses, crowded, uncontrolled, one on another. This want of arrangement, and the character of future buildings in the bazárs, will require the close attention of the Committee for some years to come.

8. With improvements in the native town, and when the supply of pure water shall be sufficient for the wants of the population at all seasons, when improved conservancy shall secure that no defects on this score leave room for fear of disease or sickness, when the roads have been extended and improved in a way the increasing size and importance of the place demand, then it is not too much to expect that the expenditure of large sums on these important works shall, in the deferred judgment of three years hence, when all is complete, be admitted to have effected an entire change in the sanitary condition of Simla, establishing its agreeable character as the summer capital of the Government of India, and the resort of so many hundreds of Europeans.

WATER SUPPLY.

9. The natural water supply of Simla is now during the summer months totally insufficient for the population. A gathering ground fed by several perennial streams has been taken up in the territory of the Rána of Koti to the north-east of Simla. The water will be led in covered iron pipes to reservoirs in or near Simla, and delivered from these for use in the town. If the present expectations are realized, the daily supply of water available from this source for a population of 16,000 souls will be six and a quarter gallons per head.

10. The construction of the works for the water-supply is entirely in the hands of the Public Works Department.

11. The allotment made for the new water supply out of the expenditure now under consideration is 7 lakhs, and the Municipal Committee, concurring as they do in the same, desire to draw very earnest attention to the statement made in paragraph 6 of the special Commitee's Report annexed, that if the water supply project costs more than 7 lakhs, or the whole scheme of improvements more than twelve lakhs, the excess will require a further grant from the Imperial Government.

12. The water supply it is now contemplated will be complete in two years.

MUNICIPAL MARKET.

13. The project is set out at some length in the special Committee's Report, paragraphs 13 to 18 herewith annexed. The rapid growth of Simla and the great increase to the European population have rendered the provision of a public market, where the food supply of the European community shall be kept and sold under proper regulations and supervision, an absolute necessity

14. Enquiry and examination have proved that such provisions are at present kept and sold in the houses of the native dealers, under conditions that are entirely opposed to what is cleanly and healthy.

15. The Municipal bye-laws enable the committee to make it compulsory on certain traders to do business in any locality, specially provided for the purpose, and it is therefore proposed that persons exercising trades, as

Butchers	Poulterers and egg dealers
Bakers	Green Grocers
Buttermen	Fishmongers

shall be located in the municipal market. The number of such persons for whom it is necessary at once to provide is 62.

16. The site selected for the market is the present racquet court and assembly rooms and two other adjoining properties.

17. The cost of this site, the adaptation of certain existing buildings and the construction of others necessary for the market is estimated at Rs. 80,000.

18. The work will be remunerative, and will in time more than repay the outlay upon it. The market is to be in working order by the 1st May 1878.

CONSERVANCY.

19. This subject is very fully discussed in the report of the special Committee, paragraphs 19 to 56, and the Municipal Committee will endeavour to carry out the proposals made at paragraph 41 of the report.

20. The Municipal Committee have required, as a very important step towards the improved conservancy of the plan, that the latrines in private compounds shall be well and substantially built on a standard plan. The main feature of this plan is that nothing is allowed to fall or soak into the ground, and if the latrines are only kept properly clean, there can be nothing offensive about them. This work is being steadily carried out.

21. The number of public latrines will be increased, and they will be much more conveniently placed in the crowded part, of the town and the bazárs than they ever have been hitherto. The building will be well roofed and protected from the weather and the interior fittings will ensure comfort to those using them; and the floors being laid with asphalte, and nothing falling immediately upon them, but into receptacles which will be removed and cleaned immediately after use, if the public attendants provided only do their work, these places should be at all times as clean and inoffensive as possible.

22. The number of public latrines to be provided is 21, at an estimated cost of Rs. 19,000

23. The whole latrine refuse, both public and private, will be removed daily by the Municipal establishment.

24. A large tract of land has been taken up at Budai Ghát, 5 miles from Simla, to which this refuse will be conveyed after dark, and buried; though it is intended, as soon as arrangements can be made, to try the experiment of burning it in a furnace at this place as the only means of effectually destroying it.

25. The Committee have ordered twenty specially constructed carts, to be drawn by bullocks, to carry off all this stuff, and the present conservaney establishment will be largely strengthened.

26. For Chota Simla and part of Elysium, which is too far from the cart road to admit of the use of carts, ground has been taken up in which the matter will be trenched, and the land subsequently cultivated.

27. The new conservancy arrangements should be in working order on 15th April 1878, and the whole estimated cost, including Rs. 19,000 for new public latrines, Rs. 9,000 for erecting sweepers' barracks, stables at Budai Ghát, cost of carts, bullocks &c. is Rs. 40,000.

28. The Committee, while feeling sure that these proposals for the immediate improvement of conservancy will work a very marked and beneficial change in the sanitation of Simla, do not view this at all as a final scheme of conservancy for the station.

29. The preparation of a complete project for the removal of the whole drainage, sewage and latrine refuse from Simla is one that it is hoped Government will direct the Department of Public Works to take in hand as soon as the works of the new water supply are in a more forward state. If there is an abundant supply of water for flushing purposes, then probably it will be found easy to carry the drainage in iron mains some miles out of the station, and apply all sewage matter to the land in a perfectly innocuous manner.

30. A comprehensive drainage scheme of this kind must be entrusted to scientific officers to place in working order, which it is assumed can best be done in 1880, when the water supply is ready, and to meet the cost the Municipal Committee propose from the whole sum of twelve lákhs to assign the sum of Rs. 1,30,000.

BAZAR IMPROVEMENTS AND DEMOLITIONS.

31. These projects may be considered together as being identical and inseparable.

32. The construction of a public market will of itself effect great improvements in the main bazár of Simla, by locating in one spot, under proper regulations, the food suppliers of a large section of the community.

33. Besides their stalls in the market, well built places of residence are also offered to these people close to their business which most of them will gladly accept. This arrangement will remove from the present bazár about 350 of the inhabitants, and the houses vacated by them can, if necessary, be taken up and removed; or they will be available for other occupants, and help to mitigate the present evil of overcrowding.

34. A new grain market is in course of construction on the site of the old one, which was a very poor place and had fallen into entire disrepair. New double storeyed shops, affording greatly extended accommodation, will provide for the residence and requirements of the flour and grain dealers in a convenient locality, and under arrangements which the importance of their trade in the place demands.

35. The cost of the new grain market is estimated at Rs. 16,500; but the annual rent will within a reasonable time reimburse the Committee for this outlay.

36. The slaughter-houses were in very bad order, and are now being rebuilt at a cost of Rs. 3,200. No improvement for the bazár was more urgently required than this.

37. One of the greatest wants in Simla for many years has been a serái affording accommodation to travellers or casual residents, who are now very uncomfortably provided for in private houses in the bazár, and thus another sourse of over-crowding will be remedied.

38. A new serái will be ready this year, and the cost of it will be Rs. 6,800 (including a new approach road,) but a good rent will soon be realized.

39. Out of the allotment therefore of Rs. 50,000 for immediate expenditure on bazár improvements, Rs. 26,500 have been appropriated to the works just mentioned; but of the balance, and as further funds are granted, the removal should be effected of a corner on the south side of the main bazár immediately below the Church, where houses are densely crowded, and their removal is urgently called for as a sanitary measure of great importance, and also for the general improvement of this locality. The total cost of removing these houses, and widening and straightening the bazár, is Rs. 2,500.

40. The removal from the upper bazár, and the provision of suitable quarters for the hill porters or coolies, is a matter calling for very early attention.

41. During the summer season there are never less than 500 of these people residing in the bazár, and crowded into most wretched quarters. They are a class, however, very essential to the necessities and comfort of the community. The squalor of their dwellings, aggravated by their natural habits, is a source of danger to the general health, which cannot longer be disregarded. The accommodation of this class should be provided for in some convenient locality, not as now, in a main thoroughfare of the bazár.

42. It is further necessary to furnish in some convenient spot one or more public lavatories. The springs and water-courses in and near Simla are jealously guarded against pollution, and therefore a large number of natives can perform no ablutions unless they go a long way down the hill, which few take the trouble to do, and any remedy for this would, in the summer season, be welcomed as a valuable sanitary improvement.

43. There is no encamping-ground at Simla, or halting place for carts or camels, which at present lie all over the cart-road, and further prescribe its narrow width. An encamping-ground is urgently required, and land must be taken up for the purpose. On it should be built three or four shops, and also sheds for cattle, where the horse dealers, who carry on a thriving trade at Simla during the summer, might keep their horses. Hitherto the dealers and their horses have been lodged in the old serái, or in the bazár, adding to the crowd and dirt of both; they will in future be well placed on the encamping-ground, and afford a source of income.

44. A sum of Rs. 50,000 has been appropriated for demolitions of houses on "the ridge," or north side of the main bazár. From these demolitions no return can be expected, except the undoubted advantage in a sanitary point of view of removing a densely crowded mass of poor tenements in the centre of the native town and on the main road leading from one side of Simla to the other.

45. A sum of Rs. 22,000 has already been spent in clearances on "the ridge," but there still remain 100 houses to be removed.

46. The value of these houses, most of which are two and three storeys high, at seven years' rental, which is not excessive, is Rs. 1,23,000, while their material might perhaps realize Rs. 10,000, so that a sum of Rs. 1,13,000 will have to be paid for the ground alone.

47. Nevertheless no one will deny that these clearances ought to be completed, if any really appreciable improvement is to be made in the native town, or in the direction where improvement is most needed.

48. To spend money on these and similar demolitions to full advantage, some little time must be allowed. It is not merely sufficient to pay money to the owners of these houses and tell them immediately to turn out the tenants. No doubt there are many native residents in the Simla bazár who have lived on here for years, and are useless to the general community, and who would be much better away. No encouragement therefore by the grant of new houses or sites need be held out to them to remain. On the other hand, of the estimated population of 2,600 persons occupying these houses in the summer, there are many whose business is of undoubted advantage to the place, and it is not desirable that they should leave Simla. At the same time they are thriftless and helpless; the price paid them for a house it is necessary to remove will not be spent in erecting another in an unobjectionable locality, but lavished by the possessor, who then, if remaining at Simla, will rent some mean place and crowd up with others; and the evil of densifying the bazár population will be increased.

49. The compensation to be paid to many of these persons who have an established business in Simla, must be in the form partly of another house erected for them in a suitable site. I am convinced that it is only by the erection of a certain number of houses of a really good class at the same time as the demolition of the old ones proceeds, we shall secure that, while removing an unwholesome, wretched class of dwelling, it shall be replaced by a decent and well-built one, and the danger of crowding be kept under control.

50. Every opportunity will be taken of encouraging the growth of the out-lying bazárs at Boileauganj and Chota Simla, rather than extending the present main bazár; but what extension is found necessary here should be allowed only in the neighbourhood of the cart road, which is somewhat removed from the European quarter and admits so much easier of effective conservancy.

51. Two estates, Pentonville and Tally-Ho-Hall, have lately been purchased with a special view to bazár extension, affording as they do ample space for the erection of 150 houses of a really good class, in what will shortly become the trade and business quarter of Simla, without fear of over-crowding or annoyance to any one. Many applications have already been made for the sites.

52. To complete the works I have mentioned, which will go far to remodel the native town, it will be necessary that the committee supplement the one and half lakhs appropriated to bazár improvements and demolitions with allotments from the available balance of their ordinary income in the next three years to the extent of Rs. 80,000.

53. This they may do with confidence; for no better object of expenditure of the public funds entrusted to them will be found, or one that will command results of greater or more general advantage to the sanitary condition and well-being of Simla. Only thus will the committee secure the real interests of house proprietors, and those who have a stake in the welfare,—in fact the existence of what should be the best kept and best cared for, because the largest and most important hill station in India

54. In providing for the wants of the native community and in reforming the conditions in which they live, in compelling them to conform to sanitary regulations and rules of good order, of which the early neglect has occasioned an immediate expense which may be grudgingly incurred, those who are called on to contribute towards it may rely that they are taking the only step to insure to themselves the value of their own property, or continuance of the benefits of a climate and a station that they made, and which, as it were, exists for them, yet which, but for the remedies now taken in hand, they were allowing their very servants to deprive them of at an ultimate cost altogether disproportionate to any burden of increased taxation they are for a few years called upon to bear.

THE ROADS.

55. Most of the roads in Simla are, it may be said, the original village tracks which the first English settlers and their successors widened out or extended from time to time as need arose.

56. Except the new cart road, very recently constructed, there is hardly another road in Simla which was laid out with any regard to uniformity of width, easy gradients, or the other features of a really well-made road.

57. Narrow roads and steep gradients mattered little a few years ago when Simla was half its present size, and no one ever thought of its growing to what it is now. The residents were few, and the summer visitors merely came to enjoy the mountain air, and left their affairs and business behind them in the plains.

58. Now the size of Simla has so increased, and the bulk of the summer population is made up of officials and business men, by whom the want of good roads, whether for facility of communication between the public offices, often long distances apart, or for the proper enjoyment of the short intervals of daily exercise and recreation they can afford, is much felt.

59. The seven miles of its principal thoroughfares is a road which might be greatly improved, and there is a better laid out mall at almost every other hill station in India.

60. A committee met at Simla last year to consider the question of the roads, and made certain recommendations, which have been approved by the Hon'ble the Lieutenant Governor, and which the Municipal Committee will adopt.

61. The first work to be undertaken is the road from the foot of Observatory Hill by the south side of Inverarm Hill to the Chowra Maidán, and thence to the Church.

62. Next in importance is the road round Jakko.

63. The sum of one lakh of rupees has been appropriated for the immediate improvement of the roads, which will be at once taken in hand when the loan is sanctioned and the money made available.

THE LOAN AND DISTRIBUTION OF EXPENDITURE.

64. The grant of five lakhs of rupees made by the Government of India towards local improvements in Simla is contingent on the Municipal Committee raising an additional seven lakhs, and I therefore append their application to the Local Government to obtain sanction from the Government of India to a loan to them to that extent under the Local Public Works Loan Act of 1871.

65. The financial position of the Simla Municipality is fully stated in the special committee report annexed, paragraphs 3—7, showing that if the local income is raised to one lakh of rupees per annum the municipality can afford to borrow seven lakhs of rupees.

66. Additional taxation has been proposed by the committee and sanctioned by the Lieutenant Governor under the Punjab Municipal Act, which should yield at once a local income of not less than one lakh of rupees; and when certain of the works themselves become, as they should, remunerative, this income will be increased and the financial position of the municipality further improved.

67. The application for the loan is appended in the prescribed form, and contains the full particulars required. In view, however, of the necessity the committee are under of supplementing to the greatest extent possible the present extraordinary expenditure with allotments from their ordinary income for some years to come, I have to urge strongly that you will solict the Hon'ble the Lieutnant-Governor to request the special sanction of the Governor General in Council to the repayment of this loan on the most favorable terms the Act permits.

68. With such sanction, the loan now asked for will have to be repaid, with interest, one-fifth of the whole in ten years, one-half in twenty years and the whole within thirty years, *vide* appendices.

69. The committee feel sanguine that this concession will be granted, as the only way in which full and continuing advantage of the advances now made by the Goverument of India can be taken.

70. The distribution of the whole expenditure of grant and loan among the several works will be as follow:—

Name of works.	1877-78.	1878-79	1879-80.	1880-81.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.
Water supply	50,000	4,00,000	2,25,000	25,000	7,00,000
Demolitions in bazár	50,000	...	...	...	50,000
Market	80,000	...	...	...	80,000
Conservancy	20,000	20,000	...	1,30,000	1,70,000
Bazár improvements	50,000	50,000	...	...	1,00,000
Station roads	...	1,00,000	...	...	1,00,000
Total ...	2,50,000	5,70,009	2,25,000	1,55,000	12,00,000

71. I trust I have succeeded in showing the necessity and importance of the proposed works, when I am confident that the assistance asked for from Government will be granted as early as possible, so that the benefits and advantages which must accrue to Simla, may be enjoyed only with the delay absolutely necessary to complete the several projects.

Resolution passed at the special meeting of the Municipal Committee, Simla, held on the 19th December 1877

That in order to avail themselves of the grant of five lakhs of rupees given by the Government of India to carry out an improved water supply, conservancy, and other works for the station of Simla, the committee hereby authorize an application, through the Local Government to the Government of India, for a loan of 7 lakhs of rupees, to be paid off in equal annual instalments spread over 30 years from the completion of the works, commencing 1881-82.

Application for a loan of Rs. 7,00,000 to the Municipal Committee of Simla.

1. The purpose for which the loan is required is to introduce a larger water supply, to provide improved conservancy, to build a public market, to improve the native bazár, and extend roads in the town of Simla, Punjab; and the works (adding a grant of five lakhs of rupees to be made by the Government of India) are estimated to cost twelve lakhs of rupees.

2. The loan applied for is Rs. 7,00,000.

3. The committee propose borrowing on the security of all the rates, duties or taxes, and the receipts from taxes now levied by, or belonging to, the municipality.

4. They are as follows:—

1. The octroi duties.
2. Income from ground tax.
3. Ditto house tax.
4. Ditto municipal buildings.
5. Ditto garden and forest.
6. Ditto conservancy tax on servants.

5. The octroi duties were sanctioned by the Hon'ble the Lieutenant-Governor (*vide* Notification No. 1354 dated 3rd April 1877); and are collected under Act IV of 1873 (Punjab Municipal Act).

6. The period for which the loan is required is thirty years.

7. The loan is required as follows:—assuming that the Government of India, who have given half the grant of five lakhs in 1877-78, will give the second half towards the water-works in 1878-79, as may be required by Superintending Engineer Imperial Circle:

	Rs.
1st April 1878	2,20,000
1st October 1878	1,00,000
1st April 1879	1,25,000
1st October 1879	1,00,000
1st April 1880	1,25,000
1st October 1880	30,000

8. It is proposed to repay the principal of the loan by instalments, as shown in Appendix, half yearly, commencing 1st October 1881.

9. The interest at the rate of 4½ per cent. will be paid half-yearly after each advance of the loan is received until the repayment of the principal commences, when both will be paid together half yearly.

10. The proceeds of each of the rates, duties or taxes, or of the receipts from property, and all other income received by the Municipal Committee for the purposes of the municipality of Simla, and the sums spent for the last three years, are as follows:—

RECEIPTS.

	1874-75	1875-76	1876-77
	Rs.	Rs.	Rs.
Lands	7,423	6,959	8,859
Houses	18,453	22,070	19,812
Octroi	13,132	13,810	16,126
Bazár sweepings	520	486	549
Garden	786	1,357	1,860
Rents from municipal buildings	3,768	3,046	2,081
Sale of lands, houses &c.	...	27	137
Fees and Fines	1,338	2,133	2,259
Sundry Receipts	386	2,924	775
Refunds (credit)	3,230	...	303
Towns	25,000	...	...
	74,036	52,812	52,761

EXPENDITURE.

	1874-75	1875-76	1876-77
	Rs.	Rs.	Rs.
Refunds (debit)	120	1	257
Collection of taxes	1,344	1,406	1,354
Police	4,856	5,529	5,538
Education	102	96	96
Medical	99	318	344
Contingencies, printing &c	1,155	621	1,311
Office Establishment	2,711	2,597	1,829
Conservancy and lighting	7,655	12,562	9,800
Miscellaneous establishment	860	1,293	1,452
Interest on loans	1,583	2,369	3,070
Compensation	7,319	17,928	4,823
Original works	1,819	3,333	5,516
Repairs and maintenance	8,965	11,786	21,252
Repayment of loans	11,839	6,540	4,526
	50,427	66,378	61,168

11. Consequent on the additional taxation to be levied in 1878-79, the budget estimate of receipts for the ensuing year will be as follows:—

RECEIPTS.

		Rs.
I.	Ground tax on estates	15,200
II.	Tax on house rentals	35,000
III.	Frontage tax	10,000
IV.	Conservancy	9,000
V.	Slaughter houses	2,500
VI.	Octroi	16,000
VII.	Public gardens	2,000
VIII.	Rent of municipal buildings	8,000
IX.	Fees and fines	1,000
X.	Sale of wood &c.,	1,300
	Total	1,00,000

The receipts from the increased taxation have not been over-estimated, so that the income should certainly not fall short of that shown, and will probably be somewhat in excess.

12. There is a debt owing by the Simla Municipality, the details of which are shown in paragraph 62 of the Special Committees Report; but the Municipal Committee will pay the whole sum now due, namely 52,000 and interest in three annual instalments, *viz*:—

	Rs.
1878-79	26,000
1879-80	18,000
1880-81	10,000

R. Parry Nisbet, *President.*
Horace B. Goad, *Secretary.*
Geo. M Bryan.
Hugh Rose, *Colonel.*
Jno. Phelps.
Henry H. Stansfeld, *Lieutenant-Colonel.*

Health of the Simla district. Good.

Registration of births and deaths. All births and deaths are, within 12 hours of their occurrence, reported to the Police Station, and weekly returns made out by the Police from these reports. Apart from this, the Municipal Committee has an establishment of two clerks whose sole duty it is, by daily enquiry, to ascertain what deaths take place. From the information obtained by them, a weekly return is prepared which is quite independent of the return prepared by the Police. The two returns are then compared, and any difference enquired into and explained.

JULLUNDUR DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1876.	Estimated Income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Jullundur including suburbs ...	50,924	32,784	14,115	28	25
	A'dampur	4,153	1,266	328	25	27
	Aláwalpur	4,836	1,346	225	27	29
	Kartárpur	11,053	4,749	3,049	15	20
	Bunga	4,817	2,375	525	42	21
11	Ráhon	12,914	5,552	1,487	24	16
	Nawashahr	5,351	1,531	277	26	20
	Phillour	6,251	2,510	575	26	19
	Núrmahal	9,025	3,818	2,186	23	19
	Nakodar	9,780	4,248	1,658	15	17
	Mahatpur	6,853	1,014	352	23	23

Details of sanitary works, conservancy, &c. In the preceding year, the highest mortality in the province was in the Jullundur district, where, as observed by the Punjab Government in its review of the Sanitary Report for 1876, "Owing to certain peculiarities in the physical formation of the country, aided probably by the embankments of the grand trunk road and railway crossing the natural drainage line at right angles, the successive heavy rains of two or three unusual seasons caused the country to become water-logged." It is satisfactory to observe from the report of the Deputy Commissioner, Major Beadon, that good arrangements have been made by the Municipal Committee, not only in Jullundur, but in the other minor towns, for improving the sanitary condition of their interior wards and dwelling quarters. Major Beadon says:—

The measures taken for the sanitary improvement of towns and prevention of epidemic diseases were of a general nature as follows:—

1. External drainage works were effected at Jullundur and Kartárpur at an aggregate cost of Rs. 3,763. In the case of Jullundur a high embankment was thrown up in order to divert floods from the habitation. At Kartárpur the protective work consisted chiefly of a deep drain.

2. At Jullundur and Phillour small hospitals, at a distance from the habitation, were erected for the reception of contagious disease cases, and supplied with furniture &c. These are meant to serve a double purpose, *viz*. the reception of sick passengers off the railway and those effected with contagious ailments in the towns themselves.

3. A project for the restoration and improvement of Dabee-talá́b, a large pakka bathing tank at Jullundur, greatly used by the Hindoo community, was developed and started. This work will cost, when finished, about Rs. 8,000, and will not only render greater comforts to those wishing to bathe themselves, but will become a pleasant recreation ground for those citizens who may be desirous of fresh air and pleasure.

4. A metalled road was constructed between Jullundur city and Basti Sheikh, the city's largest suburb. This work cost Rs. 3,314, the road being 30 feet broad and 1¼ miles long.

5. The wells of Aláwalpur, Nakodar and Ráhon were cleaned out and repaired, and a bathing tank was restored at Mahatpur.

6. A new public latrine was built at Nakodar, and in all the Jullundur latrines, sheds for dry earth were constructed. The dry earth system is now being fairly carried on in the sadar town at all its public latrines, and this is apparently being appreciated.

7. The conservancy staff of Jullundur Khás was largely added to in number during the year. The main drains of the town are daily flushed from a well in the "abádi killa" while in minor streets and lanes dry conservancy is the order of the day. House-holders have been, and are being compelled to construct sinks for the waste water of their houses, and at present are bonnd under penalty of fine, to keep these clean. Where overflow occurs, house-holders are sent before the Magistrates.

As far as possible similar action is being taken at minor towns, that is to say, the staff of sweepers is being strengthened and plain dry surface sweeping encouraged.

In all the towns of the district, where money was available, paving and metalling of streets and lanes was effected. Some Rs. 4,500 were laid out in this way.

As regards the state of villages, I am pleased to say that in many instances villagers have been induced to employ sweepers to the marked advantage of their habitation sites. I begin to receive application for permission to raise the dhál bách for payment of chowkidárs in order that it may include the sum wanted to employ a sweeper or two. I look upon these requests as indicative of a growing desire on the part of the people to keep themselves free from impurity, and never fail to accord my sanction to a measure which merits so much encouragement.

General health. Good. No serious visitation of any kind during the year.

Registration. Is effected in the usual way, and certain suggestions made during the year to ensure accuracy were duly observed and carried out.

HOSHIARPUR DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population, for 1877.	Death-rate per mille of population, for 1877.
			Rs.	Rs.		
	Hoshiárpur and its suburbs ...	21,316	28,435	11,661	34	27
	Hariána	7,802	2,822	1,588	32	29
	Garhdiwála	3,874	3,373	923	32	19
	Dasúya	8,675	2,090	1,063	24	31
9	Urmar Tánda	13,971	3,670	2,026	26	32
	Miáni	7,993	1,246	617	26	26
	Mukerián	5,125	1,728	895	25	38
	Una	4,908	993	399	12	13
	Anandpur	6,405	1,577	452	19	30

Detail of sanitary works. The large drain which was under construction for the last two years has now been completed in the town of Hoshiárpur, and is a valuable sanitary work. Two other drains were also constructed here,—one in mohalla Moulvián and the other in Custgunj. In Bahádurpur also two small drains were constructed, one well was repaired in Hoshiárpur town, four in Khanpur, and one in Bahádurpur. Wells and latrines were cleaned and repaired, and on the whole great attention appears to be paid by the authorities to the conservancy and sanitary arrangements of each town.

In forwarding to me the report of the Deputy Commissioner of Hoshiárpur, Mr. A. Brandreth the Commissioner of the Division, observes:—

I think your remarks on the Hoshiárpur latrines (see section X) in your inspection report on that place coupled with your certificate that conservancy is more attended to there than anywhere else almost in the province, will explain why the natives dislike these latrines so much, and look on them as hot beds of infection and disease. I fear that unless we can improve them they will be a serious cause of unpopularity of the English rule and administration.

There is no doubt that latrines constructed on the radically and absurdly faulty system of those in use at Hoshiárpur and many other towns are extremely unpopular and looked upon with aversion by the natives. But the remedy is simple, and is in the hands of the municipal authorities. It is simply to provide suitable buildings for the purpose in view in place of the positively disgusting and incomplete structures at present provided for the use of the towns-people. It should be borne in mind that it is not enough for the municipal committee merely to allot a certain sum for the construction of public latrines, and to take no precautions that they be built on a proper plan and be provided with suitable furniture and an efficient working establishment. To enclose a quadrangular bit of ground within walls, and to divide the area into a number of compartments, to put a piece of fragile and porous pottery into each, and place the whole under the charge of one or two inadequately paid sweepers, as is the too common practice, is not, whatever the expenditure incurred may have been, providing the town with a public latrine in the proper acceptation of the term. It is, on the contrary, preparing a nuisance, and the place indisputably becomes such very soon after being appropriated to the public use. The construction of a public latrine, the municipal committee should be aware, requires as much forethought and provision for its details as any other work of pubic utility, and should not be neglected by municipal authorities because the subject is an unsavoury one. Whatever plan be adopted no public latrine should be opened for use until it has been officially inspected and pronounced fit for the purpose. I consider that no latrine should be built without a roof supported on short props to admit of free ventilation; that each compartment should be furnished with suitable

receptacles either of glazed pottery or iron-ware; that the compartment floors should be pakka and provided with a catch drain for ablution water &c.; that adjoining the latrine there should be provided separate sheds for the storage of dry earth and the contents of the receptacles till removed to the place of final disposal; and lastly, no latrine should be opened to the public use till it is provided with an efficient staff of sweepers to ensure its proper service and maintenance in a wholesome state. With arrangements such as these duly provided there is no reason why public latrines should not here become as popular places of resort as they are in other towns where they are properly looked to and tended. Had they in the first instance received the same amount of attention from the municipal authorities of Hoshiárpur as those gentlemen have, greatly to their credit, devoted to other sanitary measures in connection with their town, there would have been, I am sure, no cause of complaint on this score.

Conservancy water supply drainage.

During the year arrangements have been completed for burying all the filth from privies. It is buried in two places. Half in pits on the top of old brick kiln heaps, a little way to the east of the town where it will remain for a year and then be sold as manure. Half in the ground of the committee near the slaughter house, where it is buried in trenches; here a grove or garden will soon be laid out.

The out-fall of the main drain above alluded to is on to low ground to the north of the town. In order to utilize this valuable sewage, negotiations for the purchase of a piece of waste ground have been completed. It is hoped that this will soon be a wood preserve or be brought under the plough.

To complete the sanitary arrangements desirable in Hoshiárpur these objects are now aimed at:—

I. To construct a drain from the south of the town, kacha Kila Toba, which should enter the new main drain somewhere near the kotwáli.

II. To fill up the kacha Kila Toba, a pestiferous pond 100 yards square and very deep. This has just been commenced.

III. To reconstruct the system of drains on the northern side of the town, and especially the large drain which joins the new drain near the Landa gate.

IV. To utilize the waste sewage of the main drain by applying it to vegetation. For this purpose arrangements are nearly completed for the purchase of 10 bigáhs of waste ground.

V. To secure for the municipality all rights in all the house sweepings which are at present sold by the sweepers to brick burners, or to zamindárs, and spread about upon the adjacent fields. This when accomplished will secure two purposes. It will stop a nuisance, and will also secure a monopoly of manure to the committee which will enable them, it is hoped, to pay all or a great portion of the expenditure on conservancy; this I deem, says Mr. Coldstream, the Deputy Commissioner, to be a prime object in all municipal arrangements, but there are generally difficulties connected with the vested rights of sweepers. Orders have been given to all municipalities to take care to prevent the growth of rights in town sewage which the committees can best use so as to create least nuisance, and which ought to be a property of growing value to committees, as it has been found to be at Hoshiárpur.

As large quantities of quinine are distributed in this district, small hand bills lithographed in Urdú giving directions for the effective adminstration of quinine and febrifuge have been prepared, and these will be distributed with supplies of quinine; simple sanitary rules have also been drawn up by Mr. Johnstone, Assistant Commissioner, and will be freely circulated; this will doubtless do a great deal of good.

Health of the district.

Very good throughout the year. No epidemic disease occurred. In the month of October 1877, the Deputy Commissioner (Mr. Coldstream) reported an out-break of Guinea worm in the village of Biláspur, a hundred men of the village were attacked but recovered.

Registration of births and deaths.

Great care seems to be devoted to this subject by the authorities.

KANGRA DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population, for 1877.	Death-rate per mille of population, for 1877.
	Dharmsála Sanitarium, ...	3,862	3,394	1,701	16	21
	Kángra ...	6,336	4,070	1,491	27	30
	Tira Sujánpur ...	3,393	1,916	332	25	30
5	Harripur ...	3,842	1,979	648	21	26
	Jawálamukhi ...	2,844	1,562	457	29	31
	Núrpur ...	7,337	6,502	833	21	29

Sanitary works.

No details furnished, but it is stated that the municipal funds are so entirely pre-occupied in fixed and necessary charges that no sanitary measure of any importance can be taken in hand.

Health of the district.

Exceptionally good.

Water supply; drainage; conservancy.

No new arrangements effected.

Registration of births and deaths.

Same as last year.

AMRITSAR DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1876.	Estimated Income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population, for 1877.	Death-rate per mille of population, for 1877.
			Rs.	Rs.		
6	Amritsar and its suburbs ...	142,381	315,045	114,191	34	41
	Majitha ...	6,004	1,160	941	21	24
	Jandiála ...	7,037	4,692	1,716	28	27
	Rámdás ...	5,257	2,338	268	21	15
	Tarn Táran ...	3,133	4,998	1,509	34	22
	Vairowál ...	5,958	1,766	594	33	33

Details of sanitary works.

Not given. The municipality of Amritsar is rich enough to afford to pay for its own Secretary, and it appears that the city benefits in consequence by due attention and supervision in all matters of sanitary improvement and conservancy arrangements. In the minor towns also considerable sums have been spent on sanitary works.

Drainage, conservancy, &c.

The Secretary to the Municipal Committee reports as follows:—

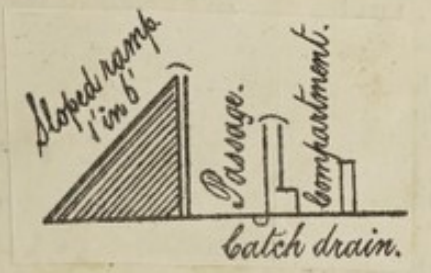
The sanitary state of the town (of Amritsar) has been still more improved by the work of paving bye-lanes, metalling roads, renewing old drains, and putting in new ones where required, filling up unwholesome excavations, and opening out new streets, all of which works have received a large amount of attention during the year just passed through.

A complete scheme for the drainage of the eastern side of the city, estimated to cost one and a half lacs of rupees, was submitted for the approval of the Public Works Department in September last; when this work is finished, a great deal will have been done. At present the old ditch on this side of the city receives all the sewage, which is an intolerable nuisance; the scheme provides *inter alia* for the removal of that.

So far as the conservancy of the public streets and drains are concerned little requires to be done.

No town in India, much less Amritsar, can hope to derive the full benefits of the laws of sanitation till the people themselves, both in their persons and property learn to appreciate these laws. What benefit does a Hindu derive from the roads and drains surrounding his house being kept perfectly clean, when the ante-chamber of his dwelling is occupied by a cow, or it may be two or three, when the houses occupied by the mass of the people are small and ill-ventilated, and when the roofs are used freely as latrines. To alter this state of things at once would be impossible.

A latrine on a new, and may be original, plan so far as outward appearances go, was constructed by the municipality during the year under report. The latrine is circular in form and provides 56 separate compartments. The seats are raised with wooden cross pieces, on which persons using the latrine may sit; each compartment is provided with an earthen pot or dish; the ground under the dish is pakka to admit of urine running rapidly off into a small catch drain. The dishes are removed by sweepers from openings in the back wall of the compartments, between which and an outer wall that supports a sloped ramp of earth, there is a passage (see section in margin) It is the sloped ramp of earth covered with green grass that gives to the whole its originality in design and appearance. No person ignorant of its purpose would suppose that the building was a latrine. From every point of view it looks like a green mound.



General health.

Fair. The prevailing diseases have been fever, bronchitis, pneumonia and small-pox.

Registration of births and deaths.

Well attended to.

GURDASPUR DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
16	Gurdáspur ...	4,137	3,763	1,522	17	24
	Dinanagar ...	6,226	7,147	1,791	27	30
	Behrampur ...	3,477	1,377	280	22	41
	Kalánaur ...	6,051	2,492	586	27	34
	Pathánkot ...	4,507	2,830	301	26	33
	Sujánpur ...	6,557	2,067	669	28	28
	Dalhousie sanitarium ...	2,255		Not given.	1	11
	Narot ...	3,944	1,730	252	32	33
	Shahpur ...	1,336	1,290	134	19	22
	Sukhuchak ...	3,246	1,210	299	28	17
	Darman ...	1,607	673	132	25	14
	Kot Naina ...	1,726	801	157	29	34
	Batala ...	26,929	17,718	6,305	28	20
	Srigobindpur ...	5,531	2,923	528	32	30
	Fatahgarh ...	4,481	1,441	180	31	28
	Dera Nanak ...	7,212	3,630	1,081	35	30

Details of sanitary works.

In the large towns some of the streets have been paved, and new drains built in addition to those in the previous year. In all the latrines the dry earth system is in force, so far as it is possible to carry it out.

Water supply; drainage; conservancy.

The water supply for drinking purposes is derived from wells, which are generally kept clean, and no filth allowed to collect near them. The drains and streets are kept clean by an efficient establishment of sweepers and bhistis, superintended by either a daroga or some of the members of the Municipal Committee, the filth being removed to some distant field. The water supply and drainage of the Dalhousie sanitarium is reported by the Civil Surgeon, Dr. Ringer, to be good; cleanliness fair. The refuse of the sanitarium is buried.

Health of the district. Remarkably good.

Registration of births and deaths. Fairly attended to.

SIALKOT DISTRICT.

No. of the municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
	Siálkot ...	32,989	24,690	6,753	34	22
	Daska ...	5,401	1,015	180	32	21
	Jamki ...	4,359	1,723	137	40	29
	Mitranwalli ...	3,095	912	278	43	29
	Kila Sobha Singh ...	5,159	2,193	232	27	23
10	Pasrúr ...	8,276	2,452	299	27	19
	Zafarwál ...	4,975	2,922	413	21	28
	Sankhatra ...	2,390	976	73	24	20
	Chawinda ...	5,251	245	42	31	23
	Narowál ...	5,207	1,457	429	25	23

Details of sanitary works.

Not given—but the figures noted above show what has been expended for improvement of drains and sewerage and sanitary works. In Siálkot city a new drain has been constructed at an expense of Rs. 2,200. Dams have been erected to prevent overflow of water-courses towards the city during floods. It will be observed from the above table that in most of the minor towns of this district a very small amount in proportion to the income was spent on sanitary works.

Conservancy. The Civil Surgeon reports thus :—

While out-door conservancy is receiving attention and is doubtless better than it used to be, it does not appear that there is much improvement in domestic conservancy. Court-yards continue to conceal from observance quite as much of insanitary conditions as ever, and the surroundings of towns and villages present the usual filthy appearance.

Health of the district. Unusually good. Diseases of the respiratory system were prevalent during the early and later months of the year owing to cold rainy weather.

Registration of births and deaths. Same as last year.

LAHORE DISTRICT.

No. of municipal towns in the district.	Names of Municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Lahore and its suburbs ...	1,28,441	1,72,975	58,686	33	34
	Sharakpur ...	4,425	1,965	426	42	29
	Chunian ...	6,449	5,593	1,829	58	28
7	Khudian ...	3,322	959	216	49	32
	Kasur ...	16,793	19,605	4,734	30	20
	Khemkarn ...	5,860	4,016	2,939	40	25
	Patti ...	6,290	4,484	1,560	29	29

Not given. Sanction to the project for supplying pure water to the city has been received, and the preliminary operations for the work have been fairly taken in hand. From the above statement it will be seen that in the minor towns a good per-centage of the estimated income has been spent on sanitary works.

Details of sanitary works.

The conservancy arrangements of the city are supervised as heretofore by members of the Municipal Committee assisted by Government officials and the president. A detailed account of the conservancy arrangements will be found in my summarised inspection report. Efforts have been made among the Eurasian residents of the Civil Station, Lahore, to encourage the burying of the fœcal matter of each house in shallow trenches in the house-holders' own compound, instead of throwing it into open pits to await the arrival of the scavenger's carts, but only a few persons have adopted this plan.

It seems difficult, says Dr. Scriven, the Civil Surgeon, to persuade the public how completely the injurious effects of decomposing refuse are prevented by this mode of dealing with it, many persons still believing that to bury night-soil in their gardens is simply to poison the grounds.

Fair. A slight out-break of typhoid fever occurred at Lahore in the beginning of February amongst the European population, and lingered till the end of June 1877. The summer months appear to have been very healthy, and this fact is ascribed to unusual drought. In the months of October and November, however, the place was exceedingly sickly from malarious fever of a very obstinate kind, affecting a great number of Europeans both children and adults, especially those who had just returned from the hills. Small-pox became prevalent in the month of November.

General health.

Same as last year.

Registration of births and deaths.

GUJRANWALA DISTRICT.

No of municipal towns in the district.	Names of Municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
10	Gujránwála	20,362	18,411	3,974	39	29
	Eminabad	6,719	1,500	684	32	21
	Kila Dídár Singh	2,214	920	701	55	32
	Wazirabad	15,346	12,294	5,791	36	34
	Sohdra	4,716	603	591	27	23
	Akálgarh	5,037	1,506	461	34	23
	Rámnagar	7,180	2,760	1,624	24	24
	Háfizabad	2,299	675	386	50	40
	Jalálpur	2,572	947	820	34	31
	Pindi Bhatián	4,188	1,161	839	37	28

Not furnished. Due attention seems to be paid to the conservancy arrangements of the towns; an establishment is kept up in all towns, but the municipalities have limited means and are consequently unable to spend as much money as they would desire on sanitary works.

Details of sanitary works.

Water supply; drainage; conservancy.

Dr. Quinnell, the Civil Surgeon, says in his report:—

The water supply is obtained entirely from wells. Most of them are pakka, but the water in all of them continues, as usual, exposed to every kind of pollution. I have examined most of them, but never found the water sweet or clean in a single one. The chief places for ablution, besides wells are (at the sadar) two large pakka tanks just outside the town. The water in these remains very foul and offensive all the year round. If there is any one thing more than another which contributes to the unhealthiness of native towns generally in these parts, it is, I feel convinced, the practice amongst the inhabitants of answering all calls of nature on the roofs of their own dwelling houses. The extent to which this detestable habit is indulged can only be realized by personal inspection the first thing in the morning. The consequence is that during the heavy rains of the hot season, the roofs and walls, become quite saturated with a solution of ordure, &c. How the occupants can breathe and retain any semblance of health in an atmosphere poisoned by exhalations which the heat and moisture then give off and which are felt to be overpowering often at a quarter of a mile distance, is difficult to understand.

The Commissioner, Lahore Division, Mr. J. G. Cordery, in forwarding the Civil Surgeon's report to my office, observes that:—

Such denunciation also of a native habit that cannot be prevented as follows the Civil Surgeon's remarks upon the water of the place, appears to me unpractical and unwise, as well as unsustained by hygienic facts.

Such utter neglect as that depicted in the Civil Surgeon's report is most probably confined to a few houses in the poorest quarters of the town only, and even in this case it is decidedly the lesser evil to deposit ordure on the roof, where its effluvia are quickly dissipated in the general atmosphere, than to allow it to accumulate on or saturate the soil of the basement, from which its exhalations must rise through the house, leaving out of consideration the many risks of contamination of the person, of food, and water supplies, in the latter case.

Health of the district. — Fair.

Registration of births and deaths. — Same as last year.

FEROZEPORE DISTRICT.

No. of municipal towns in the district.	Names of Municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure on sanitary work for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.	Remarks.
			Rs.	Rs.			
7	Ferozepore	15,168	42,407	15,415	26	33	
	Zira	3,471	*3,159	2,070	19	30	* Including Rs. 1,192 balance from previous year.
	Fatahgarh	1,654	485	46	36	31	
	Makhu	1,713	1,219	72	35	29	
	Dharmkot	5,467	†3,996	2,547	48	34	† Including Rs. 1,936 Ditto.
	Kot Isa Khan	1,520	426	92	28	27	Ditto.
	Muktsar	2,983	‡2,418	1,464	51	25	Including Rs. 1,360 Ditto.
							Ditto.

Details of sanitary works. — In the Ferozepore municipality, construction of a well at cremation ground, Rs. 300. Repairs to wells Rs. 35; cleaning and repairing canal cuts Rs. 105; cleaning tank Rs. 69. Construction of two new pakka tanks, one at Dharmkot at a cost of Rs. 2,300, the other at Zíra at a cost of Rs. 1,800.

Water supply drainage conservancy — (See my summarized Inspection Report of Ferozepore, Section X of this report).

Health of district. — Good. No epidemic.

RAWALPINDI DISTRICT.

No. of municipal towns in the district.	Names of Municipal towns.	Population according to the census of 1875.	Estimated income for 1877.	Expendiure on sanitary works for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
6	Rawálpindi	20,802	56,627	33,293	34	39
	Pindigheb	8,223	2,370	777	45	32
	Murree sanitarium	7,939	Not given.		2	4
	Makhad	4,252	3,094	2,117	26	31
	Hazro	7,950	8,758	3,906	47	26
	Attock Maláhi Tola	3,213	2,930	952	40	25

Details of sanitary works. — Six pakka drains have been constructed in the different streets of the town of Rawalpindi, and 18 new latrines were built for the city, and many wells cleaned.

Water supply; drainage; conservancy. — The chief defect in the sanitary state of Rawalpindi is the liability of the water supply to be polluted by contamination with surface impurities. After a lengthened discussion and the proposal of various schemes for the provision of a good water supply, nothing seems likely to be done at present owing apparently to insurmountable difficulties offered by the special circumstances of the locality. The drainage of the city is good, and great attention is given to the disposal of refuse &c.

Health of the district. — Good. Small-pox prevalent in almost all parts of the district; not very virulent however.

Dr. R. Gray, Civil Surgeon of Murree, in his Sanitary Report for 1877, with respect to the water supply, says :—

It was the earnest wish of the Municipal Committee to remedy some of the sanitary defects of the present water supply; want of funds, however, has been the great obstacle that has stood in the way of much being done.

Some of the defects of the present water supply are most obvious. There is no clean collecting ground, the water which fills the tanks is the rain water which falls within the station itself. This must, in the first instance at least, be more or less contaminated with sewage. Such water might be to some extent purified by filtration, but I think it is more than questionable whether water once rendered thoroughly septic by sewage contamination can be so depurated by natural filtration as to be rendered innocuous.

I forward herewith (appendix I) a very interesting memorandum by Mr. A. B. Wynne, of the geological survey, in which he discusses the question as to whether or not the strata of the Murree hills are favorable to natural filtration. Para 16 of my memorandum, to which he refers, is to the following effect. "But the drinking water of the station is liable to contamination from other causes than those operating at the tanks. The collecting ground consists of the sites on which the houses of the station are built, and in many cases the houses are close to the tanks. Moreover, from the geological formation of the Murree hills, there is very little natural filtration. The springs (I mean those in the station) probably in no single instance come from a great depth, the rain water merely percolating through the surface mould, and than running along the smooth sandstone or impermeable clay with which it is in some places covered. The dip of the strata is north-west, and it is on the northern side of the station that almost all the tanks are situated. From the above considerations it is evident that if the greatest care is not taken in regard to the cleanliness of the station,—if night soil, litter, and filth are not prevented from accumulating in the compounds, contamination of the water must take place, however effectual may be the means for protecting it at the tanks."

Mr. Wynne's opinion is that the "position of the Murree strata (tertiary sandstone and clay) is favorable to a large amount of natural filtration, in fact too large to allow of numerous or copious springs being found within the station." This is a subject on which Mr. Wynne can speak with authority, and I willingly admit that I underrated the capability of the strata of the Murree hills to absorb water. But as some of the tanks in the station are situated near the highest part of the water-shed, the water which finds its way into them cannot have been subjected to much natural filtration. Lower down the case would no doubt be different; but in most of the tanks, certainly in all those which are situated near the highest parts of the station, the supply of water becomes muddy after a few hours heavy rain. Probably this may be partly due to the fact that the walls of the tanks are not altogether impervious to water, but the water as it issues from the springs into the tanks can be seen to be muddy.

Peachwood reservoir, near Torrington, is situated some distance below the kachery. Last year, acting under the advice of Major General A. Taylor, the Municipal Committee caused one of the springs of this reservoir to be followed up to a considerable distance, and the water to be conveyed to the reservoir in an iron pipe. The object was to prevent contamination from houses in the immediate vicinity of the tank. This was done during the latter part of the season of 1876. During the past season (1877) after a heavy rain-fall the water as it issued from this pipe was invariably turbid.

The inevitable conclusion, therefore, I think is that there is not efficient natural filtration of the water which finds its way into any of the reservoirs nearest the highest parts of the station.

During the season, the Municipal Committee resolved to fit all the principal reservoirs in the station with brass taps, and to close in the roof openings through which water has hitherto been drawn from them. When this is completed one source of contamination will be done away with, but even then I do not believe that the water supply of the station will be in a satisfactory state.

During the season it was resolved to have an analysis of the water of the station made, and with this view specimens from six of the principal reservoirs were sent to the Chemical Examiner, Lahore. I give the result of his annalysis in appendix II. It will be seen that three were of undoubtedly good quality, while the other three, from the fact of their containing a trace of nitrites were "suspected," no doubt the suspicion being that they were contaminated with organic animal matter.

None of the specimens were, however, decidedly bad, a fact which may be considered to militate against the views which have been recorded in regard to the unsatisfactory character of the water supply of the station. But it should be stated that no rain had fallen for a considerable time before the specimens of water were taken from the reservoirs, and it is obvious that at such a time the water in the reservoirs would be least liable to be contaminated with surface sewage. It was the intention to send other specimens for analysis from the same reservoirs after the ground got thoroughly soaked by a fall of rain, but the opportunity did not occur before the end of the season, and this must lie over till the commencement of next rains.

In the beginning of last season a recommendation was made by me that house proprietors should make arrangements for storing in tanks rain water collected from the roofs of houses. This would at first entail some expenditure in the construction of storing tanks, and I fear the recommendation has not much chance of being carried out. But I do not think there is any other possible scheme by which a satisfactory supply of water can be secured to the station. A second analysis of the water at a time when it is most liable to contamination, that is immediately after the commencement of the rains, should settle the point as to whether some radical change in existing arrangements should be made.

Mr. Wynne's Memorandum of the geological survey: the report of the Municipal Sub-committee on Murree water supply; and the statement of analysis of Murree waters, are herewith subjoined:—

Memorandum by A. B. WYNNE, ESQUIRE, *Geological Survey—on para.* 16 *of* DR. GRAY'S *Report on the water supply of Murree.*

16. The geological paragraph and the bearings of the structure of the Murree hill, with regard to water supply, may be worthy of some further consideration.

It appears to me that the position of the Murree strata (tertiary sandstone and clay) is favorable to a large amount of natural filtration,—in fact too large to allow of numerous or copious springs being found within the station.

The strata from the Brewery upwards into the station itself have a steep angle or inclination towards the north-west, as stated, but in the forest, on the Sunny bank road, and towards the Kashmir end of the hill, there are numerous curves in the bedding of the rocks (anticlinal arches, and synclinal hollows.) The axis of one great arch of the strata traverses longitudinally the glen of the Sohan south-east of the Murree hill, and runs towards Dewal, passing in the vicinity of Topa hill. Murree is on the north-west side of this curve, but the higher ground of the north-east end of the station and Topa hill (as well as the ground about that locality) shows the strata with many minor curvatures folding so as to pass over the anticlinal axis of Topa and the Sohan Kuss.

The strata are, besides this general arrangement, subject to great dislocation. A great fault cuts off the whole of the rocks of Murree hill from that of Kooldunna, passing with many complications through the col near the lower Kooldanna tower. Another fault nearly at right angles to this cuts off the most of the highly inclined steadily sloping strata from the part showing more curvature; it may be plainly seen near a piece of new stone-work on the mall close to the Manse and not far from where the road has slipped away.

There are doubtless numerous other slips and faults dislocating the beds, as well as numerous curvatures of the strata all over the ground and within the hill (one of the latter, for instance, occurs among the more steadily bedded strata along the mall between the depôt hospital and the workshops). All these curvatures and fractures have a connection with the percolation of rain water. Large portions lead it to lower levels, and places where it escapes are liable to slippage, when broken "out-crops" of the strata (or other circumstances with regard to the stratification) occurring at these spots favor local subsidence.

In this way the great slip on the mall may be connected with the fault near the Manse. Each considerable synclinal curvature in the stratification would also tend to interrupt the downward passage of the water and lead it along any inclination which such a trough might have.

The endless alternation of jointed sandstone and impermeable clay strata is an arrangement of the rocks in the Murree hill highly conducive to the percolation of rain water through the whole hill and to great depths. The steeply sloping beds coming to the surface would lead the water in to the hill and over much of the ground. The tendency would be to discharge it on the northern side, or to the north-west, from the dip side of the strata.

But the station itself occupies the local catchment area, the houses are built on the highest points, the water naturally issues from below, and with regard to mere surface drainage all the objections of Dr. Gray's memorandum have of course full weight and force. Still it seems to me that at many points not far below the station, the internal waters of the hill might be tapped by nearly horizontal drivings and the water so obtained would, at least, have the advantage of natural filtration. From the nature of the rocks traversed, I should suppose that water naturally filtered in this way would contain some lime and probably a good deal of iron. Its quantity would of course depend, as it does now, upon the rain-fall, but would probably be a much more permanent supply than there is at present.

With regard to mere surface drainage percolating through a highly organic mould, and running over the surfaces of smooth sandstone beds, I should think that the cases where this occurs are very rare. The quantity of water which sinks through the vegetable mould and meets stiff clay and rock surfaces runs off quickly, but a large amount is doubtless absorbed by the most superficial portion of the rocks beneath, and is slowly filtered in its downward passage through and among them, while any permanent springs would probably, if not certainly, come from it may be widely distributed sources not more deeply situated, with regard to the mass of the hill, than the points at which they issue. The heights at which such springs are found would thus be some indication as to the levels at which a permanent supply of water may be attainable, and testing the water of these springs where there is least likelihood of superficial organic matter being taken up by the water, would be a guide as to the purity of the water, likely to be obtained. In any effort to obtain water from the interior of the Murree hill, the disposition of the strata in the vicinity of the place where the trials or "drivings" might be made, would require attentive consideration. Natural springs would probably be good guides as to locality. Any water obtained in this way would, I need scarcely add, be much superior to that caught in ordinary tanks.

SEASON 1877.

Report of a sub-committee of the Municipal committee, Murree, on the water supply of the station.

Some of the principal tanks from which drinking water is supplied to the station were visited on the 24th April, and following days, by Mr. Massy, Mr. Hopkins, Mr. Powell and Dr. Gray, and the following is a brief statement of the condition in which they were found, with suggestions for their improvement.

1. *Bhistie Ghat.*—There are here two tanks from which drinking water is taken, one at the southern extremity, the other, and larger, at the north-western side of the ghát.

Both are uncovered. The larger one has a flight of stone steps leading down to the water. From both water is obtained by means of the ordinary leathern bucket which bhisties use for filling their mussucks. The bhisties stand on the steps or edge of the tanks, and the drippings from their hands, feet and mussucks must find their way into the tanks and pollute the water.

It is proposed that both these tanks be roofed, and that the water from the larger one be drawn from it by means of an iron pipe fitted with a tap.

In the smaller one the water does not stand sufficiently high to admit of its being fitted with pipe and tap. It is therefore proposed that a small Roorki pump be got for it.

2. Most of the other public tanks are roofed with wood, one or more openings being left through which water is drawn by the bhisties. This system of raising the water is most objectionable, inasmuch as it renders the tanks almost as liable to contamination as if there were no roofs over them at all. The bhisties stand on the wooden roofs, and the washings of their hands, feet, mussucks &c., find their way into the tanks with as great facility and in as great abundance as if the men stood on the edge of uncovered tanks.

It is proposed that these roof openings be entirely closed, and that water be drawn from the tanks solely by iron pipes, fitted, when necessary, with brass taps.

3. *Peachwood tank.*—There are the ordinary two roof openings in this tank, but the facilities for polluting its water are still further increased by a flight of stone steps leading to the water.

The site of the tank, immediately under the Peachwood out-houses, is very bad, and renders sewage contamination of the water almost certain.

During the past season water was brought from a spot a considerable distance above this tank in a sheet-iron tube sunk several feet below the surface It is believed that the intention was to conduct the water into the tank, but this was not done; the work was stopped several yards above the tank, and no means have been taken to utilize the water although it must have been brought thus far at no inconsiderable expense.

No doubt the water is more pure and less liable to contamination than that which percolates into the tank chiefly from the Peachwood estate, and it is proposed that the work begun last year be now completed; and that the tank be entirely closed up.

4. *The Ellerslie tank.*—During the past winter the wooden roof of this tank completely collapsed, and the tank is now roofless.

The site immediately below the stables and servants' houses of Ellerslie is most objectionable. The walls of the tank are not quite impervious to water, and the consequence is that some of the sewage, as it flows down the slope, must find its way into the tank.

There is an abundant supply of water in this tank. It issues from the side of the tank, and fills a number of wooden casks which are placed there; it is stated that this arrangement exists for the convenience of bhisties, who, in the height of the season, come in great numbers to this tank. This cask arrangement is objectionable, as it facilitates the further contamination of the water by means of the bhisties' filthy leathern buckets and otherwise.

It is proposed that the whole of these casks be removed at once; that the walls of the tank, for at least two or three feet below the surface, be built of the best pakka masonry, so as to lessen the risk of contamination from surface sewage; that the tank be fitted with several taps; and that it be re-roofed.

5. *Two tanks on the Rawalpindi road about midway between the Club and Sunny Bank, near the house "Forest Dell."*

One of these, the one nearest the Club, has a fine supply of water, is roofed in and water issues from it through a spout about a foot and a half above the ground.

Very little requires to be done to this tank to make it unobjectionable.

The other and lower tank is a very objectionable one, and it is from it that water is chiefly if not altogether obtained for the troops encamped at Sunny Bank. There is apparently not a very abundant supply of water—it is ladled out of the tank by bhisties standing on the wooden roof—and the tank cannot fail to be contaminated.

To make the water issue through pipes fitted into the wall of the tank would be a very simple and inexpensive affair.

But these two tanks are quite close to one another, and both do not appear to be necessary.

The one nearest the Club is not much used, probably because the approach to it is very bad.

6. *Tank near the Cemetery.*—Supply of water probably not abundant. In regard to this tank the general principles recommended in para. 2 should be carried out.

7. *Depôt tank.*—Water for the Depôt is stored in a large pakka tank, from which, when full, it flows into a smaller tank. The latter is covered with a moveable stone slab. From the smaller tank water is withdrawn by means of leathern hoses fitted with taps.

When the larger tank does not overflow, water has to be raised from it by means of a hand Roorki pump. This seems to be the weak point in the arrangement, for, as the pump and the parts about it are not covered, and as the stone slab is moveable, the water is liable to contamination.

8. *Kashmiri Mohulla tank.*—There is a large and perennial supply of water here, and so far as the tank itself is concerned, pollution of the water can be very easily prevented by the application of the principles recommended in para. 2. But on the high ground above it there is a large collection of filth and rubbish; as the ground is within cantonment boundaries, the cantonment authorities should be called upon to remove the filth and rubbish, and prevent their accumulation there in future.

9. *Nutwood tank.*—This is one of the most objectionable of the tanks in the station. The supply of water is not large and the tank is principally fed from two puddles above it, which puddles are immediately below Nutwood house and garden, and must collect the sewage from them.

The Civil Surgeon is of opinion that the water of this tank is quite unfit for drinking or culinary purposes.

10. *Tank under the Lawn.*—At present the supply of water is large, but in the dry weather it is said to be not more than 30 mussucks per diem.

This tank seems to be less liable than many others to contamination by percolation of sewage from houses above it.

11. *Convent tank.*—Supply of water small, but said to be perennial, seems little liable to contamination.

12. *Tank on Asylum Western Road.*—Supply of water large and said to be perennial.

This tank is at a considerable distance from houses and probably the water is little liable to contamination before it is collected in the tank.

13. There is a most objectionable little open tank on the Sydenham estate. It is right below and not more than eight or ten yards from the stables. It cannot possibly fail to be contaminated by sewage from the stables. A large number of bhisties resort to it for water.

Almost equally objectionable is a tank immediately below the Ekka stand.

14. Along the road sides there are, in different places, holes from which one may daily see bhisties filling their mussucks with water of the filthiest description. All these holes should be filled up, and any one attempting to open them again should be heavily punished.

15. There is one well in the bazár, close to a Hindu Dharmsál. It is open, and its edge is on a level with the street. Close to it people wash, bathe and probably perform other natural functions; the water cannot but be most unwholesome, and is probably the means of disseminating cholera and other diseases among the natives residing in the bazár. So long as it contains water, the majority of the bazár people are said to use it. This well should either be completely closed, or steps should be taken for protecting it from pollution.

16. But the drinking water of the station is liable to contamination from other causes than those operating at the tanks.

The collecting ground consists of the sites on which the houses are built, and in many cases the houses are quite close to the tanks.

Moreover, from the character of the geological formation of the Murree hills, there is very little natural filtration. The springs probably in no single instance come from a great depth, the rain water merely percolating through the surface mould and then running along the smooth standstone, or the impermeable clay with which it is in some places covered.

The dip of the strata is north-west, and it is on the northern side of the station that almost all the tanks are situated.

From the above considerations it is evident that, if the greatest care is not taken in regard to the cleanliness and conservancy of the station—if night soil, litter and filth are not prevented from accumulating in the compounds—contamination of the drinking water must take place, however effectual may be the means adopted for protecting it at the tanks.

MURREE:
May 10*th* 1877.

R. GRAY,
Civil Surgeon.

P. S.—Since writing the above remarks I have seen a memorandum by General Taylor on the *Peachwood* and *Ellerslie* tanks. General Taylor proposes that in regard to both those tanks contamination should be prevented by following up one of the springs and conducting the water in iron pipes from a point at which it is not liable to contamination, at the same time making the walls of the tanks impervious to water—and providing means for drawing the water from the tank by means of hydrants.

No doubt if these proposals could be carried out the water would be *purer* than it is now ; but if the views suggested above with regard to the source from which water is obtained be correct—if there are in reality no deep springs in the station, it is almost certain that the supply of water will decrease the further any spring is followed up.

The only way in which a supply of pure water can be secured is by storing in tanks rain water from the roofs of houses. It is believed that this can be done at no great expense. This proposal is strongly recommended by the Municipal Committee. House proprietors by carrying it out would greatly enhance the value of their properties, and make Murree eventually a more healthy and more popular sanitarium.

Statement of the Result of Analysis of Water sent from Municipal Committee Murree.

QUALITATIVE ANALYSIS.

Sources.	Physical Qualities.	Reaction.	Free carbonic acid.	Chlorides.	Sulphates.	Nitrates.	Sulphuric Hydrogen.	Nitrites.	Lime.	Magnesia.	Iron.	Ammonia.	Remarks.
Bhistis' Ghat No. 1.. ..	Good.	Neutral.	Slight amount.	Opacity.	Trace.	Trace.	None.	None.	Precipitate.	Trace.	None.	Faint trace.	From the qualitative analysis these waters appear nearly uniform, but No. 2, 3 and 4 are more to be suspected from containing nitrites.
Peachwood No. 2	Ditto.	Ditto.	None.	Haze.	Ditto.	Ditto.	Ditto	Faint trace.	Opacity.	Ditto.	Ditto.	Ditto.	
Ellerslie No. 3	Ditto.	Ditto.	Slight amount.	Opacity.	Haze.	Ditto.	Ditto.	Trace.	Ditto.	Ditto.	Ditto.	Ditto.	
Frankville No. 4	Ditto.	Ditto.	Ditto.	Haze.	Trace.	Ditto.	Ditto.	Slight amount.	Ditto.	Ditto.	Ditto.	Ditto.	
Nutwood No. 5	Ditto.	Ditto.	Ditto.	Slight opacity.	Haze.	Ditto.	Ditto.	None.	Ditto.	Ditto.	Ditto.	Ditto.	
Bazár No. 6	Ditto.	Ditto.	Ditto.	Opacity.	Opacity.	Ditto.	Ditto.	None.	Ditto.	Ditto.	Ditto.	Ditto.	

QUANTITATIVE ANALYSIS.

Sources.	Total hardness.	Permanent hardness.	Total solid grains per gallon.	Free ammonia grains per gallon.	Albuminated ammonia grains per gallon.	Chlorides as na-cl-grains per gallon.	Amount of oxygen for easily oxidisable matter per gallon.	Amount of oxygen grains required for less easily oxidisable matter per gallon.	Nitric acid grains per gallon.	Remarks.
Bhistis' Ghat No. 1.. ..	15·1	5·5	18·2	·0112	·0098	2·7846	·0119	·0238	38955	From the quantitative analysis the waters appear very uniform, with the singular exception of No. 2 having so much less hardness than the others; the total solids being the average.
Peachwood No. 2.. ..	7·5	3·7	20·86	·0154	·0112	1·9656	·0028	·0168	20776	
Ellerslie No. 3.. ..	12·8	3·	21·28	·0126	·009	1·9656	·0098	·0238	5394	
Frankville No. 4.. ..	11·	4·7	22·26	·0084	·0098	1·9656	·0098	·0238	57134	
Nutwood No.5.. ..	14·	2·7	13·6	·007	·0091	1·9656	·0028	·0168	18179	
Bazár No. 6.. ..	12·9	2·5	26·6	·0056	·007	1·9656	·0028	·0168	2597	

JHELUM DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure on sanitary works for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877
			Rs.	Rs.		
	Jhelum	7,947	20,629	4,147	16	16
	Chakwál	5,654	3,435	1,860	26	24
	Talagang	5,659	2,394	827	39	20
	Pind Dádan Khan	15,397	21,980	9,310	44	30
	Domeli	2,717	833*	547	21	28

Details of sanitary works.

Repairs to kacha canal in Pind Dádan Khan ... ... Rs. 860
Repairs to tank in Pind Dádan Khan ... ... ,, 500
Construction of a tank in Pind Dádan Khan ... ... ,, 2,400

New latrines were constructed in all the municipalities except Domeli.

Water supply, drainage, conservancy.

The supply of well water at Jhelum is good, and from the river abundant. The drainage and general cleanliness of the town is satisfactory. Refuse is removed and buried in trenches.

Health of the district.

Remarkably good. There was no epidemic.

Registration of births and deaths.

Same as last year.

GUJRAT DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Gujrát	17,401	8,600	3,489	46	22
	Jalálpur	14,014	6,200	2,264	48	28
4	Kunjáh	5,355	1,890	818	35	21
	Dinga	5,086	1,100	510	27	18

Details of sanitary works.

In Gujrát city 21 wells and one tank have been cleaned out, 4 pakka drains have been constructed inside the city and 5 in the outskirts, 3 new drains were made in Kunjáh, and wells cleaned in all the municpalities.

Water supply, &c.

The water supply is abundant and fair in quality. The four large towns only are drained.

Health of district.

Very good.

Registration of births and deaths.

Fairly accurate.

SHAHPUR DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census 1875.	Estimated income during the year 1877.	Expenditure for sanitary purposes during the year 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Shahpur	4,743	2,535	304	48	30
	Sahiwál	8,634	6,579	2,513	54	38
6	Ghirót	2,799	1,914	1,814	28	11
	Bhera	14,710	10,084	2,193	55	31
	Miáni	6,158	4,096	649	55	32
	Khusháb	8,344	9,954	3,555	50	28

* Includes 313 balance from previous year.

Extensive measures have been adopted for the sanitary improvements of the towns, cleaning of wells and tanks ; holes were filled up, streets paved and drained, and sewage channels kept clean. Brick kilns at Miáni and Shahpur have been removed to some distance from the town.

Details of sanitary works.

The towns are supplied with water from numerous wells, which in nearly all cases are kept in a very cleanly state, means being taken to prevent water from lodging in their vicinity. In Khusháb water is conveyed from the river Jhelum into large reservoirs were it is stored for summer use, the water being thus rendered pleasantly cool for drinking purposes. The water throughout this district cannot be considered good; it is decidedly saline in taste, and at the village of Mithalak (20 miles from cantoments on the Lahore Road) the water is quite undrinkable. Conservancy establishments have been allowed for each municipal town, and separate mohallahs (wards) have been assigned to each member to look after. The civil officers of the district look after the sanitary arrangements of each town on their visits, and enjoin on the municipal committees and tahsíldárs the importance of attending to those matters.

Water-supply ; drainage ; conservancy.

Health of the district. Exceptionally favourable.

Registers of births and deaths are checked once a week by Native Doctors in the municipal towns. The births are also checked by the reports of *dháis* or midwives.

Registration of births and deaths.

MOOLTAN DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1875.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
6	Mooltan	50,878	79,705	28,228	43	35
	Shujabad	6,280	6,856	2,229	31	36
	Kahror	4,659	2,951	1,471	38	30
	Jalálpur	3,525	2,893	377	41	37
	Talamba	1,948	1,165	573	60	38
	Dunyapur	2,054	* 5,193	2,733	43	51

All the wells within the municipal limits of the town of Mooltan and Shujabad were cleaned out at a cost of Rs. 315. Rs. 1,767 were spent on paving with brick-on-edge of the principal streets and thoroughfares of the city of Mooltan, and Rs. 600 for the same purpose in the town of Kahror. Eight new latrines were constructed at Shujabad, and a new tank at Dunyapur at a cost of about Rs. 2,657. Some improvements were also made in the drainage of Talamba.

Details of sanitary works.

Water-supply ; drainage ; conservancy. Nothing of importance to note.

Health of the district. Good. The district enjoyed a total immunity from epidemic diseases.

Registration. Same as last year.

JHANG DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated Income during the year 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population during 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
5	Jhang	8,609	24,160 †	6,733	23	23
	Maghiána	13,618			30	24
	Shorkot	2,478	1,304	144	32	47
	Ahmadpur	2,146	886	72	37	24
	Chiniot	11,999	5,690	1,186	39	26

* This includes Rs. 4,393 balance from previous year.

† Included together by the Deputy Commissioner.

Details of sanitary works.

In the municipal towns some of the wells were cleaned, drains constructed and repaired, and pavements made in some small streets which used to remain always dirty and damp.

Water supply; drainage; conservancy.

The water supply is abundant, and generally good, and is obtained from wells. The water is of good quality generally throughout the district, excepting a few villages of the Chiniot tahsíl where there are wells the water of which if used for drinking purposes often causes goitre. The drainage is as good as it could be. The refuse, &c., is removed on donkeys, and conveyed outside the town and thrown into heaps which are sold to zamindars.

Health of the district.

Good. No epidemic disease prevailed.

Registration.

Same as last year.

MONTGOMERY DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Montgomery	2,588	1,439	881	44	19
	Kamália	5,900	2,225	606	34	38
5	Pákpattan	5,723	* 7,969	3,057	40	33
	Sayadwála	3,437	1,249	344	42	26
	Dipálpur	3,407	1,137	368	23	33

Details of sanitary works.

Not given; though it appears from the above statement that a considerable sum has been spent on sanitary works.

Water supply, drainage; &c.

Nothing of importance to note.

Health of the District.

Good. No epidemic.

Registration.

Same as last year.

MUZAFFARGARH DISTRICT.

No. of municipal towns in the district.	Name of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditur for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Muzaffargarh ...	2,537	3,685	1,110	27	38
	Khangarh ...	2,802	3,742	841	30	36
	Shahr Sultán ...	2,836	662	152	33	27
7	Jatoi ...	4,814	748	155	22	13
	Alípur ...	2,282	2,897	911	59	39
	Sitpur ...	1,753	1,510	665	43	31
	Khairpur ...	2,562	2,888	826	47	39

Details of sanitary works.

A considerable sum has, as will be seen from the above table, been spent on sanitary works in the towns of this district.

Water supply &c.

The supply of water for the towns is good and abundant, wells are numerous and many of them have masonry linings. The water level varies with the seasons and the proximity of the river Chenab and Indus, from 4 to 20 feet below general level of the ground. Wells are set apart in most of the towns for drinking purposes, and are protected by raised masonry platforms or walls, and the water lifted by means of the Persian wheel. During the flood season the canals are full of water, and the people then use it in preference to well water. The

* Includes 5,343 balance from previous year.

drainage of the towns of Khangarh, Alípur, and Muzaffargarh is fair; improvements in this respect have been made in each of these places during the year. In Muzaffargarh some of the narrow bye-lanes have been brick paved, the plan being to have no drains on each side, but by giving to the roadway a slightly concave shape it will be enabled to drain off the water itself, and it can easily be kept clean by the town sweepers. The drainage of these towns is carried into hollows and fields outside. The refuse is carried out of town on asses and deposited on cultivated fields where it is ploughed into the ground.

Health of the district. Fair.—Pneumonia and bronchitis extremely prevalent during the first four months of the year; they were of a severe nature and did not entirely cease at any time during the year. Croup was also very common among infants.

Registration. The tahsíldárs and members of committees examine and report monthly as to correctness or otherwise of registers of births and deaths.

DERA ISMAIL KHAN DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Dera Ismail Khan ...	19,954	30,000	7,162	28	25
	Kuláchi ...	7,856	6,500	1,500	31	16
	Bhakkar ...	4,799	2,550	720	17	20
8	Mankera ...	1,259	460	181	37	28
	Tank ...	3,186	3,000	828	19	27
	Leiah ...	5,689	3,500	756	17	21
	Kot Sultán ...	1,393	325	120	31	52
	Karor ...	2,766	1,450	1,168	37	32

Details of sanitary works. Rs. 450 spent on paving the streets in the town of Karor. In Dera Ismail Khan Rs. 544 was spent on roads; Rs. 121 on drainage; Rs. 149 in cleaning out wells; and Rs. 16 in repairing latrines. In all the towns, particularly Tank, some important sanitary improvements are about to be made.

Water supply &c. Nothing important to record.

Health of the district. Small-pox raged somewhat severely in the Bhakkar tahsíl, but mildly in the Dera Ismail Khan city and its environs.

DERA GHAZI KHAN DISTRICT.

No. of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
	Dera Gházi Khan ...	19,133	25,017	14,362	32	31
	Jámpur ...	4,209	4,394	1,530	37	27
5	Dájal ...	5,016	3,860	2,120	42	27
	Rájanpur ...	3,548	3,440	1,237	41	29
	Kot Mithan ...	3,347	1,571	533	38	39

Details of sanitary works. The measures taken for sanitary improvements consisted of construction of new drains, and cleansing of old ones, and general measures of cleanliness for the towns.

Water supply &c. Nothing of importance to note.

Health of the district. Good.

BANNU DISTRICT.

Number of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income for 1877.	Expenditure for sanitary purposes for 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
4	Edwardes-abad	3,896	12,882	4,738	37	34
	Lakki	4,406	1,910	395	44	37
	Isa Khel	6,541	2,231	486	32	27
	Kálabágh	6,082	4,607	526	28	24

Details of sanitary works. Paving and draining were continued in Edwardes-abad, which is now pronounced a very clean and well ordered town. Special measures were also taken to keep the well-water pure, and to supply the people with it with greater convenience. In the other towns there are no funds with which to carry out any particular sanitary improvements.

Water supply, &c. Nothing particular to record.

Health of the district. Small-pox was very prevalent in the district.

PESHAWAR DISTRICT.

Number of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
2	Peshawár	58,430	1,08,822	40,947	42	34
	Shankargarh	1,017	1,724	390	38	28

Details of sanitary works. In Pesháwar Rs. 362 spent on paving; Rs. 4,288 on roads and bridges; Rs. 18,653 on drainage and sewerage; Rs, 942 on repairing and cleaning out wells; Rs. 525 in widening streets. In the small town of Shankargarh a conservancy establishment of Rs. 390 a year is kept up.

Water supply. The water supply scheme for the city of Pesháwar is still under consideration.

Health of the district. Tolerably good. Remittent fever prevailed during the spring months in some of the villages near Naushahra, and at the foot of the Khattak hills.

HAZARA DISTRICT.

Number of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
			Rs.	Rs.		
4	Haripur	4,477	5,656	2,926	22	18
	Abbottabad	1,194	2,502	1,843	17	9
	Nawashahar	3,445	1,630	999	45	31
	Baffa	4,494	1,392	675	23	19

Details of sanitary works. The measures taken for sanitary improvements consisted of cleaning and repairing of old drains, wells and latrines.

Water supply, &c. Water supply is from wells; drainage is good. Refuse matters are disposed of in the public gardens and fields.

Health of the district. Entirely good. No epidemic of any sort.

KOHAT DISTRICT.

Number of municipal towns in the district.	Names of municipal towns.	Population according to census of 1875.	Estimated income during 1877.	Expenditure for sanitary purposes during 1877.	Birth-rate per mille of population for 1877.	Death-rate per mille of population for 1877.
1	Kohát	11,043	Rs. 12,199	Rs. 2,646	12	12

Details of sanitary works. Not given. A system of pakka drainage throughout the town is under construction.

Water supply; drainage; conservancy. The Civil Surgeon reports as follows:—

The town of Kohát is supplied with water from wells. A few of the wells are in good order, and seem to be looked after, but the majority have no pakka flooring, no slope leading from the well to carry off drainage, and no means of keeping harmful substances from getting into them.

In the main street or bazár of the town of Kohát there are open side drains, and also in a few of the leading thoroughfares, but the majority of the bye-streets and mohallas are completely undrained, and the roadway in these slopes from the sides to centre, causing water to stagnate in them where they happen to be level. In some directions, as in Shakardand mohalla, there is a wide swamp of green fetid stagnant water, and in mohalla Mánkhel this state of things is striking—indeed so much so that the former tried my stomach very much, and there are many others which would try one just as much, from dirty ponds and ditches full of green and fetid stagnant water and human excrement and offal in a decomposing state lying about in some directions in the mohallas and bye-lanes. Paved, pakka, or at least raised thoroughfares of some sort should be extended as much as possible through the bye-streets and mohallas of the town of Kohát with drains at both sides. The drains of all the streets and mohallas should be covered and should have a sufficient incline (with means of cleaning them from time to time) to prevent their becoming elongated cess-pools, as happens in some cases. More attention should be paid to cleaning the wells and making a sloping pakka flooring around them. If the above recommendations are not carried out, we may expect typhoid fever to spread more and more through the town, and it is scarcely wonderful that, with the sanitary defects above described, Kohát should enjoy such an evil sanitary reputation, especially in epidemic years, with such pollution of air and water from human and other excrement containing diseased germs, continually poisoning both elements, not to speak of the injurious effects of a constant foul atmosphere rendered so from unremoved decomposing animal and vegetable matter. I must acknowledge that some considerable endeavours have been made, and with success, to improve the main street or bazár, and one or two of the leading thoroughfares, but this will not be of any real use unless similar improvements are extended to the remaining streets and to the mohallas. As the town of Kohát abuts on and is continuous with the military station, its sanitary improvement is of the greatest consequence.

The solid refuse is removed by means of donkeys to fields outside the town, where it is utilized as manure by the neighbouring zamindárs. Urine is not as a rule removed except from the latrine inside the saddar gate.

Health of the district. The general health of the year, as reported by the Civil Surgeon, was good. At Kohát town typhoid fever seems on the increase. 15 cases were treated in the dispensary last year, and several occurred in the station. Many more cases were either never admitted into any hospital or were not properly diagnosed. Even amongst European officers and their families cases of typhoid fever are becoming more common than before at Kohát.

Registration of births and deaths. Registration is utterly neglected both in the town and district of Kohát.

SECTION X.—GENERAL REMARKS AND PERSONAL PROCEEDINGS.

139. I was under canvas from the 13th October 1877 to the 15th February 1878 inclusive, inspecting all the towns and villages *en route* from Lahore, whence I set out on my tour of inspection through the districts noted in the margin. In all I inspected 37 towns and 40 villages, and from time to time on the march submitted reports of my proceedings to Government. On my return to head quarters I was engaged in inspecting the city of Lahore and its suburbs, and in disposing of all the important cases and other office work that had accumulated during my absence on tour. Following this, I was directed under the orders of the Local Government to form a committee for the inspection of villages within a radius of 5 miles of the Meean Meer cantonments. The committee assembled on the 10th April 1878, and the report of its proceedings was submitted to Government on the 3rd May. A copy is appended to this report—Appendix A.

Summary of proceedings.

Ferozepore.	Delhi.
Sirsa.	Karnál.
Hissar.	Umballa.
Rohtak.	Hoshiárpur.
Gurgaon.	Gurdáspur.

The plan I pursued on my tour of inspection was as follows:—At each town and village visited I met, in communication with the district authorities, the members of the municipal committees and lambardárs or village headmen respectively, and in company with them proceeded to inspect their several towns and villages. In the course of this duty a greater or less number of the towns-people and villagers always attached themselves to our party, and I took advantage of the opportunity to point out to them, in the way of friendly conversation and advice, the more glaring defects of the sanitary condition of their dwellings and surroundings.

Plan of procedure.

To the members of the municipal committees and to village headmen I pointed out the importance of the positions they respectively occupied, as guides to their less favored and poorer countrymen in all matters connected with the general sanitary improvement of their towns and villages, and explained in detail, on the successive occasions, to those around me the great advantages and benefits to be derived by the habitual observation of cleanliness in their domestic arrangements and mode of life, and this merely for the sake of the individual comfort and well-being that were to be thus so simply secured. I showed them how easily, by a little forethought, arrangement, and individual energy, they could free their dwellings and streets from the filth and rubbish encumbering them, and thus not only preserve their breathing air and drinking water from the multitude of sources of impurity and contamination which now beset them, but also at the same time render their dwellings and their surroundings far more comfortable, wholesome and tidy than they are; and I impressed upon them, for their earnest consideration, the great importance of their giving attention to this subject merely on the grounds of their personal welfare and self-interest, illustrating what I said by quoting examples of towns noted for their filthiness and overcrowding being also notorious for their unhealthiness and unnecessary loss of life.

Hints on domestic hygiene to municipal committees.

To the municipal committees I pointed out the importance of their exercising a careful and strict supervision of the birth and death registration of their towns, and the necessity for their vigilant care in the matter of their conservancy arrangements, and I everywhere repeated some simple and useful hints on domestic hygiene, particularly in respect to dress, diet and ventilation as they affected the proneness to disease in the individual.

I adapted my language to my audience, and using the most simple and homely terms, found no difficulty in securing their attention, and, I hope, lasting interest. Everywhere my arguments were received readily and willingly, and the people generally evinced an intelligence and good sense which was surprising, and certainly above the average of their class in the social scale. Almost everywhere they admitted the evils of their existing mode of living, and expressed their anxiety to welcome suitable improvements, but, where all alike were hereditarily careless and indifferent to the matter, they felt helpless against the difficulty of individual exertion, especially when independent of the support and example of their fellows.

The great object to be aimed at is to secure the active co-operation of the people themselves on sanitary matters.

In many instances the advice given and arguments used by my predecessor, Dr. DeRenzy, were repeated to me, and the towns-people gladly acknowledged the good results that had followed their adoption, especially in the case of protecting wells used for drinking purposes from surface drainage and pollution, and in the matter of general conservancy, both of which measures have been so largely carried out all over the province in the last three or four years; and I am encouraged to hope from what I saw and learned by personal converse with them that the people generally are fully alive to the value of sanitation amongst their communities, and are ready to accept its teachings; but in their own way and their own time, and this at present is as much as we can look for. In section IX, I have mentioned that 22,000 copies of Dr. DeRenzy's pamphlet on sanitation both in Urdú and Hindi have been circulated throughout the province during the year under review, and we must wait with patience the good fruit it promises to bear. Meanwhile it devolves on us to keep up the general interest in the subject by personal intercourse and instruction coupled with judicious guidance and encouragement, as may be required by each individual case; for, after all, the great object to be aimed at is to secure the active co-operation of the people themselves, and this can only be attained with any prospect of a successful issue by putting them in the way of learning for themselves what is in this respect of immediate advantage to their personal interests and welfare.

The security from small-pox afforded by vaccination pointed out to the people.

In several of the towns and villages small-pox was epidemic at the time of my visit, and I took advantage of the occasion to explain to the people the security afforded by vaccination, and to remind them that they were now suffering the consequences of its neglect, quoting, in proof, the immunity experienced for some years past by those towns and districts which had thoroughly adopted the prophylactic. At several places in the Delhi, Rohtak and Gurgaon districts, I heard numerous complaints against the vaccinators, but they were mostly of a trivial nature, and advanced to cover the natural objection of the people to the measure as an innovation upon their time-honored custom of inoculation. I took pains to explain the difference between the diseases produced by inoculation and vaccination respectively, and to compare the merits of the latter with the evils of the former. To show that the one perpetuated and sowed broad-cast a loathsome, destructive, and deforming disease, whilst the other, by taking up the ground with a harmless, mild and simple form of a like disease, deprived the more virulent form of a soil to grow upon, and thus tended to its ultimate extinction. To attain this desirable end I impressed on them the absolute necessity of their honest and active co-operation in the spread of vaccination and rejection of inoculation, and explained in detail to them the superior advantages of arm to arm vaccination over the method generally in vogue of using crusts or lymph on glasses or in tubes. Much care and patience is required in order to overcome the prejudices and ignorance of the people in some very extensive districts, but I believe the prospect ahead for the ultimate triumph of vaccination is on the whole hopeful, even in districts where it is at present not appreciated as it should be.

The evils produced by inoculation compared with the merits of vaccination.

No person should be employed as a vaccinator unless he produces a certificate of qualification from the head of the Vaccine Department.

Although the complaints made to me against the rough manners and want of skill of the vaccinators were mostly of a trivial nature, there is no doubt that much of the persistent objection and opposition to vaccination in some districts is the natural result of unfavorable experience of its action as a prophylactic, in addition to the original aversion of prejudice. It has too frequently happened that the immunity from small-pox promised by vaccinators has been falsified by subsequent experience, and this because they have done their work in a perfunctory and incomplete manner without taking the trouble to ascertain whether their operations were at the time successful or otherwise; the ignorant people of course naturally believing that the mere operation itself was sufficient to guarantee safety against the small-pox. I have alluded to this subject under the head of small-pox in section VI, and will only repeat here that I consider it necessary that every man employed as a vaccinator in district dispensaries should be obliged to produce a certificate of qualification from the head of the Vaccination Department before being allowed to practise the operation.

Summary of inspection reports.

I now proceed to give a summary of my inspection reports :—

SIMLA.

Inspected on the 5th, 6th, 7th and 9th July 1877.

Water supply project under the consideration of Government.

A new project for the supply of pure water to the station being under the consideration of Government, my remarks were confined for the most part to the sanitary condition of the place in respect to its conservancy system. As the municipality has since taken action for the improvement of the station in this direction, there is no necessity to reproduce my remarks. A full detail of the measures proposed by the municipality and sanctioned by Government will be found in Section IX, Sanitary Works, Civil.

KASUR.—District Lahore.

Population 16,793. (*Census* 1875).

Classified statement of deaths and births for the town of Kasur from the year 1870 *to* 1877 *inclusive.*

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	*Total births.*			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	4	65	184	4	171	428	* 386	215	171	31	26
1871	2	72	234	5	349	662	626	348	278	38	40
1872	8	80	376	3	221	688	583	315	268	35	41
1873	...	26	571	87	131	815	417	241	176	25	49
1874	...	32	194	1	122	349	404	216	188	24	21
1875	7	57	189	1	144	398	493	239	254	30	24
1876	69	52	343	...	162	626	526	279	247	31	37
1877	...	29	171	2	138	340	500	262	238	30	20

* For 39 weeks only.

Inspected 21st and 22nd October 1877.

On the 20th and 21st October, I inspected the roadside villages of Kána Kacha and Luliána *en route* from Lahore.

KANA KACHA.

Description of village.

Population 1,198; contains about 350 houses, mostly mud hovels of one or two stories high, with very small courts, and all closely packed together. Most of the thoroughfares winding amongst them are less than four feet wide, and are worn into troughs more like wide gutters than roadways; and this I conclude must be their real character and use in wet weather. Near the centre of the village are 3 or 4 brick houses of 4 or 5 stories high, tapering as they ascend, and remarkable for the small allowance made for ventilation. They are in a more or less dilapidated state, and bear the signs of neglect which pervade the rest of the village. Inhabitants mostly agriculturists.

Water supply.

The water supply is from wells, of which there are twelve within the village limits. They all have masonry tubes and some of them platforms, but none are covered over. The water is reached at 52 feet below the surface, and has a depth of about 15 feet. It is drawn in the usual way by rope and bucket worked on a revolving wheel, and is clear, but slightly brackish and heavy to the taste. The villagers consider it good for drinking purposes, though not so for irrigation, as it leaves a white saline deposit on the ground after absorption or evaporation.

Ponds.

Immediately outside the village on three sides are large ponds of more or less filthy and stagnant water. They are filled after rains by the surface drainage of the village and its environs, and sometimes overflow. In seasons of drought they run dry in May or June. They are of irregular shape and about 6 or 7 feet deep in the centre. The sides are uneven and fringed with dung heaps projecting into the water. These ponds are used for watering cattle and washing clothes.

The country around is level with a gentless lope to the south-west, and is more or less flooded by surface lodgments during the rainy season. The soil is a light clay on the surface, becoming more tenacious lower down, and containing beds of *kankar* (nodular limestone). It is slightly retentive of moisture, or impervious to it.

Registration circle.

The death register of the circle comprises 75 villages with an aggregate population of 25,784. Up to the 17th October, 429 deaths had been registered. Amongst the number were 74 from convulsions in young children, 142 from fevers, and 3 from small-pox. The villagers informed me that since the spread of vaccination here small-pox had almost disappeared from the district, and that this year there had been comparatively little sickness of any kind.

LULIANI.

Description of town.

Population 2,355; contains about 380 houses mostly built of mud, but more roomy and less crowded together than those of Kána Kacha. The roadways also are wider, but equally filthy and neglected as to conservancy. Around the village is a ring of 5 or 6 ponds of filthy stagnant water, and all of most irregular size, depth, and shape. The inhabitants are agriculturists, and also carry on a brisk carrying trade with carts. I was told by the lambardárs that they could turn out 500 with 4 bullocks to each.

Water supply.

The water supply is from wells,—all of masonry. The water is 27 feet below the surface and has a depth of about 8 feet.

Irrigation from branches of the Bári Doáb canal.

The land here is irrigated from branches of the Bári Doáb canal. One considerable branch crosses the country to the north, and another to the south of the village, and each flows in a channel banked up from 4 to 6 feet above the general level of the surface. Vegetation in consequence flourishes, but the soil shows no signs of saturation, and at a short distance from the canals is dry and hard, owing to the impervious nature of the clay subsoil. As an instance in point, I may mention that from a little beyond the village a canal-cut runs along the side of the road all the way to Kasur. The trees on the side of the stream are four or five times larger and better grown than those on the opposite side of the road, though they were all planted at the same time, and the latter lot are besides regularly supplied with water poured into cup-trenches about their roots.

Registration circle.

The Luliáni registration circle comprises 26 villages with an aggregate population of 7,900. Up to the 13th October 253 deaths had been registered, and amongst them were 70 from convulsions in young children, 137 from fevers, and only 2 from small-pox.

KASUR.

The present town dates from the time of the Pathán rulers of the country, and was founded about 140 years ago upon the site of a very ancient and extensive city named after Kaso, as was Lahore after Laho, the two sons of the mythological Ram Chunder, the Romulus and Remus of local tradition, and consists of twelve detached villages enclosed within fortified walls bearing different names, and clustered together, six on each side of the Rohi *nala*. The Rohi is a wide and sandy ravine, which drains the country from about Batála and Tarn Táran into the Sutlej beyond Chunián. It is generally dry except in the rainy season, from June to September, when it sometimes overflows and inundates Kasur and vicinity.

Four of the villages on the right bank are joined together, and form the town proper of Kasur. The houses are neatly and substantially built of brick, and some are faced with mortar. The streets and alleys are brick paved (bricks set on edge in chequers) and generally are straight, wide, and freely ventilated.

Water supply.

The water supply is from wells, of which there are 186 in the place, all of masonry, and most of them with platforms, and a few with domes above these. The measurements of 5 wells in different parts of the town gave the distance of the water from the surface of the ground between 35 and 38 feet, and the depth of the water at from 5 to 10 feet. The water is clear and bright, but has an insipid taste. New-comers find it slightly brackish and difficult of digestion, though easily got accustomed to.

Drainage.

The drainage and sewerage is effected through a system of open surface gutters which are flushed from the wells, and discharge by out-fall drains through 3 different gates into the Rohi, where the masonry drains end in open trenches. I found the gutters in a fairly good state of cleanliness in the main streets, but in the alleys they were much choked by accumulated sewage and filth, the stench from which, owing to the defective ventilation in these crowded quarters, was overpowering. This is the result of neglect of the duty of regular flushing, and the evil can be easily remedied by proper supervision on the part of the municipal committee, and care on the part of the conservancy establishment. At present the duties of the latter are limited to the main bazárs and public thoroughfares, the alleys in the dwelling quarters being left to the management of the residents, who arrange privately with sweepers for the scavenging of their respective premises. The system is faulty, and in practice the sweepers neglect their duty from want of supervision. The conservancy of the whole town should be controlled by the municipal committee, and worked by one establishment under the management and supervision of a responsible head.

The pits and hollows outside the town.

Outside the several divisions of the town are numerous pits and hollows, which are receptacles of all manner of filth. In the rainy season and after floods they become perfect sloughs of pestiferous fermentation. They should be filled up, and walled dung pits 8 or 10 feet square and 3 or 4 feet deep should be built on the surface at convenient spots slightly raised above the general level. The contents can be disposed of by fire from time to time or utilized as manure on the fields.

Latrines.

There are 5 public latrines on the open spaces around the town. Two of them are double for men and women, and three are single for women only. The former are quadrangular enclosures separated by a partition wall, the half for men being divided off into compartments. The latrines for women are merely square enclosures without any compartments or other means of privacy. None of them are roofed, nor are they provided with any utensils. They are all very much out of repair, and apparently very little if at all used, which is very fortunate, for in their present state they are altogether unsuited for use as public latrines.

Untidy condition of streets.

The attention of the municipal committee appears to be concentrated on the town proper of Kasur, and the other divisions are much neglected in all matters relating to conservancy. I visited four of them, and found the streets very untidy and encumbered with filth of sorts, though less so in the main bazárs.

Tanning, the principal industry.

The principal industry of Kasur is the tanning and curing of hides, and the manufacture of leather work, also of the untanned hide jars called *dabba*. The latter work is carried on in the Dabgari, a distinct building apart by itself from the town divisions, whilst the tanning and curing is done in a separate quarter of the Shergarhi division on the opposite side of the Rohi. On the right bank of the Rohi is the temple and tank of Bába Harriar. The water in the latter is a thick green slime, and is certainly unfit for any useful purposes, though I found two men washing their clothes in it. It is said that those who bathe in the tank very often get the itch from the action of its water. The tank should be emptied, thoroughly cleaned, and then lime-washed before being refilled, and until this is done its use by the public should be prohibited.

FEROZEPORE.—District Ferozepore.

Population 15,168. (*Census* 1875.)

Statement of births and deaths from the year 1870 to 1877 inclusive.

Classified statement of births and deaths for the city of Ferozepore from the years 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	...	105	268	6	240	619	451	240	211	22	30
1871	...	126	256	17	308	707	816	449	367	40	34
1872	...	166	263	23	313	765	741	389	352	36	37
1873	1	109	222	195	218	745	538	344	239	28	36
1874	...	50	149	...	238	437	761	426	335	37	21
1875	...	104	276	7	306	693	652	345	307	32	34
1876	...	85	1,067	3	155	1,310	449	267	182	30	86
1877	...	58	312	1	132	503	400	228	172	26	33

Inspected on 23rd, 24th and 25th October 1877.

Description of city.

The city of Ferozepore, which from a small Sikh fortress has grown to its present size and prosperity since the British conquest, is situated on an open level plain about three miles from the left bank of the river Sutlej, and about the same distance from the Military cantonments, with which it is connected by a good carriage road, flanked on each side by rows of shady trees, and at the city end by a long strip of public gardens.

The city contains 5,496 houses, of which 1,986 are used as shops. Its inhabitants are mostly engaged in the grain trade, and are reputed wealthy. There are 329 families engaged in agriculture, and about 30 in the manufacture of iron utensils such as cooking pots &c.

The city is of circular form and enclosed within walls. A carriage road with shady trees on each side runs all round. The streets are wide, straight and airy, and the bazárs have uniform rows of shops on either side. The houses are substantial, roomy masonry structures, and are not jumbled together in overcrowded files as is the case in most Punjab cities. There are several spacious market places in different parts of the city, and I found them all in a commendable state of cleanliness.

Large tank called "Ráni taláo."

There is also a large tank, Ráni taláo, within the city area. It was formerly outside the original Sikh fortress. I found it full of very dirty green water in which were floating stalks of maize straw, and husks of sugar-cane. Last year it was filled with canal water, which has not since been changed. There is another tank outside the Delhi gate. It has been recently built by the municipality, and is in very good order. It is fed from the canal. During the last 2 or 3 years a number of irrigation canals have been opened out around the city. They extend for 30 or 40 miles over the surrounding country, the super soil of which is light and sandy with beds of under-lying clay in which is found a small gritty *kankar*. The canals only flow when the Sutlej is in flood, and their waters are mostly exhausted on the surface before they reach the river again.

Water supply.

The water supply is from wells, of which there are 110 within the walls. All are of solid masonry with good platforms and parapets, and sometimes domes also. The depth of the water from the surface of the ground is from 23 to 30 feet (from 6 measurements in different parts of the city), and its depth in the wells from 12 to 15 feet. Annexed is a statement of the result of analysis of the waters of five principal wells.

Statement of the result of analysis of Ferozepore waters;—qualitative analysis.

Sources.	Total hardness.	Permanent hardness.	Chlorides, grains per gallon.	Physical qualities.	Reaction.	Free Carbonic acid.	Sulphates.	Nitrates.	Sulphuretted Hydrogen.	Nitrites.	Lime.	Magnesia.	Iron.	Ammonia.	Remarks.
Water No. I of well in Mandi Shikárpurián, Ferozepore city.	14·8°	9°	6·8	Colourless, odourless, transparent; no sediment.	Neutral.	Present.	Present considerable amount.	Slight reaction.	None.	No reaction.	Present large amount.	Present small amount.	Trace...	Present slight reaction.	All these waters have large total and permanent hardness except No. III.
Water No. II of well in Bazár at Delhi Gate of the city Ferozepore.	14°	12°	4·1	Colourless, odourless, transparent; no sediment.	Do. ...	Do. ...	Present moderate amount.	Do. ...	Do. ...	Do. ...	Do. ...	Slight reaction.	Do. ...	Trace ...	No. III was of bad quality, having bad physical qualities and containing a considerable amount of ammonia.
															No. IV also contained a notable amount of ammonia.
Water No. III of well in street of Rái Nágar Mal, city Ferozepore.	10·7°	3·5°	3·6	Yellowish colour, dark sediment, no smell.	Do. ...	Do. ...	Do. ...	Do. ...	Do. ...	Present trace.	Present considerable amount.	Do. ...	Do. ...	Considerable amount.	The water No. I contained the largest amount of saline contents, but shewed less evidence of sewage pollution than Nos. III and IV.
Water No. IV of well in Mohalla Patwárián, city Ferozepore.	11·3°	7·2°	3·2	Colourless, transparent, odourless, no sediment.	Do. ...	Do. ...	Present considerable amount.	No reaction.	Do. ...	Trace.	Do. ...	Small amount.	...	Ditto ...	
Water No. V of well in Mandi Naurián, city Ferozepore.	11·3°	6·3°	3·2	Ditto ...	Do. ...	Do. ...	Present moderate amount.	Trace.	...	Do. ...	Do. ...	Slight reaction.	Do. ...	Trace. ...	

Drainage system.

The city is provided with an efficient system of open surface gutters and drains which discharge at the different gates and through the walls into an open sewer outside, and this latter empties into waste hollows at some distance from the city. In the bazárs I found most of these surface gutters dry, and in many places blocked by heaps of grain piled in front of the shops, and in one spot I found a cooking place built in the gutter itself. The streets and public thoroughfares were in an unusually clean and tidy state. The street sweepings, night soil, and solid refuse, &c. are all removed by hand labor, and carried on donkeys or carted to appointed sites outside the city, where it is sold to farmers by a contractor.

Latrines.

There are 14 public latrines round about outside the city. Seven are for men, and seven for women. Seven also are of brick masonry and seven of mud. The first set were all built last year, and are substantial and commodious structures, but faulty in some very important points. The compartments have raised floors of lime plaster and admit of being easily and thoroughly cleaned, but they are supplied with only a single utensil of porous red pottery set on the floor between the foot rests. From its nature this vessel is liable not only to very easy fracture, but quickly becomes irremediably polluted, and taints the air of the place with pungent stinks, whilst it is further much too small for the purpose it is intended to serve. These foul and fragile earthen pots should be entirely done away with, and replaced by glazed pottery or iron troughs. None of these latrines are roofed; consequently the dry-earth system which is in use cannot be successful in wet weather. The latrines for women are mere enclosures within four walls, the visitors squatting all over the area. Their condition is, and always must be, disgusting. I found these latrines and their vicinity redolent of vile odours, suggestive of a good deal that was hidden from view by a top dressing of dry earth.

Registration.

The municipal registers of deaths and births were in good order, and kept according to form. The death register showed a total of 364 deaths up to 21st October, against 1,318 for the whole preceding year (the total mortality for 1877 is 503); and amongst them were 18 from convulsions, and 17 from inanition and debility in children; 229 from fevers, and 42 from bowel complaints. No death was registered from small-pox.

Cause of decrease in birth-rate.

The birth register showed a total of 205 births up to 23rd October (400 for the whole year, more than half the total or 247 having occurred in the last quarter,) against 453 during last year, and 663 the year before. The explanation of this very serious decline in the birth-rate here was accounted for to me by some members of the municipal committee in the following way:—In 1875 the births were at the normal rate. In 1876, owing to the excessive prevalence of fevers and general sickness, there was a most unusual mortality amongst the population generally. During this extraordinary sickness many women aborted, and many died who were pregnant. This year the births are fewer again, because many breeders are dead, and because the rest have not had time to recover from the debility and loss of virility produced by last year's sickness. The correctness of this explanation is supported by the birth and death statistics of the town for the preceding years back to 1870, as will be seen by reference to the tabular statement heading this inspection report. In each of the three last years of the series, it appears that an increased fever mortality coincided with a decrease in the birth-rate. It is popularly believed by the natives that a season of excessive fever prevalence is followed, as a rule, by decline in the propagating powers of the adult population; partly owing to the frequency of miscarriages amongst women during such periods; and partly owing to the loss of generative power amongst men; and both as results of the debilitating effects of the fever.

FAZILKA.—District Sirsa.

Population 4,346. (*Census* 1875).

Fázilka town.

Classified statement of deaths and births for the town of Fázilka for the year 1876 and 1877:—

Year.	Cholera	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1876 ...	...	7	45	17	35	104	117	55	62	27	24
1877 ...	...	8	25	3	28	64	97	59	38	22	15

Inspected on the 29th and 30th October 1877.

I marched from Ferozepore on the 26th, and arrived at Fázilka on the 29th by the stages of Naya Kila, Mamdot, Mohanki and Bagheki. My route was by the district cart road across a level tract of country, which is generally well cultivated and planted with trees about the villages, of which latter there are several at short distances from one another on the first march.

Note.—The death statistics of Fázilka for previous years not available.

Cultivation, partly by canal and partly by well-water.

The cultivation is irrigated partly by canal and partly by well-water, but much is dependent on the rains only. The canals have failed since the subsidence of the Sutlej, and have been dry for nearly three months. The autumn crops on the lands dependent on them and the rains have been entirely lost; and the drought is said to have caused much tightness, and the emigration of individual families from many communities. The country, however, looks populous and flourishing; green crops watered by wells surround every village, and large herds and flocks, which show no signs of having been on 'short commons,' graze on the waste-lands around. The peasantry too, though a very poor agricultural people, do not show any signs of physical suffering or deterioration in general health.

KHAI.

Village Khái.

About half way out to Naya Kila is the village of Khái; population 2,000. It contains about 500 houses, of which many are uninhabited, whilst almost all are in a very neglected and dilapidated condition. The village is situated on the road side, and is divided into two parts by an intervening patch of cultivation. It occupies the site of an ancient town whose name it takes. The red bricks of the latter have been largely used in the construction of the existing village, which was founded about 140 years ago by an ancestor of the present proprietors.

Though so advantageously situated for an abundant supply of ready building material, the place is a jumble of mud and brick houses without order or regularity, and wears a sad look of neglect and decay. The streets and courts are filthy and everywhere encumbered with dung and refuse heaps, and around about are several pits, and three or four cattle ponds. The bazár contains 60 shops, but only 12 were tenanted at the time of my visit.

The villagers are cultivators of the Dogar caste, and tenants of the proprietors. These lattes are three cousins; the descendants of the founder of the village, and they own it and the Khái lands jointly. Their elder is Jalál-ud-dín Khan, and he informed me that the joint property comprise the villages of Khái, Megeki, Baggewála and Gamewála, and covers an area of about 8,000 acres. In all these villages the occupants are his and his co-proprietors' tenants, and own nothing in the villages except the moveable property they may have brought in with them, together with the share of the crops, &c., they may be entitled to by agreement at the time of becoming tenants. They are provided with house accommodation by the proprietor, but have no power to alter, add to, or build on their own account without his permission. They are in fact, mere farm laborers, and are in no way interested in what does not belong to them, or in what is not their permanent residence; though, as a matter of fact, many keep their holdings from generation to generation.

I have entered into this detail regar; ding Khái, because it may be taken as a sample of the other proprietary villages in this district (I understand that fully half, if not more, of the whole number are so held) and because it serves to show to whom we should look for action in the matter of the village sanitation.

Máliki system.

In the case of the *máliki* system where three or four persons are the proprietors of a village, or where a single individual is the owner of a number of villages, it becomes an easier matter to deal with a few responsible and self-interested persons than with the hundreds of ignorant, poor, and indifferent individuals, who compose the village community. In the case of the *bhayáchári* system, where the land is owned and held in sub-division by the several families of a tribe or caste, the matter would be simplified by Government taking the place of prime proprietor, and enacting such rules and regulations for the guidance of the whole community as may be easily practicable, and deemed necessary for the public advantage and welfare. In Section VI of this report. I have indicated the kind of rules here referred to.

Villages of Karri, Betwa Pindi.

On the march from Naya Kila to Mohanki, I visited the villages of Karri, Betwa Pindi, and some lesser ones, and in all found the same state of filth, overcrowding, discomfort and neglect. And I may here anticipate and record the like verdict against all the others up to Fázilka

Overcrowded, irregularly built huts surrounded with pits from which the material of their walls has been excavated; small courts or cattle folds soppy with introdden dung and urine, and encumbered with heaps of filth of sorts mixed up with house sewage, and sweepings; narrow tortuous lanes and passages in more or less thorough disrepair; and around all cattle ponds fringed with dung heaps, and great irregular hollows in which the people ease themselves and shoot rubbish of sorts, together with universal neglect of the most simple precautions for preserving their well water from surface drainage and other sources of contamination, which are patent to themselves;—these are some of the most striking features of the insanitary condition of the rural settlements in this district. And I may say, once for all, the description with few alterations applies to the villages generally of this province.

JALALABAD.

Jalálabad town.

Between Mohanki and Bagheki, I visited the town of Jalálabad, recently founded by the Nawáb of Mamdot. It stands in the midst of an extensive tract of *jhand* (mimosa sp.) jungle, and is laid out on a liberal scale in view to its growing into a city. A serái and a court house in red brick were already finished, and an hospital

had been commenced. The shops in the main bazár were built in uniform rows, and the private houses regularly ranged in uniform blocks. Few were tenanted, many were yet unfinished, and several blocks had not yet been built on. The plan, I understand, was given to the Nawáb by Major Grey, lately Deputy Commissioner of Ferozepore, and may well be taken as a model for other villages and towns in this district.

The plan is that of an open town with straight wide streets intersecting at right angles. The main streets are planted with tree, a row on each side, and in the centre of the town, where they cross, is a public well. It was not completely finished at the time of my visit, but was daily drawn on for irrigating the young trees, and for the use of the builders. Its water is reached at about 40 feet below the surface, and is decidedly brackish. The salts are in such quantity that they form a white crust on the edges of the channels in which the water flows.

An irrigation canal has been excavated on the south-west side of the town, and another has been brought close up to it on the north-east, in banks raised upon the surface. This last was still incomplete, and the other had been dry for several months.

FAZILKA.

Fázilka town.

The municipal town of Fázilka, situated on a level plain, is of an oblong shape, and is enclosed within low mud walls immediately outside, which is a deep ditch running all round. It is entered by five gates, and contains 1,394 houses, of which 250 are shops. The residents are mostly bankers, merchants and carriers engaged in the wool and grain trade with Karrachi.

The interior is well laid out, and has wide, straight, and airy streets, which cross at right angles The main bazár is well paved, and drained by open surface gutters on each side. The drains empty into the ditch near the Ferozepore and Mooltan gates, on the north and south respectively. The only other drain in the town leads from the Chauk Mandir to the ditch on the north face. All the other streets and thoroughfares are unpaved, and absolutely without any provision whatever for drainage, or sewerage, and in rainy weather are mere sloughs of mud and mire.

The site of the town is low with reference to the level of the country to the north-ward, but the general slope of the surface favours drainage to the south-westward. The town requires a complete system of surface drains, similar to those already laid down, but instead of discharging into the ditch and there forming pestiferous pools of filth, as at present is the case, they should be conducted in an out-fall sewer across the ditch on to the low-lying waste land a mile or so to the south-west of the town.

The town possesses great facilities for an effective conservancy. Its streets are wide and straight, and the tenements and courts are capacious, airy, and not overcrowded. But I found much filth and neglect of ordinary cleanliness and comfort in these quarters. The conservancy establishment requires to be thoroughly reorganized, and put on an efficient footing.

Water supply.

The water supply of the town is entirely from wells, of which there are 27 within the walls. They are all of masonry, and most of them are protected by good platforms; but there is no provision for conducting away waste water, and it consequently accumulates about the circumference in filthy and unsightly puddles. The water lies at from 25 to 30 feet below the surface, and stands 5 to 7 feet in the wells. The water is clear and soft, and considered good, though flat and tasteless.

Registration.

The death register up to the 26th October showed a total of 63 deaths. Of these 4 were from measles, and 3 from small-pox in children; 23 deaths were registered from intermittent and 7 from continued fevers.

The birth register up to the same date showed a total of 77 births. The numbers for the whole of the two preceding years were 117 and 137.

SIRSA.—District Sirsa.

Population 12,807. (*Census* 1875.)

Statement of births and deaths of the town of Sirsa from 1870 to 1877.

Classified statement of deaths and births for the town of Sirsa from the year 1870 to 1877 inclusive.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	TOTAL BIRTHS.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females		
1870	1	13	73	20	45	152	186	102	84	17	14
1871	...	11	28	37	43	119	131	77	54	12	11
1872	1	23	215	2	91	332	261	143	118	24	30
1873	...	35	109	2	121	267	337	193	144	31	24
1874	1	27	146	13	200	389	496	263	233	45	35
1875	...	31	291	36	174	532	475	222	253	43	48
1876	...	30	240	...	108	378	421	225	196	33	29
1877	...	40	151	...	156	347	398	199	199	31	27

Inspected, 5th, 6th and 7th November 1877.

I marched from Fázilka on the 31st October and arrived at Sirsa on the 5th November by the stages of Arniwála, Malaut, Lambi, Dabwáli, and Odha, and *en route* visited several of the villages within easy reach of the line of march.

Condition of a few villages en route to Sirsa.

The villages named, as also the others, are small agricultural settlements, ranging in size from hamlets of 40 or 50 huts to villages of 150 and more houses. They are widely scattered over an open level country which is thinly covered with a stunted jungle scrub. The surface soil is arid and sandy, but produces good crops if the seasonal rains do not fail.

The autumn crop has been altogether lost this year owing to the drought, and the people have experienced considerable tightness, though no actual distress. A few poor familes have emigrated from most of the villages in search of work, either to Rúpar or Bahwalpur or Bíkaner. Apart from the high prices ruling, and the scarcity of pasturage and water for the cattle, the people do not seem to have suffered in health from the hardships of the season. I saw very few sick people, and no beggars, and found the peasantry on the whole well and comfortably housed.

The villages on this route have a decidedly cleaner and neater look than those seen between Ferozepore and Fázilka. The huts and houses are not so crowded together, and the more roomy courts and cattle folds are comparatively cleaner, and from want of water there is less mire and slush in the surroundings, but in all other respects of utterly neglected conservancy there is not much difference, with a few exceptions to be presently noted.

Water supply of these villages.

Each village on this route has one, and a few have two wells for the supply of their drinking water, and each has also one or two cattle ponds. Owing, however, to the great depth of the water below the surface, the labour of drawing it, and its often inferior quality, the villagers as a rule use the more readily obtained pond water. In many of the villages in this part of the country these ponds are their only source of water supply. They are mere excavations in some convenient spot outside the village, and are stocked by the surface drainage of the vicinity after heavy rains. Most of them are of considerable size, and retain their water throughout the year. They are used indiscriminately by the villagers and their cattle, and no attempt is made to protect them from sources of pollution. On the contrary, the villagers habitually wash their dirty clothes in them, and also their persons on returning from offices of nature in the fields around. Bathing in them is supposed to be prohibited by mutual consent, but the children dabble and swim about in them unrestrained, and women wade knee deep into them to fill their jars with the daily supply for drinking and domestic purposes Cattle also daily wade into them to drink, whilst buffaloes wallow in them by the hour, and both drop their urine and dung into them.

In the villages which possess them, the one or two wells are always sunk at the edge of one of these ponds. They are masonry tubes 8 or 10 feet in diameter and from 100 to 150 or more feet in depth; they are generally provided with good platforms and open reservoirs arround them, and to some of the latter are attached watering troughs for the cattle. The water naturally is very brackish and seldom stands more than 8 or 10 feet deep in the wells, but this scanty supply is annually increased and improved by filling the well from the pond. For this purpose the tube is pierced by a small conduit at the high water level of the pond, and in some there is a second opening on the opposite side to catch the surface drainage of that direction. When the pond fills by the rains in July and August it flows into the well through the conduit and brings its water up to its own level. The well after this is freely used by the villagers for 3 or 4 months, at the end of which time its water sinks too low to be easily drawn, and moreover again becomes brackish. The pond is now resorted to as the one common source of water supply.

Prevalence of guinea worm in this district.

In all the ponds the water is very turbid and full of vegetable and animal life, and in many cases has an offensive smell. Neither wells nor ponds are regularly cleaned; but should a pond run dry, the thick tenacious deposit on its bottom is dug out in blocks and used for building walls, as being more durable than the loose sandy soil of the country. Guinea worm is a very common disease amongst the people of this district, and its prevalence is attributed to the use of the water of the cattle ponds. With the exception of this disease and fungus foot, which also appears to be of not unfrequent occurrence, the district is supposed to be very salubrious, though intensely hot and arid in the summer months. Fevers prevail in the spring and autumn months, but not to any extraordinary extent, and occasionally small-pox makes its appearance towards the beginning of the hot weather.

Decrease in deaths from small-pox

I was assured on all sides that this last named disease had become very perceptibly less prevalent since the introduction of vaccination, and the independent testimony of the mortuary registers supports the truth of the assertion. For example, in the Arniwála circle, which comprises twenty villages with an aggregate population of 3,456, only 7 deaths from small-pox were registered; in Malaut circle with 63 villages and 16,056 population there were 16 deaths; in Dabwáli circle with 84 villages and population of 19,530 there were 5 deaths; and in the Sirsa rural circle of 76 villages and population of 26,222 there were only 2 deaths registered from small-pox during the current year, and nearly all of them occurred between the months of May and July.

DABWALI.

Dabwáli village.

There is a *tahsíl* (collectorate) here; is one of the cleanest agricultural villages I have seen. Its houses are neatly built, have free ventilation between, and spacious cattle yards around, and there are some good cart roads passing through amongst them. In several of the courts or cattle yards I observed that a small corner was walled off as a dust pit, and that the general area was remarkably clean and free from litter &c. It is the custom here, introduced, I believe, by Mr. G. E. Wakefield, late Deputy Commissioner of Sirsa, to clear out these dust pits and remove all cattle litter, house sweepings &c., every third or fourth day to appointed sites around the village. The supervision of this very advantageous measure is left to the lambardárs, and they apparently receive the willing aid of the villagers, with results beneficial to all alike.

Conservancy arrangements introduced by Mr. G. E. Wakefield, late Deputy Commissioner of Sirsa.

Similar measures, I found, were in force at Odha. The system might be easily extended to all agricultural villages in the province, especially those held by a single or two or three proprietors only.

SIRSA.

Sirsa town ; preliminary description of town.

The municipal town of Sirsa was laid out in its present form in 1835 by the British authorities, and is built on low-lying ground close to the north base of a high ridge of ruins. They mark the site of an ancient city the name of which is taken by the modern town.

The town is of quadrangular form, is enclosed within low mud walls, and surrounded by a ditch. It has five gates and contains 2,639 houses, of which 1,115 are shops and 208 are unoccupied. The main streets and bazárs cross at right angles, and are wide, straight and airy; the side streets also are well ventilated, straight, and of good width. The town has no special manufacture, its people being mainly engaged in banking and the corn trade.

Streets.

The main streets are paved on each side with red brick set on edge in chequers, and are metalled along the middle line with *kankar*. The shops on each side are in uniform rows, but much out of repair. These streets are provided with open surface drains of ample capacity; they run in front of the line of shops on each side, and empty by an out-fall drain, which is carried across the ditch on to the waste land to the south-west of the town. I found these drains very much out of repair, with here and there gaps in their continuity, and everywhere more or less encumbered with drift dust and street rubbish; in some parts they were obliterated by masses of rubbish &c. trodden into the channel and continuous with the level of the street.

In the side streets and dwelling quarters, in which the houses are mostly built of mud masonry and are much out of repair, there is no provision for surface drainage or sewerage, nor are the roadways paved. I inspected the interiors of several courts in the dwelling quarters and found all of them in a very dirty and neglected state. The floors were covered with a thick layer of house sweepings, ashes, stable litter, cattle droppings and such like, and were altogether in a more filthy and disorderly state than those of the agricultural villages inspected *en route* from Fazilka.

Drainage.

The town itself is well laid out and presents unusual facilities for a serviceable system of surface drainage. Under the existing conditions, however, much of this is carried into the great pond for the water supply of the cattle of the town. At the time of my visit I found several persons bathing and washing their clothes in the filthy pond, and noticed a woman carrying away a jar she had just filled with the turbid liquid. I was, however, assured at once that this was not to be used for drinking, but merely for scullery and laundry purposes—for either of which it was equally unfit. This pond is fed in the rains by the surface drainage of the streets around, and these, from the absence of drains and paving or metalling of any kind, are mere broad sewage gutters hollowed by traffic along the mid-line. When I made my inspection they were deeply covered with a loose dust of desiccated filth of sorts. The bed of the pond too, for some distance from its edges, was formed of a thick black muck deposited from the inpurities held in suspension by the water. On the edge of this pond a large and substantial *mandir*, or Hindu temple, was in course of construction at the time of my visit. Its foundations on one side rose out of the water, to which there was access by an adjoining flight of steps. There was to be accommodation in the temple for some hundreds of pilgrims and travellers.

Water supply.

The water supply is derived from wells, of which there are altogetter 38, namely 18 within the walls and 20 in the suburbs around. They all have masonry tubes and are provided with substantial platforms and parapets, but they want cisterns, and conduits to carry away waste water. Owing to the absence of these I found the surroundings of several of the wells in a very filthy and unsightly state, the ground being soppy and grimy with unsavoury puddles of black slush. The water lies at about 82 to 86 feet below the surface, and stands from 6 to 15 feet deep in the wells. It is clear and slightly hard, and in some wells is distinctly brackish.

In the centre of the town is the *katra*, a fine commodious and substantial brick building used for commercial purposes, and to the south of it are the town hall and the boys' school; they are separated by a public garden in which is a fine well, furnished with a raised reservoir to feed a fountain below. Beyond this garden is a large *báoli*, or well with masonry steps, and chambers on each side conducting down to the water level. The *báoli* is only occasionally worked to water the adjoining garden, and at the time of my visit its water was in a very foul state.

Latrines.

There are three public latrines outside the town; they are situated in different parts of a belt of wild caper jungle which is called *bir*, and encircles the town for about half a mile all round. The latrines are all of the same pattern and consist of spacious quadrangular enclosures with a small patch of jungle included. The area is divided by a partition wall into sides for men and women respectively. The former is provided with a row of compartments along two opposite walls; and the other has only a low screen wall in front of the row of seats which lines each of two opposite sides. None of the latrines are roofed, nor are they furnished with any sort of utensils, nor is dry earth used in their service. The bare earth receives all the discharges, and is saturated with urine and fœcal matter which usually quickly desiccates under the action of a hot sun. I found the whole atmosphere in the vicinity of these latrines pungent with ammoniacal vapours. The service of these latrines was evidently neglected. They were formerly attended to by the sweepers of the municipal conservancy establishment at a cost of Rs. 24 a month; but since September last, from motives of economy, they have been made over to a contractor at a cost of Rs. 14 a month. The latrines in the jail here are roofed and served with dry earth, and I found them in a perfectly wholesome state.

Registration.

The Municipal death register showed a total of 268 deaths up to the 3rd November. There were 15 returned under croup in children, 32 diseases of the lungs, 27 bowel complaints, 5 guinea worm, and 129 fevers. No death was registered from small-pox. I examined a number of boys in one of the town schools, and found that several bore very good vaccination marks, and that a few were pock-pitted from small-pox; but that the majority bore no marks at all, or merely ineffective scars of the lancet.

HISSAR.—District Hissar.

Population 14,162. (*Census* 1875).

Statement of births and deaths of Hissar town from 1870 to 1877.

Classified statement of deaths and births for the town of Hissar from the years 1870 to 1877 inclusive.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total Deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	...	28	341	77	167	613	150*	90	60	12	43
1871	...	50	307	34	230	621	336	199	137	24	44
1872	1	41	287	...	215	544	330	200	130	23	38
1873	...	26	203	1	166	396	302	154	148	21	28
1874	...	36	220	6	227	489	498	264	234	35	34
1875	...	65	213	118	231	627	467	265	202	33	44
1876	...	46	234	1	226	507	500	255	245	35	36
1877	...	58	210	9	211	488	420	220	200	30	34

Inspected 11*th* 12*th, and* 13*th November* 1877.

Condition of country *en route* from Sirsa to Hissar.

I marched from Sirsa on the 8th, and arrived at Hissar on the 11th November by the stages of Narel, Fatahabad and Agroha. The route, nearly all the way, lies through an arid jungle tract thinly peopled and scantily cultivated. Between Sirsa and Narel the super soil is a firm hard clay the surface of which is marked by many desiccated pools and marshes, about which are the hardened imprints of cattle hoofs. In the vicinity of Sirsa the surface is traversed by numerous irrigation cuts from the Ghaggar canal; but they had all, with the canal itself, been dry for several months. The autumn crops had entirely failed and no signs of any growing crops were seen, though here and there small patches of land had been recently ploughed and sown for the spring crop. To the south of the line of route the country is a good deal encumbered by sand dunes.

Scarcity amongst the peasantry.

The peasantry, who are mostly Mussalmans, with a good proportion of Bishnawi Hindús amongst them, have suffered greater tightness from the scarcity and drought than those in the tracts further west, but I met with no signs of actual

* For 46 weeks only.

distress amongst them. Individuals from almost every village have left their homes for Rúpar and Bíkaner and other quarters in search of work; but the majority here appear healthy and well nourished, and are unusually free from sickness. The cattle have suffered in reality and to a serious extent, being in very poor condition, and in many instances reduced to mere skin and bone. I was informed that most of them must die, even if they get good pasture soon, owing to the damage already suffered by months of starvation.

NAREL AND JODHKA.

Narel, and Jodhka

Narel on the road side and Jodhka two miles to the south of it, are small villages calling for no special remark here more than that they have all the sanitary defects of those already mentioned.

FATAHABAD.

Population 3,084; is a small municipal town which dates from the time of Feroze Shah, and was originally castellated. It contains 1,104 houses and shops, of which 167 are unoccupied or in ruins, and is built on a considerable eminence, all round which the ground is a good deal hollowed. The town has two gates, and its highest part is occupied by the site of its former citadel, now covered by the Collectorate, district officer's bungalow, and school house. The houses are compactly built of red brick, and have a neat appearance.

Streets.

The main streets are metalled and provided with surface gutters which discharge on to the road side near the Delhi gate. The elevation of the town affords natural facilities for surface drainage, but it all accumulates in the hollows and excavations that surround the place. These hollows receive also the drainage of the country around, and this after heavy rains forms wide sheets of water which completely encircle the town. On the east side of the town this water forms a marsh of considerable extent, and the land on its edges is laid out in rice fields.

At the time of my visit this marsh and the hollows about were all perfectly dry, but looking down upon them from the bungalow on the top of the elevation, I could easily understand how serious a danger they must be to the salubrity of the place. I was told that for months after the rains this marsh and the stagnant puddles around emit a very disagreeable and oppressive exhalation, and fill the air with swarms of the musquitoes and midges generated in them. They are in fact, until finally desiccated by the sun, mere pools and puddles of pestiferous slush and fermenting sewage. This ground round the town requires to be drained and properly levelled.

Water supply.

The water supply is from wells, of which there are 10 inside the town. There are also two cattle ponds. The wells all have masonry tubes and platforms. They contain from 2 to 9 feet of water, which lies at from 104 to 134 feet from the mouth of the wells. It appears that they are not regularly cleaned out, but only as occasion requires. The ponds are resorted to for the supply of drinking water quite as freely as the wells,—if indeed not more so. The pond outside of the Delhi gate is in a very foul state, but the one at the *mandir* on the Sirsa road is cleaner than such ponds usually are. Its water is esteemed unusually good, and it is the fashion here for both Musalmans and Hindus to drink of it, although it is admitted on all sides that the use of pond water for drinking is the prime cause of the prevalence amongst the people here of guinea worm, an affliction which frequently causes death, and always entails much suffering with more or less helplessness, and often permanent deformity or loss of power.

Guinea worm.

The people it appears resort to the ponds to avoid the labour of drawing from the wells. The remedy that suggests itself is to provide some simple mechanical means for drawing the water with less expenditure of labour than is now necessary with the use of the rope and bucket. A wheel worked by a crank handle appears to me well adapted to meet the requirements of the case, and obviate the difficulty now experienced.

I inspected this town under very favorable circumstances of weather, and found the main streets and thoroughfares in a commendably clean and wholesome condition; but some back alleys and interiors I looked into were in a very filthy and neglected state. Several courts of private houses were crammed with cows, buffaloes, and camels, and in one or two some hundreds of goats and sheep were crowded into a space which barely gave them movin g room.

Conservancy.

The sweepings of the town with its night soil are removed by hand in baskets, or in panniers on donkeys, and deposited on the ground at sites appointed for the purpose outside the town. The consequence of this arrangement is that a wide area is covered with little heaps of refuse and filth of all sorts, without any provision for limiting the extent of their spread, or preventing their dispersion. Practically this stuff is not only lost or damaged as a manure material, but is actually blown back to the town and all over the vicinity in the form of dust and wind drift, for by the constant passage of cattle it becomes broken up and scattered over the surface, and thus creates an unnecessary and easily preventable nuisance.

The sites appointed for shooting town filth on, should be enclosed by low walls, circular or square, built on the surface, and if there be much straw and such like stable litter it should be burnt in the enclosure by a smouldering fire. By such means the vicinity will be freed of a nuisance, and a valuable manure will be accumulated for sale to the benefit of the municipal funds. Under the existing custom of having open dung heaps in all sorts of places, the manure material loses much of its special

virtues by every shower of rain washing out its soluble and saline components; whilst to add to the mischief these important ingredients thus taken from the manure are carried by the surface drainage into the ponds and tanks from which drinking water is drawn, thus increasing the impurities with which they are already more than enough polluted. The court of every private dwelling also should have a corner walled off as a dust pit. This would allow of the court area being kept clean, and would facilitate the general conservancy service of the town by providing a fixed spot whence the sweepers could remove the refuse and sweepings of each house *en masse*. At present it is the custom for each house to cast its sweepings &c. in a heap on to the street or road in front, and from this the sweepers remove it in their daily rounds. If, as is very often the case, the sweepings &c. are thrown out after the sweepers have gone their rounds, the stuff lies there till next day, or more commonly is dispersed under the footsteps of way-farers and cattle.

HISSAR.

Hissar town.

The city of Hissar stands on slightly elevated ground from which the land falls considerably towards the south, in which direction are situated the civil station and city suburbs. On the west and north is a wide tract of jungle or *bir*, and beyond it to the west is situated the Government cattle farm.

The city is enclosed within high walls of brick and stone, and has 4 gates. It contains 3,866 houses, of which 614 are shops and 149 are uninhabited. The houses are substantially built of red brick masonry, and many are of superior construction, though in some I noticed a very objectionable feature in the position of the privy, which opened by a trap door on to the street for purposes of daily cleansing. The city has no special manufacture, its people being mostly engaged in banking and trade. They appear to be a healthy and prosperous community.

Streets.

The interior of the city is well laid out, and has some fine, broad, and freely ventilated streets, which are metalled with *kankar* in the mid-line, and paved with bricks on edge at each side. Some of the side streets also are paved with bricks and drained by a shallow gutter down the mid-line, but the majority of them are neither paved nor drained. The main streets and bazárs have surface drains which are joined by those from the side streets, where they have them, and discharge through four main out-falls into the canal which flows close outside the south of the town, only the Delhi road intervening. On the sides of this canal, and close to the sewer out-falls, are bathing ghâts for the towns-people. At the time of my inspection the water in the canal was very low and turbid, and the slopes on either side were coated with a thick deposit of dark coloured mud.

The city is favorably situated for an easy and efficient surface drainage, which could be conveyed away across the canal to some suitable spot on the low land to the south, away from both the city and the civil station.

Water supply.

The water supply is from wells, of which there are 7 inside the walls and 16 outside in the suburbs, and from the Hissar branch of the West Jumna canal. This canal feeds 14 tanks in the suburbs, and the civil station which is wholly within municipal limits. The wells are all of masonry, and have good parapets and roomy platforms. The water lies at from 88 to 122 feet below the surface, and stands from 10 to 30 feet deep in the wells. They supply the inhabitants with their drinking water, and are carefully attended to and periodically cleaned out.

Ponds and tanks.

The ponds and tanks are regular excavations on the surface of the ground, and are periodically replenished from the canal through masonry conduits or surface cuttings. I found them in good order, and the water absolutely clean in comparison with that of the village ponds seen *en route*. They are not used for drinking purpose except by some of the poorest classes.

Latrines.

There are four public latrines outside the town. I inspected those in the Taláki and Dogarán suburbs. They are well built quadrangular blocks of brick masonry. Each block is divided into two portions for men and women respectively. The side for men is divided into a number of compartments, but that for women is the mere enclosure with no provision for privacy; purposely so left, I was informed, because the sex prefers society and conversation on the occasions of meeting here. A layer of dry earth, about a yard wide and two or three inches deep along the sides of the walls, with here and there a gap caused by the removal of soiled bits, sufficiently explained the system in vogue here. It answers well enough in dry weather, but must signally fail in wet, none of the latrines being roofed, nor supplied with utensils of any kind. In the compartments on the men's side the floors are paved with a concrete of lime plaster, and over this is spread a layer of dry earth. This is supposed to be removed bodily and replaced by a fresh supply on each occasion of being soiled.

I found these latrines in excellent order and perfectly free from smell, owing to the free use of dry earth, of which an ample supply was stored in a pit close by. They require light roofs, supported on short pillars for free ventilation, to complete their efficiency. At the Taláki latrine I found the sweepers at work trenching the latrine soil and town sewage on an adjoining piece of waste ground. This plot is let out by the municipality to a contractor, who pays Rs. 50 a year for it, and disposes of the contents of the trenches in the form of *poudrette* to the cultivators and gardeners around.

Cremation ground.

Beyond the Tálaki gate latrine, and at about half a mile from the town, is the old Hindu cremation ground. It stands on the side of a public road through the *bir* jungle towards Bhattu, and attracts the eye by the number of mausolea and monuments on its area. It has been closed to use during the last 3 or 4 years on the grounds of its being too close to the city, and a new spot has been assigned in its stead about half a mile further distant on the same road.

I visited both sites in company with some Hindu members of the municipal committee who expressed an earnest wish for the restoration of their ancient cremation ground, on the plea of its peculiar associations in their minds, coupled with the inconvenience of the present site from distance and want of shelter from the weather; and they professed their readiness to enclose at their own expense the old and sacred spot with a boundary wall, and to provide it with proper ash pits

I could not get any definite explanation from them of the reasons that led to the change of the site from the former spot to another only a little further on, except that it was made summarily by the tahsíldár on sanitary grounds, the old site being considered too near to the town. But this I can hardly accept as the true reason, because it is much further off than the far more offensive latrines, and because the new site, apart from the sentimental associations connected with it, is not so suitable as the old in point of practical convenience in the shape of shelter from sun and rain and easy accessibility.

At present the new cremation ground is a mere patch of land in the *bir* jungle between two public roads (the old one being near only one which is little frequented), and is covered with heaps of ashes dotted about the surface in every direction and liable to dispersion by every puff of wind. I see no good reason why the old site should not be restored, especially if it is walled in and provided with ash pits for the collection of the refuse of the pyres till removed periodically as manure. Under such conditions it would certainly be better suited to its special purpose than the present site, which, so far as I can see, has no special feature to recommend it.

Prejudice against vaccination.

At the Government school here I examined a number of little boys, and only found one with vaccination marks. The little fellow very promptly and naïvely volunteered the remark—"It was not done here. It was done at Ludhiána." I also examined a number of the children met in the streets and suburbs, and did not find one with vaccination marks. In the school a large proportion of the boys were more or less disfigured by pock-pits, and one had lost an eye from the disease. In the jail also I noticed that many of the prisoners were pock-pitted—more so than I have noticed in any other place. There has been no epidemic of small-pox here for some time, and from what I gathered from the remarks of the people, I believe there is yet a good deal of indifference, if not passive resistance, to vaccination in this circle.

HANSI.—District Hissar.

Population 12,210. (*Census* 1875).

Statement of births and deaths in the town of Hánsi from 1870 to 1877.

Classified statement of deaths and births for the town of Hánsi from the years 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	1	47	359	53	136	596	337	187	150	25	44
1871	3	53	319	88	242	705	487	272	215	36	52
1872	...	26	309	2	197	534	435	229	206	32	39
1873	...	14	232	3	119	368	350	186	164	26	27
1874	...	35	164	30	184	413	495	267	228	36	30
1875	...	42	218	50	199	509	541	279	262	40	37
1876	...	42	249	24	154	469	489	254	235	40	38
1877	...	17	153	11	106	287	378	198	180	31	23

Inspected 14th and 15th November 1877.

Description of the town.

The town, which is said to have been rebuilt in its present form about 140 years ago, occupies the site of an ancient city supposed to have been founded by Mahmud Ghori, and the relics and traces of which extend for some distance around. It is enclosed within bastioned walls of red brick, and stands on slightly elevated ground immediately to the south of its citadel. This latter has a deep dry ditch and lofty ramparts, but was finally dismantled during the mutiny of 1857, and is now an abandoned ruin.

The town has five gates, and is isolated, as it were, on an island strip of land enclosed between the Hánsi canal and its Panchakki loop branch. The former flows past the north of the town at about 500 or 600 yards from its walls; and the latter, which leaves the main stream at about a mile to the east of the town, flows past at a hundred yards or so outside the walls to the south opposite the Barsi gate, and about a mile and a half to the west of the town rejoins the parent channel. Besides this Panchakki branch (so named from the water mills on its stream), there are several minor ones distributed over the country towards the south.

The town of Hánsi contains 2,573 houses, of which nearly two hundred are uninhabited, and it has besides 673 shops, of which about 100 are unoccupied. It has no special trade or manufacture. The inhabitants are mostly Hindus, and are engaged in trade as bankers, brokers, merchants &c. They are said to be a thriving community, and generally speaking comfortably off.

The interior stands higher than the ground outside the walls, and is well laid out in good, airy, wide streets, and for the most part generally well ventilated alleys. The houses and shops are built of red brick, and in regular rows, and many of them are substantial and commodious structures of several stories in height.

Streets and main drains.

The bazárs and main streets are metalled and paved, and drained by open surface carriers which are covered over in front of the shops and passages. They are of good capacity, and receive the drainage from the side streets, and finally discharge by 5 or 6 out-fall sewers through the walls into the Panchakki canal, and some wide hollows between it and the town walls. At the time of my visit the drains were dry and clean swept and showed no signs of carrying a constant current of liquid sewage, though in the rains they carry off the storm waters.

Panchakki canal.

The Panchakki canal, as I saw it, was a very small sluggish stream lying low in the bed of its channel, and in some parts completely choked by the rank vegetation which, with mud silt, everywhere encumbered the passage of the canal. The hollows between it and the town were, with the exception of a filthy pond of green slime in front of the Barsi gate, all dried up, and presented a surface of blistered and desiccated blackish mud. This Barsi gate pool is only a few yards distant from one of the most frequented wells of the town, the water level of which is but little below that of its bed.

The side streets and alleys in the dwelling quarters of the town are altogether unpaved and undrained, and are worn into a winding hollow along the middle line. This depression serves as a drainage gutter. I found these streets covered with a deep layer of loose and coarse dust composed of trampled litter and cattle dung mixed up with ashes, ordure, and refuse matter of sorts, and here and there caked up by freshly voided urine.

From the elevation of its site the town affords facilities for an efficient system of surface drainage, the out-fall of which could be carried across the Panchakki canal to the low land away to its south.

Latrines.

There are only two public latrines here; apparently they are more than the people require, for they seemed to be very little used. One is situated near a large tank outside the Delhi gate on the east, and the other is on the north side near the Gosáin gate. Both are of masonry, and divided into halves for men and women as previously described under Hissar. But there is this difference, that here the enclosures are drained by a gutter in front of the rows of compartments and seats, which empties through the wall into a masonry sink at each side. These sinks were all much out of repair at the time of my visit, and were quite dry.

The soil of these latrines, together with the sewage and sweepings of the town, is buried by the conservancy sweepers in deep trenches on the open ground to the north and about mid-way between the town and the Hánsi-Hissar canal. These filth pits are in the close vicinity of the Káyath well, which is one of the most used of the town wells, and is situated at the side of the main road leading from the Gosáin gate to a bridge over the canal. There is besides a saltpetre manufactury immediately adjoining the well, the brine pans being close to the platform. In them the salt is washed out from the soil taken up from the ground around the well.

Town sewage.

This site, and this method of disposing of the town sewage, are highly objectionable and dangerous considering the porous nature of the soil in this locality, of the permeability of which there is manifest evidence in the subterranean effects of the canal upon the wells of the entire surrounding area, as will be presently mentioned. As an ordinary measure of safety, it is absolutely necessary to prohibit the burying of sewage and filth in the soil around the town. All such matters should be carted away to a far greater distance than is at present the case, and deposited at convenient sites on the further side of the canal in walled enclosures or filth pits built up on the surface of the ground, and there allowed to accumulate for use as manure, or be there reduced to ashes by fire, as the case may be. The existing filth pits cannot fail to taint the well in their vicinity after the first good fall of rain has saturated the soil around. They should be closed at once, and fresh sites appointed as indicated on the further side of the canal.

Water supply.

The water supply of the town is from wells and the canal, and there are also 3 or 4 tanks around outside. Of the wells 10 are inside and 5 outside the walls. In 4 of the first set the water is so brackish as to be unfit for drinking, though from convenience of proximity they are used for scullery and laundry purposes.

With the exception of the Thákardwára well near the Barsi gate, which was built five years ago, all the others are of old date and very deep. They have not been cleaned out for many years, and under the existing conditions I doubt if it is possible to do so, for a remarkable change has occurred in them since the canal was brought here about 50 years ago. Previously to that time the ropes ran, I am assured, 60 cubits and upwards down to the water, much as they still do in the wells all along the route traversed to the westward, but now they only run from 15 to 20 cubits. That is to say, since the opening of the canal the water in the wells has risen from 40 to 45 cubits.

I measured some of the principal wells with the following results:—

Name of well.	Depth from top of platform to bottom of well in feet.	Depth from top of platform to surface of the water in feet.	Depth of water in the well in feet.	Height of platform above surface of the ground in feet.	Remarks.
Tahsíl well	116	45	71	4	The first two wells on the list are inside the town walls, and the others outside.
Balochián well	112	42	70	5	
Barsi „	137	31	106	4	
Káyath „	122½	20	102½	15	
Thakárdwára well	39	12	27	5	

In the Káyath well the water rose to within 5 feet of the surface of the ground, and stood at about the same level as that in the canal a few hundred yards to the north. This is the well near the filth pits.

The Thákardwára well was sunk 5 years ago. The difference of its measurements is very striking.

The rise in the water level of the wells here is easily accounted for by their situation between two canals less than a mile apart, and the porous nature of the soil, which contains a great deal of sand. At Hissar, and in the country to the westward up to Fázilka, the subsoil at a few feet below the surface is a stiff, impervious clay, and though the wells are sunk at the edges of the tanks in all that tract, not a drop of water enters them by percolation, but only by top flooding after rains, as has been before mentioned. The tract to the west of Hissar is mostly without canal irrigation, and the wells naturally contain only a few feet of water, and at a depth of from 90 to 120 feet below the surface of the ground and the adjoining ponds.

The water of the Hánsi wells has not, I believe, been analysed. A chemical analysis should be made as soon as possible. In most of the wells the water is too brackish for drinking or culinary purposes, though from facility of drawing, it is generally used for other domestic and laundry purposes. The canal water is generally preferred for cooking purposes, as it is found that vegetables and seeds are more thoroughly and quickly cooked in it than in that of the best wells.

It will be seen by reference to the comparative tables given in section VI, that Hánsi has a death rate (the mean of 8 years) of 40 per mille of population ; and a birth-rate of 36, and that its death-rate from fevers alone is 20 per mille.

Registration.

The municipal registers of deaths and births are carefully kept. The death register up to 13th November showed a total of 243 deaths. Of these 4 were entered under croup, and 33 debility and inanition in infants, and only one from small-pox. There was a single entry under "born dead." There were 14 deaths from bowel complaints and 37 from diseases of the chest (pleurisy being very prevalent in all this tract as far west as Fázilka), and 133 from fevers.

Opposition to vaccination.

The death register of the Hánsi rural circle comprises 147 villages with an aggregate population of 1,03,363, and up to 10th November showed a total of 860 deaths, which indicates very defective registration. There were 16 deaths entered under convulsions, 28 from debility and inanition, and 53 from small-pox,—all in infants. There were 21 deaths from bowel complaints, 93 from diseases of the chest and 587 from fevers. The small-pox mortality, whilst yet the disease is supposed to be quiescent in the district, proves that vaccination has not made much progress here; and from what I am told there is a good deal of obstruction and resistance on the part of the people. I examined a large number of children in the schools and streets here, and did not meet with a single one bearing vaccination marks. On the contrary I noticed that a very large proportion of them, certainly more than half the number, were more or less disfigured by pock-pits and blemishes of the eye.

Cremation ground.

The Hindu cremation ground is situated on the roadside about a mile to the east of the city, and contains several substantial and handsome monuments. I found it in a neglected state with ash heaps scattered all about up to the edge of the road. It requires to be enclosed within walls, and provided with ash pits for storage of the refuse after removal of the *phúl* (cinders) by the relatives.

ROHTAK.—District Rohtak.

Population 14,994. (*Census* 1875.)

Statement of births and deaths of Rohtak for 1870 to 1877.

Classified statement of deaths and births for the town of Rohtak from the year 1870 to 1877 inclusive.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	...	50	164	2	105	321	*328	183	145	25	22
1871	1	56	138	29	174	398	294	159	135	21	28
1872	...	47	132	3	156	338	290	171	119	20	24
1873	...	31	119	51	71	272	170	98	72	12	19
1874	...	30	223	13	190	456	490	259	231	34	32
1875	12	36	184	19	254	505	574	310	264	40	35
1876	...	30	235	3	237	505	674	337	337	44	34
1877	...	13	234	163	116	526	522	286	236	35	35

Inspected, 18th and 19th November 1877.

I marched from Hánsi on the 16th and arrived at Rohtak on the 18th by the stages of Suraki and Maham.

SURAKI.

Village Suraki.

Population 614, is a small roadside village, 10 miles from Hánsi. It contains about 150 miserable mud huts, crowded together without any order on the top of old dung heaps, on the sides of which pigs burrow and wallow and pick up their daily food. Across the road, and beyond the customs preventive line, are the camp ground and bungalow of the customs officer, and near them are the village pond and well side by side. The well is 112 feet deep, and contains 12 feet of water. It is used mostly by wayfarers, and little by the villagers, who, to shirk the trouble of drawing from the well, prefer the filthy compound in the pond.

MODHAL.

Village Modhal.

Six miles on from Suraki is the village of Modhal, population 500. It consists of two settlements about a mile apart. One of them stands on the roadside, and contains two or three substantial and lofty mansions, the residences of some wealthy merchants. Close about around them is a confused jumble of miserable hovels, mostly built on the elevations of old dung heaps as at Suraki, and similarly infested by pigs. Across the road, on the further side of the custom's line, is the village pond, and at its side is the well. The latter is a fine masonry structure with a commodious platform and large cisterns. These last, however, had long been dry, and the well itself unused, owing to the labour of drawing its water which is about 100 feet down.

The village pond.

The pond is a large and deep excavation, and is shaded by some large trees on its banks. It is fed by the surface drainage of the surrounding country, which enters by slopes on the east and west sides. On the edge of the slope on the east side is a large dung hill evidently the accumulation of years. I found a score or so of pigs grovelling and burrowing on its extensive surface, and noticed the carcases of cattle amongst the varied forms of filth, offal &c., composing its mass. The first fall of rain must wash the lighter and soluble parts of this manure compost straight into the pond, but this, perhaps, is immaterial, as it is foul enough already.

During the few minutes I stood on its bank I counted 7 women filling their pitchers with its water for drinking and domestic purposes; a little beyond them was a man cleaning his teeth and spewing the water back into the pond, whilst on the opposite side was another who deliberably set to washing his person at the edge of the water after having eased himself in an adjoining field; at the same time a yoke of oxen came down the slope and, wading up to the knees, commenced to drink. On other occasions I have seen cattle wade into such ponds and take water at one in end whilst pouring it out at the other.

MAHM.

Mahm.

Population 6,868, is a small town built of red brick on the site of the ruins of an ancient city of Rájput origin, which was destroyed by Sháhabuddín Ghori, and subsequently partially rebuilt on a Muhammadan model. The persent town contains a number of mosques and tombs which form the most conspicuous architectural monuments

* For 47 weeks only.

of the place, but in general condition and appearance it partakes of the ruin and decay around. It stands on a considerable elevation above the surrounding country, and is encompassed by walls which are mostly in ruins, and in some parts have disappeared altogether. The town, however, possesses many natural facilities for a quick and efficient drainage, but, as it has no municipal committee, nothing has been done to benefit by them. Nor has the town any fixed establishment for the service of its conservancy and public sanitation. The whole place wears a look of neglect and decay, and its surroundings both inside and out taken as a whole are eminently filthy and repulsive.

Mahm contains 1,532 houses, of which 205 are shops; but 38 of the former and 42 of the latter are uninhabited or unoccupied.

Water supply.

There is no canal here; the water supply is from wells and ponds. The number of wells is 43, but of these 30 are either unused on account of the brackishness of their water or are in ruins. A few hundred yards to the south of the town is a very fine and capacious *báoli*, but it has long been out of use. I found the steps near the bottom covered with a musty layer of bats' and pigeons' dung, and the surface of the water itself coated with a scum of the same, in which were entangled feathers and wind drift. One of the best wells here as to water is that in the tahsíl. It is 114½ feet deep (height of platform 2 feet) and contains 12 feet of water. The number of ponds is 12, but only 3 are close to the town and used for drinking purposes by its residents; the others are scattered about in the vicinity.

Slaughter yard.

The slaughter yard is situated outside the walls on the Gohána road. Formerly it was the rule and practice to slaughter only marked cattle after 7 days exposure for recognition, but since the drought this custom has fallen into abeyance, and now Musalmans are in the habit of buying or stealing cattle in the pasture grounds, and slaughtering them on their own premises inside the town for the sake of the hides, which are at present selling at a higher price than the live animal. This practice is highly objectionable on sanitary grounds alone, as the carcase and offal remain within the town area to mix by gradual decay with the rest of its refuse and sweepings. It is, moreover, a very sore point with the Hindus, especially as their dwellings are indiscriminately mixed up with those of the Musalmans throughout the town. Many of them made it a special ground of complaint, and begged that the old regulations for kine killing only at the appointed site might be re-enforced. The present custom is certainly not defensible, and should be at once put a stop to on solely sanitary grounds.

There are no public latrines here; the bye-ways and passages and dung heaps outside the walls supply their place.

Registration.

The death register of the town up to the 16th November showed a total of 162 deaths; of these 43 were from small-pox, which is just now epidemic in the town and district generally. One death is entered under debility and inanition, and all the rest are under only two heads, namely, three from accidents and 115 from fevers, of which 49 occurred in infants up to 5 years of age.

The death register of the Mahm rural circle comprises 18 villages with an aggregate population of 29,710, and up to the 12th November showed a total of only 215 deaths distributed under the following heads, namely 3 asthma, 1 small-pox, 1 dog bite, 1 epilepsy, 2 drowning, 1 burn, and 206 fevers, including 78 infants up to 5 years of age. There is no entry under bowel complaints or diseases of the chest; these registers, both town and rural, are very unsatisfactory, and show an amount of neglect in the duty of registration which requires notice. The rural circle register with a population of 29,710 returns 215 deaths, whilst that of the town with a population of only 6,868 returns 162. In the former, at a time when the disease is epidemic in the district, only a single death is returned from small-pox against 43 in the town, where at the time of my visit 22 children were reported to me as suffering from the disease. I may here note that vaccination was being actively carried on at the time of my visit under the supervision of Dr. Bennett, who was himself itinerating the villages around.

Again, neither of the registers shows any entries under the common diseases known to the peasantry here, and distinguished in their vernacular by such terms, as *masán*=convulsions, *aorsa*=croup, *gujráti*=pleurisy, *pechish*=dysentery, *dast*=diarrhœa, *khánsi*=bronchitis, &c. &c.

In the Ferozepore and some other districts the village chaukidárs are furnished with note books, in which deaths are entered at the time of their occurrence, and under the vernacular heading current in the village, generally a term sufficiently diagnostic to admit of an easy recognition of the disease. When presented at the Police station at the end of the week, the registration clerk transcribes the entries to his registers, and certifies having done so in red ink across the chaukídár's report, and the Deputy Inspector or Sergeant affixes his seal in verification. The same system might be introduced with advantage in this and other districts where it is not in force. Here I found the officials concerned willing, and they assured me that there was no difficulty in the matter, but that their shortcomings were owing to the want of instructions.

To save space and avoid repetition, I here in anticipation annex a list of the rural circle registers inpected in the course of my tour, as it shows at a glance the circles in which the duty of registration is neglected.

List of rural circle registers inspected during tour of 1877-78, *showing number of villages, aggregate population, total registered deaths during* 1877, *and ratio per mille of population, together with the death-rate of their municipal towns for comparison.*

No.	District.	Name of Police Station.	No. of villages in each Police Station.	Population.	Total deaths registered.	Ratio per mille.	Ratio per mille in municipal towns.	Remarks.
1	Lahore	Kasur ...	127	61,077	1,484	24	20	
2	Ferozepore ...	Ferozepore * ...	174	42,450	337	8	33	
3	,, ...	Mohanki * ...	93	20,730	276	13	...	
4	,, ...	Bagheki * ...	66	6,602	98	15	...	
5	Sirsa	Fázilka * ...	127	26,642	337	13	15	
6	,, ...	Arniwála ...	20	3,456	83	24	...	
7	,, ...	Malaut * ...	63	16,056	250	15	...	
8	,, ...	Dabwali * ...	63	19,530	248	13		
9	,, ...	Sirsa ...	76	26,222	454	17	27	
10	,, ...	Narel ...	23	7,268	150	21	...	
11	Hissar	Fatahabad * ...	87	55,941	280	5	35	
12	,, ...	Hissar * ...	81	44,735	306	7	34	
13	,, ...	Hánsi * ...	147	103,363	1,060	10	23	
14	Rohtak	Mahm * ...	18	29,710	490	16	...	
15	,, ...	Rohtak * ...	78	89,826	1,151	13	35	
16	,, ..	Kalánaur ...	17	23,032	549	24	...	
17	Hissar	Bhiwáni * ...	22	12,862	195	15	33	
18	Rohtak	Jhajjar ...	74	38,748	711	18	29	
19	,, ...	Bahádurgarh ...	27	14,257	332	23	25	
20	Delhi	Basant ...	27	13,444	273	20	...	
21	Gurgaon ...	Gurgaon * ...	92	53,116	853	16	...	
22	,, ...	Farukhnagar ...	42	18,303	432	24	35	
23	,, ...	Rewári * ...	178	72,516	961	13	35	
24	,, ...	Firozpur ...	136	60,975	1,110	18	42	
25	,, ...	Nuh ...	116	59,127	987	17	...	
26	,, ...	Palwal * ...	126	72,197	1,014	14	36	
27	Delhi	Ballabgarh * ...	67	44,997	731	16	32	
28	,, ...	Faridabad ...	42	16,301	383	23	40	
29	,, ...	Badarpur ...	32	10,249	242	24	...	
30	,, ...	Alipur * ...	89	60,782	887	14	...	
31	,, ...	Rahi * ...	36	25,105	318	13	...	
32	,, ...	Sonepat ...	111	98,220	1,770	18	23	
33	Rohtak	Gohána ...	73	105,753	1,933	18	32	
34	Karnál	Pánipat ...	71	41,210	795	19	32	
35	,, ...	Karnál ...	89	48,279	885	18	41	
36	,, ...	Batána ...	90	42,038	840	20	...	
37	Umballa	Thánesar ...	62	11,411	272	24	28	
38	,, ...	Shahabad ...	129	55,078	991	18	15	
39	,, ...	Umballa * ...	144	65,067	1,010	15	28	
40	,, ...	Kharar ...	143	64,379	1,346	21	25	
41	,, ...	Rúpar ...	171	50,755	1,029	20	16	
42	Hoshiárpur ...	Baláchor ...	176	58,121	1,166	20	...	
43	,, ...	Garhshankar ...	154	75,396	1,725	23	...	
44	,, ...	Máhilpur ...	165	87,522	1,969	22	...	
45	,, ...	Hoshiárpur * ...	234	132,619	1,838	14	27	
46	,, ...	Hariána ...	160	61,825	1,392	22	29	
47	,, ...	Garhdiwála ...	122	47,868	899	19	19	
48	,, ...	Dasúya ...	152	45,833	1,128	25	31	
49	Gurdáspur ...	Batála ...	155	65,605	1,351	20	20	
50	Amritsar ...	Lopoke ...	119	58,574	1,729	29	...	

The circles returning an annual death-rate of 16 and less per mille of population are marked with an asterisk, and call for special notice on the part of the district authorities.

ROHTAK.

Rohtak town.

The town is built on a slight rise above the ground immediately around, but lies in a hollow with respect to the country in the circumference. It occupies the site of an older city, and rises on its debris to some height in the centre of the intramural area, but to the south of the town, where the civil station is situated, the ground falls considerably, and is liable to serious inundations in seasons of floods. The town is enclosed within brick walls, which are in many parts much decayed and tumbling down. It has 14 gates, large and small, and contains 4,430 houses, of which 558 are shops. The number of unoccupied tenements is stated to be only 10.

Streets.

The main bazárs and streets are wide and airy, and slope off in opposite directions from a central rise. They are paved and metalled, and drained by surface carriers, which empty into covered drains sunk under ground. These last are furnished at intervals with boarded, and in some instances grated, gully holes, and passing out at the different gates discharge on to the surface close by, and generally into the side ditch of a public road. I found them much out of repair, very faultily laid down as to angles of junction, and more or less blocked with broken

bones, brick bats, and street rubbish of sorts, including a pariah bitch with a litter of pups. They bore no traces of carrying liquid sewage, and appear to serve merely as channels of exit for the storm waters of the town.

The side streets and dwelling quarters are unpaved and undrained, and the ground absorbs all the waste water and liquid sewage of the houses. The conservancy of this town generally is sadly neglected. I found the side streets very dirty, and was frequently assailed in my rounds by vile odours from filthy corners. Deposits of ordure were seen about the Delhi gateway, and in a ruined tenement some way within it their abundance indicated its use as a latrine. Further on, a side street near the Panchâyat well was streaked with a long line of freshly voided urine stains, as if the place were used as a public urinal.

Latrines.

There are 6 public latrines at short distances outside the main gates of the town. Four are double blocks for men and women, the other two are single blocks for each sex respectively. They are built of masonry and on the same general plan as those already described. I visited those near the Hissar and Rewâri gates, and the Chamár's tan yards, and found all alike in a very foul and neglected state. In one of them were two famished donkeys, feeding on the ordure. These latrines require to be roofed, furnished with proper glazed-ware or iron utensils stocked with dry earth, and provided with an efficient staff of sweepers. In their present state they are a disgusting nuisance.

Conservancy establishment.

The conservancy establishment consists of a head sweeper at Rs. 7 a month, an assistant at Rs. 4, and 29 sweepers at Rs. 2½ each a month. This establishment is insufficient for the proper conservancy of the town and service of the latrines. It is unreasonable to expect a man to give all his labor to the town for the pittance of Rs. 2½ a month. He must of necessity, especially now with flour at 10 seers the rupee, seek other work to keep body and soul together, apart from the wants of his family. This of itself explains much of the neglected conservancy I have noted. The establishment, I think, should be increased to 35 sweepers, and worked under the superintendence of a conservancy overseer, who should be under the direct supervision of the Civil Surgeon or Sanitary Officer. The entire conservancy of this town requires to be looked into and put on a proper footing under regular and intelligent supervision.

Water supply.

The water supply is from wells and ponds; some of the latter are fed from the canal, which flows past at a mile or so to the north of the town. There are 14 wells inside the town, and 29 in the close vicinity outside. The water of all those inside the town is too saline and bitter for any but scullery and laundry purposes. All the water used for drinking and cooking purposes is drawn from the wells outside the town. Of these 26 yield what is considered sweet and wholesome water. In the other three it is more or less brackish.

The depth of the wells varies from 90 to 108 feet, and they contain from 7 to 36 feet of water. The canal is not known to have sensibly affected the well water level, though the great range of its depth in them leads to the suspicion that there is a certain amount of sub-soil percolation in the case of some of them at least. Many of the wells are unprotected against the back flow of waste water. In the Herdheri and Chamár wells to the north of the town the mouth is flush with the surface of the ground. All these wells as yet not protected againt this source of pollution should be at once provided with parapets and platforms, and conduits to convey away waste water.

BHIWANI.—District Hissar.

Population 33,220. (*Census* of 1875).

Statement of births and deaths of Bhiwâni town from the year 1870 to 1877.

Classified statement of deaths and births for the town of Bhiwâni from the years 1870 to 1877 inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870 ...	...	94	457	17	385	953	1,524	815	709	47	29
1871 ...	...	169	581	137	790	1,677	1,780	932	848	55	52
1872 ...	2	149	515	9	770	1,445	1,526	776	750	47	45
1873 ...	...	106	335	218	521	1,180	1,420	713	707	44	36
1874 ...	...	74	487	65	496	1,122	1,784	929	855	55	35
1875 ...	80	148	512	64	660	1,464	1,393	733	660	43	45
1876 ...	...	65	254	2	413	734	1,308	697	611	39	22
1877 ...	...	64	261	283	487	1,095	1,327	719	617	40	33

Inspected, 21st, 22nd and 23rd November 1877.

I marched from Rohtak on the 20th to Kalánaur, and on the following day to Bhiwáni. The country traversed *en route* wears an arid and parched look, and is bare of pasturage. The autumn crops have failed generally, and I heard repeated complaints of the dearth and scarcity, but met with no signs of any wide-spread actual distress amongst the people, though the poor classes are undoubtedly hard pressed for food in consequence of the ruling high prices. The cattle throughtout this part of the country have suffered very seriously, and are in very poor condition.

Description of country traversed *en route* to Bhiwáni.

KALANAUR.

Population 6,184; contains about 1,000 houses and shops, and is situated on the roadside. The place has a look of prosperity, and I found the streets and bazárs, though unpaved and undrained, generally clean and in good order, and remarkably free from offensive sights and smells. There is no fixed conservancy establishment. House sweepings and cattle litter are deposited on dung heaps outside the town by private arrangement amongst the residents.

Kalánaur.

The water supply is from wells and tanks. There are 14 wells, of which 9 yield good sweet water, but in the others it is brackish, and unfit for drinking. There are 4 tanks, each with wells sunk about them; the principal of these is the Jasur tank on the north side of the town. It has 4 fine masonry wells on its sides, and each of them has capacious reservoirs and watering troughs for cattle attached to the platform. Between the wells are fine flights of steps down to the water of the tank. I found the surface of this covered with a sheet of bright green vegetation, and under it the water perfectly clear and sweet. These wells are 104 feet deep, including 4 feet height of platform, and contain 19 feet of water.

Water supply.

The Baniáwála well on the road on the oppsite side of the town is 93 feet deep, including 4 feet platform, and contains 10 feet water.

The death registers, both of the town and the rural circle, are very carelessly kept. In the former, out of a total of 141 deaths registered up to the 17th November, no less than 116 are entered under fever (including 74 infants up to 5 years of age), although the season has been remarkably free from such diseases; 16 were entered under small-pox, which is just now epidemic in the district; and only 3 from bowel complaints, and none at all from any diseases of the chest or lungs.

Registration.

In the latter, out of 284 deaths registered, 261 are entered under fever and include 126 infants up to 5 years of age, 9 under small-pox, 3 still-born, only one under diseases of the chest, and none at all under bowel complaints, whilst 4 are returned under drowning, 3 accidents, 1 snake-bite, 1 paralysis and 1 retention of urine.

Between Kalánaur and Bhiwáni the country is mostly a pasture tract with a thin jungle scrub in which are scattered patches of cultivation. The soil is light and friable, and becomes increasingly sandy towards the south, where it rises into a series of dunes. The sub-soil is a hard clay which contains beds of *kankar*. *En route* are the villages of great and little Khark, and Bámla. They have a neat and prosperous look, and contain some good masonry houses.

The streets are in fair order, and the mud huts of the poorer residents (almost wholly Hindus) are neatly built and tidily kept. In respect to water supply and conservancy these villages resemble Kalánaur.

BHIWANI.

The town was originally a small agricultural village occupied by Vishnawi Rájputs. About 64 years ago the Political Agent at Delhi established a market or *mandi* here as an entrepôt for the trade with Bíkaner, Jaisilmir, and Jaipur, instead of Dádri the former mart. The village after this rapidly grew into a town of merchants and store houses enclosed within a wall and ditch. Gradually, as trade prospered, suburbs grew up outside, but in no sort of order or regularity. Latterly, in anticipation of the Delhi Railway coming this way, the suburbs were encompassed by walls and included in one common area with the older town, the walls of which were then levelled, and the surrounding ditch gradually filled in. This latter process is still in course of completion as funds and opportunities allow.

Bhiwáni town.

Bhiwáni, consequently, now consists of two distinct parts; namely, a central one representing the older town, in which substantial masonry residences and store-houses are compactly set together; and an outer ring of the former suburbs, in which crowded clusters of straw thatched huts are separated from one another by open intervals of cultivated land or cattle commons, and in which are situated the more recent public buildings, such as the Post Office, Government Dispensary, District Officer's bungalow, and several fine tanks and wells, and a series of public latrines for women. These last are fifteen in number, and twelve of them are situated within the town walls, one close to each of its gates.

The town contains altogether 9,899 houses; of these 2,526 are masonry dwellings, shops, and store-houses, and 7,373 are thatched huts and flat-roofed mud-built houses. There are besides some hundreds of Hindu temples. The residents are almost entirely Hindus, and are wholly engaged in trade, sending Sámbhar salt to the North West Provinces, and sugar thence to Bíkaner and Jaisilmir. The trade of the place has considerably fallen off since the opening of the East Indian Railway, and the recently opened Rájputána line has still more reduced it, and now it is said to be steadily on the decline.

The town lies in a hollow, and is most disadvantageously situated in point of drainage. In fact it is found impracticable to get the storm waters out of its own area, and they are, with the ordinary liquid sewage of the town, received into wide and deep excavations or tanks, of which there are six devoted to this purpose at different spots within the intramural area.

Streets.

The main bazárs and streets are wide and airy, and conduct to the several gates of the town, of which there are twelve. The roadways are for the most part metalled, and provided with capacious open drains of masonry at each side, but the place of these in some parts of the enclosed suburb area is taken by deep ditches. These last are in course of being gradually filled in and levelled up as funds become available, but the process seems a slow one, and meanwhile they are kept as clean as is practicable.

The side streets and alleys are generally unpaved and undrained, though in some of them a brick pavement has been recently laid down. It is, I understand, intended to pave others in the same way as funds become available. In those already laid down, the surface slopes from the sides to a shallow gutter running down the middle line, and the sewage from private houses on each side flows broadcast across the pavement to this central gutter. This is a serious defect and should be remedied. A slight slope from the centre to a line of gutter on each side would at once correct the evil. I found the town generally clean, and its conservancy well looked after by the municipal authorities, who have unusual difficulties to contend against, owing to the disadvantageous situation of their town.

Latrines.

There are altogether 27 public latrines here. Twelve of them are for men, and are situated outside the walls at convenient distances from its several gates; and fifteen are for women, and are all situated on open spaces inside the walls. They are on the same general plan as those before described, and require to be roofed, and furnished with proper utensils. I found them in good order and well tended. The soil is trenched in the vicinity of those outside the walls, and these trenches also receive the sewage of the town which is brought out in barrel carts. Street sweepings and such rubbish is carted out and shot on the surface at appointed sites at some distance from the town. It would be an improvement to limit these sites within low walls, as much to restrict the rubbish area as to preserve the manure material.

Water supply.

There is no canal here. The water supply is from wells and tanks on the sides of which they are sunk. There are altogether 204 wells, of which only 15 or 16 are outside the walls. The depth of the water from the surface of the ground is from 60 to 70 feet, and its depth in the wells from 6 to 16 feet. Of all these wells only 55 yield sweet and wholesome water, and they are clustered in groups of three or four about the edges of the principal tanks. They are all inside the walls, except the Nimla tank group situated on the plain to the west, and near the site of a boring for an Artesian well now in course of progress. All the other wells are brackish and unfit for drinking purposes.

Tanks.

There are nine tanks inside and four outside the walls. They are wide, and very deep excavations in the soil, and between the wells lining them have broad flights of masonry steps. Three of those inside the walls, and the Nimla tank outside, are preserved for drinking purposes by a protecting wall, and a cháukídár as guard to keep off cattle and prevent people bathing or washing clothes, &c., in them. They are filled in the rains by the surface drainage of the surrounding vicinity, which is led into them through masonry conduits in their sides. The collecting grounds are to some extent laid out in plots of cultivation, and thus in a measure protected from the ordinary sources of surface contamination. I found these tanks perfectly dry, and presenting clean hard clay bottoms.

The other six tanks within the intramural area are mere cess-pools of great size and depth. They receive all the street drainage, and much of the liquid sewage of the town, and as I saw them contained small seas of filthy liquid resting on a bed of black muck, which was stirred up here and there by buffaloes floundering in them. Nevertheless I found a number of washermen at work washing clothes in this filthy stuff at only a few paces distance from the buffaloes, and on drawing the attention of some of the members of the municipal committee who were with me to the sight, merely elicited the excuse—"What else are they to do? It is the only place they have for the purpose." And this with about 150 wells in the place not used for drinking purposes! The use of these cess-pools by washermen should be at once peremptorily prohibited. In July last year, a qualitative analysis of the water of eight of the principal wells of this town was made by the Chemical Examiner, Lahore, and the physical quality in each

case was pronounced good, though all the samples were more or less hard, and contained an excess of common salt, as will be seen from the subjoined statement of analysis:—

Statement of the analysis of the Bhiwáni well waters.—Qualitative analysis.

Sources.	Total hardness.	Permanent hardness.	Physical qualities.	Reaction.	Free carbonic acid.	Chlorides.	Sulphates.	Nitrates.	Sulphuretted Hydrogen	Nitrites.	Lime.	Magnesia.	Iron.	Ammonia.	Chloride, as na-cl. grains per gallon.	Remarks.
No. 1. Patrám situated on the borders of Patrám's johar, that is, tank.	9·9	5·7	Good	Neutral	None	Precipitate.	Opacity	No reaction	None	None	Opacity	Trace	None	No reaction.	28·25 grains.	One bottle of each water only was sent, so that only the qualitative examination and the hardness were determined and chlorides.
No. 2. Rám Datt's well situated on the border of Patrám's tank.	8·6	3·2	Do.	Do.	Do.	Thick do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	44·63 grains.	The proportion of chlorides was very large, equivalent to about 44 grains. Chloride in No. 2, and to 28 in No. 1.
No. 3. Jhanda well, situated on the border of Patrám's tank.	8·2	3·7	Do.	Do.	Do.	Precipitate.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	38·49 grains.	
No. 4. Buca Deala well, situated on the border of Patrám's tank.	9	4·8	Do	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	30·3 grains.	No. 3 resembled No. 2, but was worse.
No. 5. Mehga Bhagtu well, situated on the border of Koosar tank.	7·5	3·5	Do.	Do.	Do.	Thick do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	54·87 grains.	Nos. 4 and 6 resembled No. 1; the others were intermediate as regards chlorides.
No. 6. Panchâti well, situated on the border of Bhojawála tank.	6·8	3	Do.	Do.	Do.	Precipitate.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	30·3 grains.	Query. Are they impregnated with salt?
No. 7. Pullu well, situated on the border of Bhojawála tank.	6·3	3·4	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	24·29 grains.	
No. 8. Chunia well, situated on the border of Bhojawala tank.	6·9	3·3	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	42·58 grains.	
9. A small blue bottle without label.	...	Has fragrant odour.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	38·49 grains.	The water most probably was put in a dirty bottle, containing attar.

I inspected one of these wells which had been closed for two years on the suspicion that its water was polluted by percolation with the contents of the cess-pool tank adjoining, and which was reopened to public use after the above analysis on the petition of the municipal committee.

Patrámwála well.

It is called Patrám's well, and has a depth of 76 feet from top of platform to bottom of well, and contains 6 feet of water. The height of the platform is 5 feet above the level of the ground. The depth from the top of the platform to the surface of the water in the cess-pool tank below is 26 feet. The surface of the water in the well is consequently 44 feet below that of the water in the tank, and of course liable to pollution through any accidental leakage, though I believe it is quite safe from any such contamination by mere subsoil percolation, because the tank is excavated in a bed of stiff impervious clay. The greatest depth of the tank is not at present more than 8 or 10 feet.

All these cess-pool tanks have a group of wells ranged round them, and formerly it was the custom to fill them in the flood season through small masonry conduits entering their shafts at the high water level of the tanks. This most dangerous practice, however, was put a stop to some years ago, and the conduits built up and closed.

The Jotrám well on one of the tanks preserved for drinking water is 86 feet deep, and contains 16 feet of water. The platform is 10 feet high, and has very capacious cisterns and watering troughs attached. The tank is perfectly dry, and its bed was here and there dug into for clay for building purposes. In the centre it was fully 30 feet below the surface of the ground in the vicinity.

Registration.

The birth and death registers are carefully kept. The death register showed a total of 695 deaths up to 20th November; of these 16 were still-born, 141 debility and inanition, and 44 small-pox in infants. There were 172 diseases of the chest, 108 bowel complaints, 12 puerperal fever, and 194 fevers. A single death from measles, and 7 from accidents and snake-bites.

JHAJJAR.—District Rohtak.

Population 12,456. (*Census* 1875).

Statement of births and deaths of Jhajjar town from 1870 to 1877.

Classified statement of deaths and births for the town of Jhajjar from the year 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	1	33	88	...	61	183	*85	48	37	7	15
1871	...	82	201	8	62	353	258	152	106	21	28
1872	...	43	147	...	33	223	137	77	60	11	18
1873	...	36	225	89	47	397	169	101	68	13	32
1874	1	23	147	32	89	292	369	221	148	29	23
1875	...	43	126	1	122	292	232	126	106	18	23
1876	...	18	90	...	100	208	293	168	125	23	17
1877	...	34	112	90	132	368	462	237	225	37	29

Inspected, 26th and 27th November 1877.

Jhajjar town.

The town lies in a hollow with respect to the surrounding country, which drains by an out-let slope towards the south; and close outside the walls it is encircled by a belt of hollows and excavations, which in the rains are filled with storm waters from the town and vicinity. In seasons of unusual flood, these waters inundate the lower parts of the town, and any how bury the approaches to it for several days together.

On the west side of the town, along the customs preventive line as far as the former Nawáb's cantonment, there is a dense barrier of trees, mostly ním, kíkar, and sirrus, which completely hide the town from view on that side. It must materially interfere with the free ventilation of the place, as the west wind prevails here for eight months out of the twelve. Some openings for ventilation might be made with advantage.

The town contains 3,855 houses; of which 449 are shops and 13 are uninhabited. They are mostly built of red brick, and are compactly set together, but none are of commanding size or attractive architecture. They rise over a slight eminence towards the centre of the town, itself enclosed within low mud walls, in which there are eight gates. Close outside the walls runs a circular road; it is metalled for wheel traffic, and has a row of trees planted on each side.

Outside this circular road is a succession of hollows and tanks, and about some of the latter are masonry wells. Beyond this belt of depressed ground are on the west, the bágh Jahánára, formerly the rebel Nawáb's residence, and now the district officer's bungalow, the tahsíl, situated within a mud fort and ditch, the customs, officer's bungalow, and a poor settlement of labouring and outcast people who occupy 140 or 150 wretched thatched huts on the site of the Nawáb's cantonment. On the south, beyond the customs line, the country slopes away in a wide spread of sandy waste and pasture tract, with here and there small patches of ploughed land. On the east side, close to the walls, are some old brick kilns and two or three dry ponds, and beyond them are the newly built Debi Sahái tank and temple, and the Kalál makbara group of tombs with a handsome mosque and tank attached, which date from the time of the emperor Shah Jehán. On the north side are more brick kiln mounds and dry hollows and the large tank of Shah Gházi Kamál, beyond which the country rises gently and spreads away in a wide expanse of pasture land and cultivation intermixed;—such are the main features of the immediate surroundings of the town.

Water supply.

There is no canal here. The water supply is from wells and tanks. There are altogether 47 wells, of which 24 are inside and 23 outside the walls. Their average depth is 55½ feet, and that of their water 10 feet. Of those inside the walls only one, Ghátiwála well, yields sweet water, all the others being too brackish for drinking or cooking use. Of those outside the walls, all except two which are brackish, yield sweet and wholesome water.

I visited the most frequented wells, and measured some of them. They all require careful looking to and repair.

The *Karm Khan* well—Garhi gate; is 56½ feet deep, including 12½ feet of water and 6 feet platform height, and yields sweet water. The reservoir and cattle trough attached were in a very neglected state, their floors being covered with a thick layer of black muck and ooze. The well is on the edge of the Gohi pond, a filthy shallow pool set apart for cattle and washer-men.

* For 47 weeks only.

Shekhwála well is on the same pond, and few yards distant from the first. It has been unused for two years, owing to its water having become unserviceable in consequence of flooding from the pond after an inundation.

Ghátiwála well, near the Government school house, is 54 feet deep, including 9 feet water and 3½ feet platform. It is the only sweet water well inside the walls, and is much frequented.

Piári Lál well—Delhi gate; is 51½ feet deep, including 8½ feet water and 5 feet of platform, and yields good water. It stands on the edge of a wide pond, now dry and exposing a desiccated bed of black muck deposit fissured in all directions.

Gashtiwála well, near Hardeo mandir, on the Delhi road—is 48 feet deep including 8 feet water and 3 feet platform, and yields the best water of all the wells here, and, though furthest from the town, is in consequence the most frequented. A few paces off is another well of more recent date. It is 52 feet deep including 12 feet water, and 3 feet platform. The difference in depth between the two—four feet—is very probably owing to the accumulation of broken vessels and muck at the bottom of the older well. The wells here are supposed to be cleaned out every year, but nobody could tell me when this well was last cleaned out. It should be at once cleaned, and the shaft put into proper repair, as its water is undoubtedly preferred by the people to that of its neighbours.

Tanks.

There are two large masonry tanks here. That at the Kalál makbara is now in course of renovation, and is to be preserved solely as a drinking reservoir. The other, outside Shah Gházi Kamál gate, is sunk at the edge of the circular road with which its brink is flush, without parapet or railing to guard against accident; a dangerous omission which should be rectified, as the wall on this side drops straight to the bottom. On the opposite side is a cattle walk for watering, and on the other two are broad flights of steps. I found the tank empty, and its floor much excavated for building purposes; some of the hollows thus made contained puddles of filthy slush. Both tanks are fed from the surface drainage of the land to the north.

Cattle ponds.

Besides these tanks there are 8 or 10 cattle ponds and hollows round about the town walls, all at this time dry except two. They serve as receptacles for the storm waters of the town and the surface drainage of the vicinity, and doubtless exercise some influence in the production of the fevers which prostrate the population in August and September after the monsoon rains.

Streets.

The interior of the town rises gradually towards the central portion of its area, and thus affords easy surface drainage. The main streets and bazárs are metalled and paved at the sides. These pavements of brick on edge slope gently to the line of house walls at each side, and form shallow and wide gutters for the surface drainage of the dwelling quarters communicating with the main thoroughfare. They conduct to the different gates, and there discharge on to the surface outside by openings in the walls. None of the side streets and alleys are paved or drained.

Sewerage.

The sewerage of the town is effected by a system of hand removal, which, when properly carried out, is I think the one best adapted to the existing conditions in small towns in this province, especially when aided by a system of open surface gutters such as is found in most towns. In Jhajjar the work appears to be tolerably well done only in respect to the solid matters and street sweepings, which are carried away in baskets, or in panniers slung on donkeys, and disposed of by fire at the brick kilns, or buried in trenches at appointed sites outside the town. What becomes of the liquid sewage? I saw few signs of any in the streets and alleys. It must be consumed on the premises, either by absorption into the ground, or by evaporation, or by blending with the surface dust, &c., or more probably all three combined.

I found the bazárs and main streets clean and free from smells, but the atmosphere of the side streets and *mohulla* interiors was pungent with ammoniacal odours smelling strongly of urine. The courts and passages were generally neglected and dirty, with puddles of slush and heaps of ashes and house sweepings at almost every door.

Conservancy establishment.

The conservancy establishment consists of an overseer at Rs. 10 a month, 8 sweepers at Rs. 3 each, and 15 at Rs. 2-½ each a month, and two water-men at Rs. 4 each a month. There are no carts, nor other means of carriage attached to the establishment. The pay of the sweepers is insufficient to secure their full services. They should be paid at least Rs. 4 each a month, and be placed under the supervision of the medical officer attached to the dispensary here, and they should be required to attend to all the thoroughfares and alleys of the town instead of merely to the main bazárs as at present.

Latrines.

There are 5 public latrines outside the town. They are all built on the same general plan as those already described, but of mud instead of brick masonry, the seats only being coated with lime mortar. They appear to be little used by the people, who resort in preference to the hollows and waste grounds all around. They require to be roofed and furnished with proper glazed ware utensils.

In the main bazár are two public urinals, great conveniences in their way, if their mismanagement did not convert them into great nuisances. Each of them consists of a row of 4 or 6 uncovered compartments at the side of the street. A gutter of lime concrete on the floor runs along the

length of the urinal, and discharges at either end into a jar of porous red pottery set for the purpose in a sink hole. I found these pits some inches deep with stinking slush and decomposed urine, the exudation of the porous earthenware and accumulation of gutter drippings. The whole air of the vicinity was tainted by them, and many complaints were made to me of the nuisance. These defects are to a great extent remediable by the use of glazed pottery for gutters, spouts, and jars, and the free expenditure of dry earth as a flooring in the sinks——of course with proper attendance and service.

Registration.

Opposition to vaccination.

The municipal registers of deaths and births are carefully kept; small-pox is prevalent in the town and district just now. The people are much opposed to vaccination, and made many frivolous complaints to me against the vaccinators, who visited the place last year, but at the same time advanced some grievances which I think deserve attention. Several of the members of the municipal committee said that the people were averse to have their children vaccinated, because the vaccinator was inexperienced, imperious and rough in manner, and insisted on vaccinating children who were at the time ill of various complaints, such as fever, cough, diarrhœa &c. They wished a competent man to be appointed, who would reside in their town at least during the vaccinating season and attend to the work fully and leisurely, and seemed inclined to send one of their own medical men to study the art, if encouraged to do so by Government aid in the way of his entertainment on the regular establishment. I have mentioned this because I think there is a good deal to be done in the way of conciliation and explanation before a ready acceptance of the prophylactic can be expected from an ignorant and in many instances disappointed people.

BAHADURGARH.—District Rohtak.

Population 7,127. (*Census* 1875).

Statement of births and deaths of Bahádurgarh town from 1870 to 1877.

Classified statement of deaths and births for the town of Bahádurgarh from the year 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per-mille of population.	Death-rate per-mille of population.
							Total.	Males.	Females.		
1870	1	35	84	3	40	163	Registers not kept.				24
1871	...	98	111	10	49	268		Ditto.		Ditto.	40
1872	...	39	190	...	49	278		Ditto.		Ditto.	42
1873	...	60	298	103	46	507		Ditto.		Ditto.	76
1874	...	43	167	1	69	280		Ditto.		Ditto.	42
1875	2	27	134	2	147	312	354	183	171	53	47
1876	...	11	86	...	65	162	290	129	161	41	23
1877	...	8	97	13	63	181	326	161	165	46	25

Inspected, 28th and 29th November 1877.

DOLHERA.

Dolhera en route from Jhajjar to Bahádurgarh.

En route from Jhajjar I inspected the roadside village of Dolhera; population 1504. It contains about 300 mud huts from amidst which rise 5 or 6 substantial brick houses occupied by Hindu merchants. The inhabitants are Ját Hindus engaged solely in agriculture. Contrary to its inviting aspect from the outside, the village is one of the filthiest and untidy I have seen. Its passages, lanes and corners were everywhere dotted with deposits of ordure, as if the people preferred these spots as easing grounds to the fields around, and the courts and door-ways were full of rubbish and filth of sorts. It appears, indeed, that they are never swept. As I saw the place, most of the court yards up to the very entrance of the dwelling houses presented a most offensive and untidy appearance. The floors were soppy with wet cattle dung trodden into the surface, and were furrowed by gutters and pits full of stale urine, whilst ashes and litter of sorts formed little heaps confusedly scattered over the general area. Such is the condition of most Ját villages. On the east side of the village is a conspicuous *mandir* (temple), and close by it the village well on the bank of a cattle pond, at this time almost dry. The water is described as of indifferent quality.

BAHADURGARH.

Chief features of Bahádurgarh town.

Situated on the high road from Delhi to Rohtak; contains 2,209 houses, of which 286 are shops and 274 are uninhabited, and is enclosed within tumble-down mud walls in which there are eight gates. The houses present a confused mixture of brick and mud buildings, many of which are in a state of ruin or decay, and with

the exception of the former Nawáb's palace in the citadel (now used as the Government school house and district officer's bungalow) are of no dimensions or elegance. The Ganj bazár is the only metalled and paved street I saw in the town. There is no regular system of drainage, though there are 3 or 4 covered drains in the Ganj bazár and citadel area. The drainage of the town finds its way along the streets as the slope of the ground favours, and passes out through outlet holes in the walls on to the surface outside, whence it follows the natural drainage line to the southward. On the east side this is by a shallow ravine or water run, but on the west it spreads over the low ground in that direction and lodges.

Conservancy.

Conservancy is much neglected in this town. With the exception of the main bazár, I found the streets and alleys in a very filthy and neglected state. The courts and passages were unswept and untidy, whilst corners and back yards, and ruined tenements were everywhere used, apparently habitually, as easing grounds. Litter and ashes, bones, and rubbish of sorts were met at almost every turn in the bye-ways and *mohallas*.

In the principal serái, I came upon a small uncovered latrine, shut off at the side of its main entrance by mud walls 4 feet high. It was in a very foul state; its floor was saturated with introdden fœcal matter, and a crooked streak of filthy ooze trickled across the roadway from a hole in one of its walls. It was furnished with no utensils, and altogether was in a very disgusting state. It should be either at once removed, or be put into proper order.

Latrines.

There are two public latrines outside the town. They are built in double blocks on the usual plan and of brick masonry. Though both had been carefully prepared for my inspection, the stench about them was insupportable, and in that near the Mandháoti gate set the members of the municipal committee who were with me coughing and spitting with disgust, though they are habituated to vile odours about their own dwellings.

Water supply.

A branch of the Delhi canal flows past the village of Parnála, a mile or two to the north of the town, but the water supply here is entirely from wells and tanks. There are 82 wells within municipal limits, and 25 of them are within the town walls, but only one of the number yields drinking water, all the others being brackish. Of the 57 wells outside the walls, 23 are used for drinking and cooking purposes, the rest mostly for irrigation only. I measured five of the wells, and found the depth of the water level varied from 28 to 46 feet, and that of the water in the wells from 6 to 18 feet.

There are two large tanks here. A fine masonry one on the west of the town, and a recent excavation in the soil on the north opposite the Delhi gate. The former contained 6 to 8 feet of dirty greenish water, and is fed from the surface drainage of the country to the north. The other was dry, but it was to be filled from the Parnála canal.

DELHI.—District Delhi.

Population 115,992. (*Census* 1875).

Statement of births and deaths for the city of Delhi from 1870 to 1877.

Classified statement of deaths and births for the city of Delhi from the year 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population
							Total.	Males.	Females.		
1870	7	396	2,257	25	1,760	4,445	* 6,232	3,286	2,946	40	40
1871	2	386	2,216	2	2,371	4,977	4,918	2,610	2,308	44	45
1872	5	403	2,535	22	2,997	5,962	4,780	2,506	2,274	43	54
1873	1	471	2,808	408	2,430	6,118	4,784	2,546	2,238	43	55
1874	...	300	2,353	82	2,558	5,293	5,208	2,690	2,518	47	48
1875	44	415	2,643	112	2,602	5,816	5,499	2,903	2,596	50	52
1876	2	340	1,973	10	2,597	4,922	5,750	2,891	2,859	50	42
1877	...	327	2,452	619	2,617	6,015	6,195	3,181	3,014	53	52

Inspected, 1st, 3rd, 4th, 5th, *and* 6th *December* 1877.

On the 1st I met the members of the municipal committee at the town hall, and afterwards accompanied by Mr. Danenberg, their Sanitary Inspector, visited the Chándni chauk, Chauri bazár, and Billimáran quarters. On my return to camp I went over the plans and drawings of the water supply and drainage scheme proposed for this city, with Mr. Devon, the Municipal Engineer.

* Including suburbs of Delhi.

The combined scheme, it appears, was commenced upon some two years ago by preparing the foundations of a reservoir on the Idgáh ridge, but the work was stopped at an early stage, and has remained in abeyance ever since pending the decision of Government on some important questions connected therewith, which were submitted for settlement. For further particulars see Section IX Civil Works.

With respect to the wards inspected this day, my remarks are confined entirely to the side streets and *mohalla* interiors; for the main roads, bazárs, boulevards, parks, and public gardens receive the full attention and care of the municipal committee, and present an appearance of cleanliness and general tidiness which is highly pleasing and attractive, and creditable to the management so far as it goes.

Streets.

The side streets, mohalla passages, and "impasses," on the contrary, present but too many offensive sights and unwholesome conditions. They are generally much overcrowded with buildings huddled together without order or regularity, and at such close intervals and opposite angles as materially to interfere with ventilation and the free light of day. They are besides in a most unsatisfactory condition as to their drainage and conservancy arrangements.

There are few lanes and passages in these off-the-main-route quarters which are not provided with drains. But they are all under ground and of various sizes and depths below the surface, with which they are connected by a multitude of apertures, trap and gully holes, and culverts, all of different shapes and sizes and at varying intervals. The only points in which they bear a common resemblance are in their states of decay and filth, their unwholesome exhalations, and their choked and obstructed channels.

Sewers and cess pits.

These under-ground sewers and cess pits, for they are in reality little else, should be entirely done away with, and replaced by open surface gutters at each side of the roadway—saucer shaped, open drains in which the stagnation and fermentation of sewage will be rendered impossible under even the most ordinary attention. Under the existing conditions it is impossible to keep these quarters decently clean or wholesome, though there is undoubtedly much room for improvement in these respects.

Almost everywhere sewage and slops from house interiors were found trickling through little openings in the walls, or down vertical gutters on their sides into the sewer inlets, either directly or after a short course along the street sides. Heaps of ashes, night soil, and kitchen refuse, &c., were found deposited on the roadway outside the doors of many houses, and, despite the existence of many public urinals in these quarters, the out-of-the-way corners and passages were almost everywhere streaked with lines of freshly voided urine.

The conservancy duties of these quarters throughout the city are not under the direct management of the municipal conservancy establishment, though the latter is supposed to exercise a certain amount of supervision over them. This it appears consists in limiting the *mohalla* sweepers to a certain time—up to 12 o'clock noon—for the removal of night soil, &c., from their respective beats. For the rest the proper conservancy of the *mohallas* is left to the private management of the house-holders, and practically there is no organized system of conservancy in these quarters.

Conservancy.

The *mohalla* residents either jointly or individually employ certain sweepers or gangs of scavengers, as the case may be, to attend to the conservancy service of their respective dwellings for no further remuneration than the night soil and house refuse itself, with occasionally a trifling present in food or cash. The accommodation is a mutual one, and the scavenger on his part does no more than is absolutely necessary to prevent his being deprived of the privilege of removing the manure material, of which he makes a considerable profit outside the city on his own account. As a matter of practice the scavenger merely removes what is of value to himself, and this he does in a most objectionable manner, to be presently mentioned, and leaves alone the sweeping and general cleansing of the streets, &c.; consequently they are in a more or less dirty and unwholesome condition, apart altogether from the evils arising from a faulty and decayed sewerage system.

The *mohalla* sweepers carry away the night soil and filth of the quarters they serve upon bullocks. The loads are packed in open panniers of matting, and are in no way covered over from view. They are borne along through the most crowded and public thoroughfares, the bullocks jostling men and cattle on the way and dropping a little here and there as they go. This they are permitted to do till noon every day. Both the manner and the time are most objectionable and unsafe. Conservancy carts should be used in the same way as by the municipal establishment, and the time should be restricted as well as the routes. I may here state that I met these night soil laden bullocks in the most public thoroughfares up to 3 P. M. on different days during my inspection. The nuisance is one that should not be tolerated in a city like Delhi.

Suggests that the control of the conservancy of the mohallas be placed under Mr. Danenberg, Inspector.

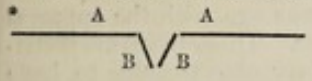
The control and management of the conservancy of these mohallas should be brought under the municipal conservancy establishment as affording the best guarantee of its being properly attended to. The creditable manner in which Mr. Danenberg has worked the establishment over which he is placed as inspector encourages the hope that, with his duties extended over the whole intramural area of the city, the present very unsatisfactory condition of these quarters would soon be materially improved. Though it is hopeless to expect that they will be all that is to be desired until the area is provided with surface gutters, and, where necessary, under-ground drains as part of a uniform system for the whole city.

Public urinals.

With reference to the public urinals, I must here note that they are generally conveniently situated, and empty direct into the under-ground sewers. But they have escaped being public conveniences, and have become public nuisances, simply owing to the neglect of precautions in the matter of little details, which in themselves are of sufficient importance to

determine whether they are to be wholesome or detrimental in their character as useful conveniences. All those I saw, 15 or 16 in number, were in a very offensive state from soakage into their floors and from puddles of putrid urine about their edges. These evils are the result of faulty construction and nothing else.

The "catch fall," though at a good incline towards the sewer opening, is made of stones set in lime cement of coarse and inferior quality, whilst the "stand floor" connected with it is formed of a loosely set rubble, or is the bare unprepared ground without a proper incline towards the "catch fall." They might be easily converted into wholesome and inoffensive conveniences by the use of a single slab of slate for each "catch fall B," and "stand floor A," respectively, the slab of the latter inclining slightly to the former, and over-riding its more highly tilted edge as shown in this cross section.*



By such means there would be no soakage and no slush, and less of the pungent stinks that now pervade the vicinity of these urinals.

Inspection of Daryáganj, Faiz bazár, Daríba, Kauria Pul mohallas.

On the 3rd December I inspected Daryáganj, Faiz bazár, Daríba, and Kauria Pul quarters. The back streets and *mohalla* interiors had all the defects already mentioned, including the filth laden bullocks jostling their way through the busy crowds. The butchers' shops in the Daríba bazár presented a very repulsive and sickening appearance from the swarms of flies settled on the meat exposed for sale, and the mangy curs loitering about the stalls.

On the 4th, accompanied by Mr. Danenberg, I inspected the back slums of Faiz bazár, and then going out at the Delhi gate, visited the slaughter yards, the latrines on the route from the Delhi to the Lahori gate, the market gardens on land trenched with city sewage, and the suburbs of Pahárgunj, sadr bazár, Teliwára, and Sabzimandi.

Slaughter yards.

The slaughter yards are well arranged and carefully attended to. I found them perfectly free from offensive smells; though at the time of my visit, they presented a very bloody scene and a sight far from pleasant. Several hundred head of cattle and goats and sheep had just been and were still being slaughtered, skinned, and quartered; conservancy carts were in attendance to remove the offal, and the enclosures themselves (they are separate for buffaloes and kine and goats and sheep) were in a surprisingly clean and wholesome condition.

Latrines.

The public latrines here are of a pattern and kind different to those seen in other stations, and appear to me to be well suited to the wants of a large city such as this where the conservancy is under intelligent and able management. At my request, Mr. Danenberg, has prepared a memorandum on these latrines and some other points connected with the conservancy of this city. I annex a copy of it.

MEMORANDUM.

"*Trenches.*—The monthly expenditure for digging trenches and burying the filth of the city sweepings, blood, and bones from the slaughter house, &c., is Rs. 95 at an average per month.

The land in which the filth is buried is the property of the municipality. In former years the trenches were ten feet deep and 20 feet, and more long, and when filled, kept covered till the filth was deodorized, and then sold to cultivators. This arrangement was no advantage to the municipality. The present system of trenching was introduced some five years ago, and has been of advantage and profit in bringing waste and useless lands under cultivation, and making the ground productive and healthy. Our trenches are 1'×1', and 2'×2', also 5'×5' for dead cattle; the carcases are cut up and then buried.

We have 137 bighás *under cultivation.* This year's revenue is small, only Rs. 1,575; the amount would have been larger but for the drought. For some of the trenched land we receive Rs. 11-8-0 per bigha. The price has been rising every year; the first year it brought Rs. 5 per bighá (5 years ago) and now it is more than double. There are a number of pakka wells in this trenched land, and if all were put into proper repair, an increased revenue would be obtained. A number have been made useful, but there are some that require the attention of the committee. These wells contain sweet drinking water.

The trenches extend from the Delhi gate to Farásh Khan-ki-khirki, on the right of the circular road coming from the Lahori gate. The stones, bricks, &c., that are being dug up from the trenches are sold for the benefit of the municipality. We pay Re. 1-8 per 1,000 cubic feet for digging trenches.

Public latrines.—The municipality has 25 in number, and they are placed at convenient distances. These latrines are outside the city and close to the city gates. They are called kacha latrines, and are made of the thick end of the sarkanda grass. The sarkanda is placed cross-way and daubed over with mud and cowdung. These latrines were designed and introduced about two years ago by Mr. Danenberg, and were highly approved of by the municipal committee, on account of cheapness, durability, usefulness, and meeting all the requirements of privacy. The former latrines were of straw, but within a short time were destroyed either by white ants or cattle, and when moved in order to pitch them in a fresh place, fell into pieces. The present ones have proved economical and useful, requiring little repair, which the sweeper in charge can always make. Each latrine has eight apartments; each divided by a screen, and are 6'×6'×5'. The ground plan accompanies this. These latrines are moved every fifteen days and pitched in a fresh spot. The sweeper in charge does this and receives Rs. 4 per

month. The dust-cart comes round twice a day and carries the filth to the trenches. The price of making one latrine like the above is as follows :—

	Rs.	A.	P.
25 bundles of sarkanda, @ 3 annas	4	11	0
10 seers of rope (*munj*)	1	0	0
125 bamboos 2-8, 4 *bullas* 2/	4	8	0
25 nafferies of chappar band, say	5	0	0
Plastering of mud and cowdung	2	0	0
Total Rs.	17	3	0

A number can be made for about Rs. 15 each,—even cheaper I have no doubt.

Filth boxes.—5'×2'×2'. These were introduced by Mr. Danenburg, 4 years ago, with the approval of the Civil Surgeon and the members of the sanitation and municipal committee. These boxes are distributed all over the city and placed where they are most needed. It was found very objectionable to have the heaps of filth kept exposed for hours in thoroughfares before it could be removed by the mohalla sweepers; these boxes remedy this evil; the filth collected by the sweeper from each house is thrown into the box, the lid put on, and the filth is removed when the sweeper has finished cleaning the whole mohalla. The cost of each box is about Rs. 7, iron bound with handles, and the wood saturated with coal tar. The box has no bottom and is placed on the bare ground, and can thus more readily be kept clean. When the filth is to be removed, the box is tilted on end and its contents removed.

Drainage.—I am of opinion that we require more urgently the drainage than the water works, if that can be done. Our drinking water is not bad if people will only take the trouble to draw it from sweet and good wells. There are a good number of them all over the city. There is no want of good drinking water, but a great want of cleaning and flushing drains. I do not think there can be any difficulty, as the canal is being widened, and water could be raised to the level required from the canal. The river water I do not consider wholesome to drink, though it may percolate into wells.

Sanitation.—Sanitation of the city and suburbs. The city is divided into four ilákas; each iláka has one jamádar, two chaprásies, and eight baildárs or sweepers. The suburbs have the same establishment of men. We have about 50 conservancy carts employed, divided among the several ilákas. Each jamádar has eight sweepers under him, to keep the main streets in order, clean drains, repair roads, plant trees, &c. The chaprásies are expected to keep the mohalla sweepers up to their work, and visit all the streets and lanes in their iláka daily. The jamádar must bring to the notice of the native members of the municipal committee any neglect on the part of the mohallah sweepers, or any transgression of municipal bye-laws by the inhabitants of the city. The Superintendent of Sanitation is to supervise all. I consider that this establishment is by far too small to do all that is required, and it is impossible that proper supervision can be exercised over the thousands of mohalla sweepers, and the city kept in such a sanitary state as could be desired. I have brought this to the notice of the municipal committee some years ago; daily is this deficiency of establishment made apparent. The monthly sum spent on sanitation in establishment is about Rs. 1,700. I consider this expenditure too small for a city containing over 160,000 inhabitants, with a yearly income of over two lakhs and a half.

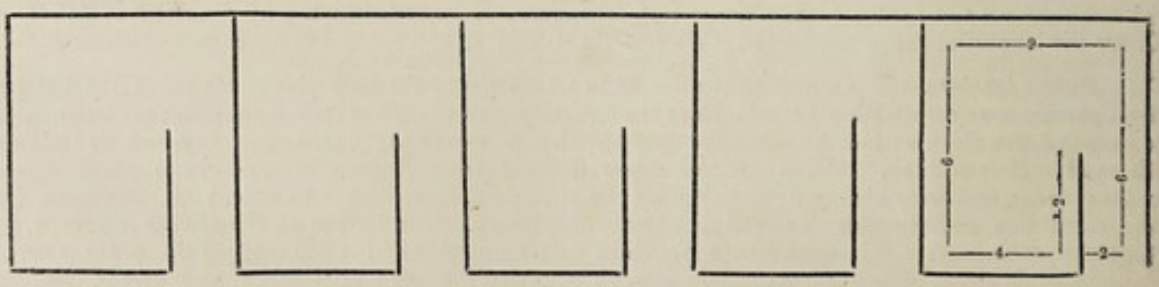
However, with the shortness of hands and establishment, sanitation has well been looked after. This is evident from the simple fact that the deaths are far fewer than in former years. Then the deaths were above 80 per diem, and the population less; while now we seldom register more than 60, and sometimes as low as 22 per diem. I think we have done something towards saving life, and this is due to constant attention to sanitation. We have had no epidemics for years, and I hope we never may. All about in large and small cities in the north-west and Punjab sickness has been rife, while the people of Delhi have enjoyed good health.

I think it should be urged on the municipality, the necessity of increasing their establishment for the sanitation of the city, and also an increase of wages; the pay is small, and work hard, and articles of food daily increasing in price.

* * * * * * * *

(Sd.) J. C. A. DANENBERG.

DELHI :
6th October 1877.



Ground plan of a kacha latrine in use at Delhi, with five apartments. Height five feet.

(Sd.) J. C. A. DANENBERG.

Latrines.

I inspected several of these latrines, and found all of them clean and wholesome, and well attended to. The practice of shifting the site at short intervals, and keeping the ground always strewed with dry earth and ashes, explains their freedom from the stenches usually abiding about the permanent masonry structures of this kind. I saw also the filth box introduced here by Mr. Danenberg. It is well adapted to its purpose, and is worth imitation in other municipal towns. Even here they might with great advantage be largely increased in number.

The several suburbs visited were found generally clean and well swept, and in these respects presented a marked contrast to the filthy lanes and impasses of the crowded quarters in the city.

Sewerage project.

On the 5th accompanied by Mr. Devon, Municipal Engineer, I visited the streets along which it is proposed to carry the main line of under ground sewers of the new project, and, from the Ferozeshah Kotla, viewed the waste land along the bed of the Jumna, which it is proposed to bring under sewage irrigation. The site appears to offer a promising field for successful experiment. I also visited the projected reservoir on the Idgáh ridge, but refrain from remark, as the question of the Delhi water supply and drainage are now under the consideration of Government.

During this day and the next I visited the Jail, Lunatic Asylum, and City Dispensary, and the civil station, and found nothing in either of them for special remark.

GURGAON.—District Gurgaon.

Is not a municipal town.

Population 4,539. (*Census* 1868.)

Inspected, 9th, 10th and 11th December 1877.

On the march from Delhi I camped at Basant, about half way on the road to Gurgaon.

BASANT.

Village Basant.

Is a small road side village of 50 or 60 thatched huts occupied by Ját Hindus engaged in agriculture, and altogether careless of the sanitary condition of their dwellings and surroundings. Ordure and filth of sorts strew the surface of the lanes in all parts, and after rain are carried along with the surface drainage into the village pond close outside to the southward. I found the pond very low from the long drought, and its contents a mere concentrated solution of sewage and rottenness. On the camp ground adjoining in a grove of *pipal* trees is a fine masonry well with a reservoir and cattle trough attached to its platform. Its depth is 69 feet including 13½ feet water, and 5 feet platform height. The water is considered sweet and wholesome. There is a Police station here.

GURGAON.

Chief features of Gurgáon station.

Consists of the civil station, sadr bazár, and Jacombpura, and is situated on the trunk road from Delhi to Rewari. The site lies low, and is subject to inundation in seasons of flood. The civil station is well laid out and remarkably well kept in point of cleanliness. The same may be said of the sadr bazár and native settlement of Jacombpura. This last is a collection of thatched huts situated at the south-west end of the sadr bazár. The block is well arranged and traversed by roomy streets crossing at right angles, and drained by shallow trenches at each side. I found the place in a clean, tidy and wholesome state, in very pleasing contrast to the sanitary condition of the village of Gurgaon, a mile or so distant to the north-west. This last contains about 1,100 mud huts and 50 shops crowded closely together about 3 or 4 large masonry houses occupied by baniáhs. The village rises to a considerable height in the centre upon the ruins of former dwellings and ancient dung heaps. The inhabitants are Ját Hindus, and the village is the filthiest and most untidy of any I have yet seen, not even excepting Dulhera previously described. The conservancy of the village is entirely neglected, and its filthy state is only to be fully understood by personal inspection. This is to be regretted, as owing to its vicinity to the civil station—itself a model of cleanliness and order—it might easily be put into a more wholesome state with only ordinary attention.

The sadr bazár consists of a uniform row of shops on each side of the trunk road, which is here metalled, paved and drained. The drains are capacious and open surface gutters which run along in front of the rows of shops at the junction of the pavement on each side with the metalled roadway, and they are bridged over at intervals in front of each shop. They discharge into a large tank in rear of the bazár, which serves as a receptacle for the storm waters of the station generally.

At each end of the bazár is a commodious serái with a public latrine adjoining—Cowan serái at the north end, and Ghammandi serái at the south end. The latrines are masonry structures divided into a row of compartments with two or three seats in each, and a gutter running the whole length in front of them and emptying on to the surface outside. The floor is paved with stones laid in lime mortar. The latrines are roofless and furnished with no receptacles of any kind, nor is dry earth used in their service. I found the compartments, floors, and entrances in a very filthy state, and emitting a foul stench.

Besides these two latrines for men, there are two others for women on the open ground west of Jacombpura. They are merely mud wall enclosures, and near them are some deep pits in which the filth of the station is cast, and some trenches in which night soil is buried.

The water supply is from wells, and is considered of generally good quality. There are altogether 11 wells here. That in Ghamandi serái is 43 feet deep including 12 feet water, and 3 feet parapet, and this is about the depth of the others.

REWARI.—District Gurgaon.

Population 25,190. *(Census* 1875).

Statement of births and deaths of Rewári town from 1870 to 1877.

Classified statement of deaths and births for the town of Rewári from the years 1870 to 1877 inclusive.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870 ...	4	322	271	9	359	965	*901	460	441	62	39
1871 ...	9	260	292	34	501	1,096	1,212	635	577	49	45
1872 ...	2	255	297	112	554	1,220	1,123	587	536	46	50
1873 ...	...	527	344	146	525	1,542	1,080	559	521	44	63
1874 ...	...	125	233	43	423	824	1,195	611	584	49	34
1875 ...	35	242	347	146	588	1,358	1,190	593	597	49	55
1876 ...	1	150	241	3	421	816	1,280	644	636	51	32
1877 ...	1	177	235	21	439	873	1,211	623	588	48	35

Inspected, 14th, 15th and 16th December 1877.

En route from Gurgaon, I inspected the towns of Farukhnagar and Pataudi.

FARUKHNAGAR.

Farukhnagar.

Population 10,594; is a castellated town of 1,501 houses and 499 shops. The fortifications completely enclose the town, and consist of high crenelated walls with bastions at intervals, and 5 gates. They rise straight from the ground, and have no ditch. They are in very good preservation, having been built about 200 years ago of stone and lime mortar.

The town is held in *jágír* by Saráj-ud-din Hyder Khan, Bahádur, but is reckoned in the Gurgaon district, and has a municipal committee, Government school, Police establishment, &c. It is traversed from north to south by a main bazár which is wide and airy, but winding in its course, and altogether undrained. The area on each side, with the exception of the Shísh-mahal on the east, in which are located the various public offices, is mostly occupied by a crowd of thatched huts massed together in no sort of order, and apparently altogether neglected in point of conservancy. No part of the town is drained; the rain waters find their way out at the several gates as best they can, or stagnate in hollows inside the walls, whilst liquid sewage and sullage sink into the ground about the houses producing them, or form puddles of filth on the surface around. I found the main bazár and adjoining streets in a generally filthy state, though the bazár itself did show some signs of being swept, because, as I was naïvely told by one of the head men of the place, it was the part of the town which would be seen by the governing authorities. In the side streets the air was tainted with offensive odours of putrid urine and ordure, and the surface was strewed with litter and filth trodden into the ground, none of the thoroughfares being paved or metalled.

Conservancy establishment.

The conservancy establishment consists of 20 sweepers under a head man. They remove the town sweepings and filth in baskets, and cast it into pits which are dug at convenient distances outside the several gates. The stuff is sold as manure to the profit of the municipal committee.

There are four public latrines outside the town, for women only. They are mere mud wall enclosures.

*For 31 weeks only.

Water supply.

The water supply is from wells, of which there are 32 within the walls, and 54 outside. Of the former all are too brackish for drinking or cooking use; of the latter only 9, close outside the walls, yield sweet water which is used for drinking purposes; the others are for the most part used only for irrigation. The intramural wells are used only for scullery and other domestic purposes, and their average depth is 34 feet, including 9 feet water and 3 feet platform height. The soil here is light, porous, and sandy.

Registration.

The birth and death registers are well kept. The death register up to the 11th December showed a total of 446 deaths against 356 last year, and 530 the year before. Of these 53 were from small-pox, 51 convulsions, 29 debility and inanition, 10 still-born, 55 bowel complaints, 37 diseases of the chest, and only 75 fevers. The rest were from a variety of other causes.

PATAUDI.

Pataudi.

Population (*not known*), is a small town held in *jagir* by Nawáb Mukhtar Ali Khán, Barech, who resides in a fort close by. The fort is enclosed within high ramparts of earth, and is surrounded by a deep and wide ditch. On the plain to its east are some masonry built and slate roofed barracks for the Nawáb's small force of Cavalry and Infantry. The town is a collection of thatched huts huddled together irregulary on the right and left of the main bazár which runs north and south, and has a broken line of masonry shops on each side. Its roadway is prominently convex, and partly paved with great stones laid in lime mortar. There is a good open masonry drain at each side so far as the pavement extends, but at each end of this they terminate abruptly on the unmetalled surface of the street, which slopes from a central rise to north and south. They are useless for any practical purpose, and are besides obliterated in parts under masses of accumulated rubbish. The town is in much the same state as Farukhnagar in respect to neglect of conservancy.

To the south of the town is a good school house, and to the east opposite the fort is a dispensary. Both have been recently built, and are neat masonry structures. The dispensary is not yet occupied.

REWARI.

Chief features of Rewari town.

The town is built on low-lying ground, the natural drainage of which is towards the north and east. The soil is loose, porous, and sandy, and is cultivated and planted with trees close up to the town itself, to the west of which at a short distance runs the line of the Rájputana State Railway.

The town contains 5,801 houses, of which 1,240 are shops and about 100 are unoccupied or in ruins, and for octroi purposes is enclosed by irregular mud walls of low height and untidy appearance, in which there are 21 gates, of which only 5 are of large size and fit for wheeled traffic.

The interior presents a very confused jumble of poor thatched huts, amongst the masses of which rise here and there separate blocks of masonry buildings 3 or 4 stories in height; and the whole is divided off into four main quarters by two principal bazárs which cross at right angles from north to south and east to west respectively. These bazárs are the only streets that are metalled and drained. The streets and alleys in the other parts of the town are all unmetalled, and for the most part undrained also, and with few exceptions they are narrow, tortuous, and of uneven surface.

I found the main bazárs and approaches to the town well kept and clean, but the dwelling quarters were everywhere in a dirty state from neglected conservancy. House drains were seen in all directions discharging black, tortuous streaks of trickling sewage on to the surface of the public thoroughfares, and freshly voided urine was found along the line of walls in most streets. The interiors of almost all the Courts I entered were in a very filthy and neglected condition and strewed with litter, ashes, cattle dung, human ordure and filth of sorts. In fact the whole surface crust of the town area appears to be made up of only broken pottery and disintegrated litter and filth.

A very large proportion of the dwellings of the towns-people consists of miserably poor, thatched huts, thrown together in no sort of order between the blocks of masonry houses. The walls of these huts are built of the surface soil of the spot, and are in many parts in a state of decay which exposes the nature of the material composing them. This material is nothing but a coarse, incohesive mixture of broken pottery and bones, mixed up with decayed animal and vegetable matters, and all loosely held together by a thin binding of earth. The decayed state of these huts gives the town a very mean and unwholesome appearance, and from the porous and easily disintegrated material of their walls renders the dwellings themselves insalubrious. For in wet and damp weather the compound material of which they are formed absorbs an abundance of moisture, which, if it does not always cause the wall to tumble to pieces, at any rate produces a certain amount of crumbling and efflorescence, and always, under the action of a powerful sun, gives rise to the exhalations of miasmatic vapours. At such times these vapours pervade the air around to such an extent as to attract the attention of passers by. So I am informed by an intelligent member of the municipal committee.

These wretched hut quarters are a dangerous evil in the midst of the town, and I think it necessary that the municipal authorities should turn their attention to the consideration of the ways and means of getting rid of it. In their present condition these hovels cannot be worth much, and as they

are an acknowledged source of unwholesome effluvia in the very midst of the town, it would be well worth the while to knock them all down and lay out the area thus cleared, after a good ploughing and sufficient exposure to the air, in regular blocks of thatched huts on the model, for example, of the Jacombpura settlement at Gurgaon.

No regular sewerage system in town.

The town has no regular sewerage system. Such surface drains as there are for carrying off rain waters. The liquid sewage of the town soaks into the soil of its area, or collects in miry puddles in the hollows on its surface. Solid refuse, such as night soil, street sweepings, &c., is removed in baskets by the municipal sweepers, and thrown into long deep trenches at convenient sites beyond the five principal gates. From these trenches the coarse litter and rubbish is removed by pottery bakers as fuel for their kilns, and the rest is carried away by cultivators as manure. The municipality does not sell this refuse stuff, and apparently thus loses a steady source of income.

Conservancy establishment.

The municipal conservancy establishment consists of 4 mates @ Rs. 4 each a month, and 50 sweepers @ Rs. 3 each a month. There is no headman, nor is the establishment under the control of the Civil Surgeon. The sweepers do their work in a very inefficient manner, which is not surprising under the circumstances of their employment, although they are supervised after a fashion by two members of the municipal committee. The whole establishment requires reorganization on a proper and efficient footing, and should be put under the direct supervision of the Civil Surgeon as health officer of the town.

Latrines.

There are no public latrines here for men, but there are four for women at convenient spots outside the town. They are mere mud wall enclosures, and are divided into halves by a partition wall, and it is the custom here to keep one half closed whilst the other is in use. When one half is too foul for further use it is closed and the other opened. Meanwhile the first is cleaned and kept ready till its turn comes round again. The stench in the one I visited was sickening, and the sight repulsive and disgusting in the extreme. It is surprising that such a system is tolerated, and it should certainly be changed for a daily removal of filth at the very least. I have no where seen the like of this custom.

Water supply.

The water supply here is entirely from wells and tanks. There are 60 wells inside the town, but all are brackish and unfit for drinking, except a group of five about the Rao Tej Singh tank, which is a fine masonry reservoir for cattle and bathing. This is the only tank in the town, and there is a second outside near the serai and Railway station. The water in both tanks, though covered with a green scum of vegetation on the surface, was clear and bright below. Neither of them has been cleaned out for many years. I measured the two wells on the north bank of the Rao Tej Singh tank. One was 69 feet deep, including 2 feet of water and 5 feet of parapet, and the other 74 feet, including 11 feet water and 7 feet platform. The five wells on this tank are much frequented, but have not been cleaned out for several years.

There are 68 wells outside the town. Of these only 30 yield sweet water fit for drinking. The rest are more or less brackish and are used only for scullery and such like domestic purposes.

Registration.

The municipal registers of births and deaths are well kept. The death register up to 14th December showed a total of 844 deaths. Of these 225 were from convulsions, 28 inanition, and 14 small-pox in infants, and 26 were still born. There were 146 deaths from bowel complaints, 110 diseases of the chest, 103 fevers, 8 puerperal fever, 7 paralysis, 6 drowning and accident, and the rest from various other causes.

FIROZPUR.—District Gurgaon.

Population 10,530. (*Census* 1875).

Statement of births and deaths of Firozpur town from 1870 to 1877.

Classified statement of deaths and births for the town of Firozpur from the years 1870 to 1877 inclusive.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	*Total births.*			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	4	114	64	...	92	274	* 312	148	164	40	30
1871	...	107	86	1	140	334	329	180	149	36	36
1872	2	129	133	46	147	457	301	162	139	33	50
1873	35	70	74	5	159	343	436	233	203	48	37
1874	3	45	136	4	128	316	392	206	186	43	34
1875	13	95	157	144	168	577	532	263	269	58	63
1876	...	86	147	...	120	353	648	307	341	61	33
1877	...	98	182	23	145	448	517	255	262	49	42

* For 44 weeks only.

Inspected 20th December 1877.

Chief features of the town of Firozpur.

The town consists of two parts, one enclosed within high walls with bastions at the four corners and at intervals along the curtains, and the other an open quarter adjoining it on the east side. The former is called the "Fort," and is entered by 10 gates. It contains the greater portion of the town which, both inside and outside the walls, is, taken as a whole, one of the cleanest and least overcrowded that I have seen in the course of my tour. The number of houses is 3,400, including 400 shops, and 75 unoccupied, as well as the huts in two suburban hamlets occupied by poor out-caste families, about 160 together.

The municipal authorities, notwithstanding the limited funds at their command, have done a good deal towards the improvement of this town. The main bazárs and thoroughfares, as well as several of the side streets and alleys, have been well paved, and drained with surface gutters during recent years. The pavements are formed of limestone slabs set in mortar, and with sufficient convexity to drain freely to the gutters at each side. It is the wish of the municipal committee to pave and drain the whole town on this plan as funds become available. Stone being abundant in the immediate vicinity (a low ridge of rocky hills lying to the west of the town), the work can be expeditiously carried out, and at a comparatively small cost, so soon as the requisite funds are provided.

Streets.

These paved and drained streets are certainly a great improvement, and whilst protecting the porous soil of the site from multitudinous sources of pollution, very greatly facilitate the work of street conservancy, and thus favour the cleanliness of the streets and the wholesomeness of the air about them. It is highly desirable that a sum of money should be annually set aside from the municipal income for the completion of this system, which is already well advanced, so that the whole town may be uniformly paved and drained.

In some of the *mohalla* alleys I observed that this new pavement had been laid down in the course of the original narrow passages, and servilely followed their straits and sinuosities. This is a mistake, especially as these alleys are mere crooked narrow passages winding about through clusters of wretched thatched huts, the mud walls of which are crumbling from the decayed nature of their materials, namely, broken bones and pottery, mixed up with animal and vegetable humus, ashes, cinders, and mould of corrupted soil. It would be far better to remove these miserable hovels altogether, and to lay down the pavement in straight broad lines across the area thus cleared, with cross streets where necessary, at right angles. The thatched huts, or better still, stone houses, might then be rebuilt of fresh and sound material in blocks around the new alignments.

Water supply.

The water supply is from wells. There are altogether 26 inside the town, but the water of every one of them is too bitter and saline for drinking or cooking purposes. There are 71 wells round about outside the town, and of these only 24 yield good sweet water fit for drinking.

The Lál Kua well in the main bazár is 36½ feet deep, including 10 feet of water and 2½ feet parapet. Brackish.

The serái well inside the town is 34½ feet deep, including 9 feet water and 2 feet parapet. Brackish.

The Rang Ali Shah well outside town, is 51 feet deep, including 24 feet water and two feet parapet. Sweet.

The Town Hall well, outside town, is 52 feet deep, including 22½ feet water and 4 feet parapet. Sweet.

The above measurements were given to me by the municipal clerk.

Latrines.

There are three public latrines here. All for women and on the usual plan. I found them in a very clean state and apparently little used. There are four or five filth pits at different spots around the town. They are about 30 feet square and 10 feet deep, and are for the reception of the town filth and sweepings; kiln burners and farmers carry away what they require from these stores. The municipality does not sell it, though they purpose doing so. The custom of throwing this filth into deep pits is most objectionable in this locality, where the soil is so porous, and the sub-soil water level so near the surface as to allow of the use of *dhánkli* or "poised beam" wells for field irrigation. It should be either stored in middens built on the surface of the ground, or destroyed by fire.

Registration.

The municipal registers of deaths and births are well kept. The death register showed a total of 446 deaths up to the 19th December, namely 4 convulsions, 23 small-pox, 14 measles, 45 inanition in infants, and 14 still-born, 95 bowel complaints, 34 diseases of the chest, 183 fevers, 7 accidents and injuries, and 27 "other causes."

PALWAL.—District Gurgaon.

Population 13,553. (*Census* 1875.)

Statement of births and deaths of Palwal town from 1870 to 1877.

Classified statement of deaths and births for the town of Palwal from the years 1870 to 1877 inclusive.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	1	159	148	7	164	479	*477	259	218	64	38
1871	1	134	172	24	192	523	630	343	287	49	41
1872	1	146	247	153	266	813	606	340	266	48	64
1873	1	89	120	9	192	411	504	269	235	40	32
1874	...	100	173	72	166	511	536	293	243	42	40
1875	161	195	300	116	186	958	706	393	313	55	75
1876	...	88	228	186	143	645	680	363	317	50	47
1877	...	74	212	1	200	487	754	384	370	56	36

Inspected, 23rd and 24th December 1877.

On the march from Firozpur I inspected the village of Noh on the 22nd December.

NOH.

Population 4,093; contains 1,800 houses, of which 216 are shops and 57 unoccupied or in ruins.

Village Noh.

The houses are for the most part substantially built of stone and brick masonry, and several of them are of large size, running up to 4 or 5 stories in height. They are built upon a high mound composed of the debris of successive former habitations extending back, according to local Hindu traditions, to a fabulous period of the world's history. The outskirts of the mound are occupied by a serái and bazár on the south-east, aud a second serái on the west, and all round between the two is a confused jumble of poor thatched huts, amidst which here and there rise up a few brick or stone built houses.

The surface drainage of the mound is naturally quick and thorough, but the water lodges in numerous pits and hollows round about, and stagnates till evaporated by the sun. There is no municipal committee here, and very little attention is paid to sanitation.

Latrines.

There are four public latrines (the usual mud wall enclosures) for women, at convenient distances on the plain around, and a cordon of pillars marks the limit within which it is prohibited to men to perform offices of nature. The regulation, however, is not well observed, and I found the ground dotted with deposits of ordure close up to the village walls.

Adjoining each latrine are the dung heaps of its respective quarter of the village. They are more offensive and unsightly than they need be, and poison the air of the spot, thus rendering the latrines more repellant than their own defects suffice to make them. The latrines are apparently never cleaned except by the vultures and kites that swarm about them.

Formerly the village maintained a staff of public sweepers, but these men have been dismissed since the reorganization of Police and enrolment of village chaukidárs. At present the better class of house-holders employ sweepers by private arrangement for the service of their own premises, but the rest leave matters to shift for themselves. I found the place everywhere undrained and unswept (though the village streets are all paved with brick), and its air generally impure, and in some parts distinctly offensive.

Water supply.

The water supply is from wells and tanks. There are three wells inside the village, and 12 round about outside, but only 8 of them yield sweet water fit for drinking, and they are on the banks of the ponds and tanks around. The best and most frequented of these wells are at Chuhi Mal's tank on the plain to the west of the village. All the rest are brackish, and some distinctly briny. The brine wells of the Government salt pans are only a few hundred yards distance from the village.

Tanks.

There are three principal tanks here. That of Chuhi Mal's mausoleum is a fine masonry structure, but sadly neglected. I found it full to a depth of 13 feet of very filthy turbid water on the surface of which floated a slimy green scum, and its floor was coated with a deposit of black muck, probably not less than a foot thick. Near by on the plain to the

For 30 weeks.

south are the ruins of another masonry tank. I found it half full of horribly filthy stuff more resembling liquid mud than bathing water. It is evidently fed by the drainage of the fields around an adjoining latrine, and which are used as an easing ground by the villagers.

There is a kacha tank near the camp ground and opposite the Police station. It was nearly dry and contained puddles of mire. A similar tank or pond is situated a little way off the road on the south-east of the village. It is the principal cattle pond of the place, and certainly contains the nearest approach to clear water of any I saw here. There are 3 wells about it. Two of them are brackish and unused; the other yields sweet water and is much frequented. They are from 20 to 23 feet deep and contain from 10 to 13 feet of water, which is about 5 feet below the surface of that in the pond.

Registration.

The death register of the Noh rural circle comprises 116 villages with an aggregate population of 59,127, and up to 20th December shows a total of 926 deaths, namely 47 convulsions, 2 inanition, 103 small-pox, 2 still-born, 102 bowel complaints, 57 disease of the chest, 5 puerperal fever, 11 drowning, 3 snake-bite, 3 injuries, 531 fevers, including 55 infants up to 5 years of age, and 60 "other causes."

Prejudice to vaccination.

The people here have a strong prejudice against vaccination, and the tahsíldár, Jáfir Ali Khan, told me that they put no trust in the vaccinators, because they were men of no position or education, and were often inexperienced. He said that he thought the measure now so indifferently received by the people here would be more readily accepted, and have a better prospect of success, were one respectable man on Rs. 50 a month with the weight of his position and education appointed to the district instead of the four or five men now employed on Rs. 10 each. I mention this without expressing any opinion myself, because I found the tahsíldár very intelligent and careful in his observations, and consider his opinion worthy of note.

Large number of deaths from bowel complaints attributed to bad water.

The large number of deaths from bowel complaints is attributed to the inferior quality of the water, which is generally more or less saline. I heard many complaints of the insalubrity of this tract of country between Firozpur and Noh, and was assured that after the summer rains it was as a rule fever-stricken to such an extent that the whole population was more or less prostrated during two or three months. This year of drought, however, has been accompanied by an unusual immunity from the autumnal fevers of ordinary years. The deaths registered from fevers up to 20th December of this year amount to 531 against 726 last year, and 738 the year before.

The surface soil in some parts is light, porous, and sandy, and in others a tenacious clay. It lies at an uniform level, the drainage of which is slow and defective, vast sheets of water covering the country for weeks together after heavy rains.

PALWAL.

Palwal town.

This municipal town is situated on the high road from Delhi to Muthra, and occupies the site of a more ancient town, rising upon its ruins to the height of about 70 feet in its centre. Owing to this elevation its interior has a good and rapid surface drainage to the lower parts around, beyond which the water lodges in ponds and hollows all about the environs.

The town contains 3,231 houses, of which 380 are shops and nearly 200 are in ruins or uninhabited, and is enclosed within walls in which there are 8 gates. The houses in the upper part of the town are mostly built of red brick, but a large proportion are much out of repair, and wear a look of decay. In the lower parts of the town are clusters of wretchedly poor thatched huts much crowded together, and presenting an unwholesome and untidy look.

The thoroughfares in the higher parts are paved with bricks on edge as a protection to the foundations of the houses on either side, but in the lower parts they are for the most part unpaved and undrained. The Gunj bazár in the latter part of the town is partly metalled with *kankar* and partly paved with slabs of stones, and that part of it which is metalled is provided with an open surface drain at each side, but they begin and end abruptly, and are of little, if any, use.

Drainage.

The town has no regular system of drainage. Its sewerage, in respect to solid matters only, is effected by hand removal, the night soil and sweepings being carried away to the outside in baskets. All liquid sewage stagnates in puddles on the surface, or soaks into the soil, or is dissipated by the traffic to and fro as it issues from the houses on to the thoroughfares.

Latrines.

There are six public latrines, all for women, and of the usual pattern. One of them is inside the town, and the rest at convenient distances outside its principal gates. These latter are badly tended, and in a horribly filthy state both inside and outside, owing to the filth pits and dung heaps around them.

Conservancy.

The conservancy establishment consists of two mates at Rs. 4 each a month, and 22 sweepers at Rs. 3 each a month. They attend only to the public roads and bazárs, and these I found in a generally clean and orderly condition, but for the rest of the town, the dwelling quarters of the people, there is no organized system of conservancy. The well-to-do house-holders look after their own premises, but the bulk of the residents are entirely careless in this respect. The town sweepings and filth are cast on the ground at the appointed sites outside. These I found were much too close to the walls, and badly chosen besides, and on pointing out these faults to the members of the municipal committee, was candidly informed by one of them, that the sites were fixed at a short distance to suit the convenience of the sweepers, who could not afford to keep donkeys or bullocks and were not provided with carts by the municipality.

One of the largest and most offensive of these dung heaps is on the west side of the town, and, drains directly into a large tank used for bathing, washing clothes and watering cattle. On my drawing attention to this the members of the municipal committee pointed to the position of the old dung heap, (it stood at the site of a brick kiln which over-looked the tank at only a few paces distance), and claimed credit for the move in advance. I hope they will persevere in this onward progress, and not forget my advice to surround the new site with a low protecting wall; nor the suggestions I offered for utilizing their town refuse as manure. On the east side of the town near the Khirki gate, and at the side of the high road to Delhi, is a cattle pond one side of which is formed by a huge dung heap, the slopes of which were burrowed into and grubbed up by pigs, and it received fresh accretions of ordure and filth from a cluster of wretched hovels in the vicinity. This pond should be filled in and levelled up. Its present condition and situation render it a grave nuisance and detrimental to the salubrity of the spot.

The conservancy establishment requires to be reorganized and placed under proper supervision. At present it is supposed to be supervised by two members of the municipal committee, but practically it is without supervision. It should be placed under the supervision of the medical officer of the dispensary here.

Water supply.

The water supply is from wells and tanks. There are 20 wells inside the town, and all of them yield sweet water, which is considered of good quality by the residents. There are 40 wells outside the town and within municipal limits, but only 8 of them are commonly used for drinking purposes, the others being used for field irrigation. There are besides 14 tanks and ponds round about the town. They are in a more or less filthy and turbid state, and no attempt is made to protect them from pollution. They are used for bathing, washing clothes, &c., and watering cattle, and none are specially set apart for one or other purpose.

The depth of the wells ranges from 50 to 120 feet according to the elevation of the ground, and the depth of water in them from 6 to 16 feet. Most of the town wells were cleaned out last year, and I was informed that a distinct rise in the level of their waters had been noticed since the opening of the canal here four years ago. In those in the town, the rise is computed at from 1½ to 3 feet, but in those close to the line of the canal at upwards of 4 feet. In these latter the quality of the water had also been observed to have undergone a change and become insipid (*phika*).

The town is almost completely encircled by two branches from the Okla canal, and they are either excavated cuttings or banked channels according to the ups and downs of the surface. One branch runs across the country to the north at about a mile distant from the town, and sweeping round the west side crosses the road to Noh at about 2½ miles from the town. The other coming from the north-east passes to the south of the town at less than a mile distant. The surface soil in this locality is light, loose and sandy, but at a few feet down is a stiff clay containing beds of *kankar*.

Registration

The municipal death register showed a total of 488 deaths up to the 24th December against 665 last year, and 978 the year before. Of this number 50 were entered under convulsions, 60 debility and inanition, 11 still-born, and only 1 small-pox. There were 65 bowel complaints, 26 diseases of the chest, 1 puerperal fever, 3 drowning, 2 injuries, 202 fevers, and 29 "other causes."

The rural circle death register comprises 126 villages with an aggregate population of 72,197, and up to the 22nd December showed a total of 985 deaths against 1,445 last year, and 2,178 the year before. Of this number, 23 were from convulsions, 54 small-pox, 33 bowel complaints, 31 diseases of the chest, 22 drowning, 10 injuries, 1 snake-bite, 799 fevers, including 187 infants up to the age of 5 years, and 12 "other causes."

From the fact that no entry appears under the heads "debility and inanition" and "still-born," it is clear that the deaths of infants are not fully registered in this circle. The number of deaths from "drowning" in tanks and wells is very high, and calls for the adoption of measures to prevent the frequency of such accidents. A parapet to every well, and an enclosing wall to every tank or pond would meet the requirements of the case.

BALLABGARH.— District Delhi.

Population 6,671. (*Census* 1875.)

Statement of births and deaths of Ballabgarh town from 1870 to 1877.

Classified statement of deaths and births for the town of Ballabgarh from the year 1870 to 1877 inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	...	67	80	1	98	246	287	156	131	46	39
1871	...	92	86	25	96	299	294	173	121	47	48
1872	58	81	121	5	139	404	287	166	121	46	64
1873	...	91	124	5	126	346	281	139	142	45	55
1874	..	40	144	27	83	294	254	126	128	40	47
1875	11	81	98	13	99	302	304	150	154	48	48
1876	...	28	71	4	96	199	274	141	133	41	30
1877	...	54	56	1	101	212	289	170	119	43	32

Inspected 25th and 26th December 1877.

Town of Ballabgarh.

The town of Ballabgarh consists of a small suburb in rear of the fort and palace of the late rebel Rája of this place. It is enclosed by low walls for the purpose of octroi collection, and has 5 gates. The number of houses is 2,506, of which 402 are shops, and 102 are uninhabited.

A portion of the palace has been destroyed, but the other buildings inside the fort are now occupied by various public offices, whilst the pensioned widow of the rebel resides in a separate mansion in a garden outside.

The situation of the town is slightly above the level of the surrounding country, which lies low and after rains becomes flooded by the drainage from a low ridge of hills a few miles to the westward. This ridge runs north and south and extends from Delhi to Firozpur, where it joins an extensive ramification of similar rocky heights that spread into Alwar and Jaipur territory.

At the time of my visit the country to the west and south of the town was covered with wide sheets of water many square miles in extent, in consequence of a heavy fall of rain on the 18th instant. This down-pour was very general throughout this part of the country, but in the Firozpur and Nuh districts owing to the porous and sandy nature of the soil there, the water quickly sank into the ground and did not lodge on the surface as here. I was informed by the tahsíldár of Ballabgarh that this flooded condition of the country, though very unusual at this season of the year, was its normal state during two or three months after the regular monsoon rains, and that from August to November the entire population of the country was usually prostrated by fevers, the mortality sometimes running very high, more especially in the years when cholera was epidemic. During the current year, owing to the drought, there has been a very marked immunity from the usual autumnal fevers, but on the other hand, owing to the scarcity of food and high prices, there has been an unusual amount of distress and sickness amongst the poor classes.

The town of Ballabgarh has two main bazárs, which cross at right angles in its centre and extend from end to end of its area. They are straight, wide, and airy thoroughfares metalled with *kankar* and drained by a capacious open gutter of masonry at each side. These drains empty into the fort ditch on one side, and into ponds and hollows outside the walls on the other. I found these bazárs in a clean and wholesome condition.

Streets.

The streets in the dwelling quarters are straight, wide and airy, but they are unpaved and undrained, and are everywhere disfigured by streaks and miry puddles of sewage from the houses on either side, and by streaks of urine along the walls. The conservancy establishment consists of one mate at Rs. 5 a month and 12 sweepers, of whom one receives Rs. 3, ten receive Rs. 2½ each, and one only Rs. 2 a month. I could discover no difference in the nature or amount of work rendered by them to account for this finely graduated scale of their pay, though it is plain enough that the one is proportioned to the other, of which the state of the town is sufficient evidence, notwithstanding that the place had been recently washed out by a heavy fall of rain. The establishment requires entire reorganization and fair pay.

Sewage.

The town sweepings, &c., are carried out in baskets and cast on the ground at appointed sites round about outside the walls, but the liquid sewage here, as in all other towns in which the *mohalla* streets are unpaved and undrained, either soaks into the soil or stagnates in puddles on its surface till desiccated by the sun, or dispersed by the traffic to and fro.

The quantity of liquid sewage daily let on to the surface of such town areas, may be easily calculated if we multiply the number of dwelling houses by the number of gallons of water daily consumed in each. By enquiry at different places, I find that on the average six pitchers (*gharrah*) of water, equal to fully 18 imperial gallons, are daily consumed in each house. That is to say, this quantity of water is daily brought into each house and never carried out. I have given the figures at what I believe to be less than the actual amounts in order to avoid exaggeration, and I have left out of the reckoning the liquid sewage poured on to the surface by the cattle which are habitually herded at night inside the town. The number of these it is impossible to average approximately even, as they range from hundreds to thousands, and include horned beasts, goats, sheep, horses, camels, &c.

Latrines.

There are four public latrines for women only. By an oversight I omitted to visit them, but understand that they are built on the usual plan, and are situated outside the walls, one near each of the main gates.

Water supply.

The water supply is from wells and tanks. There are 26 wells inside the town. Of these 5 are too brackish for drinking use, and in the rest the water is generally sweet, though in 3 or 4 of them it is becoming brackish (*malmala*). There are 35 wells round about outside the walls, and all of them contain sweet water. The depth of the water below the surface here is only 15 feet, but it is more inside the town, as will be seen from the subjoined measurements I made of the principal wells.

Khári well, in Brahman mohalla, is 30 feet deep including 11 feet water and 3 feet platform. The water is saline and only used for scullery and laundry purposes. I found the cistern and watering trough in a very filthy state with a deposit of blackish fœtid muck several inches deep on their bottoms. The ground around also was slushy and trodden into miry puddles.

Harsukh well; is 32 feet deep including 5 feet water and 2½ feet platform. It yields sweet water and is much used.

Ahírwála well; is 20 feet deep including 5 feet water and 2½ feet platform. It yields sweet water and is much used. The bottom is strewed with broken pottery as evidenced by the sound of my plummet striking against it. This well, as also the others here, appears not to have been cleaned out for several years.

Chauk bazár well; is 30 feet deep including 10 feet water and 2½ feet platform. Its water is brackish and unfit for drinking.

Harsahái well, outside walls near dispensary, is 28 feet deep including 10 feet water and 5 feet platform. It yields sweet water and is much frequented. The bottom is strewed with broken pottery and other deposit, the sound of my plummet being muffled in comparison with that given out at Ahírwála well. All these wells require cleaning.

Birth and death registration.

The municipal death register up to 24th December showed a total of 208 deaths, namely 23 convulsions, 34 inanition in infants, none small-pox, none still-born, 7 puerperal fever, 59 bowel complaints, 12 chest diseases, 2 snake-bite, 53 fevers, and 18 "other causes."

The rural circle death register comprises 67 villages with an aggregate population of 44,997, and up to 22nd December showed a total of 631 deaths, namely 154 convulsions, none inanition, 2 small-pox, 2 still-born, 2 child-birth, 8 puerpural fever, 96 bowel complaints, 82 diseases of the chest 2 snake-bite, 3 drowning, 241 fevers including 64 infants up to 5 years of age, and 39 "other causes."

Vaccination.

That only two deaths from small-pox have been registered in this rural circle, and none at all in the town, is very noteworthy, especially as the surrounding districts have been ravaged by a severe epidemic of the disease during the past 2 or 3 months. Here, as in other places, I examined the boys in the school, and the children met in the streets and mohallas for the purpose of ascertaining the progress of vaccination amongst them. It is the only town so far in which I found the children bearing good vaccination scars, and in which the people showed a confidence in the prophylactic.

Whilst examining a group of boys, a Hindu brought forward his son to show me the scar on his arm. As is by far too often the case, I found the child bore merely traces of the scratches made by the lancet. I at once explained to the father, and to a number of others who were crowded about our party (consisting of the municipal committee, hospital assistant, tahsíldár, &c.,) that this boy was in no way protected against small-pox by the operation which had left these scratches, and selecting another boy with the genuine marks showed them what they should look for in their own children as the sign of a successful vaccination, and without which they should on no account rest

satisfied as to the safety of their children from small-pox. I explained at some length the object of the operation, the great benefit it conferred, and the best way of securing its success, and gave my audience several hints as to how they could very easily manage matters comfortably by a little arrangement amongst themselves in concert with the vaccinator for the purpose of distributing lymph from arm to arm, instead of by the doubtful method generally practised with dry crusts, the difficulties attending the use of which I pointed out in comparison with the facilities afforded by the employment of fresh lymph direct from the arm.

The hospital assistant and two vaccinators attached to the dispensary here have always used crusts, and, like their fellows elsewhere who have not been properly trained to the work, have, as a rule, contented themselves with the mere performance of the operation without enquiry as to its success or failure. This explains the mistrust and aversion so prevalent in some districts, where a large per-centage of failures in the operation, unknown of course to the ignorant people, has on the very first outbreak of small-pox, disappointed the confident hopes of the parents, and belied the promises of the vaccinators. In the case of this town the dispensary vaccinators appear to have been more successful than their brethren in other parts of this and adjoining districts, though only to a small extent, judging from what I saw of their work. I think it advisable that all dispensary vaccinators should be obliged to produce a certificate of qualification from the head of the Vaccination Department before being entertained for this work or being allowed to practise it. Without some such safe-guard, these untrained men are likely to do much injury to the cause of vaccination, and in some places to materially retard its progress.

FARIDABAD.—District Delhi.

Population 7,583. (*Census* 1875).

Statement of births and deaths of Faridabad town from 1870 to 1877.

Classified statement of deaths and births for the town of Farídabad from the year 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	...	96	88	8	120	312	461	258	203	58	39
1871	1	95	161	77	167	501	460	234	226	57	63
1872	1	102	224	31	182	540	451	228	223	56	67
1873	4	123	401	12	201	741	400	184	216	50	93
1874	...	82	187	8	105	382	302	153	149	38	48
1875	1	98	123	8	132	362	443	230	213	55	45
1876	...	53	87	12	96	248	367	197	170	48	33
1877	...	43	101	36	125	305	434	224	210	57	40

Inspected, 26th December 1877.

Chief features of Farídabad town.

The town stands upon a low lying site half a mile or so to the east of the Delhi and Mathra road, and about 16 miles south of the former city. It is concealed from view by surrounding gardens and plantations of mango, jáman &c., and pipal, bargat and other trees planted about the tombs and wells around. It is enclosed within octroi walls, in which there are 17 gates and wickets, and contains 5,152 houses, of which 403 are shops and 55 uninhabited. Many of the houses are substantial brick buildings, and some are of considerable size, but the greater number are mean mud huts clustered together in groups between the blocks of more solid buildings.

The main bazár runs north and south, and midway gives off a branch at right angles to the east, in which direction it ends at the portals of the principal mansion in the place. In this branch street are situated the dispensary, Police station, and other public offices. Both these streets are straight, wide and airy, and are metalled with *kankar*, but only the main bazár is drained, a good open surface gutter of ample capacity running at each side. I found them both in a clean and orderly condition.

Adjoining the main bazár near the Ballabgarh gate, is the public serái It is a large disjointed area in the decayed enclosure of a former fort. I found it in a very dirty state, and the arches and recesses of the old walls full of all manner of filth and ordure, the accumulations apparently of many months.

Streets.

The side streets and alleys are unpaved and undrained, and generally neglected as to conservancy, streaks and puddles of sewage being found in the roadways everywhere. Several of the houses are provided with sinks (*chaubacha*) on the public street. They are small square open cess pits built up on the surface against the house wall, or sunk at its base below the level of the street. Some were full to the brim of very offensive sewage, but most were coated at bottom with a stinking black deposit on which rested a broken jar of pottery evidently used for bailing out the contents. These sinks should be at once cleaned out and lime washed, and then kept in a wholesome state by proper and regular service. The contents are supposed to be daily carried away in pitchers outside the town, but really they are as a rule emptied out on the surface of the roadway.

Drainage.

The surface drainage of the town finds its way out by the streets at the several gates, and there collects in the hollows and ditches around till evaporated by the sun, or absorbed by the soil, which is here light, porous, and sandy. The town sweepings and filth are carried out in baskets, and deposited on the surface at appointed sites outside the 5 principal gates.

Latrines.

There are four public latrines for women only. They are mere mud wall enclosures at convenient distances outside the walls, and have the faults of these structures generally, as previously described.

Conservancy establishment.

The conservancy establishment consists of one mate at Rs. 5 a month, and 15 sweepers at Rs. 2 each a month. They evidently render their service according to their pay, for with the exception of the main bazár, the rest of the town is entirely neglected in point of conservancy service.

Water supply.

The water supply is from wells, and 3 or 4 cattle ponds outside the walls. There are 38 wells inside the town, and of these 5 are too brackish for drinking use. There are 82 wells outside the town and within municipal limits. They yield sweet water.

Birth and death registration.

The municipal death register up to 25th December showed a total of 300 deaths, namely 78 convulsions, 5 inanition, 10 still-born, and 30 small-pox, 2 bowel complaints, 3 drowning and 172 fevers. There is no entry under any diseases of the chest, and only 2 under bowel complaints, whilst more than half the entire mortality is entered under fevers, and this is a season notoriously and exceptionally free from them.

SONEPAT.—District Delhi.

Population 13,637. (*Census* 1875).

Statement of births and deaths of Sonepat town from 1870 to 1877.

Classified statement of deaths and births for the town of Sonepat from the year 1870 to 1877 inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	1	64	237	73	113	488	377	204	173	31	40
1871	4	36	245	...	100	385	396	218	178	32	32
1872	1	43	212	...	115	371	388	219	169	32	30
1873	...	55	240	53	86	434	319	194	125	26	36
1874	15	48	311	...	113	487	415	231	184	34	40
1875	...	71	193	1	96	361	429	242	187	35	30
1876	...	81	232	...	62	375	365	209	156	26	27
1877	...	46	206	5	55	312	418	242	176	31	23

Inspected, 3rd and 4th January 1878.

On the march from Delhi I inspected the road side villages of Alipur and Rái.

ALIPUR.

Village Alipur.

Population 1899; contains 392 houses, almost all mud huts, and is situated a little way off to the west of the road, and near the camp ground 10 miles from Delhi. About 250 houses are occupied by Ját Hindus, and the rest by Brahmans,

Baniahs, and low caste families. The village stands on a slight eminence, and is very filthy inside and out like all Ját villages. The water supply is from two wells on opposite sides of the village. That on the north-west is 23 feet deep, contains 6 feet of water, and has a platform 5 feet high. There is a third well in a field a hundred yards or so from the last. It is 20 feet deep, contains 7 feet water, and has a platform 4 feet high. The water of all is sweet, but the wells are very old, and the masonry of the tubes much out of repair. I found the surroundings of each of them very slushy, and from the two first long crooked streaks of foul, slimy, black muck trickled away towards a cattle pond close by.

The camp ground has a police station, dispensary, staging bungalow, and store godown attached, and was in good order. It has two good wells, which have recently been cleaned out in preparation for the marching season.

RAI.

Village Rái.

Population 254; contains about 50 mud huts, and is situated on a slight rise in rear of the police station at the camp ground 11 miles on from Alipur. Half its residents are Brahmans, and the rest low caste families. It is a filthy little place in its surroundings, though comparatively clean in its courts and interior passages.

The water is from a single well on the south-east side of the village. The well is 32½ feet deep, including 7½ feet water and 4 feet parapet, and is much out of repair, the masonry of its tube being cracked in 3 or 4 places. The ground around it is sodden with slush which trickles down to lower levels in a long crooked streak of black muck. On some higher ground between the well and village walls, only a few paces distant, is a series of dung heaps that half encircle its parapet.

The camp ground and its two wells are in good order.

SONEPAT.

Sonepat town.

The present town stands upon the site of several successive towns of past ages, the most ancient of which is held by local tradition to have been coeval with Indrapat, and consists of three parts, namely Sonepat or shahr (the city), Kot (the fort) and Mashhad (the sepulchre). The two last are built on high mounds of debris and buried walls of former habitations, and are separated by an intervening highway, whilst the first covers the lower ground and skirts round about the other two, but is mainly concentrated on the north and west sides of Kot, together with which it is enclosed within a line of octroi walls. Mashhad has a separate barrier line.

Sonepat contains 3,320 houses, of which 300 are shops and 85 uninhabited. The town has an old and decayed look, and the state of its interior indicates a lamentable neglect of conservancy.

The Mína bazár and one or two others are paved with bricks set on edge, and the street from the Thana gate to Halvái Hatti has been recently metalled with *kankar*, but the rest of the town is unpaved and undrained. Surface drainage flows through the streets, the middle line of which is hollowed into a shallow gutter. After the rains the roadway of the main bazár is flooded by a rush of waters from the Kot or higher town. The sides of this mound are worn into deep gullies and cuttings by the storm waters pouring down them, and this process must eventually wear away the whole mound with the houses on it, unless timely checked. In some parts the wearing away of the mound has been stopped by paving the upper parts of the cuttings and converting them into wide open drains, but this appears to be insufficient, as the unprotected sides of the original cutting continue to be worn away year by year exposing parts of old walls and other debris.

The great water worn gaps in the sides of the Kot mound are used as receptacles for all the filth and sweepings of the houses around, and contain an immens mass of this refuse matter, which after saturation by rain gives off very offensive exhalation. The principal public buildings and offices, such as dispensary, police station, school, treasury &c., are situated on this mound, together with some populous quarters inhabited by Sayad and Pathan families. I observed that many of the houses here were in a state of irremediable ruin, and the passages and courts generally in a very dirty and neglected condition, and encumbered by heaps of bricks and broken walls.

It appears to me that all these ruins and surface irregularities might with advantage be removed and filled into the water worn gaps on the sides of the mound; the gaps to be then filled up by a levelling down into them of the open ground on each side, and the material thus filled in to be kept in place by a retaining wall built across the bottom of the cuttings. This done, the surface drainage to be provided for by special channels on different sides of the mound. By such an arrangement a wide building area would be formed at an elevation far above the reach of the floods to which the lower town is subjected by the surface drainage of the country to the north-west, and the main bazár would be protected from the flood that now rush through it after every fall of rain, whilst the Kot itself would be preserved from the gradual extinction which now threatens it.

To protect the lower town from the floods above alluded to, a ditch has been cut outside the circular road on it west and north sides, so as to carry off the water on to the low lands beyond the staging bungalow.

Apart from these natural defects in the construction of this town, I found its sanitation in a very backward state, and conservancy much neglected. The conservancy establishment consists of one mate at Rs. 6 and 20 sweepers at Rs. 3 each a month. There are no fixed sites for the shooting of town filth and refuse. These are cast into the water worn gullies in the sides of the Kot mound, or are disposed of as fuel on the brick kilns, of which there are several close round about the town.

Latrines.

There are four public latrines here. One is a double block for men and women, built of mud masonry on the usual plan, and impossible to keep wholesome. I found it in a horribly filthy state, and in the women's area were a number of donkeys feeding on the ordure. The other 3 are wattle screens like those in use at Delhi, and moved from site to site every 15 days or so. They were tumbling to pieces for want of care, and had evidently been just brushed up for my inspection.

Water supply.

The water supply is from wells and tanks. There are 39 wells inside the town, and they are without exception too brackish for drinking use. There are 95 wells round about outside the town, and they all contain sweet water with the exception of 8 close about the town walls. These facts speak for themselves. The depth of the wells varies from 26 feet outside the town to 102 feet inside.

There are 7 or 8 cattle ponds and 2 bathing tanks round about outside the town; of these Shambudyal's tank is the only one at all protected from pollution by surface impurities.

GOHANA.—District Rohtak.

Population 7,296. (*Census* 1875).

Statement of births and deaths of Gohána town from 1870 to 1877.

Classified statement of deaths and births for the town of Gohána from the years 1870 to 1877 inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870 ...	...	1	105	3	11	120	Register not kept.				17
1871 ...	...	1	95	1	5	102	ditto		ditto		14
1872 ...	...	2	117	3	11	133	ditto		ditto		19
1873 ..	...	...	98	1	5	104	ditto		ditto		14
1874 ...	...	4	156	1	16	177	ditto		ditto		25
1875 ...	...	6	152	6	43	207	157	107	50	22	29
1876 ...	...	7	185	1	43	236	150	86	64	21	32
1877 ...	...	12	145	10	67	234	225	137	88	31	32

Inspected, 6th and 7th January 1877.

On the march from Sonepat I inspected the villages of Batgaon, Madrah and Farmanah.

BATGAON.

Batgaon village.

Population 3,976; is situated on the west Jumna canal, which here flows on a level slightly above that of the floors of the houses nearest to it, and contains about 500 houses, many of which are built of brick masonry. The inhabitants are mostly Játs engaged in agriculture, and are entirely indifferent to domestic conservancy; but the village on the whole is cleaner than Ját settlements usually are.

The land about the village, where not cultivated, is encrusted with a spongy, white saline efflorescence, and is more or less swampy, with some considerable sheets of water covering the surface.

Sugar-cane is largely cultivated in all this part of the country, and the villagers are now busy at the mills expressing the juice and boiling it down in caldrons set alongside. Large quantities of manure are required for this crop, and it is stored about the villages in neat little heaps set close together in the courts and outside the village walls. It is the custom here also to store the *oplah* (cowdung fuel) in stacks, and numbers of such collections are to be seen in and about the villages. The care with which these stuffs are collected and stored by each house frees the general surface of a vast amount of filth and litter which otherwise, as is usual in most villages, encumber it.

The water in the wells here is only 8 or 10 feet below the surface; and is of indifferent quality, and sometimes quite brackish. The village has the reputation of being a hot-bed of fevers, though this year it has enjoyed an unusual immunity on this score. Its people are said to be largely affected with enlarged spleen, and the men to be impotent from this cause. This is so notorious that they find difficulty in getting wives from their caste-brethren of the neighbouring districts.

MADRAH.

Village Madrah.

Population 1,680 ; contains about 300 houses, and is situated in the midst of a low-lying and highly cultivated tract, about 3 miles from the canal. The village presents nothing unusual for special remark.

FARMANAH.

Village Farmanah.

Population 2,000 ; contains about 350 houses, of which many are good brick masonry buildings, and has a clean and attractive look. This, however, is soon dispelled by the realities of its immediate surroundings and interior thoroughfares, where dung heaps, miry puddles and filth of sorts encumber the surface in all directions.

The village tanks and their wells, shaded by some very fine Indian fig and banian trees, are on the north and west sides, where the ground is covered with an extensive belt of fine old wild olive trees. The depth of the water below the surface is 25 feet, and it is considered of good quality. During the rainy season the country around is covered with sheets of water for weeks together, and as it dries, fevers appear, and in severe seasons prostrate the entire population for three or four months, from August to November.

GOHANA.

Gohána town.

The town stands on a slightly raised site about half a mile to the west of the Hissar canal, and contains 1,812 houses, of which about 200 are shops and 20 are uninhabited. It is enclosed within walls and has four principal gates, and a circular carriage road runs all round immediately outside. The houses are mostly built of brick masonry; but the main bazárs and streets are winding and narrow, though well paved with brick and drained by surface gutters.

Streets.

The side streets and *mohalla* passages are unpaved and undrained, and disfigured by those villainous streaks of house sewage, common to such quarters in most native towns. On the whole, however, the public thoroughfares and streets are remarkably clean and well kept, though in the dwelling quarters there is much room for improvement.

Latrines.

There are two public latrines, double blocks of brick masonry on the usual plan for men and women. They are situated immediately outside the walls on the north and south sides respectively, and have all the evils and defects of these faulty constructions, being roofless, and unprovided with utensils of any kind.

Conservancy.

The conservancy establishment consists of one mate at Rs. 5, and 12 sweepers at Rs. 3 each a month. Their duties are confined to the service of the main bazárs and public latrines. The town refuse and sweepings are carried out on donkeys and deposited on the top of an old brick kiln close outside the south side of the walls. From here it is removed by kiln burners and cultivators at their own convenience. This site is very objectionable on account of its proximity to the town and public serái, and the circular road which runs at its base. It might with advantage be removed to another old kiln, further away in the same direction where dead animals are now cast.

Water supply.

The water supply is from wells and tanks. There are altogether 16 wells, *viz.*, eight inside and eight outside the walls. Of the former two are slightly saline or mawkish (*malmala*), and of the latter three are slightly and one distinctly saline (*khári*), all the rest are sweet.

Tanks and ponds.

There are four tanks and ponds. The latter are on the east and south sides, and receive the drainage from the interior of the town. The former are on the north and west sides. That on the north side is a very wide sheet of water, and is furnished with a flight of steps, where it abuts upon the circular road opposite the Pánipat gate. That on the west side is close to the tahsíl and treasury, at the end of a long avenue which connects it with the Hissar gate. It is fed from a canal which passes at about three miles distance on this side of the town, and is entirely for the use of the civil establishment there.

PANIPAT.—District Karnal.

Population, 24,500. (*Census* 1875).

Statement of births and deaths of Pánipat town from 1870 to 1877.

Classified statement of deaths and births for the town of Pánipat from the year 1870 to 1877, inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870 ...	...	259	328	54	275	916	533*	266	267	46	36
1871 ...	1	235	310	156	567	1,269	985	547	438	39	50
1872 ...	18	95	504	39	473	1,129	1,097	604	493	43	45
1873 ...	1	125	539	6	429	1,100	904	449	455	36	43
1874 ...	2	68	424	11	350	855	1,020	560	460	40	34
1875 ...	34	118	508	4	490	1,154	1,164	597	567	46	46
1876 ...	...	139	283	...	290	712	1,116	562	554	46	29
1877 ...	...	111	386	9	289	795	1,107	575	532	45	32

* For 24 weeks only.

Inspected, 8th and 9th January 1878.

Villages of Isrána, Mundlána and Naultha.

On the march I inspected the villages of Isrána, Mundlána and Naultha. Despite their generally filthy condition they appeared to be populous and prosperous, notwithstanding the loud complaints of the villagers against the hard times. The whole tract of country from Gohána to within a few miles of Pánipat is highly cultivated and canal irrigated. The chief crops are sugar-cane and cotton, with fields of wheat, gram, and mustard interspersed. Villages are numerous and at short distances apart, and are generally surrounded by a deep ditch. These ditches were dug with the sanction of Government, some 30 or 40 years ago, in order to prevent cattle thefts, which in those days were matters of every day occurrence in these parts. Those I saw were in a very filthy state with miry puddles of stagnant sewage and deposits of ordure, and in parts were quite obliterated by accumulations of village filth and refuse. If they were only kept in a moderate state of cleanliness, they would form an effective barrier between the village huts and the dung heaps and *oplah* stacks stored around, but as this does not seem practicable, it would be better to fill them up level with the common ground round about.

At Isrána the head men (*lambardárs*) informed me that they had received orders from the civil authorities to keep a space of 100 yards clear all round the village, and that in consequence they now stored their manure heaps and fuel stacks on convenient sites beyond that distance from the ditch. They said that this new arrangement was highly advantageous, as it gave them a clear common for the village cattle to stand on when going to and coming from pasture, and besides much improved the air of the place. Presently on going up to the village with these men, I found the land cultivated up to a few paces from the ditch, and the ditch itself partly filled up and partly banked up by the dung heaps and *oplah* stacks which they had assured me had been so advantageously removed beyond the prescribed limits. I drew their attention to this contradiction of their statements, but they merely replied that it could not be helped here as the land was already taken up by their crops.

MUNDLANA.

Population 5,109; is a considerable village, situated on a mound which overlooks a large and deep cattle pond. There is a police station here, and a death registry office. The register for 1877 showed only 100 deaths, of which 95 were entered under fever, three small-pox, one drowning, and one injury. It is evident that a large number of deaths are put down to fevers which have no right to be so.

NAULTHA.

Population 4,915; contains 960 houses, many of which, as also part of the enclosing walls, are built of brick masonry. It was for a few years a municipality, but the committee was dissolved some six years ago owing to want of funds to work it satisfactorily. The town now shows no trace of ever having been benefited by its municipal committee in so far as concerns its sanitation. I found its streets and lanes in a most dirty and neglected condition, and several of the houses I entered were worse in their domestic arrangements than those of many an humble village in this part of the country, although occupied by the same class of people, namely Ját agriculturists. Many of the houses sheltered cattle tethered in the same rooms as were occupied by their owners, whom in some they outnumbered. Even in the air of a frosty morning I found the atmosphere of these rooms distinctly pervaded by ammoniacal vapours, and imagine they must be insupportably offensive in the hot weather to one unaccustomed to them. A hole in the roof and an open entrance door afford some ventilation, but it must be impossible to render such houses wholesome and safe dwellings until the people consent to live apart from their cattle.

PANIPAT.

Chief features of Pánipat town.

This ancient and historical town is built throughout of brick masonry, and contains 7,028 houses, of which 700 are shops and 260 are in ruins. It is encompassed by walls and has 39 gates, of which 16 are main ones. All around runs a circular carriage road. The contour of the town is irregularly oblong; the long diameter running east and west. The central portion rises to a considerable height upon the ruins of successive towns built one upon the other during past ages, and, where it abuts upon the circular road on the north side, presents a perpendicular cliff of brick bats, debris and broken walls remarkable for the large square slabs of the bricks composing them. This high mound, which overlooks the rest of the town and surrounding country, is called the fort (kila) and is occupied by the police station, town hall, and other public offices.

The intramural area generally is densely packed with overcrowded houses, a large proportion of which are four or five stories high. The bazárs, streets, and alleys are narrow and winding, and are everywhere, even in the narrowest passages, carefully paved with bricks on edge, which are so arranged as to slope from the sides to a shallow open gutter running along the middle line of the roadway. The object of this arrangement is to protect the underlying debris from wear by rains by providing a free drainage channel along the course of the streets. The gutters also serve the purpose of conducting the liquid sewage away from the houses immediately producing it; but no more, for they are almost everywhere, in the main thoroughfares, broken and dented by the wheel and foot traffic, and allow of soakage and lodgment all along their courses.

In the dwelling quarters most of the houses have sinks built up against the wall at the side of the street, or sunk below its level. They receive the house sewage through a hole in the wall, and in the case of the former have a vent at the bottom, which is plugged during the day and opened at nightfall, for the contents to flow out across the road into the mid-line gutter. In those sunk below the level of the street there is generally found a small pitcher for baling out the contents on to the roadway. I found these sinks everywhere in a very foul state from neglect. I went in and out and about nearly the whole town, and no where found a flow of sewage in the gutters, though they were everywhere wet and sodden with it, and in parts silted up with its black muck. The sewage had in fact been absorbed under the pavement by leakage in the gutters ; and this is the normal state of affairs.

About three years ago the Charhao gate road was metalled with *kankar* and flanked on each side by a strip of brick pavement. This pavement slopes so as to form an angular drain with the line of the house walls on its own side. I found these drains very foul with sewage silt lodged in the acute angle formed by the junction of the pavement with the house wall, to the detriment of the latter and the air of the locality. The metalled roadway also is much worn and out of repair.

Drainage.

The drainage of the town passes out at the several gates and through out-falls in the walls, and disperses over the ground outside, or collects in the hollows and ponds round about. Street sweepings and house refuse are carried out in baskets or on donkeys, and deposited on the surface at appointed sites beyond the main gates for disposal amongst kiln burners and cultivators. There is no provision made for the removal of the liquid sewage of the sinks, though the municipal committee are anxious to entertain some *pakháli* sweepers for the purpose.

Latrines.

There are four public latrines here at short distances outside the town walls. Two are for men and two for women ; they are built of mud masonry on the usual plan, and are altogether faulty and filthy.

Slaughter yard.

The slaughter yard on the edge of the Ganda nala ditch, a few hundred yards to the north of the town, is in a very foul state owing to the soil of the whole yard being sodden with blood and the mixture of offal, &c.

Coservancy establishment.

The conservancy establishment consists of 4 mates at Rs. 5 each, and 36 sweepers at Rs. 3 each a month. Their duties are confined to the public throughfares and latrines.

Water supply.

The water supply is from wells and tanks. There are altogether 135 wells within municipal limits. Of these 96 are inside the walls, but 70 of the number are too saline for drinking or domestic use, whilst the other 26, though reckoned sweet, are not considered good or wholesome. All drinking water is drawn in preference from the wells outside. Of these again 10 are too saline for drinking use.

The favorite wells are those of Mahdo ganj, Uncha kua and Manguwála, all on the north side. From these the water is filled into *pakháls* (large water skins slung on bullocks), and carried into the town for the supply of several houses at once.

The *Mahdo ganj* well is 42 feet deep, including 21 feet water and 2 feet platform. The *Uncha kua* is 30 feet deep, with 6 feet water and 6 feet platform. It is considered the best well in the place and is much frequented.

The *Manguwála* well, close by the last, is 25 feet deep including 6 feet water and 2 feet parapet. It has an irrigation wheel which is apparently in daily use. The water is esteemed very good, and the well is much drawn on.

KARNAL.—District Karnal.

Population 24,015. (*Census* 1875).

Statement of births and deaths of Karnál town from 1870 to 1877.

Classified statement of deaths and births for the town of Karnál from the year 1870 to 1877 inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	...	185	450	18	313	966	* 409	227	182	15	33
1871	1	85	341	48	341	816	553	313	240	19	28
1872	62	82	417	20	389	970	493	287	206	17	33
1873	1	24	211	77	182	495	258	156	102	9	17
1874	...	79	331	98	318	826	768	401	367	26	28
1875	...	233	896	15	462	1,596	836	434	402	29	55
1876	...	172	830	15	387	1,404	738	422	316	31	58
1877	...	83	543	30	331	987	844	430	414	35	41

* For 50 weeks only.

Inspected, 11th, 12th, and 14th January 1878.

Villages of Mának, Gagsina, Sitoudi and Brota.

On the march I inspected the villages of Mának, 648 houses, Gagsina, 621 houses, Sitoudi, 313 houses, and Brota, 314 houses. I found each and all of them in an indescribably filthy condition, both inside and out, dung heaps, ordure, garbage and sewage puddles being met at every turn. The villages are made up of a jumble of miserably poor thatched huts, many of which are built on old dung heaps on the sides of which I found pigs grubbing and burrowing, but in each there are several good brick built houses. The streets are narrow and winding, and are worn into a gutter in the middle line by the cattle and human traffic, and together with the courts and huts are in a very filthy condition. It is surprising how the people can consent to live in such squalor and dirt, considering that they are by no means compelled to do so by poverty, for in several of the houses I found the men and women well dressed for their class, and apparently well nourished, though not remarkable for robust build and healthy appearance. The ground round about these villages is much hollowed and excavated, and covered with dung heaps and stagnant ponds. In each case I pointed out these defects to the lambardárs, and showed them how every shower of rain must give rise to unwholesome exhalations from this mass of rottenness. They readily acknowledged the force of my observations, and admitted that this filth was the cause of the severity of sickness amongst them during the rainy season especially, but confessed themselves helpless to alter the habits of the people.

The villages all along this tract bordering the course of the west Jumna canal are notorious for the unhealthiness of their climates, particulary after the monsoon rains, owing to the extreme prevalence of fevers. The cause of this prevalence of fevers is attributed to the water-logged condition of the country, especially in the vicinity of the canal, and very fairly so; but there is no doubt that the very filthy condition of the villages themselves also exercises a powerful and active influence in determining the type and fatality, if not also frequency, of this class of diseases.

A great deal may be done to counteract the evils emanating from the soil, and to mitigate the severity of the diseases produced by them, by the maintenance of a decent state of conservancy and sanitation in the villages. But of this there is little hope so long as the people continue to herd with their cattle under one and the same roof, and so long as they are left to their own carelessness and ignorance in the most simple common-sense matters of domestic hygiene I see no means of effecting any solid improvement in the present most unsatisfactory condition of these villages, except by the authoritative enforcement of some simple and easily practicable rules of conservancy. The rules proposed in this connection are given in section VI, Fevers; and need not be here detailed. If these rules were once enforced, and the civil officer made periodical inspections to see that they were properly observed, there is no doubt the people would soon accommodate themselves to the new order of things; and, learning the importance and advantage of cleanliness in their persons and dwellings, would of their own accord seek to improve their condition.

KARNAL.

Chief features of Karnál town.

Is an ancient town said to have been founded by a Rajah Karna, and to be of the same age as Pánipat. It is situated on the west side of the west Jumna canal and lies in a hollow with reference to the surrounding country, but stands upon a site slightly raised above the ground immediately around. This rise increases gradually towards the central part of the town, and thus affords natural facilities for a free surface drainage of the intramural area, but no more.

The town contains 5,437 houses, of which 852 are shops and 130 are uninhabited, and is enclosed within walls in which there are 9 gates. Outside the walls runs a circular carraige road metalled with *kankar*. The streets and passages throughout the town are paved with bricks set on edge, as in Pánipat, and the pavement with its shallow mid-line gutter serves as drain and sewer combined. I found these gutters everywhere sodden and silted with sewage, and in the main thoroughfares much broken and dented by traffic. Some of the gutters carried a thin current of sewage, the passage of which was much interfered with by the traffic to and fro of men and cattle. The sewage and drainage passes out of the town near its main gates, through good, open masonry drains which discharge beyond the circular road into a wide shallow pond on the south side and into the Gandanala ditch on the north side. This ditch runs to the west Jumna canal, and when full or flooded by rain is baled out into it, as the canal flows at a higher level. The pond on the opposite side of the town is a very wide sheet of water, which is separated from the town walls only by the width of the circular road. Its further shores are reed-grown and marshy, and those next to the road are set with a number of washer-men's slabs, on which I found the men at work with their dirty clothes. At each end of this row of slabs was a town sewer discharging into the pond at only a few paces distance from the nearest washer-men. This pond, whose water is on a level with that of the canal, may be considered as the source of water supply for the people of the town, and as continuous with its sub-soil water stratum, since all the wells in the town strike water at the level of its surface. It is in fact merely a portion of the sub-soil water stratum exposed to view by a depression (most probably artificially produced) in the surface of this water-logged tract.

Drainage and sewerage.

Owing to the unfavorable nature of the surface it seems impossible to carry away the drainage of the town. It all accumulates and stagnates on the surface of the low ground on its south and east sides. After rains the whole of this semi-circular tract remains flooded quite up to the town walls for weeks together, and the same is the case to a less extent on the north side opposite the Ganjina gate. At these times sickness is in every house, and the mortality severe, especially, the people say, amongst the infantile population.

On the north and west sides the country slopes up gently to a slightly elevated plateau. On this the civil station is laid out, and along it runs the alignment of the new canal, which it is hoped will in a measure relieve the water-logged site of the native town.

Owing to the saturated condition of the soil here, the liquid sewage of this town is not absorbed by soakage as it is in most other towns similarly paved and drained, and consequently the gutters are always either flowing with sewage or sodden by stagnant little puddles of it, greatly to the detriment of the water-supply, which thus becomes contaminated with sewage which has not even filtered through the soil.

Pavements and streets.

The pavements in the main bazárs and streets are much out of repair, and worn into hollows and ruts by wheels and cattle traffic. When the streets are repaired, it would be well to lay them down on an improved plan, with a convex or "fish-backed" (*máhi pusht*) roadway and open surface drain at each side, the bricks of the latter to be set in lime cement. In the narrower passages and "impasses," where traffic is limited and does not include wheeled vehicles, the present system is not so objectionable as it is in the main thoroughfares, but even in them it would be advantageous to have a clear roadway with side drains, so as to do away with the evil of house sewage streaming across the pavement at every few yards on its way to the mid-line gutters.

The town sweepings and night soil are removed by the municipal and mohalla sweepers independently of each other, and stored separately for disposal by sale to their own respective advantage. The municipal committee has fixed upon no sites for the deposit of these refuse matters, nor does it exercise any control upon their disposal. At a few hundred yards to the south of the town, and beyond the pond before mentioned, is a vast collection of the skeletons and carcases of cattle. The site is well removed from the town, but it lies low, and the ground is marshy. A preferable site would be the high ground amongst the old brick kilns on the west of the town, between the Hindu cremation ground and Muhammadan cemetery at the one hand and the Hánsi road on the other.

Slaughter yard.

On the east side of the town, at a short distance from the Miran gate, is the slaughter yard. I found it in a very neglected state, and giving out an intolerable stink from a mass of putrid blood, &c., immediately in its rear, and evidently the accumulation of many months. The place is a dangerous nuisance, and much too close to the town. It should be at once abolished and the ground ploughed up and exposed to the air for some months, a new site being selected at some more distant and suitable spot.

Dung heaps.

Near the slaughter yard, and extending for some distance north and south, opposite the Miran and Nawáb gates, and between them and the canal, is a vast collection of dung heaps. They are regularly ranged in square blocks, and are formed partly of the sweepings and filth from the town, and partly of the like matters brought in from surrounding villages. At the time of my inspection several cart-loads of this latter arrived on the ground, and I was informed that it had been purchased from the villagers at the rate of 2 anas a donkey-load for use as manure on the fields about this town. The site of these dung heaps is too close to the town, and the ground on which they stand is low and water-logged, and in immediate proximity to the sources of town water supply. A preferable site would be the high waste land above indicated on the west of the town.

Latrines.

There are six public latrines at convenient sites outside the walls. They are used indiscriminately by both sexes, and are built of mud walls covered with a thatched roof. Each latrine consists of a row of six or eight compartments, each of which contains four seats formed of cross beams, and is furnished with coarse pottery utensils. Attached to each latrine is a shed for the storage of dry earth, but both those I saw were perfectly empty, and it was evident from the filthy and sodden state of the floors of the compartments that dry earth was not used in their service. The filth is buried in pits close to the several latrines.

Conservancy establishment.

The conservancy establishment consists of an overseer at Rs. 10, 5 mates at Rs. 5 each, and 37 sweepers at Rs. 3 each a month, besides 4 water-men at Rs. 4 each and 2 trench diggers at Rs. 5 each a month, and there are 4 hand carts for the removal of street sweepings. The establishment is a strong one, considering that their services are confined to the main streets, bazárs, and public latrines. On the whole, the town is well kept so far as mere street sweeping is concerned, but the surroundings outside the walls were in a very untidy state, and in some parts in a horribly filthy condition from neglect.

Water supply.

The water supply is from wells and tanks. Of the latter the "Karan talao" on the north side of the town is the largest and best, and is well kept. There are 147 wells inside the town walls, and 276 outside within municipal limits. None of them are brackish or saline, but the water of most of them is flat and insipid, and sometimes has a disagreeable taste. It is considered extremely unwholeseme by strangers, and is pronounced of very inferior quality by the reisdents. If allowed to stand for a few hours after being drawn its surface becomes covered with a thin film of oily matter. It appears that no recent analysis of this water has been made, and I advised the municipal committee to send samples for analysis to the chemical examiner, Lahore.

It is a matter of the highest importance that the well water of this town should be most carefully protected from all preventable causes of contamination, and be preserved in as pure a state as the peculiar circumstances of the locality will admit of. With this object in view, there is a great deal requiring immediate attention in respect to the conservancy of the town, as has been pointed out in the foregoing paragraphs.

I have stated that the water supply of the town may be considered as derived from the filthy sewage pond just beyond its walls, on the south, and will now endeavour to show how it may be traced under the walls and the heap of debris upon which the houses of the present town stands, to the wells of the intra-mural area.

Close on the west side of this pond is a Hindu temple with a well attached. The well is 26 feet deep including 21 feet of water and 4 feet parapet. The water is only 1 foot below the surface of the ground around, and is seen to be on the same level as that of the adjacent pond.

Nearly opposite this temple is the Játon gate of the town, and a little up the slope of the street within it, is a well protected by a platform 5 feet high. At 6 feet lower down is reached the surface of the water, which stands 24 feet deep. The 6 feet between the base of the platform and the surface of the water marks the rise of the ground from the edge of the pond, some 60 yards distant. Branching to the left of this street, and higher up the rising ground, is the *chamaran* mohalla. At its top is a similar well, the platform of which is 4 feet high. The surface of the water is reached at 34 feet lower down, and the water itself is 18 feet deep, thus giving 34 feet as the rise of the ground from the pond. From the top of this well the spectator looks over the town walls down upon the pond, and it appears clear that its water and that of the well are on the same level, and one can imagine their direct continuity under the intervening structures.

Further on in the interior of the town, in Khatri mohallah, is a well, the platform of which is 2 feet high above the pavement; the surface of the water is 33 feet lower down, and its depth 25 feet.

Again in the Shahgunj bazár is a well with a platform 3½ feet high above the pavement. The water is 17½ feet lower down and stands 17 feet deep.

Lastly, on the opposite side of the town, outside the Gunjína, gate is a well with a parapet 3 feet high, and its water level barely 3 feet below the surface of the ground around, though the water itself is 22 feet deep. It is thus seen that the water in these wells stands at about the same level as that in the pond, and it appears further that it is most probably directly continuous with the latter under ground, because in flood seasons the two are observed to rise and fall simultaneously.

The state of this pond on the south and of the Ganda nala ditch on the north of the town I have already described. They are the receptacles of its sewage and are much two close to the walls. It seemed to me practicable to carry away the sewage to a distance in the north-east and south-west directions, either by means of glazed pipes or masonry drains, and short of this I do not see how it is possible to protect the wells from sewage contamination, though this alone will by no means suffice for the purpose. It is absolutely necessary besides to maintain the most strict cleanliness in and about the town, and to place its conservancy arrangements under the supervision of a properly qualified and energetic superintendent.

Birth and death registration.

The municipal birth and death registers are well kept. The death register for 1877 showed a total of 1,001 deaths, including 95 still-born or died soon after birth against 1,442 in the previous year, and 1,656 in the year before that. There were 48 convulsions, 31 small-pox, 84 bowel complaints, 83 diseases of the chest, 4 enlarged spleen, 6 dropsy, 12 puerperal fever, 6 brain fever, 563 fevers, and 69 "other causes." Of the fever deaths, 202 occurred in infants up to 5 years of age, and of the whole number 381 occurred within 15 days of illness, 40 between that and thirty days illness, and 142 after more than 30 days of illness.

The birth register showed a total of 844 births against 776 in the previous year, and 896 in the year before that.

The difference between the total annual deaths and births in this municipal town is very striking; and a similar excess of deaths over births is found, on examining the registers, to extend back to 1870. For the 8 years from 1870 to 1877 inclusive, the total number of deaths registered in the municipality of Karnál is 8,074, and of the births 5,046, *viz.* boys 2,760, girls 2,286, and this in a population of about 24,000.

THANESAR.—District Umballa.

Population 7,111. (*Census* 1875).

Statement of births and deaths of Thánesar town from 1870 to 1877.

Classified statement of deaths and births for the town of Thánesar from the years 1870 to 1877 inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers..	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death rate mille of population.
							Total.	Male.	Female.		
1870 ...	..	40	255	10	79	384	*Registers not kept.*				48
1871 ...	...	40	320	...	98	458	Do.	Do.			58
1872 ...	3	34	252	1	115	405	*99	48	51	17	51
1873 ...	...	41	131	5	139	316	192	102	90	24	40
1874 ...	...	35	110	36	132	313	216	131	85	27	39
1875 ...	...	43	111	...	120	274	204	102	102	26	34
1876 ...	...	46	95	15	140	296	227	126	101	32	42
1877 ...	...	31	77	1	92	201	210	111	99	30	28

* For 39 weeks only.

Inspected, 16th and 17th January 1878.

Chief features of Thánesar town.

The present town occupies the site of a succession of more extensive and very ancient cities that have flourished and passed away upon this spot of the historic field, and, to the Hindu, sacred soil of Kuru-kshetar, the scene of the Mahábhárat. Its houses are substantially built of red brick, and are spread over a number of mounds formed by the debris of ancient ruins. These mounds rise to a considerable height and afford many facilities for a free and natural drainage of the town area on to the low ground and hollows encompassing it.

The environs are studded in all directions with Hindu temples and tanks and places of pilgrimage, and they are mostly concealed from view by the foliage of their groves and wide-branching banian trees. Interspersed amongst them are numerous mounds, the relics of former mansions or temples, or perhaps merely the heaps of old brick kilns, with patches of waste ground, excavated hollows, and plots of cultivation here and there at hap-hazard; whilst beyond and to the eastward stand deserted, silent, and isolated in their several compounds the dismantled and decaying bungalows of the former short-lived civil station.

The population of the town according to the census of 1875 was 7,111, mostly Brahmans and other Hindu castes. In 1868, it was 7,830, and in the settlement census taken in 1849 it was 12,905. In this last year the number of inhabited houses was 6,412; at present it is 2,459 including 281 shops, and 502 in ruins or unoccupied. A tour of the town certainly supports the correctness of these latter figures, and conveys the impression that it is steadily declining in prosperity and population, notwithstanding the fact that it is an important place of Hindu pilgrimage.

Assemblage of pilgrims on occasions of the eclipse of the sun.

The greatest assemblages of pilgrims take place on occasions of eclipse of the sun, and their numbers at such times are variously estimated at from 400,000 to 700,000 souls or more. It appears that according to the ordinances of the *Shástar* (Hindu Bible), it is incumbent on each pilgrim to stay here at least 3 days. Many, however, cannot afford more than a single day, though by far the greater number stay six or seven days. The pilgrims begin to arrive about a week before the day of the eclipse, and their greatest influx is on that day itself. They begin to disperse on the following day, and by the end of 8 or 10 days after the eclipse have all left the place.

During their stay here they are lodged in the hospices of the several temples, and in the saráis, shops, and empty houses of the town, which are all prepared before hand for their reception; or they provide shelter for themselves in tents about the tanks and temples; or, as is the case with many thousands, they manage as best they can under the shade of trees or on the bare plain, with such devices for protection from the weather as their slender means admit of.

On the day of the eclipse they all bathe in the sacred tanks of the place, and the rush and tumult at this time is described as very great, though accidents are generally prevented by the careful police arrangements, and other precautionary measures adopted by the civil authorities, especially in respect to sanitation and medical care.

Description of the tanks in which the pilgrims bathe.

The pilgrims first bathe in the Sunyahet tank, then rush off in their wet garments to the Báyusar or Kuru-kshetar tank, a few hundred yards to the west, and from this to the Thántirat tank about three quarters of a mile distant and on the opposite side of the town; and the object is to accomplish the three bathings within the period occupied by the eclipse.

Besides these three principal tanks and temples, there are 357 other places of pilgrimage within the limits of Kuru-kshetar which are supposed to require a visit from the devout at such seasons. The limits of Kuru-kshetar are marked by lines drawn direct between the four following points, namely, 1 Rattan Yaksh near Pipli tahsil; 2 Bhachakruk Yaksh near Sámli Brás on the trunk road to Karnál; 3 Rám Yaksh near Rámradh in Jhind territory, and 4 Bahr Yaksh near the village of that name in Patiála territory. The extent of Kuru-kshetar from north to south is reckoned at 40 *kos* or 50 miles, and of the 360 places of pilgrimage (tirath) within its municipal limits no less than 125 are in the town-lands of Thánesar, or within a radius of two miles from the town; and of these there are 60, which are constantly visited by devotees all the year round, though in greater numbers on festival occasions.

I visited the sarais in the town, and the hospices (*dharmsála*) of the three principal temples, and found them capable of accommodating many thousands of people. They were in a generally clean and tidy condition, though I was struck by the physically inferior and unhealthy appearance of the Brahmans and pilgrims seen in the latter domiciles. Beyond noticing the presence of a leper in the Sunyahet dharmsála I did not detect the existence of any disease amongst these people.

Main bazár.

Thánesar is an open town, and so far as the inhabited part goes, consists of a main bazár (which winds through its lower lying parts from the Molri well and Sheodiwâla on the east to the Macbarah Sheikh Chilli on the west), and of a number of wards or dwelling quarters on either side of its course; those towards the north rising over the mounds in that direction, and those towards the south occupying the lower ground which slopes to the outskirts of the town.

The main bazár is metalled throughout, and has an open drain at each side. These drains slope in opposite directions from the centre of the bazár and discharge into hollows and pits on the south and north sides of the town, and in close proximity to the roads leading to the Sunyhahet and Thántirat tanks respectively. The two ends of the bazár are occupied by long rows of shops of uniform pattern and of uniform decay. They are entirely untenanted, and are for the most part roofless and falling to pieces, I looked into some of them, and from the state of the floors it was evident that they were commonly used as latrines. The drains too were in a foul state with sewage silt and accumulations of street rubbish, which blocked their channels, and caused stagnation of the sewage flowing into them from the alley gutters on either hand.

Most of the passages in the dwelling quarters (*mohalla*) are paved with brick, and drained in the usual fashion by a mid-line gutter; and many of the houses are provided with sewage sinks like those which have been described in previous reports. I found these alleys and passages generally in a clean and tidy condition, though the same cannot be said of the main bazár and town outskirts.

Owing to the large number of unoccupied and ruined tenements, some of which are of very considerable size, in all parts of the town, the task of keeping it clean and tidy is unusually severe; but it does not appear to me that the best means are adopted to overcome this difficulty, though the tahsíldár, Kanhaya Lall, spares no pains to keep the main thoroughfares in as presentable a state as he can with the very limited agency at his command.

Conservancy.

The conservancy of the town is farmed to a contractor, on account, it appears, of want of unanimity and public spirit amongst the members of the municipal committee, who thus rid themselves of the distasteful duty of supervising it. At first the contract price was fixed at Rs. 65 a month on condition that the contractor maintained 16 sweepers for the service of the main bazár and public roads, and 4 *pakhál* bullocks for the emptying of the town sinks. In the following year the price to be paid by the municipality was reduced to Rs. 52 a month, and for this year it has been again reduced to Rs. 48½ a month, the same contractor and the same establishment being maintained as before. Party jealousy is at the bottom of the contractor's undertaking the work at this nominal rate, and practically his execution of it is only nominal too. The sweepers and *pakhál* buffaloes were paraded for my inspection, and numerous complaints were made to me of their inefficiency and neglect of duty. Both men and cattle were in miserable plight. The buffaloes were so lean and weak that they could barely support the weight of their empty *pakhals*, and one of them died the day after my inspection; whilst as for the miserable and nude (from poverty) sweepers the only useful thing about them was the broom each held ostentatiously before him.

Latrines.

There are no public latrines here. No sites have been fixed by the municipal committee for the shooting of rubbish and town filth; nor could the contractor point out to me any site on which his men deposited their sweepings. Most of it, he said, was used up in the brick kilns of the place. I found growing dung heaps close to the houses at the Kaithal gate, and also on the sides of a deep dry pond near the Government dispensary, besides others on the north of the town; whilst the ruined tenements in all directions had each its own collections of rubbish and ordure.

The contract system evidently does not work well in this town, and it is therefore highly desirable that the whole conservancy establishment be recast and constituted on a proper working basis, and be placed under the supervision of the medical officer here. Subject as this town is to the sudden influx of enormous numbers of casual visitors, it is of the first importance that its conservancy should be at all times maintained at the highest attainable standard. This can best be effected by a properly organized and carefully supervised permanent establishment sufficient in strength for the ordinary requirements of the town; the same to be strengthened as occasion may render necessary.

Water supply.

The water supply is from wells and tanks. The number of wells in and about the town is 500, and of these only 20 yield sweet water. In all the rest it is more or less brackish, and in some too saline for any use at all, though that of the less saline wells is used for drinking and cooking purposes. All the 20 sweet wells are situated close outside, or on the skirts of the town. Besides these there are 124 other wells within the municipal limits in the fields round about, and they all yield sweet water. The depth of the water below the surface in these is about 26 feet. In the town wells it varies according to the elevation of the site.

Tanks.

There are four principal tanks, and 10 or 12 cattle ponds, round about the town. The former are Sanyahet and Buyasar on the south side, Thantirat on the north, and Nabhtirat on the west. Each of them covers a wide area and is provided with bathing ghâts or flights of masonry steps. I found the tanks themselves, as well as their temples and attached hospices, in a remarkably clean and well kept condition.

Cattle ponds.

The cattle ponds are lesser sheets of water and closer to the town, whose drainage, after every good fall of rain, passes direct into them, carrying with it all the surface filth and sewage of the gutters. The largest of these ponds are on the north and west sides, and communicate with the tanks of Thantirat and Nabhtirat respectively.

Drainage.

The natural drainage of the country is from the north-east to south-west along the channel of the Surasti rivulet. In the rainy season this stream overflows and inundates the environs of the town. To prevent this and divert the flood to the westward a dike has been raised at a few hundred yards to the north of the town; but the whole neighbourhood bears signs of being periodically flooded at the rainy season.

As I have done at other places, so here I spoke at length to the members of the municipal committee and the towns-men who accompanied me in my tour of the place on the subject of their town conservancy, and pointed out the great importance to them of their exerting themselves, not only to maintain an appearance of cleanliness in their main bazárs and places of public resort, but to adopt early and effective measures to prevent the progressive deterioration of the soil of their town by the daily accumulations of sewage and other impurities on its surface. I explained to them how these matters became absorbed into the soil and sunk into its lower strata, and drew their attention especially to the condition of the dwelling quarters and private tenements, as being those parts of the town in which this contamination of the soil went on most extensively and persistently, as was evidenced by the fact that no less than 480 of their 500 town wells were now rendered unfit for drinking use by reason of the salts which had reached them from the surface by percolation.

The members of the municipal committee expressed their earnest desire to do all in their power to improve the condition of the town, and looked forward hopefully to the transfer to it of the tahsíl establishment from Pipli (which they said was now under the consideration of Government), because it would strengthen their hands, not only by the presence on the spot of authority, but by the increased funds which would accrue from the activity and trade associated with it as a centre of business. In the meantime they promised to assign suitable sites for the shooting of town filth and sweepings, and to build upon them low mud wall enclosures for the reception of such matters, and to punish by fine infringements of this regulation. They also promised to see that the house drain sinks (of which in my tour I pointed out several as being in a horribly foul and disgusting state from neglect) were at once cleaned out and properly attended to in future. If these simple measures are properly carried out, they will greatly improve the sanitary condition of the town.

SHAHABAD.—District Umballa,

Population 11,660. (*Census* 1875).

Statement of births and deaths of Shahabad town from 1870 to 1877.

Classified statement of deaths and births for the town of Shahabad from the year 1870 to 1877 inclusive :—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Male.	Female.		
1870	...	30	94	20	57	201	Registers not kept.				17
1871	...	23	185	68	70	346		Ditto.	Ditto.	Ditto.	30
1872	30	42	178	10	126	386	* 222	134	88	25	33
1873	...	46	114	5	170	335	368	187	181	32	29
1874	1	21	110	85	113	330	359	184	175	31	28
1875	44	22	78	8	179	331	421	238	183	36	28
1876	...	21	95	4	147	267	293	166	127	25	23
1877	...	15	54	1	106	176	377	206	171	32	15

* For 39 weeks only.

Inspected, 18th and 19th January 1878.

Chief features of Shahabad town.

Shahabad is an open town situated on a level site at the side of the trunk road, 12 miles south of Umballa cantonments, and dates from the time of the first Muhammadan conquest of India. It contains 2,500 houses, of which 280 are shops and 80 are uninhabited or in ruins. The houses are mostly built of red brick, but on the outskirts of the town are some considerable clusters of mud huts overcrowdedly huddled together. The bazárs and main streets are paved with brick and drained by a shallow gutter in the central line. Both pavements and gutters are much broken and dented by wheel traffic, and are everywhere streaked and sodden with sewage.

Streets.

The side streets and alleys are mostly unpaved and undrained, but, like the paved streets, they discharge storm waters and such sewage as flows on to the surface outside the town, whence they find their way to the hollows and ponds around, or stagnate in puddles as the case may be. But as a rule the sewage does not go beyond the limits of the inhabited area, being soaked up by the soil of the streets. When these old pavements are renewed, it would be well to introduce the "fish back" form with a convex roadway and gutter at each side instead of repeating this faulty and objectionable style.

Conservancy.

The conservancy establishment consists of only 14 sweepers at Rs. 2-9-0 each a month for the service of the bazár and public roads, and one sweeper at Rs. 2-2-0 a month for the service of its single public latrine, and there are besides 4 *pakhál* sweepers at Rs. 7 each a month for the service of the house sinks. These men are supposed to be under the direction of the municipal clerk supervised by the committee, but practically they are under no direction or supervision at all, and consequently the conservancy of the town is sadly neglected. I found the streets in a dirty state everywhere, and especially in the Sikh quarters, where heaps of refuse and ordure were allowed to accumulate in corners and back yards about the tenements; whilst all round the town the ground was in a most offensively filthy condition from the night soil and town sweepings thrown on to it at random.

On the south side, opposite the Pathán quarter, I counted six separate spots where this filth was cast on to the surface, and as there was no limit to the area thus defiled, each spot extended over 30 or 40 square yards of ground, and was separated from its neighbour by no much greater interval. The land on this side up to Devi tank (the greater part cultivated) is used as an easing ground, and poisons the air of the vicinity with villainous stinks. Between these fields and the town is a wide cattle pond. Its bank on the town side is formed by old manure heaps, whilst the surface all about it and away quite up to the brick kilns (one of them is almost contiguous with some of the houses of the town) in the direction of the trunk road, is strewed with basket loads of night soil and house refuse. The stink from these little heaps of filth was abominable, and many of them had been spread out and scattered all over the surface by pigs, poultry and carrion birds, and the passage of cattle.

Nearer to the trunk road, on the same side of the town, is another pond. It is overshadowed by a brick kiln, and on its edge is a well which is the source of drinking water for the towns'-people of the Chamár caste. The tube of the well, including about 3 feet parapet, is 11 feet down to the water, which is seen to be on the same level as that of the pond. An interval of only 5 or 6 paces separates the well shaft from the pond water, and on the slope of this surface I saw the decaying offals of dead cattle, over which some hungry dogs were fighting. The ground immediately about this well, as in most of those seen in the town, was in a very filthy condition, the waste water being continually trodden into a foul black slush all round the parapet. I observed the like defects on the north side of the town, though to a less extent; whilst on the west I noticed that the town side of the pond there was formed by a huge dung heap of old date, and in contact with the houses adjoining.

The conservancy establishment of this town requires to be forthwith remodelled, properly organized, and placed under qualified direction and control. The members of the municipal commitee who accompanied me in my tour expressed themselves ashamed of the filthy condition of their town and of the many defects I pointed out to them. On the south side the stink was so disgusting that they were obliged to muffle their faces in their handkerchiefs or coat skirts; and they promised to fix upon suitable sites and have them enclosed within low walls for the shooting of rubbish and town filth.

Latrine.

The only public latrine here is a double block for men and women respectively, and is built of mud masonry on the usual plan, with a small shed attached for the storage of dry earth, of which it bore no signs of ever having held any. The men's side contains a row of 4 or 5 roofless compartments without seats or utensils of any kind. The floors were sodden with excreta, and altogether the place was in a filthy condition, although it had just prior to my arrival undergone a hasty cleaning, the first it had received for many a day.

Water supply

The water supply is from wells and tanks. There are 81 wells inside the town, and of these 50 are more or less saline and unfit for drinking use. There are 29 wells round about outside the town, and of these 13 are saline and unfit for drinking use. The depth to the water level inside the town varies from 24 to 30 feet, whilst just outside it is from 7 to 12 feet below the surface of the ground.

Most of the wells are soppy and miry around their parapets from want of a conduit for waste water and spillings, and many of them are in the close vicinity or in actual contact with sewage gutters and sinks.

The Devi Talao, a few hundred yards to the south of the town, is the only masonry tank here. It is of small size, and contained bright and clear water which I found covered with a fresh green scum of vegetation. It is fed by the surface drainage of the country to the eastward. Neither this tank nor the town wells have been cleaned out for several years.

Cattle ponds.

There are 9 cattle ponds about the town skirts. They receive all its surface drainage and sewer washings after rains, and are all in a very filthy state, and are habitually polluted by all manner of filth shot on to their banks. This unnecessary pollution could easily be prevented by the provision of walled enclosures or middens for rubbish and night soil.

Birth and death registration.

The municipal registers of births and deaths are well kept. With reference to the small number, only 3, of deaths registered under small-pox, I was informed that the disease had become remarkably mild in its attacks. At the Government school I examined a number of little boys, and found many of them with good vaccination marks, but in one group of six I found three with genuine scars and three with mere lancet scratches. I took advantage of the opportunity to explain to those about me that these childern were in no way protected from small-pox by the operation which had left these scars, and showed them by comparison of arms the signs of the genuine protecting scar. I told them that these childern should be vaccinated on the first opportunity, and strongly advised them to choose arm to arm vaccination in preference to any other method, because it was the one which offered the surest protection. The advice was readily accepted on its own merits, and I was told by several that their childern had been so vaccinated on the last occasion that the vaccinators had visited this town. This is the third cold season since any vaccinators came here, but their arrival is expected shortly, as they are now working in the villages of the district.

UMBALLA.—District Umballa.

Population 26,258. (*Census* 1875).

Statement of births and deaths of Umballa town from 1870 to 1877.

Classified statement of deaths and births for the town of Umballa from the year 1870 to 1877, inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	1	37	177	21	71	307	Register not kept.				13
1871	1	43	234	22	74	374	Do.	Do.			15
1872	98	78	582	37	379	1,174	* 292	171	121	16	49
1873	...	75	302	8	298	683	643	347	296	27	28
1874	1	115	381	21	331	849	973	520	453	40	35
1875	1	121	381	22	419	944	1,022	546	476	43	39
1876	..	204	502	26	445	1,177	1,120	553	567	43	45
1877	...	93	262	3	380	738	1,083	564	519	41	28

* For 39 weeks only.

Inspected, 20th, 21st and 22nd January 1878.

Chief features of Umballa town.

The town is said to date from the time of the emperor Akbar, who had a palace here in the Bádshah Bágh (now occupied by the treasury and court of justice) in the suburbs; but has only attained its present dimensions and importance since it came under British rule, under which it has nearly doubled its original size.

Its situation lies low with respect to the surrounding country, and it used to be subject to serious inundations after heavy rains until protected by dikes which divert the drainage of the country to the north-east away from the town in a south-westerly direction. There are two of these dikes; one runs through the civil station, and the other further off in the direction of cantonments; and it is observed that since they were raised, the subsoil water has diminished greatly in quantity, even to the drying up of most of the wells in the town, especially on its western side.

The town lies flat on level ground close to the north of the line of Railway from Delhi to Lahore, and contains 7,321 houses, of which 999 are shops; 44 of the shops and 166 of the houses are unoccupied. The houses are mostly built of brick masonry, and several of them are substantial and commodious buildings. There are three new bazárs with good airy roadways, which are metalled with *kankar* and have open side drains of brick masonry; and there is also the old bazár of narrower width paved with brick in the native style. I found all these bazárs and the streets leading from them in a remarkably clean and wholesome condition.

In the *mohallas* also I found the thoroughfares and alleys (they are almost everywhere paved and drained in the native fashion with bricks set on edge), in a commendable state of cleanliness and generally free from offensive odours and sights, the result probably to some extent at least of a very limted water supply. In some parts, however, I noticed that certain houses discharged their sewage on to the public road, where it formed filthy little puddles of stinking mire. I drew the attention of the members of the municipal committee who accompanied me on my tour to these houses, and they informed me that several notices had already been served upon the proprietors to

have sewage sinks erected, but so far without effect. As the cost of these cess-pits is only 4 or 5 rupees, it appears to me that these are cases in which the municipality should enforce attention according to their bye-laws.

I found the house sinks and surface drains in most parts of the town well attended to, and the general conservancy of the place well looked after. The advantage of the "fish back" pavement with convex roadway and open side drains has been recognized here, and wherever new pavements are laid down or old ones renewed, this improved system is adopted in place of the old hollow roadway with its mid-line gutter.

Conservancy establishment.

The conservancy establishment consists of two mates at Rs. 5 each, 23 sweepers at Rs. 4 each and 10 *pakhális* at Rs 12 each a month for the service of the bazárs and public roads, and of 9 sweepers (of whom 4 are women) and 4 trench diggers at Rs. 4 each a month for the exclusive service of the public latrines. There are besides 1 inspector of meat market at Rs. 12 a month, and 7 chaukidárs at Rs. 5 each for the cremation grounds and graveyards. These chaukidárs were originally appointed for the purpose of registering the number of corpses brought for cremation or burial, with a view to testing the accuracy of death registration, but now that registration is fairly established, I think they might be dispensed with, and the money thus saved be expended in increasing the sweeper establishment for more extended service in the *mohallas*, especially in the matter of their cess-pit service. Besides the above there are three conservancy carts (one for liquid sewage) at an annual cost of Rs. 200.

Latrines.

There are 6 public latrines, all conveniently situated outside the town, with the exception of one for men only in the principal sarái. This last is built of brick masonry, and is roofless, but in other respects in good order. The others are neatly built of mud masonry, and their walls are protected from the wearing effects of rain by a coping of bricks and lime cement. They are built in pairs close together for men and women respectively, and between them is a hut for the shelter of the sweeper and storage of dry earth. The enclosure for men is divided into compartments with 2 or 3 seats in each, and that for women is a mere yard with a screen wall, and one of them has a roofed shed. It is the intention of the municipal committee, I am informed, to roof all the public latrines here. When this is done, they will be the best kept latrines I have anywhere seen. I found them well supplied with dry earth, and furnished with utensils of glazed pottery, and altogether as clean and free from smells as any model latrine in our jails. These glazed pottery vessels have been introduced here by Dr. Bateson, the Civil Surgeon, the good results of whose advice and energetic supervision are observable in all parts of the town.

Slaughter yards.

There are two slaughter yards here, one inside the town on its north-west skirts for goats and sheep, and the other at some distance away to the north-east and beyond the trunk road for horned cattle. I found them both in excellent order and entirely free from smell, or in fact any sign of recent use, though I visited them only a few hours after the carcases had been quartered and carried away to market. The carcases are quartered and cut up on palm leaf mats spread upon the ground, and these are carried away with the meat by the butchers. It would be an improvement if a masonry counter, similar to those in use at Delhi, were built on each side of the pavement on which the cattle are slaughtered. The top of each counter to be formed of slate slabs sloping towards the slaughter floor for all drainage to flow into the gutter of the latter.

In the slaughter yard for cattle there are 2 masonry pavements on which the animals are slaughtered. One for those intended for food, and the other for those killed merely for their hides. Owing to the drought the number of the latter slaughtered here daily during the last 4 or 5 months has ranged from 20 to 50, so I am assured by the members of the municipal commitee. Their carcases are buried in deep pits close by, and afterwards when the flesh has rotted away the skeletons are dug up and reduced to ashes by fire. I saw four pits each 10 feet deep by 16 long and 10 wide ready dug for the morrow's work.

Meat and vegetable market.

Some of the members of the municipal committee are desirous of establishing a separate meat market for the town, instead of the existing custom of opening butcher's shops anywhere and everywhere in its crowded thoroughfares, but owing to the want of unanimity amongst themselves the proposal does not seem to make much progress. It is highly desirable that such shops should be collected together in a separate quarter, if only on account of the facility thus afforded for their proper supervision and sanitation; because, in the bazárs, to make no mention of other objections, the meat is very often exposed for sale over an open sewer drain where myriads of flies pass from one to the other. It would be well also at the same time to make a like provision for the sale of vegetables, and when the committee next discuss the subject they might with advantage consider the two proposals together. A meat and vegetable market under the same roof or in the same enclosure would certainly be preferable to the present practice.

Water supply.

The water supply of the town is from wells and tanks. There are altogether 45 wells inside the town, and of these no less than 35 are empty or run dry. Of the remaining 10, only 3 yield sweet water, the others being either brackish or distinctly saline. The depth of water in these wells is also very little, ranging from only 6 to 16 inches. On the west side of the town the depth of the water below the surface is from 50 to 60 feet, whilst on the east side it is only half that distance down.

Tanks and cattle ponds.

There are 6 tanks and 3 cattle ponds round about the town. The former are fine masonry reservoirs of considerable cubic capacity, and though used for bathing in are carefully protected from other sources of impurity, such as washing clothes, hides, cattle, &c., a chaukidár being placed in charge of each. The two principal tanks are those of Naurang Rái and Kishan Chand on the east and west respectively of the town, and both are largely used for drinking and cooking purposes. They are annually filled by the surface drainage of the country to the northward, and have not been cleaned out for many years. I found the water in each slightly turbid, but otherwise they were clean and well kept.

At the Sukul-kund pond on the south-east side of the city, I noticed that night soil and latrine filth is trenched in some high ground on its bank (ground which drains direct into the pond by a road at its side), and that a brick kiln projects into its water directly opposite. These are very serious and objectionable defects, because there is a bathing ghát on the city side of the pond between these two sources of impurity, and only a few dozen paces distant from either.

Cremation ground.

Adjoining these filth pits is a Hindu cremation ground, and there is another and larger one on the opposite side of the city at a distance of half a mile or so. Neither of them is enclosed, though the Hindu community, I am told, is considering a proposal to enclose both with funds raised by subscription amongst themselves. This is a step in the right direction, and it is to be hoped that the work will soon be carried out.

Of the cattle ponds, one to the south of Kishan Chand tank, and well removed from the city, is set apart for the use of curriers to wash hides &c., in. The washing of clothes in the tanks and ponds is prohibited, and the washermen have a well set apart for their sole use for this purpose. It is on the plain to the north-west and near the slaughter yard.

Leper Asylum.

The leper asylum, under the management of the Christian Mission here, is situated a little off the trunk road to the north-west of the city. The place was clean and tidy, and contained 20 lepers at the time of my visit. They get no medicine, but were well fed and clothed, which is after all the best treatment for the advanced forms of this disease.

Jail.

I found the Jail scrupulously clean throughout, and the latrines furnished with glazed pottery utensils manufactured in the prison factory.

Birth and death registration.

The municipal registers of births and deaths are carefully kept. During 1877 only 3 deaths from small-pox were registered. There are two vaccinators attached to the dispensary here, and they work in the town every cold season under the surpervision of the civil surgeon, but I understand that they meet with very little encouragement from the citizens. I addressed the members of the municipal committee on this subject, and afterwards, in conversation with them and others, learned that there were several reasons for the opposition of the people to the measure. One of the reasons assigned was that the people had learned by experience that vaccination was not the safeguard it was represented to be, because many persons had lost their children from small-pox after they had been operated on by the vaccinators. Another was that they had no confidence in the men employed as vaccinators, whom they considered rough in their manners and unskilful in their work.

Opposition to vaccination.

I examined a number of little boys in the Mission school and also in a Mussulman one, and though I found a fair proportion bearing genuine scars, I came across several with merely the marks of lancet wounds. I pointed out to those around me that these children were not vaccinated, and comparing their spurious marks with the genuine ones on other boys told them that it was by such cases as these in which the operation had failed and not been repeated to success, that vaccination was brought into discredit. They naturally pleaded ignorance of the subject, and said that the people knew no more than what they were told, namely, that by submitting their childern to the operation they would preserve them from small-pox, a belief which in many instances had been falsified by subsequent experience. As I have already said in previous inspection reports, I think that all vaccinators attached to civil dispensaries should be required to produce a diploma of qualification from the head of the Vaccination Department before being allowed to practise the art.

KHARAR.—District Umballa.

Population 4847. *(*Census* 1875.)

Statement of births and deaths of Kharar town from 1876 to 1877.

Classified statement of deaths and births for the town of Kharar for the years 1876 to 1877.

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1876	...	10	180	...	34	224	173	108	65	35	46
1877	...	18	67	...	34	119	148	82	66	30	24

Note.—Statistics for previous years not shown separately.

Inspected, 24th January 1878.

Kharar town.

Kharar is a neat little town situated in the midst of a populous and well cultivated tract, and is almost concealed from view by the mango groves and jáman plantations that surround it. Its site lies low with respect to the general level of the country, though the town itself is slightly raised above the land immediately around, except on the north in which direction it slopes up into an open plain, beyond which is a wide and shallow ravine which conveys the drainage of the country to the north-east away to the low lands in the south-west.

The town cotains 1,608 houses, of which 550 are shops and 190 are uninhabited. The main bazár runs north and south, and has been recently paved with brick on the improved "fish back" model with convex roadway and surface drain at each side. I found it in a clean and tidy condition. Many of the side streets are also paved, but on the old plan with concave roadway and mid-line gutter. I was informed by the municipal committee that all new pavements were in future to be laid down on the improved pattern. In the meantime they present all the defects of the faulty system, such as stagnant and obstructed sewage in the gutters, and cross streaks of the same from houses on either side of the roadway, especially in the unpaved streets where house sinks are not generally provided.

Conservancy.

The conservancy establishment consists of 8 sweepers at Rs. 3 each and 1 sweeper at Rs. 2, and 2 *pakhális* at Rs. 7 each a month for the service of the bazár and public roads, and is supposed to be supervised by the municipal committee. No sites have been fixed for the shooting of town filth and rubbish, nor does the committee concern itself as to its disposal so long as it is removed outside the town. The sweepers usually collect it in different spots around, and sell it to cultivators to their own profit; but on the south and east sides of the town, I found the ground encumbered with these dung heaps close up to the houses and the adjoining high-way, and apparently uncared for, as they were trampled and scattered abroad by the passage of cattle. I drew the attention of the municipal committee to this disgusting defilement of the open ground round their town, and pointed out how easily it might be prevented by the selection of suitable sites at convenient distances from the main gates, and their enclosure within low mud walls, by which means the manure material would be preserved from washing out of its best parts by rain and the loss by dispersion under the feet of cattle, &c. The committee entirely acquiesced in all I said, and promised to adopt my suggestions and select sites at 200 yards from the town, and after enclosing them to pass a rule rendering it punishable by fine to cast town filth anywhere outside them. When this is done, there will be no difficulty in keeping the town environs in a clean and wholesome condition, whilst the work of disposing of the rubbish as manure or fuel for brick kilns will be greatly simplified. I shall be glad to hear that the committee have carried out this good resolution, because I am satisfied that it will confer a benefit upon the whole town.

The *Pakhális* also, of whom there are only two for the service of the whole town, require regulation and supervision. At present they are under none, and empty the sewage carried out from the house sinks on to the fields or any other convenient spot, quite regardless of the vicinity of wells or ponds or roadways, and generally much too close to the town itself.

Latrines.

There are no public latrines here.

Water supply.

The water supply is from wells and tanks. Of the latter there is one good masonry one, and there are besides 3 or 4 cattle ponds. There are 47 wells, of which 32 are inside and 15 outside the town. All yield sweet water except two—one of which is inside and the other outside the town. The depth of the water below the surface is about 15 feet, and admits of the use of lever wells for field irrigation. During the rainy season, when the ravine to the north of the town is in flood, the water in the wells rises from one to two feet, and this is easily understood, as the soil here is light, porous and sandy. This sub-soil fluctuation of the water level accounts also for the general sweetness of the wells, for it is not to be supposed that they have all along escaped contamination from sewage and other impurities daily added to the soil of the town area.

This municipality was only established in January 1875, and consists of 5 non-official members. They appear to be keenly alive to the importance of improving their town, and have already done a good deal towards the advancement of its sanitation by laying down improved pavements and surface drains.

Birth and death registers.

The municipal registers of births and deaths are well kept. There are no deaths registered under small-pox during either 1876 or 1877, though in the preceding year, the first of registration, there were 35. This is the second cold season since the town was visited by vaccinators.

RUPAR.—District Umballa.

Population 10,261. (*Census* 1875).

Statement of births and deaths of Rúpar town from 1870 to 1877.

Classified statement of deaths and births for the town of Rúpar from the year 1870 to 1877, inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	...	6	152	3	27	188	Register not kept.			...	22
1871	...	3	80	1	36	120	Do.	Do.		...	14
1872	75	7	181	18	140	421	* 125	78	47	19	48
1873	...	26	179	3	122	330	249	114	135	29	38
1874	...	13	87	1	96	197	289	154	135	33	23
1875	1	22	136	8	93	262	294	140	154	34	30
1876	...	24	436	...	106	566	241	149	92	24	55
1877	...	9	117	...	38	164	120	65	55	12	16

* For 39 weeks only.

Inspected, 26th, 27th and 28th January 1878.

Villages on the line of march from Kharar to Rúpar.

The road from Kharar to Rúpar runs in a north-westerly direction across a populous and well cultivated tract of country, which is crossed by three great ravines, whose general course is from the hills in the north-east towards the river Sutlej in the south-west. They are wide, deep, and irregular channels worn in a loose sandy soil, and in the abrupt form of their banks and sharp cuttings evidence the action of violent and voluminous floods, such as occur here in the monsoon season.

The land lying between these ravines is high and generally well drained, and presents no signs of the surface lodgments such as were observed in the neighbourhood of Umballa, though in the vicinity of Kharar wide tracts are so flooded in the rainy season as to admit of rice cultivation. This crop is largely raised in the Kharar district, and with maize constitutes the principal autumn produce of the soil. At the present time the land everywhere is cultivated up to the village sites, and is covered with most promising crops of wheat and mustard, whilst a large aggregate area is under cotton and sugar-cane. There are also numerous plantations of mango and jáman trees in the vicinity of the villages.

I visited several of the villages on the line of march. They are on the whole not so utterly filthy as most of the same class of agricultural villages I have seen in the southern districts of the Province, especially those inhabited by Ját peasantry; though they are still very far from being in anything like a wholesome condition as to sanitation, and this entirely from the neglect of the most ordinary observances of domestic cleanliness. Dung heaps encumber the surface of the open ground about the villages, and encroach upon their ponds, whilst filth and litter of sorts strew the lanes and courts in all directions.

Amongst the people met in and about these villages, I noticed that an unusual number had an unhealthy anæmic look, and on enquiry was informed that enlargement of the spleen was a common disease in this part of the country, a statement, which I believe is correct, as in the course of the march I came across three men with that organ very much enlarged.

KARALI.

Village Karali.

Population 3,965, is the principal village on this route. It stands a little off the high road, is picturesquely situated amongst plantations of mango and jáman trees, and almost concealed from view by the spreading boughs of some fine groups of banian and pipal trees. It contains about 600 houses, and has a small bazár of well stocked shops in uniform rows, and does an active trade in cotton, oil seeds, and corn. I found the place in a very filthy state and utterly neglected as to conservancy. The surface drainage of a large portion of its area goes direct into a fine wide pond which extends the whole length of the village between it and the high road.

I took advantage of the opportunity to point out to the lambardárs the grave faults of their village conservancy, and in a friendly way explained how easily they might remedy the evils of which I spoke in detail. Gada Singh, their chief, readily acquiesced in all I said, and promised to talk the matter over with the other lambardárs with the view to selecting convenient sites in the fields around, and enclosing them with mud walls for the reception of town filth, &c., as proposed. He said this was a measure they would all consent to, and that there would be no difficulty in carrying it out. I hope he will be as good as his word, and shall be glad to hear that the proposed dung heap enclosures are matters of fact.

RUPAR.

Chief features of Rúpar town.

This municipal town occupies the site of a more ancient city, said to have been founded some fourteen hundred years ago, and is situated on relatively high ground about a mile from the left bank of the Sutlej, where that river quits the hills for its course in the plains. It is bounded on the east by the line of the new Sirhind canal, the excavation of which is only a few hundred yards from the entrance to the town on that side, and immediately to its south is a drainage cut, which runs across from the canal to the westward, where, at a distance of half a mile or so, it discharges into a wide sandy ravine which conveys the drainage of the civil station and land to the north of the town into the river at a point further on towards the south-west.

The town contains 2,737 houses, of which 700 are shops and 80 are uninhabited. The houses are generally well built of brick masonry, and towards the centre of the town rise over an elevation 20 or 30 feet high. The main bazár is metalled and has a surface drain at each side, but they terminate abruptly at each end of the bazár, and empty on to the public roadway in either direction. The streets generally are fairly ventilated, and are almost everywhere paved with bricks or boulders, and have open side drains which empty on to the surface outside the walls. In the *mohalla* alleys and "impasses" the pavements are of bricks with a hollow roadway and mid-line gutter in the usual native fashion.

Streets and drains.

I found the streets and alleys all over the town in a remarkably clean and wholesome condition, and the drains generally well swept, and nearly everywhere quite dry, a consequence of the very limited amount of water available here. In some parts, however, the house sinks were in an irremediably foul state owing to faulty construction and bad repair. Where these sewage cisterns are sunk under the level of the roadway, it is impossible to keep them in a wholesome state by mere baling out. Such sinks should be abolished altogether and replaced by proper ones built on the surface, and provided with a vent on the level of the floor so as to allow of their being emptied and flushed with water into the adjoining gutters. I drew the attention of the tahsíldár and members of the municipal committee who accompanied me in my tour of the place to these and other defects, and received their assurance that the faults pointed out would be at once remedied as suggested. On the whole, I met with comparatively few objectionable sights in the streets, and found decided proofs almost everywhere of attention being paid to the sanitation of the town.

Conservancy.

The conservancy establishment consists of a mate at Rs. 6, and 14 sweepers at Rs. 3 each, besides 5 *pakhális* at Rs. 9 each a month. Their duteis are confined to the service of the bazárs and public thoroughfares, and of the sinks in all parts of the town. They have nothing to do with the public latrines, which are otherwise arranged for. The night soil and street sweepings are removed in baskets or on donkeys, and cast into a hollow near the ravine on the west of the town, and the stuff is then sold as fuel for brick kilns and manure for the fields. Its sale last year (1877) realized Rs. 375. Were proper enclosed sites appointed at convenient distances from the main gates, this sum might be nearly doubled by the larger amount collected and its superior quality. At present a considerable quantity is lost to the municipality by being thrown on to more convenient and closer sites outside the walls, to the detriment alike of the sites themselves and the interests of the town.

Latrines.

There are six public latrines at convenient sites round about the town, 2 for men and 4 for women. They are roofless mud wall enclosures built on the usual plan, and though neatly plastered outside, are in a filthy state inside owing to the want of utensils. I found the floors sodden and soppy with excreta, the stink of which poisoned the air to a distance of 50 or 60 yards around. The service of these latrines is farmed out to a contractor at Rs. 36 a month. Were they roofed and provided with glazed pottery and a shed for the storage of the dry earth, the contractor would have no difficulty in keeping them at all times in a clean and wholesome condition; but this under the existing circumstances is an impossibilty.

Water supply.

The water supply is from wells and ponds, and there is a small masonry tank in the suburbs on the south-west side of the town. There are altogether 68 wells in and about the town, but 18 of them in the eastern part of the town next to the cutting of the new canal have run dry, and most of the others contain only 6 or 8 inches of water, which, when drawn, is very muddy, though otherwise considered sweet and wholesome. About five years ago when the canal cutting was first excavated, the water in the wells nearest its course was observed to diminish, but since the deepening of its bed, about 18 months ago, all these wells with a few exceptions, have run quite dry. I measured six of the wells in different parts of the town. Their total depth varied from 27½ feet to 52 feet according to the rise of the ground. The saráí well on the east side is 27½ feet deep including 1½ feet parapet. It has been dry for about a year. The Phúlchakkar well on the opposite, or west side of the town, is 30 feet deep including 7 feet water and 3 feet

parapet. This well may be taken as representing the ordinary subsoil water level, namely 20 to 25 feet below the surface. The main cutting of the canal is fully 25 feet deep, and the excavation along its middle line, which contains a little water, is about 8 feet more, so that its action in draining the wells within reach is not difficult to understand. It is under consideration of the municipal committee to sink experimental shafts within the tubes of some of the dry wells in view to tapping a lower stratum of water.

Slaughter yards.

Outside the town on the north side is the slaughter yard for horned cattle, and on the opposite side, across the drainage cut, is another for goats and sheep, and combined with it is a currier's tanning yard. I found both in a very neglected condition. The former is a mud wall enclosure consisting of two parts which drain in opposite directions. The part directly within the entrance presents a row of 4 or 5 chambers or huts opening under a verandah on each side of the roadway, which goes straight from the entrance to the slaughter yard proper, the other part of the enclosure. In some of these chambers, the roof had fallen in, and the roadway was covered with blood caked on its surface. The slaughter yard is a square enclosure 10 or 12 paces each way, and in one corner of its floor is a bit of lime cement pavement on which the cattle are slaughtered. Its surface slopes to a central gutter which empties into a deep cup at the edge of the pavement. There is an outlet in one side of the wall for the drainage of the area, but the irregularities of the surface do not admit of any flow towards it. I found the pavement and the floors of the area covered with patches of dried blood caked into the soil and emitting a sickening stench. In wet weather the place must be in a most disgusting and unbearably offensive state. At the time of my visit there were at least 16 horrid-looking, mangy curs in and about the place.

In the other slaughter yard the pavement is of red bricks set on edge, but without any covering cement or plaster. The huts about it also are in a state of ruin. Both these slaughter yard require thorough renovation.

Birth and death registers.

The municipal registers of births and deaths show that the duty of registration is much neglected in this town, and the fact that no fines were imposed upon defaulters evidences carelessness on the part of the committee on this head. The death register for 1877 shows a total of 166 deaths, of which only 31 were in infants up to 5 years of age. In 1876 the total deaths were 565, and in 1875 they were 270.

The birth register for 1877 shows a total of 120 births, against 253 in 1876 and 302 in the year before.

HOSHIARPUR.—District Hoshiarpur.

Population 13,138. (*Census* 1875).

Statement of births and deaths of Hoshiárpur town from the year 1870 to 1877.

Classified statement of deaths and births for the town of Hoshiárpur from the year 1870 to 1877 inclusive :—

year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	Total Births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	...	133	300	37	137	607	*154	82	72	29	47
1871	1	72	132	...	225	430	500	281	219	38	33
1872	200	125	189	30	245	789	565	300	265	44	61
1873	...	122	112	14	252	500	473	231	242	36	38
1874	...	62	107	6	194	369	520	257	263	40	28
1875	...	164	181	7	235	587	511	274	237	39	45
1876	...	332	402	12	252	998	529	292	237	40	76
1877	...	81	150	...	151	382	437	236	201	33	29

* For 21 weeks only.

Inspected, 1st, 2nd and 3rd February 1878.

On the march from Rúpar I inspected the villages of Baláchor, Garhshankar and Máhilpur.

BALACHOR.

Baláchor village.

Population 2,626 ; contains about 600 houses, of which 100 are shops. The whole village is owned by 18 landlords, all of whom are Hindús.

There are 16 wells inside the village and 3 immediately outside. All of them are said to yield good sweet water, except one on the road side in front of the police station. In most of the wells the tubes are much worn from age and want of repair, and the ground about them was miry and slushy from want of drainage provision.

The village generally, both inside and out, is in a very filthy state, and utterly neglected as to conservancy. I pointed out to the lambardárs the discomforts and dangers of such a state of things, and explained to them the simple means by which they could easily remedy these evils. They accepted my suggestions as appropriate, but said that they could do nothing without the support and authority of the district officers on account of the want of unanimity amongst themselves as a community. In fact they wanted many things to be done for them by authority. The head lambardár wished to see filth middens built at convenient sites round the village. Another said that the people wanted first of all their bazár to be put in order, to be paved, drained and widened, and shop-keepers prevented from encroaching on the roadway by building out shop fronts. A third said they were glad the new school house had been built, but they would have preferred to have the bazár improved first, as the old school answered its purpose well enough. Some said, and I have heard the same thing in other places, that the people thought more should be done for their village improvement by the authorities than has been done in return for the sum annually contributed by it to the district funds.

GARHSHANKAR.

Garhshankar town.

Population 5,739; contains 1,470 houses, of which 200 are shops and 160 are unoccupied, and like the last, stands at the side of the high road. It occupies the site of a very ancient town said to have been founded 2,000 years ago, and rises steeply upon the pile of its ruins to a height of 60 or 70 feet above the bazár, which runs round the base of the mound. The streets and alleys are paved and drained in the usual style with bricks on edge, but they are everywhere much out of order and in want of renewal. The whole town is in a very filthy state, and entirely neglected as to conservancy; villainous stinks and offensive sights being met in every direction, in the rear of the town away from the road especially.

There are 22 wells in and about the village, and 4 or 5 cattle ponds. 14 of the wells are inside the village, and all of them, except two, are more or less distinctly brackish. All the others contain sweet water, which lies at only 5 or 6 feet below the surface, and is affected by every heavy fall of rain. The storms of the 26th and 27th ultimo, I am told, caused a rise in them of 6 inches. The ground about all the wells, especially those outside, was in a very soppy and miry state. With the subsoil water so near the surface too much care cannot be taken to keep the surroundings of these wells in a clean and dry condition by provision for free surface drainage.

MAHILPUR.

Village Máhilpur

Population 2,043; contains 600 houses, of which 100 are shops, and is situated on level ground a little way off the high road and beyond a shallow sandy water run or gully, which drains the country to the north-eastward. Most of its streets are paved and drained in the usual style with bricks on edge, and end abruptly on the outskirts of the village, where the gutters empty on to the surface; their contents on the east side finding their way into the drainage gully, and on the others into the pits and hollows around, or else forming miry puddles on the roadway.

The village entertains a staff of 4 public sweepers at Rs. 2 each a month for the conservancy service of its bazár and public roads, but their work is proportioned to their pay, and the condition of the streets, though brushed up for my inspection, showed many signs of habitual neglect, especially in the *mohalla* quarters. The dung heaps were genearlly collected at a good distance outside the village, but in several instances I found them piled up against the walls of the outermost houses.

At a few paces from the Rádha Kishen well is a large dung heap on the edge of a very filthy pool of stagnant sewage and muck. The well is 21 feet deep, contains 7 feet of water, and has a parapet 4½ feet high. Its water stands at the same level as the stuff in the adjoining pond. This pond should be levelled up by ploughing the surrounding ground into it, and the plot be then cultivated, and the shooting of filth here should be strictly prohibited.

Most of the wells in the village are in a very filthy and slushy state about their parapets, owing to the decay of their conduits and cisterns. Notwithstanding these manifest and direct sources of contamination, the villagers consider the water of these wells to be sweet and wholesome. Indeed they hold somewhat singular views as to what constitutes contamination; for, whilst content to leave their wells in the filthy condition described, they were careful, as it was reported to me, to smash all the earthen jars, and empty out all the metal ones which happened to be resting on the platform of one of the wells at the time I stepped on to it to take the measurement of its depth, because the contact of my boots with the platform was supposed to have polluted them and their contents.

Vaccination is very popular in this village, and a large number of children were brought forward to show me their marks, which were almost all genuine scars of successful vaccination. Between 30 and 35 of the villagers are, I was informed, employed under Government in the vaccination department.

HOSHIARPUR.

Hoshiárpur town.

This municipal town, with its separate suburbs of Khanpur, Bahádurpur, and Bassi Khwája and the civil station, is situated on a level plain immediately to the south of a wide and shallow sandy ravine, which conveys the drainage of the country to the north-eastward away past the town towards the south-west.

The town with its suburbs contain 5,599 houses, of which 1871 are shops and 50 are uninhabited, but Hoshiárpur itself (which is the main town) contains 3,436 houses, of which 1,401 are shops, and has a population of 13,129. This site lies low, but is sufficiently raised above the surrounding surface to allow of free drainage into the ravine on its north side.

Streets.

The streets are paved or metalled, and sewered throughout, and I found them generally in a commendable state of cleanliness. The bazárs and main streets are metalled and drained by surface gutters at each side, but the *mohalla* passages are paved with brick in the old style with a mid-line gutter. The house sinks, which form such an objectionable feature in the streets of most native towns, have in this town been most advantageously removed (except in a few instances in which the floor of the house is below the level of the street), and the sewage of the houses flows direct into the open gutters outside. These surface drains are daily flushed and swept by the municipal water-men and sweepers, and I found them everywhere perfectly free from deposit, and generally free from unwholesome or offensive smells; but in the Kashmiri quarter the pavement was much worn and broken, and in the Chamár quarter the streets were entirely unpaved. The former I understand are to be at once put into proper repair, and I think it advisable that the latter be paved so soon as the municipality can arrange to do so.

Sewage.

In many parts of the town I noticed that the vertical sewage gutters from the upper stories of some houses were coated with a foul black deposit, and that the street gutters in the *mohalla* impasses were similarly coated owing to fraying of the mortar binding the bricks. The former should be cleaned with a wood scraper, and afterwards kept so by the occasional use of a mop, such as the sweepers can easily make with a bunch of rags at the end of a pole. The street gutters can only be put right by lining them afresh with lime cement. The sewage of the town is carried out through a capacious open outfall drain of brick masonry (in the floor of which the sewer runs) on to some waste land on the bank of the ravine to the north of the town. This drain has been recently constructed as an outlet for the storm waters of the town, and at the time of my visit its sewer carried a good and apparently constant stream of sewage. It is the intention of the municipal committee to utilize this sewage on the waste land above referred to. With careful management it ought to prove a source of fixed and considerable revenue to the municipality.

Water supply.

The water supply is principally from wells. There are 164 inside and 20 round about outside the town. Their average depth is 30 feet, inlcuding 10 feet water and 3 feet parapet, giving the subsoil water level at 17 feet below the surface. In the fields around the distance below the surface is somewhat less, or 14 feet. Of the wells inside the town 12, and of those outside 8, are more or less brackish. All the rest are considered wholesome and sweet, but the quality of their water must vary considerably at different seasons of the year and in different parts of the town, since its subsoil level is manifestly affected by every good fall of rain. This percolation, owing to the natural permeabilty of the soil, which is here light, porous, and sandy, necessitates a more than ordinary vigilance in guarding the sources of water supply from all preventible causes of contamination, and too much care cannot be taken to preserve the highest possible state of cleanliness within the town area, and especially in the vicinity of its wells.

From what I saw of the town it is evident that this very important subject has received attention from the municipal committee, and great improvements in its general conservancy have been effected; but there is still much to be done by remedying the defects I have alluded to in the condition of the surface drains. Several of the wells also have very old shafts, which are much worn and in parts present great gaps in the masonry of their tubes.

Latrines.

There are 19 public latrines here, of which 17 are built of brick masonry and 2 of mud. Those for men are provided with compartments, and those for women with merely a row of sittings along the sides of the enclosure. None of them are roofed, or furnished with utensils of any kind, nor is dry earth stored for their service. The coarse ashes and sand used for the purpose are quite unsuitable, and the floors in all of them, judging from the two I saw, and which were in a very offensive state from the long continued soakage of excreta, must be in a very filthy and unwholesome condition at all times, whilst in wet weather they must be simply intolerably foul. I observed that one of the latrines is situated in the sandy bed of the ravine on the north of the town, and that its walls up 2 or 2½ feet from the ground were damp with absorbed moisture. The situation is a very objectionable one.

Conservancy establishmnet.

The conservancy establishment consists of an overseer at Rs. 8 a month, 60 sweepers, of whom 59 get Rs. 3 each and one only Rs. 1½ a month, and 19 water-men of whom 18 get Rs. 3 each and one only Rs. 1½ a month. There are besides six messengers at Rs. 5 each a month, and two conservancy carts. The night soil and latrine filth is removed in covered iron buckets and buried in pits on the top of some old brick kilns, or trenched at

convenient sites till the poudrette is fit for use as manure. The street sweepings, litter, &c., are collected at different spots outside the town, and there sold to a contractor who disposes of it as fuel for brick kilns or manure for the fields. It is the intention of the municipal committee to organize a systematic collection and sale of night soil and street sweepings to include the whole town under municipal agency. This is a step in the right direction, and when the process is put into practice will greatly facilitate the duty of keeping the town in a thoroughly satisfactory state of conservancy. From this remark it is not to be understood that the town is now in an unsatisfactory state in that respect. On the contrary, it is one of the cleanest towns I have seen in the province, and the tidy and wholesome state of its public streets and bazárs reflects credit on the management and supervision of the municipal committee, and all concerned in the work with them.

Register of births and deaths.

The municipal registers of births and deaths are well kept, and separately for the town proper and its suburbs. The death register of the town shows a total of 382 deaths in 1877, against 998 in 1876, and 587 in 1875. The birth register for 1877 shows a total of 437 births against 529 in 1876, and 512 in 1875. The decline of the birth-rate in 1877 is similar in this town to that observed at Ferozepore and other places which suffered severely from epidemic fevers in the preceding year, and serves to indicate the wide-spread injury inflicted by that class of diseases, apart from the direct loss by mortality.

Inspection of Hariána, Garhdiwála and Dasúya.

On the 5th and 6th February, after leaving Hoshiárpur, I inspected its district municipal towns of Hariána, Garhdiwála, and Dasúya. They are situated at intervals of 8 or 9 miles on the high road from Hoshiárpur to Dharmsála, and in the midst of a populous and fertile tract of country, which is generally well cultivated and wooded with fruit and timber trees. The principal crops raised are cotton, sugar-cane, wheat, barley, maize, and mustard, with rice in some favoring localities. The principal trees are the mango, and jáman, and *ber* (zizyphus sp.) grown in plantations for their fruit, and the kikar and shisham for timber. The pipal and bargat or bannian, are also commonly seen in the vicinity of villages. The general aspect of the country is open and level, the land rising in wide and gentle slopes towards the foot of the hills, which bound the plain to the north. The surface soil of the country is light, porous, and sandy, and it is scored at short intervals by a succession of water runs which convey the drainage from the hills on the north-east towards the lower levels in a south-west direction. These water runs or gullies are generally very wide and tortuous, and have very low or no banks at all, and here and there expanding over the surface from bits of marsh of greater or less extent. They are very unstable in their course, and year by year wear away the soil on one side to throw it up as alluvium on the other. The subsoil water level is everywhere close to the surface, varying in depth below it from a few inches to 8 or 10 feet according to the undulations of the ground, and is immediately affected in its rise and fall by every heavy shower or passing flood, and even in seasons of drought seldom sinks to more than 2 or 3 feet below its ordinary level.

Such are the main features of the country in which these three municipal towns are situated.

HARIANA.

Hariána town.

Population 7,872; is a neat and prosperous little town of 2,200 houses, including 590 shops and 110 uninhabited tenements. The houses are mostly well built of brick masonry, and run two or three stories high. The bazárs and streets are all paved and drained in the usual style with bricks on edge sloping to a shallow mid-line gutter; but I understand that it is the intention of the municipal committee to introduce the "fish back" pavement with convex roadway and open side-drain in all future repairs in the main thoroughfares.

Streets.

I found the bazárs and main streets in a creditable state of cleanliness, but the condition of the side passages and alleys was not satisfactory, and the air of some quarters was perceptibly unwholesome. This is owing to the soakage, silting and stagnation of sewage in the gutters, which are in many parts broken and almost everywhere radically defective in condition, the bricks being merely set in a mud cement. As these gutters perform the functions of surface sewers as well as drains for storm waters they should be properly adapted to the discharge of both duties. A good smooth coating of lime cement would render them water tight, and there would then be no difficulty in keeping them clean and wholesome by the means at present so unsuccessfully employed, namely flushing and sweeping. Though its site lies low, the town is favorably situated for getting rid of its sewage and drainage, as it stands between two natural drainage gullies, which, coming from the north-east, sweep close round its north and south sides.

Conservancy.

The conservancy establishment consists of two mates at Rs. 3½ each, 22 sweepers at Rs. 3 each, 5 water-men at Rs. 3 each, and one messenger at Rs. 5 a month. The night soil and town refuse is collected at appointed sites outside the town and there annually sold to a contractor for removal as manure or fuel. The amount realized in 1877 was Rs. 51-4-0, but with care and proper supervision this sum might be largely increased. Both night soil and town sweepings should be collected in low walled middens or pits built upon the surface, and the daily deposits of the former should be covered with a sufficient layer of dry earth. The burying of night soil in pits is highly objectionable in a locality like this, where the soil is porous, and its subsoil water stratum only 2 ar 3 feet below the surface.

Water supply.

The water supply is from wells, of which there are altogether 51 in and about the town. Six of those in the central parts of the town are more or less brackish, but the rest contain sweet water. The depth of water in the wells is from 6 to 8 feet, and its depth below the surface varies from 4 to 12 feet according to the rise of the ground. The water in the wells on the outskirts of the town is observed to rise after rains and floods, but not so in those in its central parts. I found most of the wells in a clean and well preserved condition, but several required to be furnished with drainage conduits for waste water and spillings.

Latrines.

There are 10 public latrines here, 3 for men and 7 for women. They are built on the usual plan, of brick masonry, and have neither roofs nor utensils of any kind, nor is dry earth used in their service.

GARHDIWALA.

Garhdiwála town.

Population 3,874; contains 1,200 houses, of which 300 are shops, and 80 uninhabited; and like Hariána is situated between two natural drainage gullies which sweep in wide, shallow, and sandy channels round its north and south sides respectively.

The town is paved and drained with bricks in the usual style, and is carefully tended as to the conservancy of its bazárs and main streets, but the *mohalla* quarters are neglected, and present the same defects as those of Hariána.

I was informed by the municipal committee that a certain sum had been allotted from this year's budget for improving the roads and drains, and that it was intended to lay down some new pavement on the improved "fish back" pattern, with an open surface drain at each side. But at the same time I understood that it was their wish first to sink a new well for a recently built tank outside the town. There is no doubt that the pavements and drains are much the most pressing and important wants, and they should on no account be postponed in order to provide what may be properly considered a mere luxury.

It cannot be too clearly brought to the notice of the municipal committees, that in all matters respecting the impovement of their towns, sanitary measures should have preference over all such as are merely ornamental or luxurious. There is a great deal to be done to improve the paving and sewering of this town before it can be considered capable of being kept in a decently wholesome state by its conservancey establishment.

Water supply.

The water supply is from wells, of which there are 35 inside and 15 outside the town. They are all considered to contain sweet water. Those I saw in the town were clean and well kept, the pavement in most of them sloping up to the parapet and thus forming a good circular water-shed from the well to the adjoining street gutter.

Latrines.

There are two public latrines here for women only. They are mere oblong enclosures within brick walls.

Conservancy.

The conservancy establishment consists of a mate at Rs. 3, 10 sweepers (including two women for the service of the latrines) at Rs. 2½ each, 3 water-men Rs. 3 each, and a messenger at Rs. 4 a month. The sweepers petitioned me to intercede for an increase to their pay as they found the pittance allowed by the municipality insufficient to provide the actual necessaries of life for themselves and their families. This is not the first place in which a similar grievance has been brought to my notice by this despised but very useful class of the community, and it seemed to me that in this place they presented a more truly poverty-stricken appearance than those of their caste fellows whom I have seen in other districts.

The above rate of pay is insufficient to secure the willing service of these men at any time, but in a time of high prices, such as the last and current years have proved, it is inadequate to the support of life at a working standard. Consequently the men, instead of giving all their labour to the municipality, are forced to seek odd jobs here and there to supply their pressing wants in food and clothing. The result is that the conservancy of the town is performed in a very slovenly and imperfect manner, a few of the most public thoroughfares and bazárs only being regularly swept, and the rest as regularly neglected.

After the police, the conservancy establishment in all municipalities should be considered as next in importance, and should be provided for accordingly. With a little intelligent exertion and management on the part of municipal committees, the conservancy establishment of almost every municipality might be made wholly or partly self-supporting by the monoply of its town sweepings and night soil, as is done at Amritsar. But in most instances, especially amongst the smaller municipalities, this source of income is inexcusably neglected. The fact is, the subject is habitually shirked by natives as one of a disagreeable nature and offensive to their ideas of propriety, though with strange inconsistency they are content to live in the midst of a state of filth and sickliness which would be a disgrace to any civilized community, as it certainly is to men professing a strict attention to purity of person and respect of caste observances.

I have paid particular attention to this subject, and in every town and village that I have visited have explained in detail to the municipal or village authorities the advantages to be derived from a careful disposal of town filth and sweepings, and have impressed upon them the necessity of their devising such measures as may suit the circumstances and conditions of their several communities and localities with the view to utilizing this important source of income to the best advantage. I cherish the hope that in some instances my advice will be adopted and lead to good results, but in the majority I foresee that much patience and kindly instruction are necessary before any great change for the better can be looked for. I think, however, that something might be done in the way of stimulating municipal committees to a more active interest in this branch of their general duties, by an occasional change in their *personnel*, especially in the case of lesser municipalities, the members of which are appointed by Government.

DASUYA.

Dasúya town.

Population 8,677; includes within municipal limits the adjoining village of Kaithan, and contains altogether 2,767 houses, of which 1,382 houses, 221 shops and 115 uninhabited tenements are in Dasúya; and 988 houses, 39 shops and 22 empty huts are in Kaithan. The houses in Dasúya are built of brick masonry, and rise upon the ruins of a more ancient town said to have been founded in the time of the Pándu kings. The village of Kaithan, situated on the plain a few hundred yards to the south, is a mere collection of mud huts.

A wide, shallow, and sandy drainage gully sweeps round the north side of Dasúya from north-east to south-west, in which latter direction it joins the Bain rivulet which flows on towards Jullundur. On the other three sides of the town the land lies low, and is more or less permanently marshy. This marshy tract extends from a large bathing tank on the further side of the high road about a quarter of a mile distant on the east side of the town to an equal distance away to the south-west of Kaithan, and it passes between that village and Dasúya. At its eastern end, near the tank (the high road running between it and them), are the police station, collectorate, court of justice, public sarái, &c. From the block of these public offices a causeway leads across the marsh straight to the sarái gate of Dasúya, and another leads along the southern margin of the marsh to Kaithan, and the two are united by a third which runs direct across from the village to the town. The first and last of these roads have three or four bridges under which the drainage of the marsh flows westwards.

The bathing tank, which is now completely enclosed within masonry banks, was formerly supplied from the natural drainage gully on the north of Dasúya; but 3 or 4 years ago, simultaneously with the drying up of this channel, it developed a number of springs within its own area. The water, thus continually coming to the surface in the tank, threatened to cause its overflow, and consequently in 1875 an outlet was given to it by a cutting in its north bank, and it now flows out in a continuous stream which, passing close to the police station, enters the marsh, and winding across its area under the bridges mentioned, finally disappears under ground at a wide pool a few hundred yards to the south west of Kaithan. Previous to the appearance of these springs in its floor, the tank used occasionally to run dry, but since their formation and the constant outflow from it the original area of the marsh has become greatly extended, and the soil of the whole vicinity completely water-logged.

Unhealthy condition of the town.

The police station and other Government buildings, being situated on the edge of this marsh, have proved extremely unhealthy habitations. I examined them carefully with reference to a communication from the Commissioner of Jullundur, which I have dealt with separately. But I may mention here that I found the floors of the police station and public sarái saturated with moisture, and in some parts actually soppy, and the air of some empty rooms strikingly damp and chilly. This is their normal condition, but after rains and floods the subsoil water oozes up through the floors, which are merely the ground smoothed and levelled. Some "*detenus*" in the lock-up complained bitterly of the cold and damp of the floors, as also did the police, who had cots to sleep on. The place has been found extremely unhealthy, and more especially of late years since the diversion of the water from the drainage gully to the tank. In their present condition these buildings are not fit for habitation.

The municipal committee assured me that the great sickness and mortality from which their town had suffered in recent years was entirely owing to the marshy and water-logged condition of the land around, and they were anxious to have it drained by means of a cutting from opposite the sarái gate to the drainage gully at a point half a mile or more to the south-west of Kaithan. I understood from them that the question was now under the consideration of the authorities, and that the locality was to be shortly surveyed for the purpose of ascertaining the most favorable levels. The measure is one of urgent importance, for there is no doubt that the whole air of the locality is greatly deteriorated by the marsh, and more especially so, as it receives all the sewage and filth of both the town and village. I found the air of the whole place perceptibly heavy and offensive, and at sunset distinctly damp and chilly.

Water supply.

The water supply is from wells, of which there are 53 in and about Dasúya and 46 in and about Kaithan. Of the first lot 15, and of the other 4, are brackish and unfit for drinking purposes, but the rest are considered to contain sweet and wholesome water. In the interior of the town the depth of the water below the surface varies according to the ups and downs of the ground, but on its outskirts and in the fields around it is only a few inches below the general level of the surface.

Drains and streets.

Dasúya is paved and drained throughout with bricks set on edge. In the main streets and bazárs the roadway is convex with an open drain at each side, but in the *mohalla* quarters they are hollow with a mid-line gutter in the usual native style. I found the main streets and bazárs generally well swept and clean, but not so the *mohalla* alleys in the lower parts of the town. In these, owing to the worn and broken state of the gutters, there was much stagnation and soakage of sewage which tainted the whole atmosphere of the vicinity. These gutters require to be deepened and coated with lime cement. The main outlet for the sewage is by a drain which empties into the marsh outside the sarái gate.

The northern part of the town rises to a height of 50 or 60 feet, and in sickly seasons has been observed to escape with much less suffering and loss of life than the other parts, which are but slightly raised above the level of the marshy tract upon which they abut. A very large portion of this salubrious area, however, is entirely unoccupied by the resident population. Its southern portion is occupied by the *mohalla* Machriyál, and on its eastern side stands the Government dispensary, but the rest of the area is covered by the ruins of an ancient citadel and some waste ground adjoining. The site would be a good one for the police station and other Government offices to be removed to, and I was told that the place had been thought of in this connection.

Village Kaithan.

Kaithan is for the most part a mud built village, and its site lies low. Its streets are very irregular and unpaved, and in many parts are worn away in the centre so as to form a wide ditch. On its west side adjoining the houses is the public latrine for women, and just beyond it is a vast collection of dung and refuse heaps projecting some way into the marsh, which extends onwards from this part for several hundred yards to the south-westward. The air of the whole neighborhood, and in fact of the entire village, was poisoned by the sickening stinks arising from this mass of seething corruption. It is astonishing how the people can tolerate the nuisance.

Besides the mud wall enclosure used as a latrine at Kaithan, there are three other and similar enclosures (all for women) at different spots round Dasúya. None of them are even decently kept.

The conservancy establishment consists of a mate at Rs. 4, 10 sweepers at Rs. 2½ each, 3 watermen at Rs. 3 each, and a messenger at Rs. 5 a month, for the service of the main bazárs and public roads of Dasúya only. There are besides 3 female sweepers at Rs. 3 each a month for the service of the public latrines, one of them being told off to the Kaithan latrine. Last year their pay was Rs. 6 each a month, but it is now reduced to half that sum from motives of economy.

Town sweepings of Dasúya.

The night soil and town sweepings of Dasúya are carried out in baskets and on donkeys, and deposited on the ground at different spots round about the town, but by municipal sweepers principally to a spot on the further bank of the drainage gully to the north, where it is sold to a contractor who disposes of it as fuel or manure. Last year the sale of this stuff realized Rs. 47-8-0 for the municipality, a sum which with a little care and management might be easily quadrupled.

Register of births and deaths.

The municipal registers of births and deaths are well kept. The death register for 1877 shows a total of 271 deaths against 505 in 1876 and 1,259 in 1875. The birth register shows the total births of the same years as 207, 276, and 383 respectively, another instance of the decline in the birth-rate (similar to that observed at Ferozepore, &c.,) following a year of epidemic fever.

BATALA.—District Gurdaspur.

Population 26,929. (*Census* 1875).

Statement of births and deaths of Batála town from 1870 to 1877.

Classified statement of deaths and births for the town of Batála from the year 1870 to 1877, inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases	Total deaths.	Total births.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	3	52	369	6	153	583	*237	132	105	19	21
1871	3	41	187	16	155	402	337	198	139	12	15
1872	102	60	456	234	343	1,195	467	256	211	17	44
1873	1	45	307	178	370	901	581	308	273	21	33
1874	1	47	212	4	289	553	809	427	382	30	20
1875	162	143	690	33	338	1,366	900	459	441	33	50
1876	...	143	1,005	2	223	1,373	668	359	309	24	51
1877	...	41	287	...	220	548	749	390	359	28	20

* For 24 weeks only.

Inspected, 8th, 9th and 10th February 1878.

Batala town.

The present town (said to date from the time of Bahlol Lodi), though its actual site is slightly raised above the surrounding level, is situated on low-lying ground in an open plain, the natural drainage slope of which is towards the south, and rises upon the ruins of former buildings to a height of 30 or 40 feet in the central part of the area, where are the remains of an old fort. It contains 7,328 houses, of which 1,800 are shops, and 150 are uninhabited, and is enclosed within brick walls in which there are 12 main gates. The walls are much out of repair and present considerable gaps which have been temporarily filled up by mud banks. I understand that an annual sum of Rs. 1,000 has been set aside from the municipal income for the restoration of these walls, which in their present dilapidated state afford many openings for the evasion of octroi dues.

Outside the walls runs a circular carraige drive, now in course of being metalled, and bordering it in all its circuit is a succession of pools (*dhább*) formed by the surface drainage of the town and its environs, whilst here and there (seven in all) is a masonry tank for bathing and watering cattle. Finally, all round the town, and in parts coming close up to its walls, is a series of walled gardens and mango, &c., plantations, the foliage of which completely conceals the town from outside view; and winding amongst them on its west side is a natural drainage gully with a wide and undefined channel, which opposite the Teli gate becomes sufficiently deep and narrow to admit of bridging.

In the town the houses are mostly brick built and run up to 4 or 5 stories in height, and in some parts are much crowded together. The streets are everywhere paved and drained with bricks on edge, and in most parts the old style has been replaced by the improved convex roadway and side drain. In some of the main streets and bazárs I observed that the roadway was paved in the line of the wheel ruts with a long line of round boulders; a device which has much damaged the adjoining pavement on each side by the fracture and depression of the bricks caused by the concussions of heavy wheel traffic. A good metalled roadway would obviate these defects.

Streets.

I found the streets and passages generally throughout the town in a creditable state of cleanliness, and in the main throughfares the side-drains were flowing with sewage. This sewage passes out at the main gates through open drains of good capacity, and is discharged into the nearest of the pools beyond the circular road. These pools, owing to the recent rain are now more than usually full, and do not appear at all like the foul sinks of stagnant sewage which they really are during the greater part of the year. Several of the towns-people complained to me that the stinking exhalations from them in dry weather poisoned the air of the whole neighbourhood. This I can well understand, and am surprised that in a town where so many improvements have already been effected, this glaring evil has been allowed to exist so long. From what I saw of the locality, it appears to me quite a practicable measure to connect all the main drains where they issue, at the several gates, by a circular outfall sewer prolonged in a single channel to a proper distance from the town towards the low ground away to the southward. This drain should be of sufficient capacity to carry off also the storm waters of the town; there would then be no necessity for all these pools or *dhábbs* encircling the walls, and they could then be filled in and levelled up by ploughing and be advantageously brought under cultivation.

Water supply.

The water supply is from wells and tanks. There are 241 wells inside the walls, and 46 round about outside, and they all contain sweet water. The depth of the wells varies according to the rise of the ground; but that near the Kot gate on the north side of the town is 31 feet deep, including 17 feet water, and 2½ feet parapet. This gives 11½ feet as the depth of the water below the surface, and may be taken to represent that of the sub-soil water level generally. The Jaimal Singh well in the centre of the town is 74½ feet deep, contains 17 feet water, and has a parapet 2½ feet high, giving the water level at 42½ feet below the surface, and representing a rise in the ground of about 30 feet upon the ruins of former buildings. Most of the wells have good platforms or parapets, and are generally well kept as to their surroundings.

Tanks.

There are 7 masonry bathing tanks round about the town. Of these the Anárkali and Lake tanks are the principal, and are both in good order. There are besides 8 or 10 ponds which, as already stated, receive the surface drainage and sewage of the town.

Latrines.

There are 7 public latrines round about outside the town, 2 for men and 5 for women. They are built of brick masonry much on the usual plan, without roofs and without utensils, and with unpaved floors, and are awlays in a horribly filthy state.

Conservancy.

The conservancy establishment consists of an overseer at Rs. 18; a mate at 4; 41 sweepers at Rs. 3 each, and 14 water-men at Rs. 4 each a month for the service of the bazárs, main thoroughfares and public latrines. The conservancy of the rest of the town is farmed to a contractor who last year paid the municipality Rs. 575 for the privilege. He employs his own men and donkeys in the work, and sells the street sweepings and ordure removed, either as fuel or manure, to his own profit. On the part of the municipality he is merely required to remove the filth daily out of the town between fixed hours morning and evening; but is left at liberty to store it and dispose of it at his own convenience. The municipal committee have appointed no fixed sites for the storage of this filth, and consequently heaps of it are found all round the town in the vicinity of its main gates, though much of it is generally at once utilized as fuel at the brick kilns.

I understand that the contract is to be renewed next month, and consider this a suitable opportunity for the municipal committee to appoint fixed sites for the collection of such portion of this stuff as is not at once disposed of at the brick kilns, the sites to be enclosed by low mud walls. Such an arrangement, whilst preserving the filth from many sources of injury to it as a manure, will protect the open spaces round the town from their most common causes of defilement, and, as recognized places for shooting rubbish will habituate the people residing on the town skirts to carry away their filth from the vicinity of their dwellings, especially if the regulation is at first strictly enforced by the aid of a little judicious fining.

Slaughter yard.

In an angle of the walls near the Háthi gate, on the south side of the town, is what is called the slaughter yard. It is a triangular bit of open ground between the circular road and town walls, and at the time of my visit was in a most disgracefully filthy state; the whole of its uneven surface being covered with pits full of the blood and garbage of the animals slaughtered on the narrow spaces between them. From 20 to 25 head of cattle, they told me, are daily slaughtered on this limited area (on which footing is insecure owing to the number of its pits, some full to the brim and others only partially so); but neither the members of the municipal committee nor the towns-people around me at the time of my visit, could tell me when any of these pits had been cleared of their putrefying contents.

The stink from this pestiferous spot poisons the air of the adjoining quarters of the town, and has been a cause of repeated complaints on the part of their residents; but the butcher in charge has done nothing more towards mitigating the nuisance than to appoint an old and decrepid sweeper on half a rupee a month, just to cover the pits from time to time with a few baskets full of ashes from the nearest brick kiln, on the plea, it appears, that he considers the place should be kept clean by the municipality in return for the fees paid by him. Be this as it may, the slaughter yard in its present condition is a disgrace to the municipality for even tolerating its existence where it is, in contact with the town walls, a few paces only from one of its main gates, and at the side of a public road, without any wall or separation or other means of shelter from the public view.

The slaughtering of cattle on this sopt should be immediately prohibited, the ground should be ploughed and planted with some quick-growing crop, and 3 or 4 successive crops raised before it be allowed to lie fallow. Perhaps maize or cotton or sugar-cane would do well on it. A new slaughter yard should be provided at a convenient distance from the town, and furnished with a proper pavement for slaughtering, and masonry counters on each side for quartering the cattle on; whilst a covered verandah on one side of the yard would prove a useful addition as a shelter from the weather. Two years' butcher's fees at the rate of last year (Rs. 425) would suffice to build a very good slaughter yard on the plan of those at Delhi, though on a smaller scale.

Cremation ground.

Near the Anárkali tank, and at the side of the high road on the north-east side of the town, is the Hindu cremation ground. Its surface is covered with a multitude of little ash heaps pressed down by a few bricks thrown upon each. The area should be walled off.

Register of births and deaths.

The municipal registers of births and deaths are well kept. Up to the 8th February of this year 2 deaths from small-pox were registered. Though the disease has not become epidemic here, as it has in other towns not very far distaut, the infant population is by no means well protected by vaccination.

Opposition to vaccination.

I am informed that a native superintendent of vaccination with 3 or 4 subordinates came here in December last, and left in the following month to itinerate the villages of the district, having vaccinated only 260 children in the town. The opposition appears to be mostly on the part of the Hindus, and though the members of the municipal committee exerted themselves to persuade the people in their several wards to have their children vaccinated, the measure seems to have been accepted only by the better classes, the poor and ignorant steadily refusing it. I was told by some that vaccination would never make satisfactory progress in this country until the municipalities were empowered by bye-laws to enforce it by small fines, as is done in the matter of birth and death registration.

I examined a large number of little boys in the Government school and in a Muhammadan *madrassa*, and also several children in the the *mohallas*, but found very few with genuine vaccination scars, whilst the number disfigured by pock-pits of small-pox was very remarkable. In the Government school, in a class of 16 boys, no less than 7 were so disfigured, and in the Muhammadan school 2 boys were perfectly blind, and 2 others partially so from the effects of the disease, whilst several others were more or less severely disfigured by its pock-pits.

Villages "en route" from Batala to Lahore.

Inspected 11*th*, 12*th*, 13*th and* 14*th February* 1878.

Villages *en route* from Batála to Lahore.

I marched from Batála on the 11th and returned to Lahore on the 15th February, by the stages of Bandher, Sahesra, Chaogaon and Awán.

Village Aliwál.

At Aliwál, 6 miles out from Batála, I struck the line of the Bári Doáb canal, which here divides into the main branches for Amritsar and Lahore. Aliwál itself is a small agricultural village on the road side, and seemed to me a very dirty one. I saw it on the day after a violent thunder-storm with heavy rain, and found its surroundings in a

very filthy and unwholesome state, owing to the hollows and pits around being full of surface drainage and slush, a thick mixture and strong solution of the surface filth of the village lanes and courts, and the soluble portions of its encircling dung heaps. A hot sun acting upon these stagnant collections of liquid filth must render the atmosphere of the locality thoroughly noisome till such time as their desiccation remains incomplete.

On the further side of the high road, immediately opposite the village, is a masonry well, the water of which is only 8 feet below the surface of the ground; and at 5 paces from it is a deep pit, one bank of which is formed by a dung heap. The pit contained a quantity of horribly filthy liquid, which was evidently on the same level as the water in the well. This latter was clear to look at, and the soil between the two, at least on the surface, was a greasy, tenacious, and probably impermeable clay, but the close proximity of this foul slough is of itself sufficient cause to proscribe the use of the well as a source of drinking water.

From Aliwál I followed the line of the Lahore canal by the villages of Násirke, Palowál and Pohmah, where I struck off by Badála to Bandher. The first three villages are close on the canal, and the others on land irrigated from it. The country, owing to the recent rain, was more or less under water, and here and there wide sheets of it necessitated considerable detours on the line of march. The soil where ploughed was a heavy loam, and where fallow or waste presented a slippery, greasy surface; and in some pits which I happened to see dug at the side of the high road for its repair the earth was merely moist, and approached to dryness at the depth of a couple of feet or so.

Most of the villages on the route from Bandher to Awan were found to be more or less completely encircled by belts of drainage water which had accumulated in the pits and hollows around them, and had of course carried into these depressions all the surface filth of the village interiors and their environs. This is the normal condition of these villages during the monsoon season, say from June or July to September or October, and it is when these stagnant pools begin to ferment and evaporate under a hot sun that fevers prevail, and in seasons of unusual severity prostrate the entire population.

At present, possibly owing to the unseasonable fall and mild temperature, there is little or no general sickness beyond what is ordinarily experienced at this season, and everywhere, from entirely independent sources, I heard the same story, namely, that last year and up to the present time the whole of this tract has been unusually free from epidemic sickness. Nowhere did I hear the people attribute any ill health to the effects of canal irrigation; on the contrary, my pointed inquiries on this subject always elicited a negative reply, and I was repeatedly assured that enlargement of the spleen was not a common disease here. I met with no case of enlarged spleen amongst the peasantry seen in the fields and villages, but at Bandher I found three field laborers with very pronounced anæmia.

At my interview with the lambardárs and villagers, I took the opportunity to give them some simple hints as to the precautions they should adopt against fever by protecting the body from the effects of sudden chill, &c., and explained to them in detail how much the condition of sound health depended upon the circumstances of life in point of fresh air, pure water, proper shelter, and good food; and dwelt upon the fact that it was the nature of these circumstances, whether good or bad, which determined the character of sickness in point of mildness or severity, curability or fatality.

The people readily acknowledged the force of all I said, and admitted that they lived in an unnecessarily filthy condition of habitation, but consoled themselves with the idea that they had made great strides towards improvement in this respect under British rule. Some of them gave me an account of the state of their villages under the Sikh *regime*, but I did not see that it was much worse than it is at present. The main difference I could trace is, that they were then thoroughly indifferent to and ignorant of sanitation, whereas now they certainly are desirous of bettering their condition in these respects, and have to some extent learned the advantages of cleanliness over filthiness. This in itself is something gained, and is a hopeful sign for steady, though perhaps slow, advance in the same direction for the future.

At Chaogaon I went over the same ground again with the *lambardárs* and villagers attending them (as indeed I have done at almost every village where I have camped during the pas four month's tour), and met with more earnest expressions of desire to improve their village sanitation than anywhere else. Rupa Singh, *lambardár* of Bholar, who followed me from his village to my camp, and Mussawá Sing *lambardár* of Chaogaon, both evinced a ready interest in the subject of sanitation, and promised to give immediate attention to my suggestion as to casting rubbish and cattle litter, &c., on fixed sites at a distance of not less than 200 yards from the village, and as to keeping the vicinity of wells clean and dry, and free from pits and hollows.

They both said that there was no real difficulty in carrying out these measures, but that an authoritative ruling was necessary in order to enforce the attention and obedience of the villagers. This I have heard at other places also, and at Sahesra, when speaking on this subject, one of the *lambardárs* said that the people would all get accustomed to the new *regime* after a time, if it were systematically enforced, and quoted the instance of vaccination as a case in point. He said that at first the people opposed it, but that now they had satisfied themselves of its advantages, they were glad to see the

vaccinators going round their villages, as they found by experience that small-pox was now quite a different disease here to what it used to be. It was much less prevalent, and when it did make its appearance it was of a much milder form, and vastly less fatal than formerly.

On the march I made inquiries regarding the prevalence of small-pox, but nowhere heard of the existence of the disease. In fact, the only disease I heard of was fever, of which an occasional case here and there was said to exist, though I saw none myself. From what I heard I believe these were merely isolated cases of typhoid or enteric fever, a disease which apparently is never entirely absent from these agricultural villages.

LAHORE.—District Lahore.

Population 92,035. (*Census* 1875.)

Statement of births and deaths of Lahore city from 1870 to 1877.

Classified statement of deaths and births for the city of Lahore from the year 1870 to 1877, inclusive:—

Year.	Cholera.	Bowel complaints.	Fevers.	Small-pox.	Other diseases.	Total deaths.	TOTAL BIRTHS.			Birth-rate per mille of population.	Death-rate per mille of population.
							Total.	Males.	Females.		
1870	15	129	1,530	13	615	2,302	*1,478	782	696	19	27
1871	11	71	1,310	149	690	2,231	2,424	1,368	1,056	28	26
1872	300	73	2,958	266	734	4,331	2,120	1,168	952	25	51
1873	4	50	1,557	12	489	2,112	1,291	734	557	15	25
1874	4	107	1,314	13	857	2,295	2,544	1,381	1,163	30	27
1875	37	171	2,375	112	1,298	3,993	3,329	1,828	1,501	39	47
1876	30	132	3,326	422	1,026	4,936	3,020	1,619	1,401	33	54
1877	1	38	2,194	46	858	3,137	3,069	1,678	1,391	33	34

* For 47 weeks only.

Inspected, 2nd to 12th April 1878.

Chief features of Lahore city.

The city of Lahore is of an irregularly oblong shape, the long diameter running east and west, and has 13 gates, between which from one to the other extends a low curtain wall of brick masonry, except in the western portion of the north face which is occupied by the fort and the adjoining imperial mosque. A well metalled circular road runs all round the city, and between it and the walls, except in front of the fort and mosque, is a belt of ornamental garden, which is divided into sections by the cross roads leading outwards from the several gates.

These gardens are neatly laid out in flower beds and plantations of fruit trees, and are traversed by a carriage road and numerous side walks which afford a pleasant promenade to the citizens. They also give passage to and partly conceal from view the great outfall sewer of the city, which, commencing on its north face to the east of the fort, winds round the walls and finally turns off at the Taxáli gate on the west. On the south side the gardens are also traversed by a canal-cut; it has been widened and enclosed at intervals for bathing purposes, and finally empties into the channel of the outfall sewer.

To the north, in front of the fort and mosque, the ground lies low and is turfy, and is subject to inundation in seasons of flood. The circular road cuts it here in a raised causeway.

The city is divided into 8 wards or police districts, and contains 30,960 houses, of which 8,325 are shops and 3 are public saráis, and 3,692, including 1,125 shops, are unoccupied or in ruins.

There are 1,806 wells inside and 533 round about outside the walls. Of the first set 324, and of the other 118, are more or less brackish, whilst the water of the rest is hard and ill flavoured, and generally considered of inferior quality. All the wells inside the city are of masonry, and most of them have platforms and parapets, and a spoke wheel for drawing with rope and bucket. Many of the houses have such wells on their own premises. The depth of the subsoil water level in the wells inside the walls varies according to the ups and downs of the ground, but in those outside it is about 29 feet, and the depth of water in the wells from 4 to 10 feet.

The interior of the city presents a densely crowded mass of brick buildings of very irregular form and varying size, with no fine streets nor squares, nor markets. In the northern quarters occupied

by the mosque, fort (held by European troops), Rajá's palaces, police barracks, &c., &c., the ground rises considerably above the level of the intramural area, and is less densely crowded than other parts of the city. The streets in these parts are wider, and the *mohallas* more spacious, and there are several open spaces of considerable area which ensure a freer ventilation than is possible in other quarters.

In the opposite, or southern, parts of the city the ground lies low, and after heavy rain is subject to serious floods from the surface drainage of the surrounding quarters, which collects in mass at the outlets of the Akbari, Mochi, and Lahori gates. All this part of the city is much overcrowded, and the *mohallas* present narrow impasses which ramify amongst blocks of houses 4 or 5 or more stories high. Ventilation here is very defective, and the sanitary condition of the lanes and thoroughfares very far from wholesome by reason of faulty conservancy.

As the work now taken in hand for providing the city with a pure water supply and a system of surface drainage will, when completed, very materially improve its present most unsatisfactory state in these respects, it is not necessary here to enter into detail of the many defects in its sanitary condition directly connected with them.

Conservancy.

But there are certain arrangements connected with the general conservancy of the city, which I understand will not be much affected by the new system of water supply and drainage, and with respect to these some remarks are necessary.

Everywhere throughout the city generally, I found the public thoroughfares and side streets in a state of greater or less disrepair in respect to their drains, and in many parts in respect to the roadways also; whilst the system of conservancy for the whole place is radically faulty in its most important details, namely, in the arrangements for a quick, thorough, and regular removal of night soil, garbage, and street refuse.

The roadways and surface drains are, I understand, to be repaired and laid down on new lines in conjunction with the water supply and drainage works, and some improvement is to be effected in the present system of conservancy by a remodelling of the establishment on the plan of that employed by the Amritsar municipality.

Hitherto the great obstacle in the way of an effective conservancy here has been the right of the agriculturists on the town lands to the refuse matter and night soil of the city, and to the privilege of removing it free of charge in their own carts under no further restriction than that of regular daily attendance between certain fixed hours. Besides these, it appears that there is another set of agriculturists who also have a right to the removal of town sweepings, &c., in their own carts, and at their own convenience, on payment for the privilege. The rights of these people are, I understand, to be purchased by the municipality as a preparatory step to the reorganization of their conservancy establishment. The sooner this is done the better, for it is impossible to work the conservancy of this city in anything like an efficient or satisfactory manner so long as these people and their carts are in the way.

When they are got rid of and the road is clear, I would recommend that the general sanitation and conservancy of the whole city be undertaken by the municipality, and worked on a rational and efficient system. At present the municipality arranges only for the surface cleansing of the bazárs, public latrines, main thoroughfares, and places of common resort, the dwelling quarters being left to the care of their residents.

In the streets I found the surface drains, house gutters and sinks everywhere in a very foul state, simply from careless service; and the streets themselves no where, with a few exceptions in the northern quarters, in so clean and tidy a condition as they should be. In fact there was a marked absence of careful and intelligent supervision everywhere.

Sewage.

The whole of the sewage of the city is carried through the streets in open surface gutters, there being no under-ground sewers anywhere, and as there are wells at frequent intervals along the course of these surface drains, the means for keeping them flushed and wholesome are close at hand. But the facilities afforded by these wells are evidently neglected or mismanaged, notwithstanding the large number of sweepers and water-men told off to this service. The drains, as a rule, were more or less silted up with sewage deposit, and where out of repair (as is the case in many places) the soil was saturated with the escaped sewage.

In the *mohallas* the condition of the drains was no better, and no worse, than in the main streets. The conservancy of these quarters is not under the direct management of the municipality, though it is supposed to be supervised by the municipal conservancy establishment, from which four sweepers are detailed for this duty for the whole city.

Each *mohalla* or ward, according to its size and number of houses, is the preserve, as it were, of from two to six families of sweepers. The women attend to the interior of the houses, and the men to the courts and out-houses; and for this service each family gets from half an anna to four annas a month from each house, besides a dole of bread, and now and then a trifling present on occasions of a birth, death, or marriage. They remove the night soil and house sweepings, &c., daily from the *mohalla* to the nearest public street, where it is deposited in a heap at the roadside, or some corner thereof, to be taken away by the scavengers' carts. Should the carts come late in the day, or fail to come

altogether, as sometimes happens in wet weather or busy harvest time, or should the stuff be deposited on the usual spot after the cart has gone by, in either case it soon becomes trodden under foot by the traffic, and dispersed over the public roadway, an accident of by no means rare occurrence.

In the *mohallas* each house has its latrine built on the roof in such a position that its floor drains into the spout or gutter, which runs perpendicularly down the outside of the house wall to the surface drain at its foot in the street below. This seems a very sensible arrangement, and practically works entirely to the satisfaction of the inmates of the house. The urine and ablution water finds a ready escape down the gutter, whilst the fœcal matter and the earth of the receptacles set on the privy floor are removed together morning and evening, or oftener in case of necessity, by the sweeperess in charge. By its position the interior of the house remains free from the disagreeable odours which would of necessity pervade it were the latrine placed on the ground flour, though, where neglected, as is too generally the case, the gutter becomes very foul and a nuisance to the vicinity.

Conservancy establishment.

The municipal conservancy establishment of the city as at present constituted, consists of an overseer at Rs. 50 a month, an assistant overseer at Rs. 35, a clerk at Rs. 15, two mates at Rs. 7 each, 141 sweepers of whom 5 get Rs. 4-8 each, 12 get Rs. 4 each, and 124 get Rs.3-8 each, 71 water-men at Rs. 4 each, and 6 messengers at Rs. 5 each a month. They are distributed in the following manner under the general superintendence of the overseer and his assistant, namely, 18 sweepers to the service of the public latrines, 92 sweepers and 42 water-men to the bazárs and public streets, 13 sweepers to the out-fall sewer, 4 sweepers and 22 water-men to the circular road, 7 sweepers and 4 water-men to the Landa bazár, 1 sweeper and 1 water-man to the Rattan Chand serái, the Tahsíl and Hazúri bágh respectively, and 4 sweepers to superintend the *mohalla* conservancy.

Conservancy carts.

There are no conservancy or night soil carts provided by the municipality. The whole of the city sweepings and filth, &c., is removed in open country carts and on donkeys. Of the latter there are 120, mostly employed in the *mohallas*, and of the former there are 129, of which 57 are on the free and 72 on the paying list. The regulation hours of work are from 5 to 9 A. M. in summer and from 6 to 10 A. M. in winter, but practically both carts and donkeys come and go irregularly, and in the case of the paying carts and donkeys are often absent for days together in wet weather or busy times.

Latrines.

There are seven public latrines attached to the city, and they are built at convenient distances close beyond the circular road. The accommodation they afford is far short of the requirements of the city, and is of a kind by no means inviting or wholesome. And, as a consequence, on each of the five days on which I visited the city, I saw the people using the public gardens, and bye-ways, and waste corners about for purposes of nature. These seven latrines are all built of brick masonry, and are of three different patterns, each of which has its own faults.

Those near the Taksáli and Akbari gates are of one pattern; each consists of two long parallel sheds which are well roofed, lofty, and freely ventilated by a succession of wide arched openings in the front and rear walls. Each shed is divided into 8 or 10 compartments by a screen wall of mud masonry six feet high. The compartments are about 10 feet square, and have well sanded floors on which are set 6 or 8 red pottery vessels of the size and shape of an ordinay brick, and utterly useless for any practical purpose. I found these compartments or chambers remarkably clean and free from odour, except that of urine, with which the sand on their floors was caked and saturated in scattered spots. Four sweepers are told off to the Taksáli, and two to the Akbari latrines. Owing to the want of privacy, decency forbids the use of these spacious chambers by more than one at a time, and they are cleaned after each evacuation. On the occasions of my inspection I noticed that the fields around were more freely resorted to than these latrines.

The latrine at the Mori gate is built on the plan of those introduced at Pesháwar some years ago, when I was civil surgeon there, but the original design has been here departed from in its most essential parts; for in the Pesháwar model each compartment was provided with a moveable iron trough under the seat, and a glazed pottery urinal fixed in its front so as to empty into the earth-dressed rough below, whereas in this latrine there is no sign of these essential receptacles, nor indeed of any rther, the excreta falling on the bare floor. In the division into compartments with raised seats, and the oof propped on pillars for free ventilation, however, the original has been here followed. The latrine onsists of three rows containing 64 compartments, 18 of which are under a separate roof for women, and has four sweepers (including a woman) told off to its service. I found it in a very filthy and offensive state, owing to the absence of utensils and the saturation of its floors with excreta. In its present unfurnished state no amount of labour and attendance can suffice to keep it in a decent and wholesome condition. Being situated in a populous neighbourhood, this latrine is much frequented, and it is consequently of the greatest importance that it be kept in a wholesome state. As it is, however, it is a serious nuisance, if not a positive danger to the locality.

The other four latrines are built on one plan, and are merely roofless enclosures with a row of compartments along the sides. Those at the Shahálmi and Mochi gates are much out of repair, and in a very foul condition with their floors and seats completely saturated with excreta. Two sweepers are attached to the service of each of them.

In all these latrines river sand, or the coarse ashes from brick kilns, is used instead of dry earth and answers the purpose of an envelope for the removal of the excreta fairly enough, if only suitable implements were used for the work, and with intelligent handling. As it is the stuff is roughly scraped off the floor into a basket by means of an ox rib, and stored in an open pit close by till carted away, there being no sort of protection from the weather, nor any provision for preventing offence to the passing public.

Each and all of these latrines should be summarily and authoritatively condemned till put into proper order, duly furnished, and provided with an efficient service. It is little to the credit of the municipality that such disgusting nuisances should be allowed to exist in the midst of populous suburbs, and in close proximity to constantly frequented public roads. It is far better that they be done away with entirely than be maintained in their present unwholesome condition.

The Pesháwar plan of latrine appears to be the least difficult to manage properly and keep in a wholesome condition, and a lavatory added to each end of a row of compartments would complete their utility. But whatever plan be adopted, no public latrine should be opened for use till it has been thoroughly furnished with the requisite utensils, and provided with an efficient establishment for its service. Every public latrine should be provided with two or more close covered iron soil pans for the reception of excreta till carted away, and the use of open pits for the purpose should be strictly prohibited.

Conservancy carts.

I have before mentioned that it is the intention of the municipal committee to reorganize their conservancy establishment as soon as the rights of the agriculturists on the town lands are disposed of, and I would venture to suggest for their consideration, when the subject is brought forward for settlement, the advisability of their adopting the pattern of conservancy carts and garbage boxes introduced at Delhi by Mr. Danenberg, the municipal sanitary inspector there. The latter are a most useful contrivance for the temporary collection of street sweepings and house refuse, &c., in public thoroughfares and crowded resorts.

Sanitary Inspector.

As to the *personnel* of the conservancy establishment, whatever changes may be decided on, the prime desideratum is an intelligent, active, and properly qualified Sanitary Inspector. This municipal officer should be charged with the control and management of the entire conservancy of the city and civil station, as at present provided for by the municipality, and be held responsible for its proper working.

Civil station of Lahore.

The civil station of Lahore lies to the south and east of the city, and comprises Anárkalli with its populous native bazár and European business quarter, Donaldtown with its public gardens and assembly rooms, Government house and European bungalows, and Naulakha with its railway barracks, work-shops, and stations. The area covered by the civil station is about 14 square miles traversed by about 60 miles of public roads, and the whole of it is within municipal limits, which include besides 13 villages and hamlets. Of these Muzang and Kila Gujar Singh are in the midst of the European quarters, and they are the only ones whose conservancy is in any way controlled and provided for by the municipality.

The population of the sadr bazár and civil station is about 36,406, namely 1,690 Europeans and 34,716 natives. The number of European bungalows is about 270, and of native houses about 7,829.

Water supply.

The water supply is from wells, of which there are altogether 533; of these 118 are either brackish or otherwise unfit for use. In the best wells, the water is of undue hardness and of indifferent quality.

Drainage

A large proportion of the station is laid out no the sites of former graveyards, and several old brick kiln mounds are included within its area. The slope of the ground is gently towards the south-west, in which direction the river Ravi flows at about half a mile to the west of the city. The surface drainage gravitates towards Anárkalli, where the land lies lowest. At the south-west corner of this division of the station the surface drainage from Donaldtown and the direction of Government house concentrates in a single natural channel, which at the Chárburji meets another of nearly equal size from Anárkalli bazár. The united channels here join the relics of an ancient bed of the Ravi, which some way further on, meeting the drainage cut from Meean Meer cantonments, finally empties in to the river.

The old bed of the river runs between the present stream and the city, and forms a very irregular and in some parts effaced channel 7 or 8 miles in length. It was formerly subject to annual flushing whenever the river rose inflood but since the railway embankment was built across it to the north ward of the city this has ceased to be the case. The portion of this old channel directly to the west of the city presents some deep hollows which contain detached sheets of stagnant water. The southernmost of these receives the contents of the city out-fall sewer, and has been afforded an outlet into the river by an artificial cutting carried by the village of Samndah. To the south of this point of diversion the old channel is more or less completely obliterated by cultivation, but in the vicinity of the Bank of Bengal and Saint James' church it again becomes traceable in greatly reduced size till it is joined at the Chárburji by the drainage gullies before mentioned. The drainage coming after rain from Donaldtown and the eastern parts of the station is greater than that from Anárkalli, and as it meets the latter

at right angles, it generally throws it back for a time, and thus causes considerable flooding in the southern parts of Anárkalli bazár, especially in the Chakla and Anájganj quarters.

Insanitary condition of latrines of Anárkalli bazár.

In my inspection report of the Anárkalli bazár, submitted about this time last year, I pointed out the very insanitary condition of its latrines, slaughter yards, and the drains in its back streets and slums. I have now to report that the defects then mentioned have not been remedied, nor do the observations then submitted by me appear to have received any attention from the municipality.

Slaughter yard.

The slaughter yard for kine, and the beef market adjoining, with the filthy open drain (a mere cutting in the soil, which is saturated to a foot or two on each side by absorption of the current sewage) running in front of it are just as offensive and unwholesome now as they were then. The slaughter yard itself is in a very discreditable state, so also is the one for goats and sheep near Mayo Hospital. In this latter the pavement was being repaired at the time of my visit, and an adjoining yard was used as a temporary measure. Its state of filth and stench baffles description, and is simply incredible without personal inspection.

Sanitary condition of bazár very defective.

I found the sanitary condition of the bazár and adjoining quarters everywhere very defective, and the conservancy arrangements very badly managed. The dirty condition of the drains, the sloppy and slushy surroundings of the wells, and the horribly offensive state of the public latrines, all evidence absence of intelligent supervision, and lack of interest in the sanitation of the place compared with the sanitary improvements made in other municipal towns; it appears to me that we are yet far behind in this the capital city of the province.

Conservancy establishment of civil station.

The conservancy establishment of the civil station consists of an overseer at Rs. 45, an assistant overseer at Rs. 25, two gang masters at 6-8-0 each, 2 mates at Rs. 5 each, 59 sweepers at Rs. 4 each, 4 mate water-men at Rs. 5 each, 50 water-men at Rs. 4 each, and two messengers at Rs. 5 each a month. There are besides 15 conservancy carts at Rs. 10 each a month. Of these, 15 sweepers are told off to the service of the public latrines, including 4 for Muzang; 15 sweepers and 8 water-men are appointed to the service of Anárkalli bazár and roads; 5 sweepers are distributed to the Commissioner's court, Museum, Anárkalli police station, Mela Ram's tank, and as overseer's orderly respectively; and 24 sweepers and 42 water-men are employed in the civil station, the former to attend to the general conservancy of the roads, and the latter to lay the dust and water the young trees on the old and new mall and the public drives.

Open bullock hackeries used for conservancy carts.

The conservancy carts are common open bullock hackeries, and are employed exclusively for the service of the European bungalows in the civil station; the railway settlement having a separate conservancy establishment of its own under direct supervision independent of the municipality. Besides these 15 carts, which are under the complete control of the conservancy overseer, there are 36 others, which ply in the Anárkalli bazár for the removal of its night soil and street sweepings, &c. Four of the number are free by right of custom, and 32 pay a monthly fee of Rs. 2 for the privilege. The first set are under some sort of obligation to attend daily between fixed hours, but the others are not so, and the consequence is that they suit their own convenience, and are often absent for 8 or 10 days at a time without any previous warning, thus occasionally putting a stop to the bazár scavenging till other arrangements can be made.

The whole of this system of scavenging is very unsatisfactory, and should be entirely changed. With the steady demand there is here for this kind of manure material, there should be no difficulty in arranging for its storage for sale by a specially organized establishment.

Latrines in civil station.

There are 10 public latrines in the civil station, and not one of them is in anything like a decent state. The Anájgunj resembles the Mori gate one both in plan and filthy condition, the more serious evil, as it is the only one in that quarter of the bazár. All the other latrines are built of mud masonry (except the two behind the Club House and Price's shop, respectively, which are of brick masonry,) roofless, and without utensils, and generally in a state of disrepair and neglect.

Lock Hospital, European vagrants' house, distillery and the tan yard.

In the course of my inspection of Anárkalli bazár I visited, amongst other places, the Lock-Hospital, the European vagrants' rest house, the distillery, and the tan-yard. The two first were much in need of repair and furniture. In the first of them I found two women under treatment for venereal disease sleeping together on the same cot, and under a single sheet common to the two. In the others the floors of the several rooms were the bare earth, soft and dusty with effloresced salts in the soil, and there was an almost entire absence of furniture. There were five Europeans in the place at the time of my visit.

The drainage arrangements of the distillery require to be attended to. I found 3 or 4 casks sunk in the ground at the side of an open masonry drain which runs along the front of the still-shed to a reservoir outside the rear of the distillery yard. They were in a thoroughly rotten condition and full of the refuse of the stills, and the nearest of the row was sunk only two or three feet from the tube of the distillery well. The reservoir outside had evidently not been cleaned out for a long time. The casks, if necessary at all, should be placed at a further distance from the well, and replaced by new ones.

The tan-yard (dabgari) was not in work at the time of my visit, though one of its two tanks was half full of horribly offensive stuff in which some hides were macerating for the manufacture of those untanned hide jars called *dabba*. The whole place was untidy and unswept, and when in active work must be a serious nuisance to the neighbourhood, which is a populous quarter. The manufactory ought to be abolished here, and removed to some more suitable site outside the inhabited area.

Jail and Lunatic Asylum.

I found both the Jail and the Lunatic Asylum in excellent order throughout. In the latter I observed that the latrines were roofless, though kept scrupulously clean, and free from odour of any kind. The arrangements here for filtering the drinking water, introduced several years ago by Doctor Scriven, the Superintendent, continue to work well and give perfect satisfaction.

In the Jail for female prisoners the drinking water is supplied by hydrants, but it is drawn from the wells by Persian wheels, the materials of which are subject to decay and the water is consequently liable to contamination from this source.

Latrines in Railway work-shops.

In the latrines of the Railway work-shops (of which I inspected 7 or 8) there was a very foul smell from decomposing urine. These latrines are provided with good glazed pottery utensils set under the seats, and are generally well attended to, but there is no provision for receiving the urine, which is apparently voided on to the floor. This is an evil which can be easily remedied by a little thought given to the subject. Outside the work-shops, and near a goods' shed, a range of roofless latrines built of mud masonry was in course of erection at the time of my visit. They are intended for the use of natives, and the plan is much the same as that of an adjoining set of the old pattern now in full use. The principle and plan are alike altogether faulty, and the place will assuredly become a serious nuisance before it has been a week in use.

Birth and death registers.

In the city I inspected the municipal registers of deaths and births. They are not kept so carefully as they should be. I found several mistakes and instances of confusion in numbering of both births and deaths, and on examining the check books found that in two instances at least, certificates of deaths had been given to parties who had registered births. The Registrar, it appears, has other duties to perform, and evidently treats this one of registration as of little importance. He admitted to me that the work was done in a hasty manner, and as he could find time from his other duties in the court of the Honorary Magistrates. This is very unsatisfactory, and not creditable to the municipality.

In conclusion, the result of my inspection has made it very clear to me, that a thorough remodelling of the conservancy establishment of the municipality is an urgent necessity, no less than the remedying of the various defects above pointed out. No time should be lost in taking the subject under serious consideration with the view to some suitable measures being put into practice. I trust that the faults and defects described in this report will be attended to by the municipal committee, and that this report will not experience the barren results of that submitted by me in this month last year.

H. W. BELLEW, SURGEON-MAJOR,

Sanitary Commissioner, Punjab.

P. S.—Since the above was written, the municipal committee have taken up the several subjects of this report, and made an allotment of Rs. 5,000 for the renovation of the surface drains throughout the city, the work to be at once taken in hand, and have made arrangements for the reorganization of the conservancy establishment, improvement of public latrines, &c.

VITAL STATISTICS
OF THE
GENERAL POPULATION, 1877.

ANNUAL FORM No. I.

BIRTHS REGISTERED in the DISTRICTS of the PUNJAB during the year 1877.

1	2	3	4			5			6	7	8
Number.	Districts.	Population according to Census of 1875-76.	*Number of births registered.*			*Ratio of births per* 1000 *of population.*			Number of males born to every 100 females born.	Excess of births over deaths per 1000 of population.	Excess of deaths over births per 1000 of population.
			Males.	Females.	Total.	Males.	Females.	Total.			
	DELHI DIVISION.										
1	Delhi 6 Munl. towns ...	192,753	5,203	4,810	10,013	26·99	24·95	51·95	108·17	7	...
2	Gurgaon 4 „	59,867	1,511	1,423	2,934	25·24	23·77	49·01	106·18	13	..
3	Karnál 5 „	74,796	1,469	1,359	2,828	19·64	18·17	37·81	108·09	7	...
	HISSAR DIVISION.										
4	Hissar 6 Munl. towns ...	69,241	1,294	1,156	2,450	18·69	16·69	35·38	111·94	4	...
5	Rohtak 6 „	55,263	1,111	992	2,103	20·10	17·95	38·05	111·99	8	...
6	Sirsa 5 „	28,097	469	405	874	16·69	14·41	31·10	115·80	7	...
	UMBALLA DIVISION.										
7	Umballa 11 Munl. towns ...	103,811	1,873	1,616	3,489	18·04	15·57	33·61	115·90	11	...
8	Ludhiána 6 „	65,053	1,490	1,412	2,902	22·90	21·70	44·61	105·52	7	...
	JULLUNDUR DIVISION.										
9	Jullundur, whole district ...	783,020	11,600	10,362	21,962	14·81	13·23	28·05	111·95	...	10
10	Hoshiárpur 10 Towns	80,069	1,172	1,022	2,194	14·64	12·76	27·40	114·68	...	1
11	Kángra 5 „	23,752	294	316	610	12·38	13·30	25·68	93·04	...	3
	AMRITSAR DIVISION.										
12	Amritsar 7 Towns	169,770	2,810	2,644	5,454	16·55	15·57	32·12	106·28	...	5
13	Gurdáspur 15 „	87,367	1,240	1,204	2,444	14·19	13·78	27·97	102·99	1	...
14	Siálkot 16 „	99,205	1,646	1,448	3,094	16·59	14·60	31·19	113·67	13	...
	LAHORE DIVISION.										
15	Lahore 8 Towns	171,600	2,813	2,378	5,191	16·39	13·86	30·25	118·29	2	...
16	Gujránwála 10 „	70,633	1,310	1,197	2,507	18·55	16·95	35·49	109·44	7	...
17	Ferozepore 7 „	31,976	575	469	1,044	17·98	14·67	32·65	122·60	1	...
	RAWALPINDI DIVN.										
18	Rawalpindi 5 Towns	44,440	867	833	1,700	19·51	18·74	38·25	104·08	5	...
19	Jhelum 5 „	37,394	633	595	1,228	16·93	15·91	32·84	106·39	8	...
20	Gujrat 4 „	41,856	917	888	1,805	21·91	21·21	43·12	103·26	20	...
21	Shahpur 6 „	45,388	1,199	1,145	2,344	26·42	25·23	51·64	104·72	21	...
	MOOLTAN DIVISION.										
22	Mooltan 7 Towns	69,335	1,497	1,463	2,960	21·59	21·10	42·69	102·32	8	...
23	Jhang 5 „	38,850	621	619	1,240	15·98	15·93	31·92	100·32	6	...
24	Montgomery 5 „	21,055	343	356	699	16·29	16·91	33·20	96·35	1	...
25	Muzaffargarh 7 „	19,586	348	337	685	17·77	17·21	34·97	103·26	5	...
	DERAJAT DIVISION.										
26	D. I. Khan 8 Towns	46,902	667	569	1,236	14·22	12·13	26·35	117·22	2	...
27	D. G. Khan 5 „	35,253	653	595	1,248	18·52	16·88	35·40	109·75	5	...
28	Bannú 4 „	20,925	402	322	724	19·21	15·39	34·60	124·84	5	...
	PESHAWAR DIVISION.										
29	Peshawar 2 Towns	59,447	1,380	1,110	2,490	23·21	18·67	41·89	124·32	8	...
30	Hazárá, whole district	364,324	3,320	2,379	5,699	9·11	6·53	15·64	139·55	2	...
31	Kohát 1 Town	11,043	82	53	135	7·42	4·80	12·22	154·72	...	...
	Total ...	3,022,071	50,809	45,477	96,286	16·81	15·05	31·86	111·72	5	...

NOTE.—The population of the Rural circles of Jullundur and Hazára is according to the census of 1868.

DEATHS REGISTERED in the DISTRICTS of the PUNJAB during the year 1877.

1	2	3	4	5	6			7	8			9		
Number.	Districts.	Population according to census of 1868.	Area in square miles.	Average population per square mile.	*Numbers of deaths registered.*			Number of males died to every 100 deaths of females.	*Ratio of deaths per 1000 of the Population.*			*Mean ratio of deaths per 1000 during previous 5 years.*		
					Males.	Females.	Total.		Males.	Females.	Total.	Males.	Females.	Total
	DELHI DIVISION.													
1	Delhi	608,850	1,277	477	8,717	7,345	16,062	119	27	26	26	30	31	30
2	Gurgaon	696,646	1,980	352	7,311	5,887	13,198	124	20	18	19	21	20	21
3	Karnál	610,927	2,352	260	7,275	5,566	12,841	131	22	20	21	21	19	20
	HISSAR DIVISION.													
4	Hissar	484,681	3,540	137	3,273	2,596	5,869	126	12	12	12	15	15	15
5	Rohtak	536,959	1,811	296	5,577	4,325	9,902	129	19	18	18	18	17	18
6	Sirsa	210,795	3,121	67	1,825	1,572	3,397	116	16	17	16	19	19	19
	UMBALLA DIVN.													
7	Umballa	1,008,860	2,621	385	9,534	7,118	16,652	134	17	15	16	23	21	22
8	Ludhiána	583,245	1,368	426	6,972	6,034	13,006	115	22	23	22	23	23	23
9	Simla	33,594	18	1,866	296	205	501	144	18	17	15	14	18	16
	JULLUNDUR DIVN													
10	Jullundur	783,020	1,326	590	10,104	8,808	18,912	115	23	25	24	31	37	33
11	Hoshiárpur	938,890	2,086	450	11,384	9,310	20,694	122	22	21	22	32	33	33
12	Kángra...	743,758	8,988	83	8,055	6,801	14,856	118	20	19	20	23	22	22
	AMRITSAR DIVN.													
13	Amritsar	832,750	1,562	533	11,794	9,923	21,717	119	25	27	26	30	33	31
14	Gurdáspur	906,126	1,818	498	10,996	8,502	19,498	129	22	21	21	29	30	29
15	Siálkot	994,458	1,955	508	9,638	7,470	17,108	129	18	16	17	28	28	28
	LAHORE DIVISION.													
16	Lahore	775,551	3,659	212	11,443	9,247	20,690	124	27	27	27	31	32	31
17	Gujránwála	550,576	2,563	215	7,238	6,008	13,246	120	24	24	24	24	26	25
18	Ferozepore	533,416	2,739	195	4,706	3,773	8,479	125	16	16	16	19	18	19
	RAWALPINDI DIVN													
19	Rawalpindi	699,647	6,218	112	7,944	6,892	14,836	115	21	21	21	18	17	18
20	Jhelum	500,988	3,910	128	5,396	4,651	10,047	116	20	20	20	22	22	22
21	Gujrat	616,347	2,029	303	5,896	4,950	10,846	119	18	17	18	17	16	17
22	Shahpur	368,796	4,700	78	4,512	3,813	8,325	118	23	22	22	28	26	27
	MOOLTAN DIVN.													
23	Mooltan...	459,765	5,927	77	6,610	5,069	11,679	130	26	24	25	25	24	25
24	Jhang	348,027	5,702	61	2,526	1,917	4,443	132	13	12	13	17	17	17
25	Montgomery	359,437	5,573	64	4,342	3,311	7,653	131	22	21	21	23	24	24
26	Muzaffargarh	295,547	2,954	100	3,946	3,220	7,166	122	24	24	24	20	18	19
	DERAJAT DIVN.													
27	Dera Ismail Khan ...	394,864	7,096	56	4,245	3,541	7,786	120	20	19	20	21	19	20
28	Dera Gházi Khan ...	309,978	4,740	65	2,485	1,865	4,350	133	14	13	14	13	12	13
29	Bannu	287,547	3,171	91	2,883	2,372	5,255	121	19	18	18	16	14	15
	PESHAWAR DIVN.													
30	Pesháwar	500,443	2,497	200	3,312	2,458	5,770	135	12	10	11	13	12	12
31	Hazárà	367,218	2,835	129	2,807	2,150	4,957	130	15	12	13	15	13	14
32	Kohát	145,419	2,839	51	710	481	1,191	148	9	7	8	11	9	10
	Total for the Province, ...	17,487,125	104,975	166	193,752	157,180	350,932	123	20	20	20	24	23	23

ANNUAL FORM

DEATHS REGISTERED in the DISTRICTS of

1	2				
Number.	Districts.	January.	February.	March.	April.	May.
	DELHI DIVISION.					
1	Delhi	1,135	842	1,099	1,108	1,258
2	Gurgaon	845	675	896	1,040	1,139
3	Karnál	962	843	1,056	919	1,115
	HISSAR DIVISION.					
4	Hissar	445	349	418	419	464
5	Rohtak	645	529	666	654	822
6	Sirsa	294	256	278	275	318
	UMBALLA DIVISION.					
7	Umballa	1,547	1,365	1,497	1,232	1,555
8	Ludhiána	939	788	853	761	1,053
9	Simla	39	39	38	43	48
	JALLUNDUR DIVISION.					
10	Jullundur	2,175	1,329	1,415	1,225	1,544
11	Hoshiárpur	1,879	1,642	1,660	1,402	1,851
12	Kángra	1,330	1,237	1,235	1,003	1,119
	AMRITSAR DIVISION.					
13	Amritsar	2,218	1,509	1,448	1,216	1,855
14	Gurdaspur	2,019	1,855	1,678	1,291	1,992
15	Siálkot	1,790	1,201	1,188	1,139	1,674
	LAHORE DIVISION.					
16	Lahore	1,986	1,622	1,452	1,068	1,690
17	Gujránwála	1,712	1,087	1,018	806	1,216
18	Ferozepore	647	428	435	482	499
	RAWALPINDI DIVISION.					
19	Rawalpindi	995	831	874	840	1,142
20	Jhelum	674	561	628	591	887
21	Gujrat	818	726	860	735	936
22	Shahpur	670	603	635	565	702
	MOOLTAN DIVISION.					
23	Mooltan	1,393	1,158	1,107	888	898
24	Jhang	460	427	428	373	314
25	Montgomery	904	772	616	597	625
26	Muzaffargarh	1,021	685	442	478	581
	DERAJAT DIVISION.					
27	Dera Ismail Khan	695	617	627	619	798
28	Dera Gházi Khan	577	463	392	323	426
29	Bannu	506	403	444	457	615
	PESHAWAR DIVISION.					
30	Pesháwar	527	414	468	417	561
31	Hazárá	485	440	559	432	431
32	Kohát	115	113	82	129	109
	Total for the Province ...	32,447	25,809	26,492	23,527	30,237
	Ratio of deaths per 1,000 in each month,	22·26	17·71	18·18	16·14	20·75

the PUNJAB during each month of the year 1877.

3							4	5
June.	July.	August.	September.	October.	November.	December.	Total deaths registered during the year.	Number.
1,485	1,265	1,193	999	1,084	1,853	2,741	16,062	1
1,353	1,148	1,172	873	932	1,276	1,849	13,198	2
1,456	1,250	1,199	839	880	1,249	1,073	12,841	3
517	556	457	328	458	506	952	5,869	4
910	826	696	607	722	1,150	1,675	9,902	5
282	251	217	200	272	357	397	3,397	6
1,925	1,437	1,257	1,164	1,079	1,316	1,278	16,652	7
1,329	913	1,089	1,036	1,418	1,682	1,115	13,006	8
49	28	46	50	35	41	45	501	9
1,444	1,395	1,386	1,402	1,883	2,013	1,701	18,912	10
2,022	1,506	1,643	1,448	1,789	2,256	1,596	20,694	11
1,330	1,146	975	1,438	1,359	1,235	1,449	14,856	12
1,913	1,853	1,666	1,533	2,053	2,202	2,251	21,717	13
2,028	1,618	1,295	1,277	1,398	1,390	1,657	19,498	14
2,016	1,703	1,218	1,132	1,329	1,316	1,402	17,108	15
1,833	1,530	1,414	1,648	1,964	2,152	2,331	20,690	16
1,231	1,032	848	861	983	1,120	1,332	13,246	17
547	691	643	741	1,283	1,120	963	8,479	18
1,554	1,459	1,127	1,145	1,524	1,622	1,723	14,836	19
1,047	835	812	850	928	1,112	1,122	10,047	20
1,181	943	781	862	933	788	1,283	10,846	21
958	639	591	484	608	909	961	8,325	22
951	666	623	806	903	1,091	1,195	11,679	23
388	314	264	283	340	435	417	4,443	24
653	473	467	397	530	731	888	7,653	25
502	446	510	462	756	664	619	7,166	26
931	585	412	538	516	605	843	7,786	27
379	292	267	290	255	320	366	4,350	28
562	431	301	290	366	418	462	5,255	29
663	416	366	368	448	516	606	5,770	30
460	416	323	312	350	394	355	4,957	31
92	90	124	89	101	70	77	1,191	32
33,991	28,153	25,382	24,752	29,509	33,909	36,724	350,932	
23·32	19.32	17·42	16·98	20·25	23·27	25·20	20·07	

DEATHS REGISTERED ACCORDING to AGE in the

1	2	3		4		5		6	
No.	DISTRICTS.	Under 1 Year.		1 Year & under 6.		6 and under 12.		12 and under 20.	
		Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
	DELHI DIVISION.								
1	Delhi	2,187	1,820	1,862	1,696	371	290	227	213
2	Gurgaon	1,446	1,157	1,666	1,345	320	227	226	149
3	Karnál	1,917	1,323	1,382	1,023	280	209	218	184
	HISSAR DIVISION.								
4	Hissar	630	404	666	469	168	136	110	86
5	Rohtak	1,180	883	1,453	1,095	273	161	159	122
6	Sirsa	385	372	317	293	59	52	61	57
	UMBALLA DIVISION.								
7	Umballa	1,960	1,568	1,715	1,418	347	266	332	229
8	Lodhiána	1,727	1,687	1,539	1,254	259	271	194	164
9	Simla	57	38	25	24	8	3	14	13
	JULLUNDUR DIVISION.								
10	Jullundur	1,608	1,723	2,376	2,315	511	440	428	399
11	Hoshiárpur	2,395	2,244	1,744	1,690	497	446	418	341
12	Káugra	1,142	1,051	845	906	348	320	411	391
	AMRITSAR DIVISION.								
13	Amritsar	2,660	2,650	1,986	1,861	433	402	347	448
14	Gurdáspur	1,513	1,432	1,466	1,311	457	363	366	335
15	Siálkot	1,666	1,350	1,762	1,488	429	354	313	256
	LAHORE DIVISION.								
16	Lahore	3,261	2,745	1,626	1,422	363	351	374	427
17	Gujránwála	1,560	1,390	1,213	1,036	252	244	222	184
18	Ferozepore	901	810	739	593	223	181	204	179
	RAWALPINI DIVISION.								
19	Rawalpindi	2,316	1,823	1,389	1,300	334	310	275	302
20	Jhelum	1,549	1,184	954	816	222	192	171	196
21	Gujrat	1,220	938	1,208	1,046	249	245	164	183
22	Shahpur	1,460	1,104	666	633	164	178	109	115
	MOOLTAN DIVISION.								
23	Mooltan	1,108	973	595	501	251	249	224	191
24	Jhang	345	304	210	191	86	76	94	69
25	Montgomery	1,027	870	626	496	167	141	117	117
26	Muzaffargarh	640	515	421	391	219	158	130	97
	DERAJAT DIVISION.								
27	Dera Ismail Khan	902	743	805	741	292	221	147	133
28	Dera Gházi Khan	269	237	241	167	126	93	139	78
29	Bannu	527	384	810	790	272	204	97	71
	PESHAWAR DIVISION.								
30	Pesháwar	466	365	575	494	146	119	143	153
31	Hazárá	336	237	484	344	201	166	148	127
32	Kohát	54	39	134	83	46	35	26	14
	Total for the Province ...	40,414	34,363	33,500	29,232	8,375	7,103	6,608	6,023
	Ratios per 1,000 living ...	4·25	4·31	3·52	3·66	0·88	0·89	0·69	0·75

DISTRICTS of the PUNJAB during the year 1877.

7		8		9		10		11		12
20 AND UNDER 30.		30 AND UNDER 40.		40 AND UNDER 50.		50 AND UNDER 60.		60 AND UPWARDS.		
Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Number.
511	558	541	495	729	497	746	469	1,543	1,307	1
409	438	401	400	547	381	635	472	1,661	1,318	2
459	398	454	386	695	529	642	447	1,228	1,067	3
211	245	210	199	303	226	271	177	704	654	4
285	285	270	287	409	288	456	314	1,092	890	5
141	115	108	113	173	125	192	108	389	337	6
623	517	774	529	998	618	840	521	1,945	1,452	7
330	347	342	319	486	381	581	332	1,514	1,279	8
33	23	40	29	41	22	26	12	52	41	9
543	490	557	468	786	510	925	561	2,370	1,902	10
671	599	825	602	1,137	688	1,127	666	2,570	2,034	11
740	812	640	547	1,074	711	812	491	2,043	1,572	12
688	762	779	575	1,040	671	1,092	606	2,769	1,948	13
847	679	941	697	1,411	873	1,255	764	2,740	2,048	14
524	444	591	477	847	587	770	469	2,736	2,045	15
587	614	686	570	1,035	644	920	569	2,591	1,905	16
275	281	364	321	595	407	672	446	2,085	1,699	17
259	284	246	262	345	243	446	288	1,343	933	18
463	559	555	512	609	501	532	357	1,471	1,228	19
256	297	274	335	351	342	363	250	1,256	1,039	20
261	308	283	263	405	340	432	292	1,674	1,335	21
117	159	176	173	287	229	292	223	1,241	996	22
481	450	676	485	880	569	662	371	1,733	1,280	23
111	119	178	152	284	206	300	175	916	625	24
227	201	258	207	406	250	389	222	1,125	807	25
258	275	388	340	457	392	393	268	1,040	784	26
248	240	281	255	353	271	353	220	864	717	27
190	234	284	232	342	209	254	175	640	440	28
146	131	153	155	241	169	206	134	431	334	29
263	236	326	233	349	261	294	157	750	440	30
165	195	260	234	276	215	185	134	752	498	31
91	37	88	69	86	59	73	54	112	91	32
11,413	11,332	12,949	10,924	17,977	12,414	17,136	10,744	45,380	35,045	
1·20	1·42	1·36	1·37	1·89	1·56	1·80	1·35	4·77	4·38	

ANNUAL FORM NO. V.

DEATHS registered according to CLASSES in the Districts of the PUNJAB, during the year 1877.

1	2	3					4					5				
Number.	Districts.	*Population according to Census of* 1868.					*Number of deaths registered.*					*Ratio of deaths per* 1,000 *of Population.*				
		Muhammadans.	Hindus.	Native Christians.	Other Castes.	Total.	Muhammadans.	Hindus.	Native Christians.	Other Castes.	Total.	Muhammadans.	Hindus.	Native Christians.	Other Castes.	Total.
	DELHI DIVISION.															
1	Delhi						4,565	10,148	10	1,339	16,062					
2	Gurgaon						4,252	7,077	...	1,869	13,198					
3	Karnál						3,709	7,321	...	1,811	12,841					
	HISSAR DIVISION.															
4	Hissar						1,360	3,793	...	716	5,869					
5	Rohtak						1,812	6,909	...	1,181	9,902					
6	Sirsa						1,300	1,651	...	446	3,397					
	UMBALLA DIVISION.															
7	Umballa						4,886	9,375	...	2,391	16,652					
8	Ludhiána						4,790	6,784	1	1,431	13,006					
9	Simla						102	252	1	146	501					
	JULLUNDUR DIVISION.															
10	Jullundur						8,781	7,524	1	2,606	18,912					
11	Hoshiárpur						7,338	10,562	...	2,794	20,694					
12	Kángra						979	11,835	...	2,042	14,856					
	AMRITSAR DIVISION.															
13	Amritsar						10,227	9,355	...	2,135	21,717					
14	Gurdáspur						9,751	7,714	...	2,033	19,498					
15	Siálkot						10,956	4,436	...	1,716	17,108					
	LAHORE DIVISION.															
16	Lahore						13,070	5,766	...	1,854	20,690					
17	Gujránwâla						9,039	3,293	1	913	13,246					
18	Ferozepore						3,977	3,716	...	786	8,479					
	RAWALPINDI DIVISION.															
19	Rawalpindi						13,187	1,579	...	70	14,836					
20	Jhelum						8,703	1,235	...	109	10,047					
21	Gujrat						9,492	1,294	...	60	10,846					
22	Shahpur						6,790	1,356	...	179	8,325					
	MOOLTAN DIVISION.															
23	Mooltan						9,086	2,356	...	237	11,679					
24	Jhang						3,345	1,000	...	98	4,443					
25	Montgomery						5,386	1,910	...	357	7,653					
26	Muzaffargarh						6,009	1,090	...	67	7,166					
	DERAJAT DIVISION.															
27	Dera Ismail Khan						6,565	1,161	...	60	7,786					
28	Dera Gházi Khan						3,648	679	...	23	4,350					
29	Bannu						4,713	523	1	18	5,255					
	PESHAWAR DIVISION.															
30	Pesháwar						5,262	450	...	58	5,770					
31	Hazára						4,640	309	...	8	4,957					
32	Kohát						1,052	119	...	20	1,191					
	Total of the Province	...	...	...	...	...	1,88,772	1,32,572	15	2957,3	3,50,932	...	...	...	...	...

Information not available.

ANNUAL FORM No. VI.

DEATHS REGISTERED from different CAUSES in the DISTRICTS

1	2	3	4	5	6	7		
							Injuries.	
							Suicide.	
Number.	A. DISTRICTS.	Population according to Census of 1868.	Cholera.	Small-pox.	Fevers.	Bowel complaints.	Males.	Females.
	DELHI DIVISION.							
1	Delhi	434,660	...	87	4,826	528	1	2
2	Gurgaon	636,779	1	1,503	6,062	1,043	5	11
3	Karnál	546,613	...	943	5,508	574	2	...
	HISSAR DIVISION.							
4	Hissar	425,089	...	163	2,850	144	...	...
5	Rohtak	509,509	1	770	6,795	130	1	6
6	Sirsa	197,988	1	92	1,779	149	1	...
	UMBALLA DIVISION.							
7	Umballa	936,992	...	397	8,977	1,023	1	5
8	Ludhiána	546,290	1	418	6,535	578	...	4
9	Simla	18,746	...	...	84	34	...	...
	JULLUNDUR DIVISION.							
10	Jullundur	708,129	1	5	13,246	386	5	4
11	Hoshiárpur	911,781	...	11	12,657	1,557	6	14
12	Kangra	740,896	2	34	8,965	1,318	13	10
	AMRITSAR DIVISION.							
13	Amritsar	696,584	1	138	10,052	736	5	4
14	Gurdáspur	876,942	6	11	13,249	1,054	5	12
15	Siálkot	961,469	1	18	11,555	545	6	3
	LAHORE DIVISION.							
16	Lahore	630,317	4	223	10,167	444	8	5
17	Gujránwála	514,868	2	66	8,931	286	7	1
18	Ferozepore	518,248	...	213	5,298	333	3	3
	RAWALPINDI DIVISION.							
19	Rawalpindi	670,906	1	251	8,977	297	1	...
20	Jhelum	485,591	1	38	5,227	493	2	...
21	Gujrat	584,932	...	17	6,950	257	...	1
22	Shahpur	354,086	...	317	3,942	434	1	1
	MOOLTAN DIVISION.							
23	Mooltan	408,887	...	471	7,327	247	1	..
24	Jhang	322,410	...	60	2,549	128	...	...
25	Montgomery	359,437	...	511	4,881	161	...	...
26	Muzaffargarh	295,547	...	364	5,705	81	1	...
	DERAJAT DIVISION.							
27	Dera Ismail Khan	369,579	...	1,021	4,793	175	1	2
28	Dera Gházi Khan	286,770	...	96	2,909	95	2	3
29	Bannú	284,323	...	1,575	2,311	326	...	1
	PESHAWAR DIVISION.							
30	Pesháwar	440,049	...	233	2,638	128	2	...
31	Hazárá	364,324	...	15	3,639	235	...	...
32	Kohát	129,166	...	120	644	24	...	1
	Total of Districts ...	16,167,907	23	10,181	200,028	13,943	80	93

NOTE—A. Districts in this statement do not include the population and

and TOWNS of the PUNJAB during the year 1877.

8			9	10	11								12
RIES.					RATIO OF DEATHS PER 1,000 OF POPULATION.								
Wounding or accidents.	Snake bite or killed by wild beasts.	Total.	All other causes.	Total deaths from all causes.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Injuries.	All other causes.	*From all Causes.* For the year.	*From all Causes.* Mean of previous five years.	Number.
94	25	122	2,431	7,994	...	0·20	11·10	1·21	0·28	5·59	18	24	1
222	26	264	2,143	11,016	0·001	2·36	9·52	1·64	0·41	3·36	17	18	2
138	29	169	3,577	10,771	..	1·72	10·08	1·05	0·31	6·54	20	19	3
53	11	64	778	3,999	...	0·38	6·70	0·34	0·15	1·83	9	12	4
121	21	149	1,163	9,008	0·001	1·51	13·34	0·25	0·29	2·28	18	16	5
31	15	47	982	3,050	0·004	0·46	8·98	0·75	0·24	4·96	15	18	6
149	30	185	4,490	15,072	...	0·42	9·58	1·09	0·20	4·79	16	20	7
76	16	96	4,030	11,658	0·002	0·76	11·96	1·06	0·17	7·38	21	22	8
4	3	7	167	292	...	...	4·48	1·81	0·37	8·91	15	18	9
116	12	137	3,475	17,250	0·001	0·01	18·70	0·54	0·19	4·91	24	32	10
239	43	302	5,338	19,865	...	0·01	13·88	1·71	0·33	5·85	22	31	11
270	62	355	4,121	14,795	0·002	0·04	12·10	1·78	0·48	5·56	20	22	12
178	30	217	5,025	16,169	0·001	0·20	14·39	1·06	0·31	7·21	23	27	13
169	34	220	4,386	18,926	0·01	0·01	15·11	1·20	0·25	5·00	21	28	14
128	27	164	4,090	16,373	0·001	0·02	12·02	0·57	0·17	4·25	17	28	15
127	108	248	5,510	16,596	0·006	0·35	16·13	0·70	0·39	8·74	26	30	16
97	87	192	2,656	12,133	0·003	0·13	17·35	0·55	0·37	5·16	23	23	17
64	22	92	2,040	7,976	...	0·41	10·22	0·64	0·18	3·94	15	18	18
175	49	225	4,238	13,989	0·001	0·37	13·38	0·44	0·33	6·32	21	17	19
130	44	176	3,641	9,576	0·002	0·08	10·76	1·01	0·36	7·50	20	21	20
90	18	109	2,742	10,075	...	0·03	11·88	0·44	0·19	4·69	17	16	21
74	39	115	3,060	7,868	...	0·89	11·13	1·22	0·32	8·64	22	25	22
110	48	159	1,715	9,919	...	1·15	17·92	0·60	0·36	4·19	24	22	23
54	36	90	981	3,808	...	0·19	7·29	0·40	0·28	3·04	12	16	24
70	32	102	1,998	7,653	...	1·42	13·58	0·45	0·28	5·56	21	23	25
65	45	111	905	7,166	...	1·23	19·30	0·27	0·37	3·06	24	19	26
72	34	109	1,171	7,269	...	2·76	12·97	0·47	0·29	3·17	20	21	27
35	26	66	548	3,714	...	0·33	10·14	0·33	0·23	1·91	13	11	28
35	13	49	954	5,215	...	5·54	8·13	1·15	0·17	3·35	18	14	29
88	7	97	647	3,743	...	0·53	5·99	0·29	0·22	1·47	8	8	30
117	11	128	916	4,933	...	0·04	9·99	0·64	0·35	2·51	13	14	31
48	6	55	118	961	...	0·93	4·98	0·18	0·42	0·91	7	9	32
3,439	1,009	4,621	80,036	3,08,832	0·001	0·63	12·37	0·86	0·28	4·95	19	22	

deaths of the principal Towns, Cantonments and Hill Sanitaria.

DEATHS REGISTERED from different CAUSES in the

1	2	3	4	5	6	7		
Number.	B. TOWNS.	Population according to Census of 1875-76.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Injury. Suicide. Males.	Injury. Suicide. Females.
	DELHI DISTRICT.							
1	Delhi	115,992	...	619	2,452	327	4	1
2	Do. Suburbs	44,561	...	57	881	200	...	...
3	Sonepat	13,637	...	5	206	46	...	...
	GURGAON DISTRICT.							
4	Farkknagar	10,594	...	63	86	61	...	...
5	Rewári	25,190	1	21	235	177	...	...
6	Ferozepore	10,530	...	23	182	98	...	...
7	Palwal	13,553	...	1	212	74	...	...
	KARNAL DISTRICT.							
8	Kárnal	24,015	...	30	543	83	...	...
9	Kaithal	15,799	...	2	79	103	...	1
10	Panipat	24,500	...	9	386	111	1	...
	HISSAR DISTRICT.							
11	Hissar	14,162	...	9	210	58	...	...
12	Hánsi	12,210	...	11	133	17	1	...
13	Bhiwáni	33,220	...	283	261	64	...	...
	ROHTAK DISTRICT.							
14	Rohtak	14,994	...	163	234	13	...	...
15	Jhajjar	12,456	...	90	112	34	...	...
	SIRSA DISTRICT.							
16	Sirsa	12,807	...	...	151	40	...	...
	UMBALLA DISTRICT.							
17	Umballa	26,258	...	3	262	93	...	...
18	Jagádhri	12,522	1	3	94	23	...	...
19	Shahabad	11,660	...	1	54	15	..	...
20	Sádhaura	11,167	...	...	78	18	...	...
21	Rúpar	10,261	...	...	117	9	1	...
	LUDHIANA DISTRICT.							
22	Ludhiána	36,355	...	7	589	123	...	...
	JULLUNDUR DISTRICT.							
23	Jullundur	35,222	...	3	481	89	...	1
24	Do. Suburbs	15,702	...	...	302	1	...	..
25	Kartárpur	11,053	...	...	124	25	...	...
26	Ráhon	12,914	...	...	79	43	...	...
	HOSHIARPUR DISTRICT.							
27	Hoshiárpur	13,138	...	...	150	81	...	...
28	Urmar Tánda	13,971	...	...	220	73	...	...
	GURDASPUR DISTRICT.							
29	Batála	26,929	...	...	287	41	...	...
	AMRITSAR DISTRICT.							
30	Amritsar	136,166	1	517	2,691	293	2	2
	SIALKOT DISTRICT.							
31	Siálkot	32,989	...	2	285	82	...	...
	LAHORE DISTRICT.							
32	Lahore	92,035	1	46	2,194	38	...	...
33	Do. Suburbs	36,406	...	...	317	74	...	...
34	Kasur	16,793	...	2	171	29	...	...
	GUJRANWALA DISTRICT.							
35	Gujránwála	20,362	...	...	277	56	...	...
36	Wazirabad	15,346	...	...	344	29	...	...
	FEROZEPORE DISTRICT.							
37	Ferozepore	15,168	...	1	312	58	...	...
	RAWALPINDI DISTRICT.							
38	Rawalpindi	20,802	...	1	318	128	1	...
	JHELUM DISTRICT.							
39	Pind Dadán Khan	15,397	1	...	182	129	...	...
	GUJRAT DISTRICT.							
40	Gujrat	17,401	...	...	160	12	...	...
41	Jalálpur	14,014	...	1	169	39	...	...
	SHAHPUR DISTRICT.							
42	Bhera	14,710	...	...	165	78	...	...
	MOOLTAN DISTRICT.							
43	Mooltan	29,448	...	4	333	97	2	...
44	Do. Suburbs	21,430	...	...	390	66	...	...
	JHANG DISTRICT.							
45	Maghiáina	13,618	...	...	159	23	...	...
46	Chiniot	11,999	...	42	118	15	...	...
	D. I. KHAN DISTRICT.							
47	Dera Ismail Khan	19,954	...	63	213	36	...	2
	D. G. KHAN DISTRICT.							
48	Dera Gházi Khan	19,133	...	7	263	69	1	...
	PESHAWAR DISTRICT.							
49	Peshawar	58,430	...	6	733	144	...	...
	KOHAT DISTRICT.							
50	Kohát	11,043	...	18	64	12	...	...
	Total of the Towns ...	1,268,616	5	2,113	19,078	3,650	13	7
	Total for the Province ...	17,487,125	29	12,296	219,281	17,664	97	100

NOTE.—The deaths registered in the Frontier Cantonments and Hill sanitaria are shown separately in

DISTRICTS and TOWNS of the PUNJAB during the year 1877.

8			9	10	11								12
RIES.					RATIO OF DEATHS PER 1,000 OF POPULATION,								
Wounding or accidents.	Snake bite or killed by wild beasts.	Total.	All other causes.	Total deaths from all causes.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Injuries.	All other causes.	*From all Causes.* For the year.	*From all Causes.* Mean of previous five years.	Number.
39	5	49	2,568	6,015	...	5·34	21·14	2·82	0·42	22·14	52	50	1
6	...	6	597	1,741	...	1·28	19·77	4·49	0·13	13·40	39	37	2
...	...	...	55	312	...	0·37	15·11	3·37	...	4·03	23	33	3
2	2	4	160	374	...	5·95	8·12	5·76	0·38	15·10	35	42	4
6	...	6	433	873	0·04	0·83	9·33	7·03	0·24	17·19	35	47	5
3	...	3	142	448	...	2·18	17·28	9·31	0·28	13·48	42	43	6
5	1	6	194	487	...	0·07	15·64	5·46	0·44	14·31	36	52	7
7	...	7	324	987	...	1·25	22·61	3·46	0·29	13·19	41	38	8
2	2	5	99	288	...	0·13	5·00	6·52	0·32	6·27	18	21	9
5	1	7	282	795	...	0·37	15·75	4·53	0·28	11 51	32	39	10
2	2	4	207	488	...	0·63	14·83	4·09	0·28	14·62	34	36	11
4	...	5	101	287	...	0·90	12·53	1·39	0·41	8·27	23	34	12
2	1	3	484	1,095	...	8·52	7·86	1·93	0·09	14·57	33	37	13
4	...	4	112	526	...	10·87	15 61	0·87	0·27	7·47	35	29	14
3	...	3	129	368	...	7·22	8·99	2·73	0·24	10·36	20	23	15
3	1	4	152	347	...	...	11·79	3·12	0·31	11·87	27	33	16
14	...	14	366	738	...	0·11	9·98	3·54	0·53	13·94	28	39	17
2	...	2	137	260	0·08	0·24	7·50	1·84	0·16	10·94	21	29	18
4	1	5	101	176	...	0·08	4·63	1·21	0·43	8·66	15	28	19
..	...	...	146	242	...	..	6·98	1·61	...	13·07	22	36	20
...	1	2	36	164	...	...	11·40	0·88	0·19	3·51	16	39	21
8	4	12	617	1,348	...	0·19	15·94	3·33	0·32	16·69	36	33	22
9	...	10	253	836	...	0·08	13·66	2·53	0·28	7·18	24	57	23
5	...	5	98	406	...	...	19·23	0·06	0·32	6·24	26	47	24
5	...	5	63	217	...	...	11·22	2·26	0·45	5·70	20	55	25
1	1	2	76	203	...	...	6·12	3·56	0·15	5·88	16	28	26
8	...	8	143	382	...	...	11·42	6·16	0·61	10·88	29	50	27
2	...	2	152	447	...	...	15·75	5·22	0·14	10·88	32	54	28
8	1	9	211	548	...	...	10·66	1·52	0·33	7·83	20	40	29
55	1	60	1,986	5,548	0·01	3·80	19·76	2·15	0·45	14·58	41	49	30
7	...	7	359	735	...	0·06	8·64	2·48	0·21	10·88	22	43	31
20	1	21	837	3,137	0·01	0 50	23·84	0·41	0,23	9·09	34	41	32
10	1	11	215	617	...	...	8·70	2·03	0·30	5·90	17	25	33
5	...	5	133	340	...	0·12	10·18	1·73	0·30	7·92	20	34	34
8	1	9	248	590	...	...	13·60	2·75	0·44	12·18	29	42	35
9	...	9	141	523	...	...	22·42	1·89	0·59	9·19	34	37	36
4	...	4	128	503	...	0·06	20·57	3·82	0·26	8·44	33	43	37
10	1	12	352	811	...	0·05	15·29	6·15	0·58	16·92	39	40	38
1	...	1	158	471	0·06	...	11·82	8·38	0·06	10·26	30	39	39
7	1	8	201	381	...	...	9·19	0·69	0·46	11·55	22	34	40
2	...	2	179	390	...	0·07	12·06	2·78	0·14	12·77	28	30	41
5	1	6	208	457	...	...	11 22	5·30	0·41	14·14	31	40	42
12	3	17	467	918	...	0·13	11·31	3·29	0·58	15·76	31	34	43
14	1	15	371	842	...	...	18·20	3·08	0·70	17·31	39	47	44
...	1	1	142	325	...	...	11·67	1·69	0·07	10·43	24	22	45
2	...	2	133	310	...	3·50	9·83	1·25	0·17	11·08	26	27	46
3	2	7	173	492	...	3·16	10·67	1·80	0·35	8·67	25	28	47
5	...	6	245	590	...	0·56	13·74	3·61	0·32	12·80	31	28	48
33	...	33	1,081	1,997	...	0·10	12·54	2·46	0·56	18·50	34	43	49
4	...	4	41	139	...	1·63	5·79	1·09	0·36	3·71	12	24	50
375	37	432	16,236	41,514	0·003	1·66	15·04	2·87	0·34	12·80	33	37	...
3,832	1,047	5,076	96,586	350,932	0·001	0·70	12·54	1·01	0·29	5·52	20	23	

Form No. VI, B. but are included in the Grand Total for the Province.

DEATHS REGISTERED in the FRONTIER CANTONMENTS and HILL SANITARIA during the year 1877.

Number.	Frontier Cantonments and Hill Sanitaria.	Population.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Injuries.					All other causes.	Total deaths from all causes.	Ratio of deaths per 1,000 of population.	Total births registered during the year.	Ratio of births per 1,000 of population.
							Suicide.		Wounds or accidents.	Snake bite or killed by wild beasts.	Total.					
							Males.	Females.								
	Frontier Cantonments.															
1	Abbott-abad ...	2,894	...	...	1	1	...	...	...	...	...	22	24	8	41	14
2	Mardán ...	1,964	...	...	7	3	...	...	1	...	1	19	30	15	49	25
3	Kohát ...	5,210	...	...	24	16	3	...	3	...	6	45	91	17	54	10
4	Edwardesabad ...	3,224	1	2	8	...	...	...	...	...	...	29	40	12	19	6
5	Dera Ismail Khan ...	5,331	...	...	3	6	...	...	1	...	1	15	25	5	12	2
6	Dera Gházi Khan ...	2,937	...	...	5	3	1	...	1	...	2	17	27	9	19	6
7	Rájanpur ...	1,138	...	...	3	1	...	...	...	...	...	15	19	17	16	14
	Hill Sanitaria.															
1	Simla ...	14,848	...	...	86	23	...	...	4	...	4	96	209	14	71	5
2	Dharmsála ...	2,862	...	...	21	14	...	...	1	...	1	25	61	21	45	16
3	Dalhousie ...	2,255	...	...	7	2	...	...	2	...	2	13	24	11	3	1
4	Murree ...	7,939	...	...	10	2	...	...	5	1	6	18	36	4	15	2
	TOTAL ...	50,602	1	2	175	71	4	...	18	1	23	314	586	11	344	7

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DEATHS REGISTERED from CHOLERA in

1	2	3		4						
Number.	Districts.	*Circles of registration.*		*Villages.*		January.	February.	March.	April.	May.
		Number in each district.	No. from which deaths from Cholera were reported.	Number in each district.	No. from which deaths from Cholera were reported.					
	DELHI DIVISION.									
1	Delhi	15	...	753	...	...	...	...	...	...
2	Gurgaon	16	2	1,267	2	...	...	...	...	1
3	Karnál	14	...	868	...	...	...	...	...	...
	HISSAR DIVISION.									
4	Hissar	12	...	706	...	...	...	...	...	...
5	Rohtak	11	1	492	1	1	...	...	...	...
6	Sirsa	13	1	630	1	...	...	...	...	...
	UMBALLA DIVISION.									
7	Umballa	19	1	2,216	1	...	...	...	...	1
8	Ludhiána	9	1	859	1	...	1	...	...	...
9	Simla	3	...	189	...	...	...	...	...	...
	JULLUNDUR DIVISION.									
10	Jullundur	9	1	1,213	1	...	...	...	..	...
11	Hoshiárpur	14	...	2,215	...	...	...	...	...	...
12	Kangra	15	3	706	3	1	...	1	...	...
	AMRITSAR DIVISION.									
13	Amritsar	10	2	1,094	2	...	...	...	...	...
14	Gurdáspur	17	5	2,344	6	...	1	1	...	1
15	Siálkot	13	...	2,290	...	...	...	...	...	1
	LAHORE DIVISION.									
16	Lahore	20	4	1,710	4	...	...	...	3	1
17	Gujránwála	9	2	1,209	2	...	...	...	...	1
18	Ferozepore	15	...	1,253	...	...	...	...	...	...
	RAWALPINDI DIVISION.									
19	Rawalpindi	18	1	1,717	1	...	...	...	...	1
20	Jhelum	11	...	966	...	...	...	...	...	..
21	Gujrat	8	...	1,411	...	...	...	...	...	...
22	Shahpur	15	...	628	...	...	...	...	...	...
	MOOLTAN DIVISION.									
23	Mooltan	13	...	1,147	...	...	...	...	...	...
24	Jhang	9	...	1,012	...	...	...	...	...	...
25	Montgomery	16	...	1,626	...	...	...	...	...	...
26	Muzaffargarh	12	...	539	...	...	...	...	...	...
	DERAJAT DIVISION.									
27	Dera Ismail Khan	19	...	841	...	...	...	...	...	...
28	Dera Gházi Khan	17	...	518	...	...	...	...	...	...
29	Bannu	11	...	544	...	...	...	...	...	...
	PESHAWAR DIVISION.									
30	Pesháwar	19	...	732	...	...	...	...	...	...
31	Hazára	15	...	1,099	...	...	...	...	...	...
32	Kohat	5	...	452	...	...	...	...	...	...
	Total for the Province ...	422	24	35,246	25	2	2	2	3	7

the DISTRICTS of the Punjab during each month of the year 1877.

5							6			7			8	9
							Total.			Ratio of deaths per 1,000 of Population.				
June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.	Mean ratio per 1,000 of previous 5 years.	Number.
...	...	...	...	...	...	...	...	...	...	...	...	...	0·17	1
...	1	...	...	...	...	...	1	1	2	0·002	0·002	0·002	0.22	2
...	...	...	...	...	...	...	...	...	...	...	...	...	0·38	3
...	...	...	...	...	...	...	...	...	...	...	...	...	0·09	4
...	...	...	...	...	...	...	...	1	1	...	0·004	0·001	0·09	5
...	...	1	...	...	...	...	...	1	1	...	0·01	0·004	0 12	6
...	...	...	...	...	...	...	1	...	1	0·001	...	0·001	0·29	7
...	...	...	...	...	...	...	1	...	1	0·003	...	0·001	0·28	8
...	...	...	...	...	...	...	...	...	...	...	...	...	0.98	9
...	...	...	...	...	1	...	...	1	1	...	0·002	0·001	0·12	10
...	...	...	...	...	...	...	...	...	...	...	...	...	0·20	11
...	...	...	...	...	...	...	1	1	2	0·002	0·002	0·002	0·24	12
1	...	...	...	1	...	...	1	1	2	0·002	0·002	0·002	0·33	13
1	...	...	2	...	...	...	5	1	6	0·01	0·002	0·01	0·52	14
...	...	...	...	...	...	...	1	...	1	0·001	...	0·001	0·21	15
...	1	...	...	...	...	...	2	3	5	0·004	0·008	0 006	0·43	16
...	...	...	...	...	1	...	2	...	2	0·006	...	0·003	0·23	17
...	...	...	...	...	...	...	...	...	...	...	...	...	0·12	18
...	...	...	...	...	...	...	1	...	1	0·002	...	0·001	0·22	19
1	...	...	1	...	...	...	2	...	2	0·007	...	0 003	0·23	20
...	...	...	...	...	...	...	...	...	...	...	...	...	0·21	21
...	...	...	...	...	...	...	...	...	...	...	...	...	0·26	22
...	...	...	...	...	...	...	...	...	...	...	...	...	0·01	23
...	...	...	...	...	...	...	...	...	...	...	...	...	0·002	24
...	...	...	...	...	...	...	...	...	...	...	...	...	0·004	25
...	...	...	...	...	...	...	...	...	...	...	...	...	0·002	26
...	...	...	...	...	...	...	...	...	...	...	...	...	0·13	27
...	...	...	...	...	...	...	...	...	...	...	...	...	0·01	28
...	...	...	1	...	...	...	1	...	1	0·006	...	0·003	0·70	29
...	...	...	...	...	...	...	...	...	...	...	...	...	0·41	30
...	...	...	...	...	...	...	...	...	...	...	...	...	0·17	31
...	...	...	...	...	...	...	...	...	...	...	...	...	0·51	32
3	2	1	4	1	2	...	19	10	29	0·001	0·001	0·001	0·24	

DEATHS REGISTERED from SMALL-POX in the DISTRICTS

1	2	3		4		5						
		Circles of registration.		*Villages.*								
Number.	Districts.	Number in each district.	No. from which deaths from small-pox were reported.	Number in each district.	No. from which deaths from small-pox were reported.	January.	February.	March.	April.	May.	June.	July.
	DELHI DIVISION.											
1	Delhi	15	10	753	22	...	...	2	5	18	24	17
2	Gurgaon	16	16	1,267	286	41	69	136	264	288	281	123
3	Karnál	14	13	868	290	20	15	46	53	105	152	143
	HISSAR DIVISION.											
4	Hissar	12	8	706	46	24	25	15	26	31	26	18
5	Rohtak	11	11	492	102	30	...	4	42	98	57	51
6	Sirsa	13	7	630	27	14	7	7	7	10	10	3
	UMBALLA DIVISION.											
7	Umballa	19	19	2,216	224	14	18	43	22	54	71	59
8	Ludhiána	9	9	859	107	65	40	33	25	57	76	47
9	Simla	3	...	189	...	...	...	...	...	...	...	...
	JULLUNDUR DIVN.											
10	Jullundur	9	5	1,213	6	...	...	...	2	2	...	1
11	Hoshiárpur	14	6	2,215	6	...	3	1	...	...	...	...
12	Kángra	15	4	706	8	1	...	...	1	1	4	5
	AMRITSAR DIVISION.											
13	Amritsar	10	10	1,094	58	15	5	8	11	17	15	14
14	Gurdáspur	17	8	2,344	17	...	...	5	1	...	1	...
15	Siálkot	13	6	2,290	13	...	3	2	3	3	1	1
	LAHORE DIVISION.											
16	Lahore	20	16	1,710	77	27	27	14	20	36	35	15
17	Gujránwála	9	7	1,209	25	12	8	8	4	12	12	2
18	Ferozepore	15	10	1,253	59	26	27	26	25	33	19	21
	RAWALPINDI DIVN.											
19	Rawalpindi	18	12	1,717	55	11	6	7	9	12	18	27
20	Jhelum	11	9	966	12	...	...	3	2	3	7	10
21	Gujrat	8	4	1,411	8	...	1	...	4	1	1	1
22	Shahpur	15	13	628	58	11	8	12	12	39	31	16
	MOOLTAN DIVISION.											
23	Mooltan	13	13	1,147	142	34	36	29	57	74	76	48
24	Jhang	9	7	1,012	33	6	8	15	16	16	18	12
25	Montgomery	16	16	1,626	185	41	45	43	44	53	66	35
26	Muzaffargarh	12	9	539	76	13	10	20	44	45	40	39
	DERAJAT DIVISION.											
27	Dera Ismail Khan	19	19	841	221	82	87	96	158	222	178	96
28	Dera Ghazi Khan	17	7	518	33	2	3	9	10	8	7	6
29	Bannú	11	11	544	190	166	143	165	169	262	206	144
	PESHAWAR DIVISION.											
30	Peshawár	19	16	732	72	39	15	11	22	21	17	5
31	Hazárà	15	5	1,099	12	...	2	2	1	...	...	2
32	Kohát	5	4	452	32	11	9	16	15	21	21	14
	Total for the Province ...	422	310	35,246	2,502	705	620	778	1,074	1,542	1,470	975

of the PUNJAB during each month of the year 1877.

August.	September.	October.	November.	December.	6 Total. Males.	6 Total. Females.	6 Total. Total.	7 No. of these deaths among Children. Under 1 year.	7 No. of these deaths among Children. 1 and under 12 years.	8 Total ratio of deaths per 1000 of population. Males.	8 Females.	8 Total.	9 Mean ratio per 1000 of previous 5 years.	10 Number.
7	9	34	188	464	389	379	768	152	601	1·19	1·34	1·26	0·50	1
62	22	19	65	241	886	725	1,611	293	1,294	2·39	2·22	2·31	2·26	2
95	44	40	118	153	570	414	984	254	682	1·72	1·48	1·61	1·79	3
5	1	1	36	258	264	202	466	63	396	0·99	0·93	0·96	0·86	4
12	2	18	248	461	548	475	1,023	128	883	1·87	1·94	1·90	0·67	5
2	2	3	10	17	41	51	92	19	69	0·35	0·54	0·44	1·78	6
44	24	11	18	26	230	174	404	144	247	0·42	0·38	0·40	1·39	7
21	3	8	18	32	223	202	425	96	317	0·70	0·76	0·73	0·79	8
...	...	...	...	...	...	...	...	...	...	...	...	...	0·20	9
...	...	...	1	2	4	4	8	2	5	0·01	0·01	0·01	0·44	10
...	...	...	2	5	8	3	11	6	3	0·01	0·01	0·01	0·33	11
3	12	3	1	3	19	15	34	6	7	0·05	0·04	0·04	0·10	12
6	5	37	189	333	365	290	655	154	480	0·78	0·79	0·79	1·49	13
...	1	1	...	2	8	3	11	1	8	0·01	0·01	0·01	0·84	14
1	...	2	1	3	12	8	20	6	13	0·02	0·02	0·02	0·61	15
12	10	8	15	52	151	120	271	61	199	0·35	0·34	0·35	1·21	16
1	...	1	3	3	28	38	66	20	45	0·09	0·15	0·12	0·39	17
11	2	1	9	14	136	78	214	34	171	0·46	0·32	0·40	2·04	18
16	12	36	41	57	123	129	252	72	170	0·33	0·40	0·36	0·50	19
3	2	2	4	2	17	21	38	10	24	0·06	0·09	0·07	0·23	20
...	2	...	1	7	12	6	18	3	14	0·04	0·02	0·03	0·88	21
16	8	15	60	89	155	162	317	73	240	0·79	0·94	0·86	0·73	22
26	11	8	20	56	230	245	475	94	339	0·91	1·18	1·03	1·25	23
5	1	...	1	4	49	53	102	14	84	0·25	0·34	0·29	1·28	24
37	16	15	40	76	280	231	511	102	381	1·40	1·45	1·42	2·49	25
30	19	28	32	44	193	171	364	75	267	1·19	1·28	1·23	0·80	26
35	33	23	22	52	563	521	1,084	198	795	2·65	2·86	2·74	1·01	27
4	5	1	17	31	57	46	103	14	82	0·33	0·33	0·33	0·65	28
43	46	49	94	90	773	804	1,577	246	1,252	5·02	6·02	5·48	0·56	29
6	10	27	23	43	136	103	239	35	190	0·51	0·44	0·48	1·29	30
...	...	2	2	4	8	7	15	2	12	0·04	0·04	0·04	1·14	31
15	5	1	4	6	81	57	138	17	115	1·02	0·86	0·95	1·47	32
518	307	394	1,283	2,630	6,559	5,737	12,296	2,394	9,385	0·69	0·72	0·70	0·98	

DEATHS REGISTERED from FEVERS in the DISTRICTS

1	2	3		4						
Number.	Districts.	*Circles of Registration.*		*Villages.*		January.	February.	March.	April.	May.
		No. in each District.	No. from which deaths from fevers were reported.	No. in each District.	No. from which deaths from fevers were reported.					
	DELHI DIVISION.									
1	Delhi	15	15	753	648	640	442	635	639	682
2	Gurgáon	16	16	1,267	1,017	505	368	482	473	527
3	Karnál	14	14	868	724	548	510	574	495	572
	HISSAR DIVISION.									
4	Hissár	12	12	706	529	282	197	272	243	278
5	Rohtak	11	11	492	450	488	405	560	496	594
6	Sirsa	13	13	630	421	164	138	161	156	168
	UMBALLA DIVISION.									
7	Umballa	19	19	2,216	1,672	989	821	870	711	875
8	Ludhiána	9	9	859	757	502	379	387	339	518
9	Simla	3	3	189	33	9	14	8	12	12
	JULLUNDUR DIVISION.									
10	Jullundur	9	9	1,213	1,096	1,776	987	1,029	899	1,142
11	Hoshiárpur	14	14	22,15	1,853	1,277	1,024	985	853	1,081
12	Kángra	15	15	706	639	703	688	668	580	645
	AMRITSAR DIVISION.									
13	Amritsar	10	10	1,094	967	1,462	932	802	612	1,047
14	Gurdáspur	17	17	2,344	2,076	1,510	1,395	1,208	859	1,368
15	Siálkot	13	13	2,290	1,898	1,462	895	835	703	1,060
	LAHORE DIVISION.									
16	Lahore	20	20	1,710	1,490	1,447	1,133	961	621	985
17	Gujránwálá	9	9	1,209	1,059	1,373	811	706	573	861
18	Ferozepore	15	15	1,253	1,027	435	267	250	274	290
	RAWALPINDI DIVISION.									
19	Ráwalpindi	18	18	1,717	1,370	626	530	536	526	711
20	Jhelum	11	11	966	749	386	318	337	294	427
21	Gujrát	8	8	1,411	1,160	597	482	523	426	574
22	Sháhpur	15	15	628	518	355	318	300	246	305
	MOOLTAN DIVISION.									
23	Mooltan	13	13	1,147	858	1,023	830	812	626	578
24	Jhang	9	9	1,012	638	323	304	259	216	200
25	Montgomery	16	16	1,626	1,037	671	559	394	358	388
26	Muzaffargarh	12	12	539	457	908	602	367	365	480
	DERAJAT DIVISION.									
27	Dera Ismail Khan	19	19	841	610	500	412	416	360	405
28	Dera Gházi Khan	17	17	518	387	437	359	308	241	332
29	Bannu	11	11	544	316	238	173	192	198	212
	PESHAWAR DIVISION.									
30	Pesháwar	19	19	732	437	305	260	286	250	350
31	Hazárá	15	14	1,099	758	394	346	405	290	283
32	Kohat	5	5	452	155	76	86	41	77	62
	Total for the Province ...	422	421	35,246	2,7806	22,411	16,985	16,569	14,011	18,012

of the PUNJAB during each month of the year 1877.

5							6			7			8	9
							Total.			*Total ratio of deaths per 1000, of population.*				
June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.	Mean ratio per 1,000 for previous five years.	Number.
809	697	599	520	522	915	1,265	4,525	3,840	8,365	13·87	13·59	13·74	17·94	1
621	544	580	468	524	713	972	3,741	3,036	6,777	10·10	9·30	9·73	10·83	2
697	583	592	365	423	641	516	3,571	2,945	6,516	10·80	10·51	10·66	11·58	3
314	328	281	200	297	317	465	1,911	1,563	3,474	7·26	7·17	7·17	9·31	4
733	642	544	502	569	708	900	4,030	3,111	7,141	13·78	12·72	13·30	14·34	5
147	155	126	104	151	219	241	1,054	876	1,930	9·00	9·34	9·15	11·43	6
1,149	789	693	656	603	729	697	5,341	4,241	9,582	9·70	9·25	9·50	12·62	7
805	532	668	609	848	980	557	3,771	3,353	7,124	11·81	12·70	12·21	13·55	8
25	9	17	19	11	19	15	115	55	170	5·20	4·79	5·06	4·51	9
1,155	1,119	1,058	990	1,394	1,519	1,164	7,588	6,644	14,232	17·68	18·78	18·18	22·94	10
1,304	971	1,095	876	1,147	1,441	973	7,065	5,962	13,027	14·01	13·72	13·87	20·36	11
717	680	618	1,005	995	825	862	4,757	4,229	8,986	12·09	12·07	12·08	11·61	12
1,209	1,175	1,035	872	1,220	1,257	1,110	6,898	5,845	12,743	14·68	15·90	15·30	19·64	13
1,356	1,131	861	853	923	958	1,121	7,579	5,964	13,543	15·12	14·73	14·95	19·69	14
1,358	1,214	867	724	850	918	954	6,570	5,270	11,840	12·19	11·56	11·90	18·89	15
1,133	988	854	887	1,114	1,300	1,426	7,008	5,841	12,849	16·36	16·82	16·57	21·41	16
939	811	617	536	655	770	900	5,133	4,419	9,552	16·75	18·09	17·35	18·07	17
361	421	416	480	945	803	668	3,077	2,533	5,610	10·48	10·56	10·52	10·69	18
999	889	677	646	948	1,085	1,132	4,827	4,478	9,305	12·81	13·86	13·30	11·68	19
536	478	420	409	511	646	647	2,816	2,593	5,409	10·64	10·97	10·80	13·18	20
796	667	541	605	677	524	867	3,851	3,428	7,279	11·60	12·05	11·81	11·09	21
517	318	310	219	284	482	453	2,125	1,982	4,107	10·85	11·45	11·14	16·62	22
664	464	384	494	584	747	844	4,572	3,478	8,050	18·09	16·78	17·51	16·83	23
262	200	161	159	203	282	257	1,616	1,210	2,826	8·35	7·84	8·12	10·11	24
418	295	276	225	312	458	527	2,793	2,088	4,881	13·96	13·10	13·58	15·23	25
403	325	373	325	583	511	463	3,126	2,579	5,705	19·28	19·33	19·30	16·33	26
578	358	271	363	347	419	580	2,696	2,313	5,009	12·67	12·70	12·68	15·75	27
297	214	181	197	172	203	239	1,830	1,350	3,180	10·68	9·73	10·26	9·49	28
225	175	153	142	201	200	210	1,287	1,032	2,319	8·35	7·73	8·06	10·56	29
437	253	179	198	256	279	325	1,913	1,465	3,378	7·15	6·29	6·75	7·12	30
326	293	241	232	278	295	257	2,027	1,613	3,640	10·59	9·17	9·91	9·48	31
39	52	81	58	66	51	43	410	322	732	5·17	4·87	5·03	5·63	32
21,329	17,770	15,769	14,938	18,623	21,214	21,650	1,19,623	99,658	2,19,281	12·58	12·49	12·54	14·94	

DEATHS REGISTERED from BOWEL COMPLAINTS

1	2	3		4		5				
		Circles of Registration.		*Villages.*						
Number.	District.	No. in each district.	No. from which deaths from bowel complaints were reported.	No. in each district.	No. from which deaths from bowel complaints were reported.	January.	February.	March.	April.	May.
	DELHI DIVISION.									
1	Delhi	15	15	753	185	73	52	46	52	80
2	Gurgaon	16	16	1,267	374	87	46	57	88	104
3	Karnál...	14	14	868	293	54	36	47	56	73
	HISSAR DIVISION.									
4	Hissar	12	10	706	85	14	9	18	23	23
5	Rohtak...	11	11	492	38	10	13	6	12	14
6	Sirsa	13	13	630	84	10	9	11	17	22
	UMBALLA DIVISION.									
7	Umballa	19	19	2,216	525	104	65	74	75	105
8	Ludhiána	9	9	859	669	42	35	34	40	89
9	Simla	3	3	189	25	1	1	5	7	8
	JULLUNDUR DIVISION.									
10	Jullundur	9	9	1,213	154	87	31	29	25	81
11	Hoshiárpur	14	14	2,215	655	142	78	84	79	246
12	Kangra	15	15	706	353	117	79	87	60	118
	AMRITSAR DIVISION.									
13	Amritsar	10	10	1,094	345	108	54	41	62	128
14	Gurdáspur	17	17	2,344	448	99	58	51	56	137
15	Siálkot	13	13	2,290	277	58	28	27	28	84
	LAHORE DIVISION.									
16	Lahore	20	20	1,710	252	54	21	19	32	64
17	Gujránwálla	9	9	1,209	179	43	26	21	16	30
18	Ferozepore	15	15	1,253	157	44	26	17	13	26
	RAWALPINDI DIVISION.									
19	Rawalpindi	18	18	1,717	215	24	19	19	25	36
20	Jhelum	11	11	966	207	29	31	16	41	75
21	Gujrat	8	8	1,411	168	21	11	24	22	46
22	Shahpur	15	15	628	186	43	30	37	39	51
	MOOLTAN DIVISION.									
23	Mooltan	13	13	1,147	103	44	29	25	26	32
24	Jhang	9	9	1,012	99	11	8	15	12	19
25	Montgomery	16	15	1,626	117	17	7	12	8	21
26	Muzaffargarh	12	11	539	47	18	6	8	3	5
	DERAJAT DIVISION.									
27	Dera Ismail Khan	19	18	841	73	12	16	12	7	26
28	Dera Gházi Khan	17	14	518	44	25	16	10	10	14
29	Bannu	11	11	544	108	22	20	13	23	35
	PESHAWAR DIVISION.									
30	Peshawar	19	19	732	76	15	7	16	21	12
31	Hazára...	15	14	1,099	113	10	4	9	20	41
32	Kohat	5	5	452	18	4	...	...	9	6
	Total of the Province .	422	413	35,246	6,672	1,442	871	890	1,007	1,851

n the DISTRICTS of the PUNJAB during each month of the year 1877.

June.	July.	August.	September.	October.	November.	December.	6 Total. Males.	6 Total. Females.	6 Total. Total.	7 Ratio of deaths per 1,000 of population. Males.	7 Ratio of deaths per 1,000 of population. Females.	7 Ratio of deaths per 1,000 of population. Total.	8 Mean ratio per 1,000 for previous five years.	9 Number.
83	81	111	70	97	155	201	622	479	1,101	1·91	1·69	1·81	2·14	1
133	137	155	104	128	191	223	814	639	1,453	2·20	1·96	2·08	2·78	2
97	103	80	82	68	94	81	498	373	871	1·50	1·33	1·42	1·33	3
29	32	26	11	34	29	35	161	122	283	0·60	0·56	0·58	0·77	4
12	18	14	4	13	18	43	117	60	177	0·40	0·24	0·33	0·48	5
20	13	14	13	18	21	21	113	76	189	0·96	0·81	0·90	1·08	6
145	127	85	99	97	114	91	750	431	1,181	1·36	0 94	1·17	1·48	7
72	43	48	56	86	100	56	410	291	701	1·28	1·10	1·20	1·30	8
4	1	7	5	9	2	7	34	23	57	1·54	2·00	1·70	2·01	9
35	44	42	34	53	44	42	340	207	547	0·79	0·58	0·70	1·20	10
252	159	148	119	131	170	103	1,009	702	1,711	2·00	1·61	1·82	3·04	11
219	165	84	103	65	98	137	731	601	1,332	1·83	1·71	1·79	2·94	12
112	108	82	78	95	73	88	675	354	1,029	1·45	0·96	1·23	1·27	13
193	137	86	77	87	56	60	685	412	1,097	1 37	1·02	1 21	1·95	14
85	55	46	62	60	53	41	396	231	627	0·73	0·51	0·63	1·26	15
74	55	47	55	58	56	50	405	180	585	0·94	0·52	0·76	0·90	16
37	22	23	35	47	35	36	235	136	371	0·77	0·56	0·67	0·76	17
28	36	27	30	38	47	39	240	151	391	0·82	0·63	0 73	1 06	18
49	34	28	45	49	50	49	272	155	427	0·72	0·48	0·61	0·63	19
92	45	55	59	59	66	54	336	286	622	1·27	1·21	1·24	1·27	20
52	27	18	20	15	23	29	198	110	308	0·60	0·39	0·50	0·51	21
61	38	41	36	39	51	46	300	212	512	1·53	1·22	1·39	1·44	22
26	23	30	39	57	41	38	262	148	410	1·08	0·71	0·89	0·98	23
13	12	9	19	19	23	6	94	72	166	0·48	0·47	0·48	0·58	24
16	6	10	5	16	22	21	100	61	161	0·50	0·38	0·45	0·48	25
5	1	4	8	9	8	6	56	25	81	0·34	0·19	0·27	0·18	26
23	18	14	23	20	30	16	134	83	217	0·63	0·46	0·55	0·47	27
8	12	14	19	14	12	14	105	63	168	0·61	0·45	0·54	0·37	28
31	30	22	30	28	27	45	182	144	326	1·18	1·08	1·13	0·91	29
27	15	17	28	26	32	59	200	75	275	0·75	0·32	0 55	0 43	30
37	29	21	15	13	16	21	145	91	236	0·76	0·52	0·64	0·63	31
5	2	4	8	8	2	4	35	17	52	0·44	0·26	0 36	0·44	32
2,075	1,628	1,412	1,391	1,576	1,759	1,762	10,654	7,010	17,664	1·12	0·88	1·01	1·30	

APPENDICES.

APPENDIX I.

POLICE FORCE.

A—TABLE showing the SICKNESS and MORTALITY among the POLICE FORCE serving in the PUNJAB, during the year 1877, *and the prevalence of the principal diseases in each month of the year.*

Months.	Average strength.	Average number daily sick.	Number daily sick per cent. of strength.	No. of deaths.	Died per 1000 of strength.	Causes of deaths in Hospital.															
						Small-pox.	Enteric fever.	Simple continued fever.	Intermittent and remittent fever.	Malignant cholera.	Phthisis pulmonalis.	Scurvy.	Apoplexy.	Heart diseases.	Respiratory diseases.	Dysentery.	Diarrhœa.	Hepatitis.	Wounds and accidents.	All other causes.	Died out of hospital.
January ...	19,596	261·41	1·34	29		...	...	...	2	...	1	...	...	...	8	...	...	...	1	1	16
February ...	19,678	243·62	1·24	22		...	...	...	2	...	3	...	...	...	6	1	...	...	...	...	10
March ...	19,687	212·74	1·08	18		...	...	...	...	...	...	...	...	...	8	...	...	...	1	1	8
April ...	19,619	201·57	1·03	23		...	...	...	2	...	...	...	...	...	2	1	...	1	...	1	16
May ...	19,604	223·84	1·14	16		...	...	1	...	...	1	...	...	...	1	1	1	...	...	2	9
June ...	19,533	229·72	1·18	23		...	1	1	2	...	...	...	2	...	2	...	...	...	...	...	15
July ...	19,578	209·75	1·07	20		...	...	...	1	...	...	...	...	1	4	1	1	...	...	1	11
August ...	19,610	217·65	1·11	17		...	...	...	1	...	...	...	...	...	1	...	...	...	1	5	9
September ...	19,633	228·65	1·16	18		...	...	...	2	...	...	...	...	...	5	1	...	...	...	...	10
October ...	19,599	269·82	1·38	16		...	...	1	3	...	...	...	...	...	1	...	1	...	...	1	9
November ...	19,613	284·56	1·45	23		...	...	1	...	...	2	...	...	...	5	1	3	...	...	2	9
December ...	19,567	265·06	1·35	24		...	...	...	2	...	...	...	1	...	7	...	...	...	...	1	13
						...	1	4	17	...	7	...	3	1	50	6	6	1	3	15	135
						Died per 1000 of the average strength.															
For the year 1877	19,610	237·37	1·21	249	12·70	...	1·12		...	0·36	...	0·15	0·05	2·55	0·31	0·31	0·05	0·15	0·76	6·88	
For the year 1876	19,806	327·12	1·65	275	13·88	0·10	1·46		0·25	0·40	...	...	...	2·57	0·56	0·35	0·15	0·15	0·96	6·92	

Cause of Admission.	Number of admissions into Hospital in each month.												Total admissions during the year.	Admitted per cent. of strength.	Died per cent. of admission.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.			
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Enteric fever	...	...	...	...	...	1	...	...	...	...	...	...	1		
Simple continued fever	5	3	3	1	13	9	20	10	15	19	25	...	121	15·06	0·74
Intermittent and remittent fever ...	180	132	135	164	216	272	221	224	241	424	359	262	2,830		
Malignant cholera	...	...	...	...	...	...	...	...	...	...	...	...	...		
Rheumatism	20	16	28	15	16	20	21	14	18	25	18	24	235	1·20	
Primary Syphilis—															
Hard chancre (indurated bubo)	5	9	8	9	3	9	8	6	3	5	5	8	78	0·40	
Soft chancre (suppurating bubo)	1	6	3	6	2	9	5	5	5	2	7	5	56	0·28	
Secondary syphilis...	1	4	2	2	...	4	8	4	7	2	2	4	40	0·20	
Phthisis pulmonalis	3	7	3	2	3	...	...	1	4	2	1	4	30	0·15	23·33
Scurvy	2	1	...	...	...	...	1	...	1	...	1	1	7	0·03	
Apoplexy	...	...	...	...	...	2	...	...	...	1	...	1	4	0·02	75·00
Eye diseases	5	...	7	15	21	14	11	20	14	18	9	10	144	0·73	
Respiratory diseases	94	81	67	44	28	27	20	14	21	22	46	52	516	2·63	9·69
Dysentery	19	11	14	24	20	33	13	18	37	36	34	33	292	1·49	2·05
Diarrhœa	11	2	4	7	12	11	14	15	12	11	8	2	109	0·55	5·50
Tænia	...	...	...	...	...	...	...	...	1	...	...	...	1	...	
Hepatitis	...	...	1	2	3	1	...	...	1	1	1	...	10	0·05	10·00
Gonorrhœa	4	3	7	8	5	2	8	5	3	5	6	1	57	0·29	
Guinea-worm	...	...	...	...	...	3	7	9	6	1	...	...	26	0·13	
Abscess and ulcer	38	30	25	55	59	55	51	58	55	46	49	56	577	2·94	
Wounds and accidents	11	9	15	13	9	11	15	11	5	12	12	17	140	0·71	2·14
All other causes	92	83	105	92	91	78	72	103	73	79	105	79	1,052	5·36	1·42
	491	397	427	459	501	561	495	517	522	711	686	559	6,326	32·26	
	Admitted per cent. of the average strength in each month.														
For the year 1877	2·50	2·02	2·17	2·34	2·55	2·87	2·53	2·64	2·66	3·63	3·50	2·80	32·26		
Ditto 1876	2·22	2·09	1·87	2·05	2·43	2·46	2·66	5·89	9·44	8·96	5·61	2·88	48·48		

B. TABLE showing the SICKNESS and MORTALITY among the Police Force

Number.	Districts.	Average strength.	Number of admission.	Admission per cent. of strength.	Average number of daily sick.	Number daily sick per cent. of strength.	Number of deaths.	Died per 1000 of strength.
1	Delhi ...	1,178	483	41·00	12·98	1·10	18	15·28
2	Gurgaon ...	531	104	19·58	4·01	0·75	1	1·88
3	Karnál ...	663	151	22·77	7·30	1·10	10	15·08
4	Hissar ...	565	141	24·95	4·69	0·83	9	15·93
5	Rohtak ...	446	150	33·63	3·93	0·88	10	22·42
6	Sirsa ...	384	83	21·61	4·97	1·29	4	10·42
7	Umballa ...	1,178	199	16·89	7·05	0·60	14	11·88
8	Ludhiána ...	553	194	35·08	10·98	1·98	7	12·66
9	Simla ...	200	62	31·00	3·06	1·53	2	10·00
10	Jullundur ...	525	125	23·81	6·85	1·30	4	7·62
11	Hoshiárpur ...	504	150	29·76	6·18	1·22	4	7·94
12	Kángra ...	421	170	40·38	6·06	1·44	5	11·88
13	Amritsar ...	926	366	39·52	7·86	0·85	17	18·36
14	Gurdáspur ...	592	149	25·17	5·00	0·84	11	18·58
15	Siálkot ...	544	115	21·14	4·34	0·80	6	11·03
16	Lahore ...	1,299	555	42·72	26·59	2·05	30	23·09
17	Gujránwála ...	495	123	24·85	6·41	1·29	1	2·02
18	Ferozepore ...	562	213	37·90	7·59	1·35	7	12·45
19	Rawalpindi ...	1,013	472	46·59	16·24	1·60	7	6·91
20	Jhelum ...	519	271	52·21	11·28	2·17	4	7·71
21	Gujrat ...	415	103	24·82	3·35	0·81	5	12·05
22	Shahpur ...	437	135	30·89	7·21	1·65	3	6·86
23	Mooltan ...	842	325	38·60	13·67	1·62	8	9·50
24	Jhang ...	486	151	31·07	5·12	1·05	5	10·29
25	Montgomery ...	506	145	28·66	5·05	1·00	5	9·88
26	Muzaffargarh ...	355	260	73·24	8·00	2·25	10	28·17
27	Dera Ismail Khan ...	602	257	42·69	7·05	1·17	8	13·29
28	Dera Gházi Khan ...	392	89	22·70	4·73	1·21	2	5·10
29	Bannu ...	450	125	27·78	3·51	0·78	9	20·00
30	Pesháwar ...	1,096	267	24·36	9·77	0·89	14	12·77
31	Hazára ...	468	100	21·37	3·15	0·67	2	4·27
32	Kohát ...	463	93	20·09	3·39	0·73	7	15·12
	Total ...	19,610	6,326	32·26	237·37	1·21	249	12·70

serving in each District of the PUNJAB during the year 1877.

Causes of deaths in Hospital.																
Small-pox.	Enteric fevers.	Simple continued fever.	Intermittent and remittent fevers.	Malignant cholera.	Phthisis pulmonalis.	Scurvy.	Apoplexy.	Heart diseases.	Respiratory diseases.	Dysentery.	Diarrhœa.	Hepatitis.	Woundsand accidents.	All other causes.	Died out of hospital.	Number.
...	...	...	...	...	...	...	...	...	5	...	...	...	...	1	12	1
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	..	2
...	1	...	...	...	...	...	...	...	1	1	...	...	...	1	6	3
...	...	...	1	...	...	...	...	...	2	...	...	...	...	2	4	4
...	...	...	2	...	2	...	1	...	...	...	...	...	...	...	5	5
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	3	6
...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	12	7
...	...	...	...	...	1	..	...	...	1	...	...	...	...	...	5	8
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	9
...	...	...	...	...	...	...	1	...	2	...	...	...	...	...	1	10
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	11
...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	3	12
...	...	...	4	...	1	...	...	...	7	...	...	...	...	1	4	13
...	...	1	...	...	...	...	...	...	1	1	...	...	...	2	6	14
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6	15
...	...	...	2	...	2	...	...	...	10	3	1	...	...	2	10	16
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	17
...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	5	18
...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	5	19
...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	2	20
...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	4	21
...	...	...	1	...	...	...	...	...	1	...	...	...	...	1	...	22
...	...	...	1	...	...	...	...	...	2	...	...	...	...	1	4	23
...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	3	24
...	...	...	...	...	...	...	...	...	2	...	...	...	...	1	2	25
...	...	...	1	...	1	...	...	...	...	...	1	...	...	...	7	26
...	...	...	1	...	...	...	...	...	3	...	...	...	...	...	4	27
...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	28
...	...	...	...	...	...	...	...	...	1	1	...	...	...	1	6	29
...	...	2	1	...	...	...	...	...	2	...	2	...	...	1	6	30
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	31
...	...	...	...	...	...	...	1	...	...	...	...	...	2	...	4	32
...	1	4	17	..	7	...	3	1	50	6	6	1	3	15	135	

APPENDIX No. II.

LAWRENCE MILITARY ASYLUM AT SANAWAR

A.—Table showing the SICKNESS and MORTALITY among the CHILDREN of the above ASYLUM during the year 1877.

Months.	Average strength.		Average number daily sick.		Number daily sick per cent. of strength.		Number of deaths.		Died per 1,000 of strength.		Causes of deaths in Hospital. All other causes.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
January	220	172	4·83	4·19	2·19	2·44	1	...	4·54	...	1	...
February	218	169	8·67	8·57	3·98	5·07	...	...	...	...	...	...
March	202	187	21·29	9·12	10·54	4·88	...	...	...	...	...	...
April	231	181	22·83	30·46	9·88	16·83	...	...	...	...	...	...
May	240	175	9·67	9·38	4·03	5·36	...	...	...	...	...	...
June	238	173	29·16	15·93	12·25	9·21	...	...	...	...	...	...
July	236	178	11·00	28·63	4·66	16·08	...	...	...	...	...	...
August	237	184	11·80	21·09	4·98	11·46	...	...	...	...	...	...
September	237	185	8·76	14·66	3·70	7·92	...	...	...	...	...	...
October	231	183	8·64	10·09	3·74	5·51	...	...	...	...	...	...
November	225	175	9·66	9·73	4·29	5·56	...	...	...	...	...	...
December	203	162	8·48	11·67	4·18	7·20	...	...	...	...	...	...
											1	...
											Died per 1000 of the average strength.	
For the year ...	226	177	10·14	14·46	4·49	8·17	1	...	4·42	...	4·42	...

DISTRIBUTION of CHILDREN according to AGE on 1st July 1877.

Sex.	2 and under 5 years.	5—10.	10—15.	15—20.	Total of all ages.	Remarks.
Boys	8	77	132	17	234	
Girls	3	67	100	6	176	
Total ...	11	144	232	23	410	

B.—TABLE showing the CAUSES of ADMISSIONS into HOSPITAL among the CHILDREN

NUMBER IN

Causes of admission.	January.		February.		March.		April.		May.		June.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...
Chicken-pox	...	...	...	...	...	1	4	...	6	...	1	...
Measles	...	...	...	...	66	4	15	53	1	...	...	...
Enteric fever	...	...	...	...	...	...	...	...	...	...	...	...
Simple continued fever ...	...	...	...	...	...	...	...	...	...	...	...	...
Intermittent, and remittent fevers	...	...	...	...	...	...	...	...	1	...	...	...
Malignant cholera ...	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria — ...	...	...	...	...	...	...	...	...	...	...	...	...
Hooping-cough	...	...	...	...	...	...	...	...	..	...	34	21
Mump	...	...	...	...	...	..	...	...	...	...	1	...
Acute rheumatism ...	...	...	...	...	...	...	...	...	...	...	...	...
Phthisis pulmonalis ...	...	...	...	...	...	...	...	...	...	...	...	...
Meningitis	...	...	...	...	...	...	...	...	...	...	...	...
Sun-stroke	...	...	...	...	...	...	...	...	...	...	...	...
Epilepsy	...	1	...	...	...	...	...	1	...	...	...	...
Conjunctivitis (Ophthalmia)	...	...	...	...	...	...	2	...	...	2	...	...
Valve disease of heart ...	...	...	...	...	...	...	...	...	...	...	...	...
Croup	...	...	...	...	...	...	...	...	...	...	...	...
Bronchitis	...	...	...	...	...	...	...	...	...	...	...	...
Pneumonia	...	...	...	...	1	...	...	...	...	...	...	...
Dysentery	...	...	...	...	...	...	...	...	...	...	2	1
Diarrhœa	...	1	...	1	...	...	1	...	2	5	...	2
Ulcer	...	2	...	...	...	...	...	...	...	...	...	...
Tinea favosa	1	1	1	...	...	...	...	...	2	...	...	...
Itch	...	...	...	...	...	...	1	...	...	...	...	...
Wounds and accidents ...	1	...	2	...	1	...	...	...	5	...	...	1
All other causes	13	8	24	15	5	5	7	1	22	8	23	12
Total ...	15	13	27	16	73	10	30	55	39	15	61	37
Admitted per cent. of the average	6·82	7·56	12·38	9·47	36·14	5·34	12·99	30·39	16·50	8·57	25·63	21·39

of the LAWRENCE MILITARY ASYLUM of SANAWAR during the year 1877.

EACH MONTH.

July.		*August.*		*September.*		*October.*		*November.*		*December.*		*Total Admissions during the year.*		*Admitted per cent. of strength.*		*Died per cent. of admissions.*	
Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	11	1	4·87	0·56	...	...
...	...	...	...	...	...	...	...	...	...	...	...	82	57	36·28	32·20	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	3	...	1	1	1	1	...	...	...	2	8	4	3·54	2·26	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	6	...	2	...	...	...	...	...	...	...	...	36	29	15·93	16·38	...	...
...	1	...	1	...	...	...	...	...	...	...	...	1	2	0·44	1·13	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...
...	...	...	...	...	...	...	...	...	...	...	:	...	...	...	...	...	...
...	...	...	1	...	...	...	...	...	...	...	...	...	3	...	1·69	...	...
...	3	1	3	...	...	...	...	1	...	...	...	4	8	1·77	4·52	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	2	...	...	...	1	...	...	...	3	...	1·69	...	...
...	...	...	...	...	...	...	...	...	2	...	...	...	2	...	1·13	...	...
...	...	...	...	...	...	1	...	...	...	...	...	2	...	0·88	...	...	...
...	1	...	...	...	...	1	...	1	1	...	...	4	4	1·77	2·26	...	...
5	1	5	2	3	1	...	...	1	2	1	1	18	16	7·96	9·54	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1·13	...	...
...	...	...	...	...	...	...	...	...	...	...	...	4	1	1·77	0·56	...	...
...	...	3	...	...	...	...	...	...	...	...	...	4	...	1·77	...	...	...
5	...	1	...	...	...	3	...	1	1	3	...	22	2	9·73	1·13	...	...
21	10	15	1	17	6	29	14	20	9	5	3	201	92	88·94	51·98	0·50	...
35	22	28	10	21	10	35	16	24	16	9	6	397	226				

strength in each month.

14·83	12·36	11·81	5·43	8·86	5·40	15·15	8·74	10·67	9·14	4·43	3·70	175·66	127·68

LAWRENCE MEMORIAL ASYLUM AT MURREE.

A.—Table showing the SICKNESS and MORTALITY among the CHILDREN of the above ASYLUM during the year 1877.

Months.	Average strength.		Average number daily sick.		Number daily sick per cent of strength.		Number of deaths.		Died per 1,000 of strength.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
January ...	78	63	0·41	0·32	0·52	0·51	...	...	...	...
February ...	77	64	2·85	4·92	3·70	7·69	...	...	...	...
March ...	86	65	0·96	0·45	1·12	0·69	...	...	...	...
April ...	86	65	1·48	0·13	1·72	0·20	...	...	...	...
May ...	88	65	0·45	0·12	0·51	0·18	...	...	...	...
June ...	88	66	0·06	0·90	0·07	1·36	...	...	...	...
July ...	88	68	0·19	0·25	0·21	0·37	...	...	...	...
August ...	87	67	0·70	0·29	0·80	0·43	...	...	...	...
September ...	83	65	0·56	1·10	0·67	1·69	...	...	...	...
October ...	82	63	0·22	0·16	0·26	0·25	...	...	...	...
November ...	86	66	...	...	...	...	...	...	...	...
December ...	85	63	...	...	...	...	...	...	...	...
For the year ...	84	65	0·65	0·72	0·77	1·11	...	...	...	...

DISTRIBUTION of CHILDREN according to AGE on 1st July 1877.

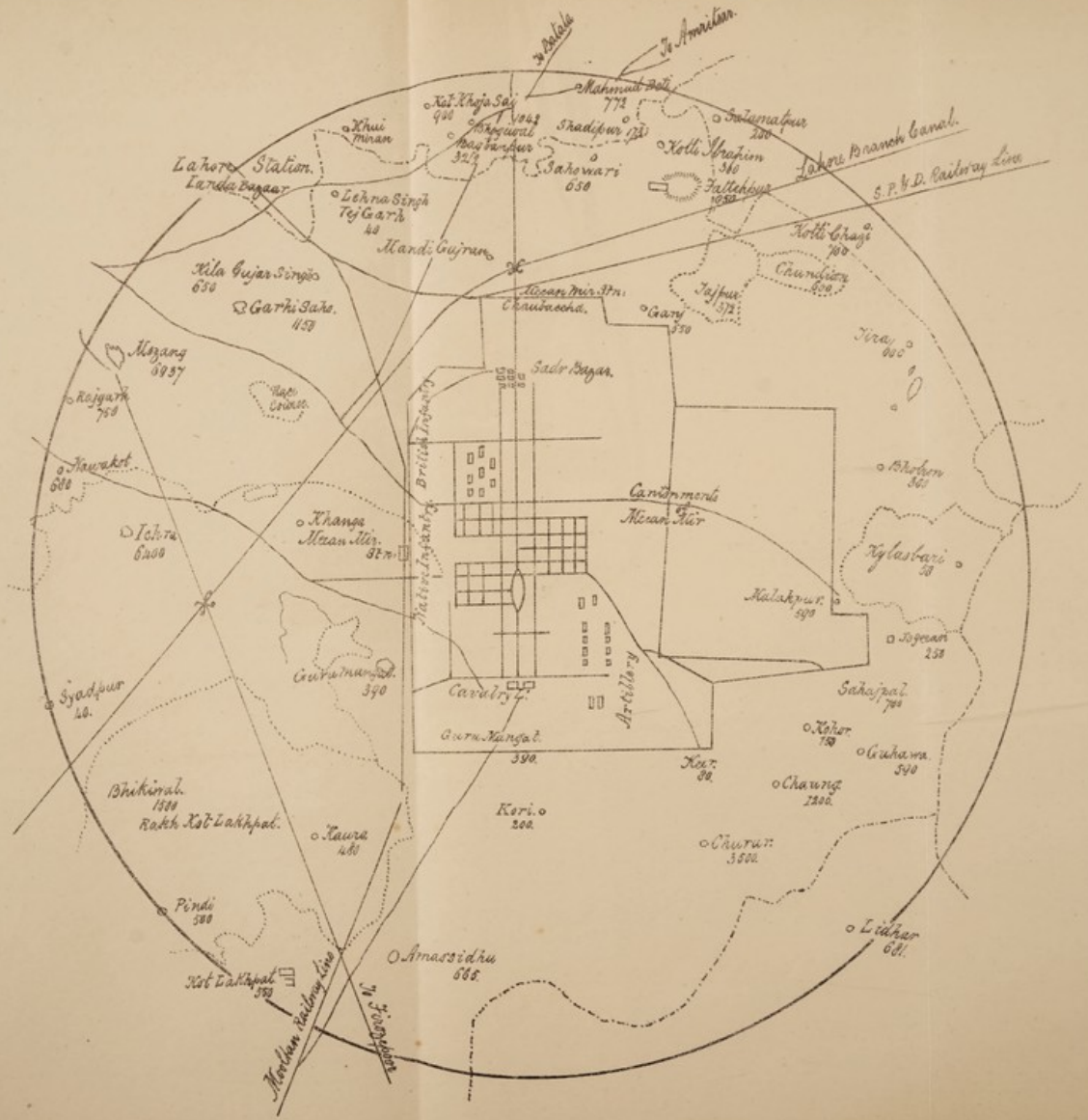
Sex.	2 and under 5 years.	5—10.	10—15.	15—20.	Total of all ages.	Remarks.
Boys ...	...	40	45	3	88	
Girls ...	...	25	36	5	66	
Total ...	...	65	81	8	154	

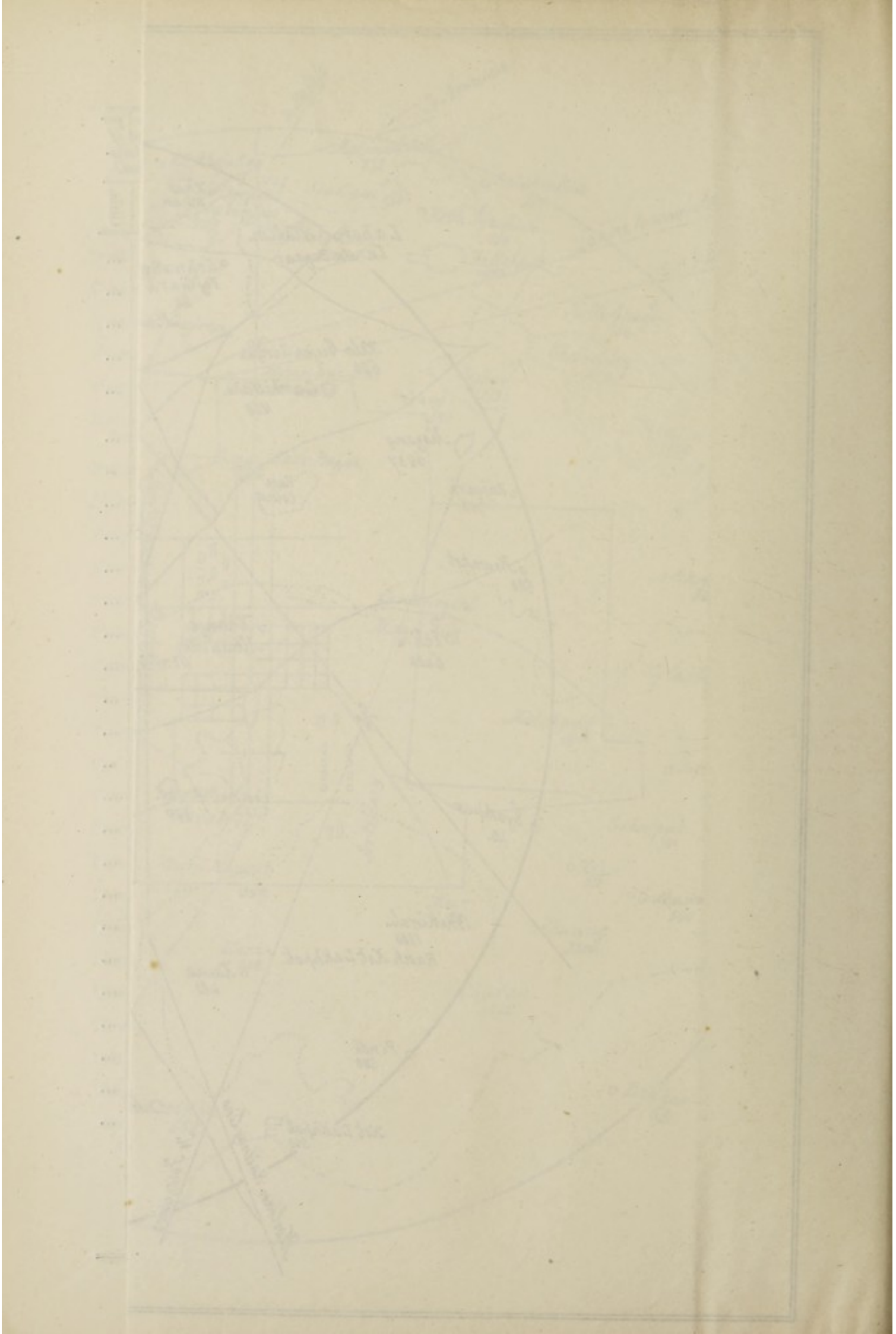
B.—TABLE showing the causes of ADMISSIONS into HOSPITAL among the CHILDREN

Causes of Admission.	Number in											
	January.		*February.*		*March.*		*April.*		*May.*		*June.*	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
Small-pox	...	...	...	...	...	...	...	...	...	...	...	...
Chicken-pox	...	...	...	...	...	...	...	...	...	...	...	...
Measles	...	...	...	...	...	...	...	...	...	...	...	...
Enteric fever	...	...	...	...	...	...	...	...	...	...	...	...
Simple continued fever ...	...	...	...	...	...	...	...	...	...	...	...	...
Intermittent and Remittent fevers	...	...	...	...	...	...	1	...	...	...	...	...
Malignant cholera ...	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria	...	...	...	...	...	...	...	...	...	...	...	...
Hooping-cough ...	...	...	...	...	...	...	...	...	...	...	...	...
Mumps	...	...	...	...	...	...	8	...	1	1	...	9
Acute rheumatism ...	...	...	...	...	...	...	...	...	...	...	...	...
Phthisis pulmonalis ...	...	...	...	...	...	...	...	...	...	...	...	...
Meningitis	...	...	...	...	...	...	...	...	...	...	...	...
Sun-stroke	...	...	...	...	...	...	...	...	...	...	...	...
Epilepsy	...	...	...	...	...	...	...	...	...	...	...	...
Conjunctivits (Ophthalima)	2	...	...	...	1	...	...	...	...	...	...	...
Valve disease of heart ...	...	...	...	...	...	...	...	...	...	...	...	...
Croup	...	...	...	...	...	...	...	...	...	...	...	...
Bronchitis	...	...	...	...	...	...	...	...	...	...	...	...
Pneumonia	...	...	...	...	...	...	...	...	...	...	...	...
Dysentery	...	...	...	...	...	...	...	...	...	...	...	...
Diarrhoea	...	...	...	...	...	...	...	...	...	...	...	...
Ulcer	...	...	...	...	...	...	...	...	...	...	...	...
Tinea favosa	...	...	...	...	...	...	...	...	...	...	...	...
Itch	...	...	...	...	...	...	...	...	...	...	...	...
Wounds and accidents ...	...	...	...	...	...	...	...	...	...	...	...	...
All other causes ...	1	2	9	8	...	3	1	...	2	...	1	...
	3	2	9	8	1	3	10	...	3	1	1	9
	Admitted per cent of the											
	3·85	3·17	11·68	12·50	1·16	4·61	11·63	...	3·41	1·54	1·14	13·64

of the LAWRENCE MEMORIAL ASYLUM at MURREE during the year 1877.

EACH MONTH.												Total admission during the year.		Admitted per cent of strength.		Died per cent of admission.	
July.		*August.*		*September.*		*October.*		*November.*		*December.*							
Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	..	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	..	...	...	..	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	1	...	1·19	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	...	...	...	...	...	...	...	9	11	10·71	16·92	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	..	...	...	...	...	...	..	...	...	...
...	...	...	1	...	...	...	...	..	...	...	...	3	1	3·57	1·54	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1·54	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	1	...	1·19	...	...	...
...	...	3	...	1	3	1	1	...	...	...	...	19	17	22·62	26·15	...	...
...	1	4	1	1	4	1	1	...	...	...	...	33	30				
average strength in each month.																	
...	1·47	4·60	1.49	1·20	6·15	1·22	1·59	...	...	...	...	39·28	46·15				


To Batala
To Amritsar
Mahmud Bati
772
Kot Khoja Saj
900
Khui Miran
Bagwal
1043
Shadipur 731
Salemapur
220
Bagbanpur
327
Sahowari
650
Kotli Ibrahim
340
Fatehpur
1053
Lahore Branch Canal.
S.P.&D. Railway Line
Lahore Station.
Landa Bazaar
Lehna Singh
Tej Garh
40
Mandi Gujran
Kotli Chagi
700
Kila Gujar Singh
650
Garhi Sahe.
450
Mozang
8937
Rajgarh
769
Race Course
Sadr Bazar
Jaspur
372
Gazi
350
Kira
600
Bhobon
361
Kawakot
680
Ichra
6400
Khanqa Mean Mir
Cantonments
Mean Mir
Kylasbari
28
Kalakpur
590
Jogwan
258
Gurumangat
390
Cavalry
Artillery
Sahaspal
700
Kohor
150
Guhawa
540
Chauriq
1200
Kot
80
Bhikiwal
1380
Rakh Kot Lakhpat
Kaura
480
Kori
200
Churun
3500
Pindi
580
Amarsidhu
665
Lidher
681
Kot Lakhpat
382
Mordan Railway Line
To Jandiala



APPENDIX A.

No. 1503, *dated* 30*th April* 1878.

From—H. W. Bellew, Esquire, C. S. I., *Sanitary Commissioner, Punjab;*

To—The Officiating Secretary to Government, Punjab.

With reference to the correspondence noted in the margin, I have the honor to forward herewith, for transmission to the Government of India, a copy of the report of the committee for the inspection of villages within a radius of five miles of Meean Meer cantonments.

No. 6-220, dated 3rd November 1877, from Secretary to the Government of India; to Secretary to Government, Punjab.
No. 968., dated 21st February 1878, from Secretary to Government, Punjab; to Sanitary Commissioner, Punjab.
No. 7, dated 2nd January 1878, from Secretary to the Government of India; to Secretary to Government, Punjab.

Report of the Committee for the Inspection of Villages within a radius of five miles of Meean Meer cantonments.

The committee was constituted under instructions from the Government of India, Home Department, No. 6-220, dated 3rd November 1877, to the Government of the Punjab, and in accordance with the tenor of No. 968. of 21st February 1878, from Secretary to Government, Punjab, with enclosures as per margin, to the Sanitary Commissioner, Punjab, and of Government of India, Home Department, No. 7, dated 2nd January 1878, to Secretary to Government, Punjab.

No. 240, dated 5th February, from Commissioner and Superintendent, Lahore; to Secretary to Government, Punjab.
No. 85-G., dated 28th January 1878, from the Lieutenant-General Commanding Lahore Division, to Commissioner and Superintendent.

1. The first meeting of the committee was held at the office of the Sanitary Commissioner on the 8th of April 1878, for the purpose of arranging the order of inspection and other details connected with the inquiry, the nature of which is set forth in paragraphs 3 and 4 of No. 218, dated 3rd November 1877, from Secretary to the Government of India, to Secretary to Government, Bengal, in the following terms:—

"3. The primary object in appointing these committees is to ascertain, as a preliminary step to the best action practicable, what is the actual state of villages in the neighbourhood of cantonments, whether they are in reality a source of danger to the troops in cantonments, and whether if the sanitary evils that may be found to exist in them are removeable, and what the cost of such measures will be. The attention of the committee should be directed more especially to the drainage of the site of each village and of the ground around it; to the sources of water supply and their liability to pollution; and to the general condition of the villages in respect of cleanliness and conservancy. It will probably not be possible to introduce the use of latrines in villages, and in fact latrines are worse than useless when they cannot be under proper inspection; but the committee might, when inspecting villages, report what improved arrangements for conservancy are feasible. For instance, it would greatly conduce to the sanitation of villages if the cattle, which as a rule are tied up inside enclosures, could be removed to a short distance outside the village. This change would no doubt be one of great difficulty for many reasons, and certainly could not be at once carried out; still with some trouble the objections to it might be gradually overcome. Care must of course be taken in any schemes of sanitary reform in villages around cantonments not to offend the prejudices of the villagers concerned. It is impossible for any Government agency to keep villages clean, but the villagers may in time be educated to see the advantages of cleanliness. What is chiefly required is to prevent the people fouling localities near the sources of water supply. A record of the actual state in these respects of the villages from which cantonment supplies are drawn would afford useful information to the military and civil authorities."

"4. The committee should be allowed to examine into sanitary measures within cantonments so far as these are connected with the subject of their inquiry, and should be directed to prepare estimates for carrying the objects suggested in paragraph 3 of this letter, especilly as regards the water supply. The committee should also submit duplicate reports, one to the Quartermaster-General of the Army, and the other, through the Local Government, to this Department."

2. A rough outline map was prepared of the area included within the prescribed limits by drawing a circle with a radius of five miles from the centre of cantonments, and filling in the space thus delineated with the several villages as laid down on the map in the Quartermaster-General's Department, and the whole was then divided into quadrants, as is shewn in the sketch map attached to this report. These several sections were taken in hand successively, and the several villages in each inspected by the committee on the dates specified, and with the results hereafter described in detail.

15th *April.*—The committee assembled at Meean Meer at 6 a. m., and at once proceeded to inspect the villages in the south-west section of the five-mile radius area. The following villages were inspected:—

Guru Mangat.—Population 390; contains 78 mud huts and several others, which are roofless and in a state of decay. The inhabitants are mostly Hindus. The Mussulmans are of poor classes and work as day labourers in the cantonments. There are 6 Hindu families in the village, and the rest in a Hindu temple which adjoins it.

The temple has a good masonry tank attached to it. It is at this time half full of turbid water. The temple i held in great sanctity by Sikhs of the Bhábra caste. A festival is held here at the full moon of every month and attended by 20 or 30 Bhábras. There are also two annual festivals at which from 200 to 250 persons assemble here,—all Bhábras, and mostly from Amritsar and Lahore.

The water supply of the villages is from wells. There are four; all with masonry tubes round about outside. One of these, a few dozen yards to the north of the village, is 6 feet in diameter, and has a depth of 45 feet including 13 feet of water. Another well attached to the temple on the south-west has a diameter of 4 feet and is 44 feet deep, and contains 10½ feet of water, which is turbid. The water of all the wells here is brackish. The wells themselves, either by their construction or their situation, are generally efficiently protected against the chance of pollution by surface drainage, whilst the impermeable nature of the clay soil in which they are sunk affords a safety from contamination by subsoil percolation.

Besides the wells there are 5 cattle ponds in close proximity round the village. They are irregularly scooped-out hollows, and contain shallow stagnant pools of very thick turbid and putrescent water, altogether unfit for the use of man and beast. Their edges and the ground about are covered with deposits of ordure and refuse matter of sorts.

The village is situated close on the west of the line of railway from Lahore to Mooltan. The site actually covered by its houses is slightly raised above the general level of the ground around, and its surface drainage is in the first instance into the numerous hollows, and excavations that surround it. After heavy rains or in seasons of flood, the drainage of the site generally is with that of the surrounding tract of country towards the south-west, and ultimately into the current of the river Ravi.

On the north-east side, between the village and line of railway, is a brick kiln in full work on the native system, and on one side of it are heaps of refuse matters, stable litter, &c., used as fuel; whilst on the other the surface is honeycombed with diggings for brick clay. The opposite side of the village is clear and covered with cultivation at a short distance from it. On the whole, the surroundings of this village are very filthy. On the further side of the railway line, and just outside a cantonment boundary pillar, is a great collection of bleached bones and some carcases of horses, for the most part well cleaned of their fleshy parts. This is the site where the dead cattle from the cavalry lines are deposited for disposal by carrion feeders. It is immediately opposite the village, and must prove a great nuisance to its inhabitants, if not actually injurious to them in point of health. The people here generally seemed very poor, and there was a marked absence of robust looks among them, whilst several were observed to have a decidedly weak and sickly appearance.

Kaura.—Population 480; is a small village of 102 mud-built houses. It is situated on level ground a few hundred yards to the east of a road connecting the cantonments with the grand trunk road from Lahore to Ferozepore. The site is open and airy, and its natural drainage is towards the south-west by some shallow surface water-runs. The surroundings of the village are on the whole clean and tidy, and the ground is comparatively free from the unsightly and unwholesome hollows and excavations which too commonly characterize village sites in this Province.

The inhabitants are Mussulmans, mostly Ját cultivators, with a dozen or fifteen families of village artificers and a few outcasts. They appeared to be generally well off, and physically robust and healthy, with some hale greybeards amongst them.

The water supply is from wells, of which there are only two. The one on the south-west side is drawn on by the bulk of the villagers; that on the plain to the north-east is set apart for the use of outcasts. In both the water is brackish, but clear. The latter well is 46 feet deep, including 12 feet of water. It has a diameter of 13 feet, and its opening is flush with the level of the surrounding ground.

There are two cattle ponds, wide and shallow, with irregular outlines, and more or less encumbered with deposits of ordure and refuse matters. That on the east side is the main one, and beyond it to the south are the remains of some old brick kilns.

The cultivation here is entirely dependent on the rains.

Amar Sidhu.—Population 565; contains about 200 mud houses, and one of brick masonry. The inhabitants are a mixture of Mussalmans, Sikhs and Hindus, and comprise 40 families of Ját cultivators, and about 80 of village artizans and outcasts.

The village is situated about a mile and a half to the south-west of Kaura, and on the side of the same road, and has a good many trees planted about it, though the site is on the whole open and airy. To the south and east are small patches of waste and scrubby jungle.

The interior of the village is very dirty and threaded by very narrow-winding lanes barely wide enough for a single horseman to pass, and the houses are much crowded together.

The water supply is from wells, of which there are only two. One on the open ground to the north-east is set apart for outcasts. Its depth is 41 feet, including 8 feet of water, and its diameter is 4 feet. Its opening is very slightly raised above the level of the ground around. The other well is in the interior of the village. Its total depth is 46½ feet, including 10 feet of water and 3½ feet parapet. Its diameter is 8 feet. It stands at the side of the street, and its surroundings on that side are soppy and miry. The water of both wells is clear and sweet. There are four cattle ponds round about outside, all widely and irregularly excavated, and in a very dirty state.

In general appearance the people are healthy and well-to-do; several greybeards were noticed among them. On the open ground across the road, and opposite to this village, is the site of one of the cholera camps for the cantonments.

Kot Lakpat.—Population 550; contains 76 mud huts clustered together on the north side of an old mud fort now in ruins, and the interior of which is laid out in corn fields. The inhabitants are Mussulmans, Sikhs and Hindus. There are eight families of Ját cultivators; the rest are artizans and outcasts.

The surroundings of the village are much hollowed out by excavations, and everywhere in a very dirty state.

The water supply is from wells, of which there are five altogether. One of these is for drinking purposes, and the others for irrigation of the fields around, in which they stand. The water is clear and sweet. The village well is 35 feet deep, including 3 feet of water; it has a diameter of nine feet. It is by its situation well protected from pollution, as it stands outside the village on a slightly elevated site.

The ground on the east side of the village is very much excavated by deep hollows, all of which are in a very foul state, and several of which contain puddles of filthy stagnant slush.

There are some brick kilns here in active work for the supply of the Lahore water-works.

Pindi.—Population 500; is a small village of 48 mud huts. The inhabitants are Mussulmans of the Naru Rajput caste, with a few village artizans and other menials. They are engaged in agriculture, and on the whole appear to be a healthy and well-to-do community.

There are two wells in the village That on its north side is 42 feet deep, including 10 feet of water, and has a diameter of 13 feet. It is furnished with a Persian wheel apparatus, which is in a state of decay, and with a hand spoke wheel, to which is attached a rope and bucket for ordinary use. Water sweet. There are four or five cattle ponds round the village, the water in all of which is very filthy.

The surroundings of the village site are in a very untidy state, and the surface is much excavated, most of the hollows being encumbered with ordure, farmyard refuse, or stagnant and putrescent puddles of slush.

Shádi Khui.—Population 68; is a small hamlet belonging to Bhekiwál. It consists of a square mud wall enclosure, in which are about 20 huts with lots of room for more, and is situated close on the west side of the Lahore branch of the Bári Doáb Canal, at a short distance from the sheds of one of the cholera camp sites for the cantonments. It was laid out some 7 or 8 years ago, and is occupied by Aráin cultivators, who are tenants of the landlord. The little community appeared to be contented, prosperous and healthy.

The water supply for the place is from two wells and the canal. The former both yield sweet water, and are the sources of the drinking supply. The latter waters the cattle.

The site of the village is on open level ground, and its surroundings, with the exception of the ditch at the foot of the enclosing walls, are free from hollows and excavations. The interior presents an untidy look from scattered litter and cattle refuse, as is the case generally in such agricultural settlements.

Bhekiwál.—Population 1,500; contains about 204 mud-built houses, and is situated on a dry arid plain, the drainage of which is towards the south-west. The inhabitants are Mussulmans, and comprise fifty families of Khokar Rajputs, who are engaged in agriculture, together with village artizans of mixed castes, such as carpenters, weavers, sweepers, herdsmen, &c.

The water supply is from wells, of which there are three in the village. They all contain sweet water. The well on the east side is 24½ feet deep, and has a diameter of 4 feet. It contains only 2½ feet of water and its opening is very slightly, if at all, raised above the level of the ground around. There are two cattle ponds close outside the village, both in a very neglected condition as to cleanliness, and containing shallow pools of thick, turbid, and putrescent water.

The ground immediately round the village is tolerably clear and free from hollows, but dung heaps fringe the village skirts, and the interior courts and passages are in a very filthy condition from the entire neglect of conservancy. The country round is open to the eastward, in which direction (towards the cantonments) it presents a long strip of arid waste. In the direction of Pindi and across the canal there is a wide patch of stunted mimosa and acacia jungle with good pasture for cattle. On the other sides the surface is cultivated, and has a good sprinkling of trees.

The inhabitants of this village presented on the whole a healthy and prosperous appearance, and amongst them were several hale greybeards, notably the grandfather and great grandfather of a family of four generations, each represented by a member amongst those around us at the time of our inspection. The eldest progenitor and his son were equally adorned with flowing beards of snowy whiteness, and were remarkably active for their age, and in full possession of their faculties. The elder out of the two, who was said to be over one hundred years of age, had a tough leathery skin; whilst the other who was said to be 76 years old, had not yet lost the soft pliancy natural to the skin, though it was sufficiently wrinkled. The son of this man was a fine robust fellow in the prime of life with a beard beginning to grizzle. The two ancients are *lambardárs* of the village, and are much looked up to by the people.

It may be here mentioned by anticipation that in almost every village visited by the committee three or four or more greybeards, generally fine hale men, were observed amongst the groups of villagers assembled to receive us, or amongst those met with in our course through and about their homes.

Sayadpur.—Population 40; is a collection of 10 or 12 mud huts on the side of the high road from Lahore to Mooltan, and is occupied by Aráin cultivators, who are all Mussalmans.

There is only one well in the village for drinking, and there are 10 in the fields around for irrigation purposes, and there is one cattle pond.

The village, though, by the map, within the five-mile radius, is actually beyond it.

Ichra.—Population 8,400. This is a considerable village, and contains about 1,004 houses mostly built of brick masonry, and many of which are 2 or 3 stories high. The houses are crowded together upon an eminence raised from 10 to 20 or more feet above the general level of the ground around, and evidently formed by the *debris* and relics of former habitation on the same spot during successive ages. The streets are narrow and winding, and the courts confined and ill-ventilated. The main street is roughly paved with bricks set on edge, and drained by a surface gutter at one side, the outfall of which is into one of the numerous hollows encircling the village site,

The sanitary condition of the public passages and private dwellings, in point of conservancy, is most defective, and dirt and filth of sorts strew the surface everywhere. There is in fact an entire absence of any systematic and regular conservancy.

The inhabitants are of mixed creeds, Mussulmans, Sikhs and Hindus, and comprise various castes, of which the predominating are Khokar Rajputs and Kamboh Aráins. There are about 40 families of weavers besides other castes of village artizans and menials; and there is a small number of merchants and traders, In general appearance the people look healthy, prosperous and well-to-do.

The water supply is from wells, of which there are 9 in and about the village. The water is clear and sweet. The well in a field to the west of the village is 30 feet deep and 12 feet diameter. It contains 4 feet of water, and has a Persian wheel attached.

The ground about the village is very irregular, and much scooped, out into hollows. In several of these are stagnant puddles of sewage or other putrid matter. On the west side, between the village and the high road from Lahore to Ferozepore, the ground is much broken up and covered with lime and brick kilns. The former burn *kankar*, which is apparently excavated on the spot.

Here, as in the strictly agricultural villages, the cattle are tethered or stabled at night in the courts or houses of the interior premises, and no special arrangements are made for securing a proper conservancy service for these places. Near this village is the *khangah* or mausoleum of Shah Jamál. It is held sacred by the Mussalmans of this neighbourhood, and visited by numerous devotees. A fair is held here annually on 5th of Rabi Sani, but no very great gathering takes place.

16*th April*.—The committee assembled at Meean Meer at 6 a. m., and immediately proceeded to inspect the villages in the south-east section of the five-mile radius area. The following villages were visited :—

Malakpur.—Population 590 ; contains about 82 mud-built houses compactly set together and surrounded by many large trees. The inhabitants are Mussulmans, and almost all of them of the Naru Rajput caste. They are employed for the most part in agriculture, and also work as day-labourers in cantonments. They appear healthy and well-to-do.

The water supply is from wells, of which there are four about the village. The water in all is brackish, and, though considered potable by the natives, is almost useless for purposes of irrigation. They are nevertheless all furnished with Persian wheels.

The well to the south of the village is 32 feet deep, and has a diameter of 12 feet. It contains 10 feet of water, which is clear, sparkling, and distinctly saline. Its opening is flush with the ground, and a quantity of loose vegetable matter was seen floating on the surface of the water.

There are two cattle ponds here on opposite sides of the village, both in a foul state.

Cultivation is brought close up to the village walls, and the ground generally is free from the many hollows observed about most of the villages already inspected.

Kylasmari.—Population 50 ; is a small village of about 25 mud huts situated on the edge of the five mile radius, and close to the course of the Bári Doáb Canal, where it is crossed by the Harike road which run between this village and Malakpur. Its inhabitants are Mussulmans of the Khokar Rajput and Syál Ját castes, with a few families of artizans and menials.

The water supply is drawn from a single well on the east side of the village. It is 35 feet deep and 4 feet in diameter, and contains 4 feet of water, which is slightly brackish. Formerly, it is said, this water was quite saline, but since the opening of the canal it has been gradually altered in quality and rendered less so. At a few paces from the well is a deep excavation, the bed of which is covered with a stagnant pool of thick, turbid bubbling and putrescent sewage or similar liquid.

There are three cattle ponds here—all very foul.

The village lands are irrigated from the canal, and there is a belt of swampy rice fields immediately in contact with the village on its south side.

Jogiyán.—Population 250 ; is a small village of 59 mud huts ; inhabitants Mussulmans of the Bhatti Rajput and other castes ; in appearance generally healthy and prosperous. Village, inside and out, very dirty and untidy from neglected conservancy.

The water supply is drawn from a single well, and is of brackish quality. The well is 40 feet deep, and has a diameter of 13 feet. It contains 10 feet of water, and has a parapet 3 feet high.

There is a large cattle pond on the east side. Its water, though turbid, is said to be good. The sides and surroundings of the pond are on the whole tolerably clear of refuse matter and filth.

The cultivation on the east side is irrigated from the canal, and rice is raised to a small extent. The principal crops, however, here, as in the whole of this area, are, wheat, barley, and pulse for the spring harvest; and maize, millet and cotton, for the autumn harvest.

Sahajpál.—Population 700 ; contains 118 houses, all of mud and occupied by Mussulmans of the Rajput caste (80 families), with the usual complement of artizans and menials. Generally they appear to be a healthy and prosperous community.

The water supply is drawn from 3 wells in and about the village. The water in all is brackish. The well in the village is 41 feet deep, and has a diameter of 7 feet. It contains 12 feet of water, and has a parapet 3 feet high. There is a single cattle pond here on the west side of the village ; it is tolerably clean and free from deposits of filth on its sides.

Cultivation is brought close up to the village, and the ground around it is generally free from excavations Heaps of manure and other refuse matter cover the surface in and about the village yards and passages. Cultivation is irrigated from the canal, but the ground was nowhere found to be swamped as at Kylasmari.

Gohâwa—Population 590; contains 142 mud huts. The inhabitants are of mixed creeds, and comprise 27 families of Badhal and Bhatti Rajputs who are Mussulmans, and 20 families of Her Jàts who are Hindus, together with artizans and menials (*kamin*).

The water supply is from 3 wells, each of which is furnished with a Persian wheel apparatus. The water in all is brackish. There is also one cattle pond here, the water of which is tolerably clean.

Cultivation is brought close up to the walls, and is irrigated from the canal. Some rice fields in a swampy state are close outside the village on its south-east side. The interior of the village is filthy.

Chachuwàli.—Population 48; is a small hamlet of about a dozen mud huts occupied by Her Játs. It has a single well of brackish water and no cattle pond. It is situated in an open plain, the natural drainage of which is to the south-west, and is surrounded by cultivated fields dependent on rain for irrigation.

Lidhar.—Population 681; contains 262 mud huts built on the top and sides of an elevated mound situated in the midst of an open plain. The site is airy and naturally well drained, but the village yards and passages are dirty and untidy, with litter and filth of sorts encumbering the surface in all directions. The inhabitants are mostly Hindus and Sikhs of the Her Ját and Lidhar castes, and there are the usual *kamin* families of artizans and menials.

The water supply is from wells, of which there are four on the plain round about the circumference of the mound. The water in all of them is brackish. The well on the west side is 50 feet deep, and has a diameter of 9 feet. It contains 12½ feet of water, and has a parapet 2½ feet high.

The ground round the mound on the north side is open, bare and gritty for some hundred yards. On the other sides it is cultivated close up to the base of the mound.

There are 4 cattle ponds and 2 pakka tanks at short distances round the village site. They are fed from the surface drainage of the country to the northward, and are, owing to their distance from the village, generally free from deposits of filth and refuse matters.

Kohar.—Population 150; contains 44 mud huts. The inhabitants are Hindus of the Sidhu caste, and a few *kamin* families.

There is one well here from which the village draws its supply of water. It is on the south side and is 41 feet deep, including 11 feet of water which is saline. There is also one cattle pond.

The village site is level, and the ground around is open and free from excavations. Its natural drainage is towards the south-west.

Chung.—Population 1,200; contains 67 mud huts. Inhabitants are of mixed castes and creeds, comprising Sikhs of the Sandu and Mand Játs, and *kamin* families of Hindus and Mussulmans.

The water supply is from 2 wells, in both of which the water is brackish. There are also 2 cattle ponds. The site lies low, and in the rainy season water lodges and stagnates on the surface.

Cultivation is brought close up to the walls and is irrigated from the canal. Rice is grown to a small extent. Like most others of its kind the village is very dirty and untidy.

Kir.—Population 80; is a small hamlet of 103 huts disposed in two blocks on a slightly elevated part of an open arid bit of plain. The inhabitants are Mussulmans of the Bhatti Rajput caste and a few *kamin* families.

The water supply is from a single well at some distance from the north division. The well is 56 feet deep, and contains 17 feet of water, which is brackish. Close outside the south division is a cattle pond—a wide shallow pool of very filthy festering slush.

Charar.—Population 3,500; contains 260 houses, several of which are built of brick masonry. The inhabitants are Sikhs of the Gil Ját caste, together with *kamin* families of mixed creeds, Hindu and Mussulman.

The site of the village is considerably raised above the level of the surrounding ground, and consequently has a free natural drainage. Its surroundings are for the most part clear and free from excavations. The interior of the village (which is of old date) is very dirty, and contains several ruined tenements.

The water supply is from 2 wells, both of which contain sweet water. The one on the west side is 51 feet deep and 13 feet in diameter. It contains 16 feet of water. There are 4 cattle ponds round about the village, all capable of much improvement.

The cultivation here is to a small extent irrigated from the canal.

17th April.—The committee assembled at Mecan Meer Cantonments at 6 A. M., and at once proceeded to inspect the following villages in the northern half of the five mile radius area :—

Mecan Meer.—Population 290. This is a village of 50 or 60 brick built houses and 30 or 35 mud huts enclosed within walls of a square shape, and is entered by a single gateway on the north side. Its inhabitants are Mussulmans of the Ját, Gujar, Aráin and Rajput castes, and are employed in the cultivation of the fields around and the care of milch kine, whose milk is sold in the city and cantonments and civil station. There are between 150 and 200 head of cattle distributed amongst the houses of the village. Most of the houses have small yards attached to them. In these the cattle are tethered all the year round, except during the three winter months, when they are taken inside the houses at night. These yards and the interior of the village generally are in a very untidy state with litter strewing the surface everywhere, whilst the ground of the yards is soppy and saturated with urine, and has an uneven surface with cowdung irregularly trodden on to it. The air was sensibly affected by the exhalations from these excreta.

The water supply is from two wells. One of these is inside and the other outside in front of the entrance gate. Both of them yield clear sweet water. The former is 38 feet deep and 4 feet in diameter, and contains 4 feet of water. There is also one cattle pond here on the north side not far from the gate.

Immediately to the east of the village and separating it from the mausoleum of Meean Meer runs the line of railway to Mooltan. It crosses the Lahore branch canal, which passes at a short distance to the north of the village. The ground around the village is tolerably clear of filth and excavations. The villagers looked generally healthy and prosperous.

In the months of June and July (twice each month) festivals are held at the shrine of Meean Meer, when the devotees of the saint assemble to the number of perhaps 200 or 300 at a time for a few hours to present their offerings and perform prayers.

Ganj.—Population 550 ; contains 152 brick-built houses. The inhabitants are Aráin cultivators with the usual *kamin* families. All are Mussulmans. The village stands at the side of the line of the Lahore and Delhi railway, from which it is separated by a ditch, across which is thrown a bridge of stout planks. The ditch receives such drainage as there is from the village, and is the common receptacle for rubbish and sweepings from the houses on its course.

The water supply is from wells, of which there are 5 in the village, all containing sweet water. The well near the village mosque is 42 feet deep, and has a diameter of 13 feet. It contains 5 feet water, and has a parapet 3 feet high.

There are 2 cattle ponds outside the village. Both are in a dirty state, and in no way protected (as is the rule) against contamination from surface drainage or pollution from garbage and stable refuse thrown into their hollows.

The interior of the village is generally dirty and untidy. The drain leading from the mosque to the ditch outside runs as an open surface gutter at the side of the lane. It is in a horribly foul state, and entirely blocked with drift and refuse matter falling into its channel. An attempt had been made to clean it just before our arrival, and here and there we found the path on its side covered with black splashes of horribly fœtid slush.

As in all the other villages inspected, so here there is no attempt at regular or systematic conservancy, or indeed any conservancy at all immediately outside the dwelling rooms of the inhabitants.

Tajpur.—Population 372 ; consists of a single brick house and about 7 to 9 mud huts clustered together on a somewhat low-lying site.

The inhabitants are Mussulmans of the Aráin and Rajput castes, with a number of *kamins*.

The water supply is from a single well situated 30 or 40 yards outside the village. Its depth is 45 feet and its diameter 7 feet. It contains 20 feet of water, and has no parapet. The water is sweet. There are 4 other wells in the fields around, but they are not used, as irrigation is from the canal which flows through this tract.

There are 3 cattle ponds here, all more or less dirty and neglected, especially that on the east side, which has a shallow puddle of festering slush only at its bottom.

The village itself and its surroundings appear to be tolerably clean, or more properly less unkempt and neglected than the majority of the like settlements.

Cultivation is brought close up to the walls and is canal irrigated. Rice is grown to a limited extent.

Chandiàn.—Population 600 ; is a small village of 37 mud huts inhabited by Mussulman Rajpúts with a few Játs and Awáns.

The water supply is from a single well close outside the village. Its depth is 38 feet and its diameter 11 feet. It contains 16 feet of water, which is turbid and brackish. There was a quantity of straw and drift floating on the surface of the water. The well was provided with a Persian wheel apparatus which was much out of repair. There are two other wells in the fields around, but they are not used.

There are 3 cattle ponds round the village, all in need of improvement.

The surroundings of the village are very dirty and much excavated, and encroached on by cultivation, which comes close up to the walls in some parts. Irrigation is by canal water, and rice is raised in small quantity. The people have a healthy and prosperous look, and amongst them were observed several greybeards.

Kotli Ghāzi—Population 100 ; contains 71 mud huts. Inhabitants, Mussulmans of the Awán caste and *kamíns ;* generally a healthy and well-to-do community.

The water supply is from a single well, which stands in a field about 80 yards to the east of the village, It is 44 feet deep, and has a diameter of 8 feet. It contains 12 feet of water, which is brackish. There are 2 cattle ponds, both dirty.

The village is surrounded with cultivation close up to its walls, and the ground about is much excavated. The fields are all canal irrigated, and some are laid out for rice.

Salámatpura.—Population 200 ; contains about 100 mud built houses. Inhabitants, Mussulmans of the Aráin caste and *kamins* ; generally healthy and prosperous.

Water supply from wells, of which there are 2 near the village and 5 in the fields around. The water in all is brackish. One well close outside the walls is 44 feet deep, and has a diameter of 4 feet ; it contains 14 feet water. There are 3 cattle ponds round the village.

The ground round the village is very untidy, covered with dung heaps and scattered rubbish up to the walls, and much dug into.

Cultivation includes rice, and is irrigated from the canal by *jhalárs*.

Fatahgarh.—Population 950 ; contains 262 houses, of which most are built of brick masonry. Inhabitants Mussulmans of the Aráin caste and *kamins*.

The water supply is from 2 wells, both of which contain sweet water. One of them is 51 feet deep, and has a diameter of 5 feet. It contains 19 feet of water. There are 3 cattle ponds.

The village is very dirty, and the ground around is covered with dung heaps and deposits of ordure close up to the walls. The air of the place is pervaded with foul smells.

The cultivation includes rice, and is all irrigated by canal cuts.

Kotli Abdurrahmán.—Population 360 ; contains about 80 mud huts and 3 or 4 brick houses. The inhabitants are Mussulmans of the Aráin and *kamin* castes.

The water supply is from a single well, which contains sweet water. It is situated close outside the village on the edge of a deep excavation, in the bottom of which is a filthy pool of stagnant slush. The depth of the well is 41 feet, and its diameter 5 feet. It contains 10 feet of water.

The surroundings of the village are very dirty, and the ground is much excavated. The cultivation is all irrigated by canal cuts and includes a few rice fields.

Sahwari.—Population 650 ; contains 116 mud huts, and is situated close to the road from Shálámár to cantonments, a deep drainage cut intervening. Inhabitants, Aráin and *kamin*.

The water supply is from a single well inside the village. It is 44 feet deep and 4 feet in diameter, and contains 9 feet of water which is sweet. The surroundings of this well were soppy and dirty. There ar 2 ponds both covered with a scum of green vegetation. The water below is slightly turbid and apparently fresh and good.

The village is very dirty, and the ground round it a good deal cut up by drainage channels and excavations The cultivation is brought close up to the walls, and is all irrigated from canal cuts and from *jhalars* on their banks.

19*th April.*—The committee assembled at Shálámár at 6 a. m., and thence proceeded to inspect the remaining villages within the five-mile radius and not included within the limits of the Lahore municipality. The following villages were inspected:—

Khwájah Sayad.—Population 900 ; contains about 120 houses, mostly built of brick. Inhabitants are Mussulmans of the Bhatti Rajput, Aráin and Ját castes, and appear to be a generally healthy and well-to-do community.

The village site is slightly raised above the level of the ground, which is a good deal cut up by the drainage channels and excavations. The natural drainage is to the northward, in which direction it joins a wide ravine which used formerly to be flooded periodically by the Ravi, but is now obstructed by the railway line. This ravine marks the former course of the Ravi, and in its passage to the west of the Lahore city becomes the receptacle of all its sewage and waste canal water. These used to stagnate here till last year, when a cutting gave an outlet to the whole into the river near the village of Sandah.

The water supply is from 4 wells, all containing sweet water. One inside the village is 42 feet deep and 4 feet diameter. It contains 19 feet of water and has a parapet 4 feet high. Another on the east side and used only by outcaste families is 20 feet deep and 3 feet in diameter. It contains 3 feet of water, and has a parapet 3 feet high.

On the north side the ground is very untidy, and the surface strewed with dung heap matters. Opposite the gate on this side also is a potter's kiln of steadily increasing growth.

Cultivation is irrigated entirely from wells, of which there are 30 in the fields around. No canal water here.

Bhoyewál—Population 1,042 ; contains about 300 houses, mostly of brick. The inhabitants are mostly Aráin and Gujars, with a few Khatris and *kamins* (shop-keepers and artizans and menials). They appear to be generally a healthy and prosperous people.

The water supply is from wells, of which there are 13 in the village. They all contain sweet water. One in the centre of the village, where the rise of the ground is about 10 feet higher than the level of that outside, is 28 feet deep and 4 feet diameter, and contains 8 feet of water.

This village is very filthy, and the ground about it much cut up and excavated. Litter, ordure and dung heaps overspread the surface in every direction. Its houses are closely packed and overcrowded. It adjoins and is almost continuous with the next village Bhagwánpura.

Bhagwánpura.—Population 3,212 ; is a considerable village situated a little off the Lahore and Amritsar road, which passes to its south. It contains about 800 brick-built houses, many of which are two or three or four storeys high. They are all much crowded together and occupy a site somewhat higher than the ground around. The inhabitants are Aráins (600 families), Khatris and *kamins*, and in general appear healthy and well-to-do.

The water supply is from wells, of which there are 20 in the village and 90 in the fields around. They contain sweet water. One well on elevated ground in the centre of the village is 26 feet deep and 5 feet diameter. It contains 7 feet water, and has a parapet 3 feet high. Another well on its outskirt and very little above the level of the ground around is 38 feet deep and 4 feet diameter. It contains 8 feet of water, and has a parapet 2 feet high. There are 3 cattle ponds.

The interior courts and passages of this village, and the outside surroundings, are in a very filthy and unwholesome condition. The ground between the village and the high road is covered with scattered litter and rubbish and deposits of ordure, and towards the west of the village is honeycombed with excavations and hollows, the clay being used in making bricks or mud walls.

Debipura.—Population 110. This is a collection of 40 mud huts enclosed within square walls, and situated a little way off the high road, and about a mile to the east of Shálámár gardens. Its inhabitants are Aráins and a few *kamin* families.

The water supply is from wells, of which there are 5. One is immediately outside the walls and on the east side. The others are in the fields around. They all contain sweet water. The village well is 40 feet deep

and 13 feet in diameter. It contains 12 feet of water, and has no parapet. Stalks of straw and leaves were observed on the surface of the water. There is one cattle pond here. It is thickly coated with a scum of vegetation, below which the water is bright and clear.

Cultivation is irrigated by canal water, and is brought close up to the wells on the north and west sides. On the other sides are plantations of peach, plum and other fruit trees.

Shádipur.—Population 173; contains about 50 mud huts, and 2 or 3 brick houses in two blocks set close together. The inhabitants are Rajputs, Játs, and *kamins*, all Mussulmans. In appearance they look healthy and in good condition.

The water supply is from a single well situated between the two blocks. It is 31 feet deep and 9 feet in diameter, and contains 8 feet of water which is sweet. There are 5 other wells in the fields around. There are two cattle ponds close to the walls. The ground around is excavated, and more or less encumbered with litter and dung heaps. Cultivation is irrigated from canal cuts.

Mahmud Buti.—Population 772; contains about 283 mud houses and 15 or 20 brick-built ones, and there are the ruined walls of 40 or 50 other mud huts. The inhabitants are Mussulmans of the Bhatti Rajput and Aráin castes, with a few *kamin* families.

The water supply is from wells, of which there are 3 in and about the village, and 32 in the fields around. The well outside the village to the south is 18 feet deep and 5 feet in diameter. It contains 4 feet of water which is sweet, and has a parapet 1 foot high.

There are no cattle ponds, but the ground about is very irregular with many drainage channels, and near the village is much excavated into hollows in which water lodges after rain.

The site of the village is somewhat raised above the ground around, and is close to the bank of a wide ravine which formerly formed the channel of the river Ravi. In the rainy season it fills with water, and is liable to overflow, owing to the obstruction of its channel to the southward by the railway line. The land around is poor and inclined to aridity, and here and there are wide patches of gritty waste (*kankar*) or powdery clay. The cultivation is irrigated by wells. There is no canal water here.

The interior of the village is as dirty and untidy as most others of its class, but the ground immediately around it is tolerably free from scattered litter and ordure. This is the last of the villages inspected by the committee. The remainder of those in the north-west section of the five-mile radius area are included within the limits of the Lahore municipality, which covers an area of about 14 square miles, and comprises 13 villages and hamlets besides the city of Lahore, civil station of Anarkulli, and Donald Town, and the Railway settlement at Naulukha, the whole being under an organized system of conservancy, which is supervised and controlled by the authorities appointed by Government.

It now devolves on the committee, before submitting any suggestions for the improvement of the villages inspected and others included within the five-miles radius, to review briefly the principal physical features and main characters in a hygienic sense of the area occupied by these villages with the object of discovering whether in their existing conditions they really do injuriously affect the salubrity of cantonments; and if so in what manner. And this it seems convenient to do under the heads of topography, cultivation and sanitation.

Topography.—The circular area in the centre of which is situated the cantonment of Meean Meer is a wide open plain on the east or left bank of the river Ravi, which is at a distance of 8 or 10 miles from the cantonment itself. The highest part of this plain is occupied by the cantonment, and is traversed also by the Lahore branch of the Bári Doáb Canal, which flows across it from north-east to south-west and touches the cantonment boundary near the village of Meean Meer. Between this village and Ganj, both on the left bank of the canal, are the new water-works for supplying the cantonment with pure water distributed in pipes.

The surface soil is a stiff impermeable clay, and in many parts, at a few feet below the surface, contain beds of nodular limestone (kankar). In the vicinity of the Lahore civil station the clay is excavated for brick making, and the kankar for burning into lime and for metalling roads.

The natural surface drainage of the area is on two lines to the north-west and south-west on either side of the canal alignment, and in each direction it is aided by an artificial cutting leading from cantonments into the natural gully formed by the ancient bed of the river Ravi, and which itself empties into the river. The slope or "fall" for this natural drainage is very slight over the greater portion of the area under consideration, and consequently, after rain, water lodges on the surface, and in some parts, where the ground lies low, forms wide sheets of very shallow depth, which remain till desiccated by the sun. In the vicinity of villages where the ground has been thoughtlessly excavated for building purposes, the surface drainage collects and forms deep pools, which are in reality thick mixtures of all the surface filth and ordure deposits in the village outskirts, and becomes merely collections of stagnant sewage which last a long time before finally drying up. On the whole, the surface drainage is free, and there are no permanent swamps or marshes in any part of this area.

The depth of the sub-soil water below the surface varies in different parts. In the southern half of the area, as gathered from the measurements of the village wells, it ranges from 32 to 39 feet in the tracts at a distance from the canal, and 22 to 30 feet in the vicinity of its course. In the northern half it ranges from 23 to 37 feet in the eastern section, and from 13 to 30 feet in the western, both being freely canal irrigated.

The general aspect of the country is barren and waste in the central parts of the area, and fairly well wooded and cultivated in its outskirts. The cantonment of Meean Meer, situated as it is [in the centre of the area] on a clear open plain, is surrounded by a broad belt (from one to three miles wide) of perfectly open and unoccupied ground, and is thus exceptionally favoured in its circumstances of position so far as they afford the protection of isolation against the contagiums or any other extraneous sources of disease communication or infection. The ventilation of the entire site is perfect, its area free and open, and its drainage, though perhaps not so perfect and rapid as it might be, is no where obstructed, and does not appear to be seriously defective.

Cultivation.—As before stated, the cultivation and population of this area outside cantonments are mainly spread over its peripheral parts. In the northern half the villages and fields, together with their plantations and gardens, are more closely set together than they are in the southern, being more generally and freely irrigated by the canal than are those in the other half. They also extend closer up to the cantonment boundaries than do the villages on the south side. In this latter direction, with the exception of a cluster of five or six villages beyond the eastern limits of cantonments (on this side occupied by a wide open plain, which is used as an Artillery range and parade ground), and whose lands are canal-irrigated, the villages are generally widely scattered and separated by preserves (rakh) of pasture and jungle scrub, and with very few trees of large size, except such as are found immediately about the villages themselves.

The crops usually raised are wheat, barley, maize, millet, and the common pulses in their seasons, with rice to a limited extent in the eastern sections, and some cotton. There is no rank vegetation or forest growth in any part of the area. The general character of the soil is barren and arid, and where not cultivated, the ground presents a clean dry surface of compact clay or coarse limestone grit. These uncultivated tracts are here and there covered with jungle patches which stretch across the southern part of the area, and grow good pasture grasses, though they support no forest trees.

Sanitation.—The condition briefly recorded in each of the villages inspected by the committee will have sufficiently indicated the nature and extent of their sanitary defects. With the exception of two or three of the large ones (which are built of brick masonry) in the vicinity of the Lahore city, all the villages are built either of unburnt bricks or unwrought clay. The houses in them are single-storeyed, and as dwellings can be made very comfortable and healthy, as they are occasionally found to be. But as a rule they are too much crowded together, are without sufficient courtyard area, and have no facilities for free communication ; their lanes and streets, such as they are, being mere passages, winding narrow and irregular, and both unpaved and undrained. With such radical defects as these, it is not difficult to appreciate the consequence in point of sweetness and cleanliness of their occupations by poor communities of uneducated and primitive agriculturists. Each house is in fact a farmyard, and contains all its own farm implements and cattle under one roof and in one area in common with the owner's family, but instead of being, as it naturally should be, situated by itself in the midst of its fields or lands, it is jumbled up with a number of others of like character in a very limited and altogether insufficient space, and this for no other object apparently than mutual succour and protection against a common enemy or foreign foe.

The result of this overcrowding and a total absence of sanitary precautions of any kind is intensification of the evils and discomforts attending the accumulation and multiplication, within very narrow bounds, of the natural and usual forms of farmyard refuse and litter and filth. Whatever the gravity and import of these may be under ordinary circumstances, and whatever their tendency and effects under conditions of extraordinary occurrence, it appears to the committee that the advantages of space, ventilation and free approach, which have been sacrificed to the more pressing requirements of the times and position, are for the present at least irremediable, and it does not appear to them that this is a matter of much consequence, seeing that in the whole tour of inspection the villagers no where presented any sign of injury or suffering attributable to the faulty conditions and modes of their daily life. On the contrary, as a whole, the villagers everywhere presented the appearance of a remarkably healthy and generally prosperous and contented people.

None of the sanitary defects which the committee have found to exist in the several villages inspected by them are of a nature to produce any special injury or general deleterious effect upon the health of those living in cantonments, more than any community in general is liable to from inter-communication and business dealings with its neighbours.

The villagers alone are directly exposed to the evil consequences of the careless habits of life in which they are born and grow up, so far at least as they may operate as the causes of sickness and disease ; but they can be, and doubtless are, sometimes the medium of the communication of disease originating in their own dwellings to others far removed and previously free from any sickness, and this in the course of their daily life dealings with them. For instance, the very dirty conditions of life prevailing in these agricultural villages are such as of themselves to account for the occurrence of the cases of typhoid or enteric fever (or fevers which are believed to be of this type) which are to be met with in them at almost any season, as the direct result of drinking water or other alimentary fluid which has been contaminated by human excreta. And it is possible that the contagion of the disease may be conveyed to widely separated places otherwise free of it through the medium of direct inter-communication, as in the cases where milk is the vehicle.

If we consider the actual conditions attending the collection of milk in the villages and its conveyance for sale in the cantonments or city, it is easy to understand how this important and largely consumed article of diet may become a medium for communicating disease in healthy quarters. As a rule, the cattle and peasantry live together in the villages, and almost always in a space much too limited for (at the very least) cleanliness and comfort, and when any communicable sickness or disease occurs amongst the inmates of any one of its tenements, it is practically impossible to protect any single thing in it from contamination by the contagion. In the case of milk, it may derive the contagion in the process of its abstraction from hands which were just before employed in the nursing of one afflicted with small-pox or some other contagious fever, or it may imbibe it from the air of a sick room sheltering such cases, or from vessels kept in such rooms and freely handled by those in constant contact with the sick. Collected under these very unfavourable conditions, and carried away for sale in earthenware jars or metal vessels, the cleanliness of which is seldom paid attention to, a suspicion more or less justly attaches to the character, for wholesomeness and harmlessness, of the milk coming from such villages.

The force of these statements applies especially to the village of Mecan Meer, which, of all the others within the area inspected, is devoted to the tending of milch kine, and which more than any other derives profit by the sale of milk in the cantonments, civil station and city.

For this village the committee are of opinion, some special measures of precaution are necessary, and, as it is situated close outside the boundaries of cantonments, and is thus beyond the control of the military

authorities, they consider that it would be of advantage to place it for all purposes of sanitation and conservancy inspection under the supervision of the cantonment authorities.

For the rest, it does not appear to the committee that it would be advisable at present to press any measures of sanitation which would not be easily practicable and understood by the peasantry as directly conducive to their immediate advantages and welfare; but at the same time they consider that much might be done towards improving the sanitary condition of these villages without running counter to their caste prejudices or offending the sentiments of lifelong custom of their inhabitants.

In this direction the committee are of opinion that every village should be bound by a few simple rules of conservancy, the observance of which would ensure to their inhabitants much more wholesome and cleanly conditions of life than those at present prevailing in and about their dwellings. These rules are the following :—

First.—To maintain (in the same way as the village watchmen) one or more village sweepers according to requirement, for the service of the public streets and lanes, &c.

Second.—To prohibit the excavation of the common ground round the village on any pretext whatever, or the storing upon it of manure heaps, or the shooting of any filth or rubbish upon its surface.

Third.—The cattle ponds to be properly defined and protected against filth and rubbish being thrown into them, or heaped on their banks. Digging into their banks or beds for building material or on any pretence whatever to be strictly prohibited.

Fourth.—Earth for building purposes to be taken from the fields, and all such excavations to be subsequently ploughed level. Such diggings to be prohibited on the common ground of village, or within at least 200 yards of its walls.

Fifth.—All manure and such like heaps of rubbish, together with carcases of dead cattle, to be collected either in common heaps at fixed public spots not within 200 yards of the village, or else to be stored as private property in the fields of the owners at the same distance from the walls.

Sixth.—No manure heaps or other refuse matter or ordure to be stored inside the village, either in the private yards or on the public thoroughfares and open spaces. Lambardárs to be held responsible for the management and observance of these regulations.

No. 1956, *dated Lahore, 9th May* 1878.

From—J. G. CORDERY, *Esquire, Offg. Secretary to Government, Punjab*; *To—The Sanitary Commissioner, Punjab.*

I AM desired to acknowledge the receipt of your No. 1503, dated 30th ultimo, forwarding report of the committee for the inspection of villages within a radius of five miles of the Mecan Meer Cantonment, and to enquire whether a copy of the report has been forwarded by you to the Quartermaster-General.

2. If you have not already furnished the Quartermaster-General with a copy of the report, it will not be necessary to incur the labor of making a duplicate, as the report is being printed and copies can be supplied from this office.

No. 1957, *dated Lahore, 9th May* 1878.

From J. G. CORDERY, *Esquire, Offg. Secretary to Government, Punjab*; *To—The Officiating Commissioner and Superintendent, Lahore Division.*

With reference to the correspondence ending with your No. 240, dated 5th February last, I am desired to forward printed copy of a report of the committee for the inspection of villages within a radius of five miles of the Mecan Meer Cantonment, and to draw your attention to the conservancy rules suggested by the committee.

2. I am also to request your opinion on the proposal to bring the village of Mecan Meer under the supervision of the Cantonment authorities.

No. 1958, *dated Lahore, 9th May* 1878.

From—J. G. CORDERY, *Esquire, Officiating Secretary to Government, Punjab; to the Secretary to the Government of India, Home Department.*

Wtih reference to the correspondence ending with your No. 1, dated 2nd January 1878, I am desired to forward, for the information of the Government of India, printed copy of a report of the committee for the inspection of villages within a radius of five miles of the Mecan Meer Cantonment, together with copy of this office letter No. 1957, of this date, to the address of the Commissioner and Superintendent, Lahore Division, showing the action taken by this Government.

2. A copy of the report has also been forwarded to the Quartermaster-General of the Army.

No. 1959, *dated Lahore, 9th May* 1878,

From—J. G. CORDERY, *Esquire, Offg. Secretary to Government, Punjab to the Quartermaster-General of the Army.*

With reference to your No. 4295, dated 8th July 1876, I am desired to forward printed copy of a report of the committee for the inspection of villages within a radius of five miles of the Mecan Meer Cantonment, together with copy of a letter No. 1957, of this date, to the address of the Commissioner, showing the action taken by this Government.

Proceedings of the Hon'ble the Lieutenant-Governor of the Punjab in the Home Department,—No. 3882, dated 18th November 1878.

READ—

Two reports on vaccine operations in the Punjab; one for the first quarter of the year 1877, and the second for the official year ending 31st March 1878.

OBSERVATIONS.—The last report submitted by the Superintendent-General referred to the operations of the Vaccine Department for the calendar year 1876, the system of reporting for the official year having been changed under orders of Her Majesty's Secretary of State; but as this change has been attended with inconvenience, the old system has been reverted to, and the second of the reports now under review is for the official year 1877-78, the other being a report of the operations in the intervening period between the close of the previous calendar and the commencement of the last official year. The Superintendent-General has further furnished the means of comparing the work performed by the Provincial establishment during the official years 1876-77 and 1877-78, and the following results are shown :—

	Total number vaccinated.	Of which were primary.	Percentage successful of primary.	Cost of each successful case.
				Rs. A. P.
1876-77 ...	288,527	284,771	98·67	0 3 6·37
1877-78 ...	373,577	371,821	98·81	0 2 8·18

This return is favourable under each head; while the following table showing the total number of persons vaccinated by all establishments employed on this work may be considered fairly so as regards the amount of work done during the past year :—

	1874-75.	1875-76.	1876.	1877-78.
By Provincial establishments ...	374,615	300,506	285,068	373,577
„ Dispensary ditto ...	39,568	37,552	40,960	43,265
„ Municipal ditto ...	29,388	21,291	22,388	34,392
„ Local ditto ...	46,260	43,974	46,880	36,451
„ Native States ...	7,701	22,274	8,850	6,290
„ Hakims ...	...	...	1,804	2,645
Total ...	497,532	425,597	405,950	496,620

The report shows that the Provincial establishment met with fair success in their efforts to get the people to bring forward their children in the several districts over which their operations extended, with the exception of Rohtak, which was, during the past year, visited by them for the first time. Opposition here appears to have been due to the worthless nature of the work of incompetent local vaccinators in former years, which had created mistrust in the minds of the people and deprived the vaccinating staff of the support of the Municipal Committee. It will rest with the local Civil authorities to use their influence to remove this mistrust and to enlist the services of the members of the Committee both here and at Pind Dadan Khan, where they are also said to have shown utter indifference to the progress of vaccination.

A fair amount of work appears to be done in the way of vaccination by the Dispensary, Local and Municipal establishments, but the remarks of the Superintendent-General about the inferior class of men frequently employed by these bodies should receive the attention of the local officers. The work performed by this class of men must in most cases be useless, and calculated to create that mistrust in the minds of the people which it is so desirable to guard against. The case of the head vaccinator at Amritsar more especially is one of a serious character; and the suggestion of the Superintendent-General that this man, who has been several times suspended and dismissed for grave misconduct, should be finally removed from the service, is one that should have been carried out by the local authorities without waiting for an expression of the views of Government in such a matter.

The report from Mandi is very satisfactory, as is also that from the Suket State, of the progress made after the objections which first retarded operations had been overcome.

The Lieutenant-Governor has determined, at the first favourable opportunity, to amalgamate the Departments of Sanitation and Vaccination, placing both under the direction of the Sanitary Commissioner. During the hot season, vaccinating operations cannot be carried on with any good effect in the plains; and this staff can be employed upon village and town sanitary inspection, and the improvement and check of vital statistics. Some years ago the amalgamation of these departments was viewed unfavourably by this Government from the fear that the undoubted benefits of vaccination would be less strongly pressed upon the people when the department which superintended it was united with another whose objects were doubtful, and whose energy was dissipated in the discussion of unprofitable theories.

But the Lieutenant-Governor is glad to believe that sanitary science in India has become more practical and reasonable; that its attention is directed to the removal of obvious and acknowledged evils; and that it has understood that no important sanitary results can be obtained except with the support and concurrence of the people.

This being the case, the union of the Sanitary and Vaccination Departments will be an advantage, and not a danger.

ORDER.—Ordered that the report be printed with the remarks of the Hon'ble the Lieutenant-Governor for general circulation, and that the attention of the several local officers be called to the matters specially noticed.

By order of the Hon'ble the Lieutenant-Governor of the Punjab.

LEPEL GRIFFIN,

Secretary to Government, Punjab.

Printed at the Punjab Government Civil Secretariat Press, Lahore.—26-11-78.—218.

Supplementary Report on Vaccine operations in the Punjab for the Quarter ending 31st March 1877.

FROM

J. BENNETT, ESQUIRE, M. D.,
Officiating Superintendent General Vaccination, Punjab.

To

J. G. CORDERY, ESQUIRE,
Officiating Secretary to Government, Punjab.

SIR,

I have the honor to submit, for the information of the Hon'able the Lieutenant Governor, a Supplementary Report on the Vaccine operations performed in the Punjab during the three months ending 31st March 1877; the period intervening between the Report for 1876 and that for the official year 1877-78, the official year in future being the year of Vaccination Report.

2. The aggregate number of operations performed by all establishments in the Punjab during the three months under review is 239,932; the number of successful primary vaccinations is 215,861, and of re-vaccinations 2166, the per-centage of success being 95·06 and 75·10 respectively. The total expenditure amounted to Rs. 19,568-2-8, and each successful case cost 1 anna and 5·23 pies.

3. The numbers vaccinated by the Provincial establishment were 157,170 primary vaccinations and 62 re-vaccinations, total 157,232. Of the primary vaccinations, 149,210 were successful, the per-centage of success being 98·82, that of re-vaccinations being 19·64. The number of vaccinators (including 28 Native Superintendents) was 149, and the average number of operations done by each was 1055·24. The total expenditure was Rs. 15,569-12-6, and the cost of each successful case was 1 anna and 8·03 pies.

4. The Provincial establishment consisted of—

1 Superintendent General.
1 Superintendent.
1 Native Deputy Superintendent.
28 Native Superintendents.
121 Vaccinators.

5. Dr. Garden held charge of the Department. The staff of vaccinators working immediately under his supervision visited the districts of Hoshiárpur and Gurdáspur, and met with very encouraging results.

HOSHIARPUR DISTRICT.

Of this district Dr. Garden reports that the inhabitants are now well accustomed to vaccination, and that "many of the leading people put themselves to considerable inconvenience to assist in the work." The rural population, like those inhabiting the districts of Siálkot and Gujránwála, may now be said to be in great measure won over to the cause of vaccination, the number of those viewing it with suspicion or distrust being small, and becoming smaller every year.

The total number vaccinated throughout the district was 34,992, of which 98·62 per cent. were successful; 9 were re-vaccinations. The proportion successfully vaccinated was equal to 35·4 per mille of population, or, comparing one tahsíl with another, the following results are found :—

TAHSIL.	Number of successful primary vaccinations.	Ratio per 1,000 of population successfully vaccinated.
Hoshiárpur	·,535	38·1
Dasúya	10,174	45·6
Garhshankar	7,907	31·1
Una	5,635	26·1
Total	33,251	35·4

The comparatively low ratios exhibited is to be accounted for by the fact that vaccination having been extensively practised in previous years, the number of subjects has become proportionally small. The lowest ratio is placed against Una, 14 per mille under the assumed birth-rate, and shows that a considerable number of children must have there remained unvaccinated.

GURDASPUR DISTRICT.

6. About the beginning of March, the tahsíls of Pathánkot and Shakargarh were undertaken by Dr. Garden's staff, and favourable results are reported to have been obtained. Owing to the unusual coolness of the weather, work was continued in this district beyond the period at which the vaccinating season in the plains usually ends.

The total numbers vaccinated were 13,606 by the itinerant establishment, and 1437 by the local men, total 15,043. The per-centage of successful primary cases was 97·8, and the successful vaccinations in the tahsíl of Pathánkot were equal to 32·40, and in that of Shakargarh to 30·94 per mille of population.

7. At the beginning of the quarter, the establishment under my superintendence, consisting of 6 Native Superintendents and 24 Vaccinators, was finishing work in the tashíl of Amritsar, from whence operations were extended to the neighbouring tashíl of Ajnála, and to the district of Siálkot beyond; and during the three months embraced in this report, consideraòle portions of the tahsíls of Amritsar and Ajnála in the district of Amritsar, the tahsíls of Raya, Pasrúr and Siálkot in the district of Siálkot, and the tahsíls of Gujrat and Gujránwála were overtaken; 54,566 persons in all having been vaccinated.

AMRITSAR DISTRICT.

8. Great opposition was met with in tahsíl Amritsar. In several zails, where formerly but little difficulty had been experienced, insurmountable resistance was this year offered. Although the inhabitants of this parganah have had vaccination brought to their villages every second year for the past twelve years, and although a large proportion of their children have during that time been successfully vaccinated, they yet appear to be unable to see its benefits; on the contrary, the operation instead of increasing in favour, as in most other districts of the Punjab, seems to be losing ground with them.

SIALKOT DISTRICT.

9. A marked contrast to the above was presented by the inhabitants of the Siálkot district, where the prophylactic appeared to be received with the same favour and belief in its protective powers as was noticed in former years. Another and not unimportant element of success however, obtaining in this, but not found in the Amritsar district, was the active interest taken in the work by the civil authorities, and especially by Colonel Jenkins, the Deputy Commissioner, whose ready coöperation set a good example to the native officials and members of Municipal Committees, inducing them to take advantage of the favourable attitude of the people, and to aid in carrying out operations in as expeditious and complete a manner as possible. Population of the three tahsíls overtaken 824,776, and the total number of vaccinations 33,508, of which 99·37 per cent. (excluding re-vaccinations) were known to be successful; the proportion of successful cases to population being 38·49 per mille.

GUJRAT DISTRICT.

10. On transferring operations from Siálkot to Gujrat district, the attitude of the people was seen to be less favourable, but no active opposition having been shown, a fair amount of work was done.

The total number of vaccinations in the tahsíl of Gujrat was 8,046, of which 99·42 per cent. were successful, the proportion of successful primary cases to population being 29·57 per mille, a decrease of 8·9 under that obtained in Siálkot district. The portions of the other two tahsíls remaining uncovered at the end of 1876 were overtaken by the local vaccinators of the Provincial establishment, 5,537 operations, of which 96·83 per cent. were successful, having been performed by them.

GUJRANWALA DISTRICT.

11. The tahsíl of Gujránwála was undertaken towards the close of the vaccinating season.

The total number vaccinated in this tahsíl was 7,158, of which 98·87 per cent. were found successful, and the number of successful primary cases (6818) was equal to 30·64 per 1,000 of population. The numbers vaccinated by the local native Superintendent and his vaccinators in the other two tahsíls were 4,838 in Wazirabád and 1,075 in Háfizabád, the per centage of success being 98·73.

The practice of vaccination having become popular with the inhabitants of these parts, the local vaccinators are, as a rule, able to cover the whole of the district in the course of each vaccinating season, with the result that the average annual number of deaths from small-pox, in a population of 550,576,

has, during the 4 years ending 31st December 1876, declined (Sanitary Commissioner's return) from 448·7, that obtaining for the previous period of 4 years, to 92, a decrease of 83 per cent. The local native Superintendent, Nánák Chand, is a pains-taking man, and the high degree of immunity from small-pox of late years enjoyed by the people of this district is, in great measure, due to his labours.

12. In addition to the districts before mentioned, 9 local native Superintendents, with a staff of 4 men each, conducted operations in the districts of Delhi, Karnál, Umballa, Ludhiána, Jullundur, Kángra, Lahore, Ferozepore, and Jhelum. The aggregate numbers of vaccinations performed by this portion of the establishment amounted to 40,796, the ratio of success in primary vaccinations being 99 per cent. The district of Delhi, one of the worst as regards vaccination, gives the smallest number (2572), and Ludhiána, which used to be almost as backward, shows the highest number (7503) of vaccinations performed.

DISPENSARY, MUNICIPAL &c. VACCINATION.

A brief summary of each is given as follows :—

13. *Dispensary Vaccination.*—The total number vaccinated by the Dispensary establishments was 31,402, of which 30,151 were primary, and 1251 were secondary vaccinations ; of the primary cases, 24,997, or 87·28 per cent. were successful, and of the re-vaccinations 1,045, or 89·31 per cent. were successful, the ratio of success in the latter being greater by 2·03 per cent. than that of the former class of cases, a most unusual and improbable result. The number of vaccinators was 36, and the average number vaccinated by each was 872·27. The total cost was Rs. 954, and of each successful case pies 7·03.

14. *Municipal Vaccination.*—The total number vaccinated by municipal vaccinators was 16,389, of which 16,095 were primary, and 294 were secondary vaccinations. There were 13,782 of the former, and 207 of the latter known to be successful, the ratio of success in each being 89·83, and 76·95 per cent. There were 44 vaccinators employed, and the average number of operations done by each was 399·73. The total cost was Rs. 1,113-13-9, and of each successful case anna 1 and pies 3·28.

15. *Local Funds.*—The total number vaccinated by Local Fund vaccinators was 25,674, of which 25,217 were primary, and 457 were primary vaccinations, with 21,353 and 236, or 88·39 and 56·19 per cent. successful respectively. There were 56 vaccinators employed, and the average number of operations done by each was 458·46. The total cost was Rs. 1,419-12-5, being at the rate of anna 1 and pie 0·62 each successful case.

16. *Native States.*—Baháwalpore is the only native state from which vaccination returns have been received. The number vaccinated was 4,355, of which 3,640 were primary and 715 were re-vaccinations ; of the primary cases, 2,878 are returned as successful, or 79·34 per cent., the ratio of success in re-vaccinations being 67·72 per cent. There were 4 vaccinators employed, and the average number vaccinated by each was 1088·75. The total cost was Rs. 480, and each successful case cost annas 2 and pies 3·70. Vaccination was also carried on by 12 Hakíms without additional cost to the State, the number of operations performed by them having been 2,783, of which 76·11 per cent. were returned as successful.

17. Hospital Assistants attached to dispensaries performed 917 operations, of which 93·89 per cent. were successful.

18. Of district Hakíms, only one (in Kúlú) has submitted returns. The number said to have been vaccinated by him was 601, the proportion returned as successful being 98·5 per cent., but this in all probability is highly over-stated, the ratio of success obtained by this class of operators rarely, if ever, in reality exceeding 50 per cent.

19. Only three cantonments have submitted vaccination returns, viz., Delhi, Meean Meer, and Siálkot. The total number of operations was 579, the ratio of successful cases being 87·4 per cent.

20. Annexed are the usual statements showing number of vaccinations, cost &c. In future a revised set of forms ordered by the Government of India will be used instead of those now appended.

I have the honor to be,
Sir,
Your most obedient servant,

JOHN BENNETT,
Officiating Superintendent General Vaccination, Punjab.

STATEMENTS.

Statement No. I.—showing particulars of vaccination in each circle of

1	2	3		4		5		6	7	8			
Circle.	Name and rank of Superintendent.	Number of Native Superintendents.		Number of Vaccinators.		Total number of persons vaccinated.		Collectorate, Political Agency or Native States, in which vaccinations were performed.	Population of area included in last column	Name of portion of District or of Town.		A. Sex.	
		1876.	1877	1876.	1877.	1876.	From 1st January to 31st March 1877.					Males.	Females.
							2,572	DELHI.	3,15,286	Tahsíl Delhi	...	...	...
									1,67,897	Do. Sonepat	...	1,313	1,259
		...	1	...	4	...	2,572				Total ...	1,313	1,259
							2,871	KARNAL.	2,40,322	Tahsíl Karnál	...	1,425	1,446
							274			Town Do.	...	143	131
		...	1	...	4	...	3,145				Total ...	15,68	1,577
		...	1	...	4	...	3,293	UMBALLA.	1,97,081	Tahsíl Umballa	...	1,687	1,604
							2,104	LUDHIANA.	2,90,148	Tahsíl Ludhiána	...	1,149	950
							4,835		1,43,458	Do. Samrála	...	2,653	2,175
							564		1,39,639	Do. Jagraon	...	384	180
		...	1	...	4	...	7,503				Total ...	4,186	3,305
		...	2	...	8	...	2,038	JULLUNDUR.	2,60,885	Tahsíl Jullundur	...	1,141	897
							7,802	HOSHIARPUR.		Tahsíl Hoshiárpur	...	4,380	3,422
							888		2,50,036	Town Do.	...	555	333
							305		...	Suburbs Do.	...	166	139
							965		...	Town Hariána	...	548	417
							9,661		...	Tahsíl Dasúya	...	5,352	4,309
							306		2,53,807	Town Do.	...	171	130
							166		...	Do. Tánda	...	85	81
							333		...	Do. Urmar	...	193	140
							282		...	Do. Miáni	...	152	130
							8,225		...	Tahsíl Garhshankar	...	4,651	3,571
							80		2,23,031	Town Do.	...	50	30
							5,848		...	Tahsíl Una	...	3,054	2,793
							131		2,12,016	Town Anandpur	...	71	57
									...				
		...	10	...	44	...	34,992				Total ...	19,431	15,552
							904	KANGRA.	1,24,780	Tahsíl Núrpur	...	482	422
							6,379		1,79,961	Do. Hamirpur	...	3,273	3,106
		...	6	...	24	...	7,283				Total ...	3,755	3,528

DEPARTMENT.

superintendence in Punjab province during the three months ending 31*st March* 1877.

9										10				11		12
Primary Vaccination.										Revaccination.				*Percentage of successful cases excluding those unknown from the total.*		
B. *Caste.*				C. *Age.*		D. *Results.*				A.	B.	C.	D.			
Christians.	Hindús.	Musalmáns.	Other castes.	Under 1 year.	Above 1 year.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	In primary vaccination.	In secondary vaccination.	Average number of persons vaccinated by each vaccinator.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
...	1,774	223	575	1,684	888	2,486	25	61	2,572	...	...	...	...	99·00	...	
...	1,774	223	575	1,684	888	2,486	25	61	2,57:	...	...	...	...	99·00	...	643·
...	1,551	692	628	2,251	620	2,815	30	26	2,871	...	...	...	...	98·94	...	
1	145	67	61	248	26	271	1	2	274	...	...	...	...	99·63	...	
1	1,696	759	689	2,499	646	3,086	31	28	3,145	...	...	...	...	99·00	...	786·25
...	1,246	1,015	1,030	1,763	1,528	3,160	40	91	3,291	1	1	...	2	98·75	50·00	823·25
...	748	1,027	324	1,911	188	2,081	8	10	2,099	...	3	2	5	99·61		
...	2,927	1,006	895	3,195	1,633	4,798	13	17	4,828	...	5	2	7	99·72		
...	376	132	56	530	34	560	2	2	564	...	...	...	...	99·64		
...	4,051	2,165	1,275	5,636	1,855	7,439	23	29	7,491	...	8	4	12	99·69	...	1,875·75
2	623	1,039	374	1,551	487	1,975	16	47	2,038	...	...	...	...	99·19	...	254·75
...	3,127	3,075	1,600	3,820	3,982	7,422	104	276	7,802	...	...	...	...	98·61	...	
...	358	472	58	424	464	865	3	20	888	...	...	...	...	99·65	...	
...	123	164	18	133	172	302	3	...	305	...	...	...	...	99·01	...	
...	452	335	178	489	476	946	1	18	965	...	...	...	...	99·89	...	
4	4,282	4,047	1,328	4,189	5,472	9,143	151	367	9,661	...	...	...	...	98·37	...	
...	71	214	16	148	153	275	16	10	301	2	3	...	5	94·50	40·00	
...	49	112	5	75	93	157	4	5	166	...	...	...	...	97·51	...	
...	145	166	22	170	163	326	4	3	333	...	...	...	...	98·78	...	
...	31	232	19	70	212	273	3	6	282	...	..	...	...	98·91	...	
...	4,628	1,863	1,734	4,639	3,586	7,830	84	311	8,225	...	...	...	...	98·93	...	
...	25	36	19	22	58	77	...	3	80	...	...	...	...	100·	...	
...	4,288	617	942	3,179	2,668	5,515	91	241	5,847	...	..	1	1	98·37	...	
...	73	27	28	85	43	120	1	7	128	...	3	...	3	99·17	...	
4	17,652	11,360	5,967	17,441	17,542	33,251	465	1,267	34,983	2	6	1	9	98·62	25·00	795·29
...	578	187	139	590	314	877	9	18	904	...	...	...	...	98·98	...	
...	4,959	227	1,193	1,817	4,562	6,281	5	93	6,379	...	...	...	..	99·92	...	
...	5,537	414	1,332	2,407	4,876	7,158	14	111	7,283	...	...	...	...	99·80	...	303·45

1	2	3		4		5		6	7	8			
Circle.	Name and rank of Superintendent.	Number of Native Superintendents.		Number of Vaccinators.		Total number of persons vaccinated.		Collectorate, Political Agency or Native States, in which vaccinations were performed.	Population of area included in last column.	Name of portion of District or of Town.		A. Sex.	
		1876.	1877.	1876.	1877.	1876.	From 1st January to 31st March 1877.					Males.	Females.
							1,098	AMRITSAR.	1,37,908	Tahsíl Amritsar	...	579	518
							4,756		2,09,540	Do. Ajnála	...	2,496	2,260
		...	4	...	16		5,854		...	Total	...	3,075	2,778
							17,047	SIALKOT.	3,80,031	Tahsíl Siálkot	...	9,228	7,819
							1,527		...	Town Do.	...	835	692
							291		...	Cantt. Do.	...	185	106
							119		...	Town Kila Sobha Singh	...	60	59
							127		...	Do. Daska	...	78	49
							9,704		2,44,997	Tahsíl Pasrur	...	5,235	4,469
							375		..	Town Do.	...	175	196
							4,193		1,99,748	Tahsíl Raya	...	2,114	2,073
							125		...	Town Nárowál	...	64	56
		...	6	...	24		33,508		...	Total	...	17,974	15,519
							1,005	GURDASPUR.	2,47,297	Tahsíl Gurdáspur	...	514	491
							91		...	Town Kalánaur	...	49	42
							341		2,50,764	Tahsíl Batála	...	163	178
							5,137		1,63,350	Do. Pathánkot	...	2,719	2,418
							137		...	Town Do.	...	69	68
							326		...	Do. Sujánpur	...	175	151
							7,904		2,45,362	Tahsil Shakargarh	...	4,449	3,455
							102		...	Town Naina Kot	...	51	51
		...	11	...	48		15,043		...	Total	...	8,189	6,854
							2,126	LAHORE.	3,06,832	Tahsíl Lahore	...	11,51	975
							1,430		1,97,667	Do. Kasur	...	730	700
							53		...	Town Khem Karn	...	32	21
		...	1	...	4		3,609		...	Total	...	1,913	1,696
							773	FEROZEPORE.	1,31,500	Tahsíl Ferozepore	...	392	381
							2,323		94,837	Do. Muktsar	...	1,203	1,120
							114		...	Town Do.	...	56	58
		...	1	...	4		3,210		...	Total	...	1,651	1,559
							6,277	GUJRANWALA.	2,22,559	Tahsíl Gujránwála	...	3,288	2,977
							729		...	Town Do.	...	392	332
							152		...	Do. Eminabad	...	82	70
							4,008		1,51,041	Tahsíl Wazirabad	...	2,236	1,771
							510		...	Town Do.	...	218	290
							127		...	Do. Akálgarh	...	73	54
							193		...	Do. Rámnagar	...	105	88
							1,006		1,76,986	Tahsíl Háfizabad	..	569	436
							69		...	Town Do.	...	26	42
		...	7	...	28		13,071		...	Total	...	6,989	6,060

9									10				11		12
Primary Vaccination.									Revaccination.				*Percentage of successful cases excluding those unknown from the total.*		
B. *Caste.*				C. *Age.*		D. *Result.*			A.	B.	C.	D.			
Christians.	Hindús.	Musalmáns.	Other castes.	Under 1 year.	Above 1 year.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	In primary vaccination.	In secondary vaccination.	Average number of persons vaccinated by each vaccinator.
...	4,64	460	173	798	299	1,038	7	52	1,097	1	...	...	1	99·33	100·	
...	1,305	2,700	751	2,195	2,561	4,472	109	175	4,756	...	...	...	...	97·62	...	
...	1,769	3,160	924	2,993	2,860	5,510	116	227	5,853	1	...	...	1	97·93	100·	365·87
1	4,170	10,320	2,556	9,696	7,351	16,346	100	601	17,047	...	...	...	...	99·39	...	
10	342	1,111	64	781	746	1,170	...	357	1,527	...	...	...	...	100.	...	
65	86	120	20	109	182	210	2	79	291	...	...	...	...	99·05	...	
...	38	72	9	86	33	119	...	...	119	...	...	...	...	100·	...	
...	68	50	9	68	59	118	...	9	127	...	...	...	...	100·	...	
...	2,483	5,880	1,341	6,340	3,364	9,348	64	292	9,704	...	...	...	...	99·32	...	
...	162	179	30	171	200	357	3	11	371	2	2	...	4	99·16	50·	
...	1,027	2,527	633	3,419	768	3,966	30	191	4,187	2	4	...	6	99·39	33·33	
1	43	72	4	99	21	117	1	2	120	...	5	...	5	99·15	...	
77	8,419	20,331	4,666	20,769	12,724	31,751	200	1,542	33,493	4	11	...	15	99·37	26·66	1,396·16
...	262	535	208	341	664	885	33	87	1,005	...	...	...	...	96·40	...	
..	25	59	7	34	57	82	5	4	91	...	...	...	...	94·25	...	
...	103	178	60	89	252	317	2	22	341	...	...	...	...	99·37	...	
...	2,515	1,639	983	2,430	2,707	4,846	74	217	5,137	...	...	...	...	98·49	..	
...	53	75	9	83	54	134	3	...	137	...	...	...	...	97·81	...	
...	84	221	21	206	120	313	6	7	326	...	...	...	...	98·11	...	
2	2,877	3,685	1,340	4,271	3,633	7,490	194	220	7,904	...	...	...	...	97·47	...	
...	64	28	10	70	32	102	...	...	102	...	...	...	...	100·	...	
2	5,983	6,420	2,638	7,524	7,519	14,169	317	557	15,043	...	...	...	...	97·81	...	313·39
...	631	1,132	363	1,463	663	2,096	13	17	2,126	...	...	...	...	99·38	...	
...	490	672	268	1,191	239	1,417	5	8	1,430	...	...	...	...	99·64	...	
...	17	31	5	48	5	52	...	1	53	...	...	...	...	100·	...	
...	1,138	1,835	636	2,702	907	3,565	18	26	3,609	...	...	...	...	99·49	...	902·25
...	135	520	118	598	175	702	13	58	773	...	...	...	...	98·18	...	
...	862	1,061	400	1,797	526	2,180	41	102	2,323	...	...	...	...	98·15	...	
1	48	35	30	75	39	102	3	9	114	...	...	...	...	97·14	...	
1	1,045	1,616	548	2,470	740	2,984	57	169	3,210	...	...	...	...	98·12	...	802·50
...	1,628	3,792	845	4,814	1,451	5,992	68	205	6,265	2	9	1	12	98·87	18·18	
2	341	353	28	449	275	620	9	25	724	...	5	...	5	98·71	...	
...	34	111	7	114	38	136	1	15	152	...	...	...	...	99·27	...	
...	715	2,757	535	3,040	967	3,881	42	84	4,007	...	1	...	1	98·92	...	
...	209	288	11	275	233	489	6	13	508	...	2	...	2	98·78	...	
...	50	68	9	83	44	121	3	3	127	...	...	...	...	97·58	...	
...	59	121	13	136	57	189	1	3	193	...	...	...	...	99·47	...	
...	129	737	139	728	277	951	19	35	1,005	...	1	...	1	98·04	...	
...	39	29	...	45	23	62	2	4	68	...	1	...	1	96·87	...	
2	3,204	8,256	1,587	9,684	3,365	12,511	151	387	13,049	2	19	1	22	98·80	9·52	466·82

1	2	3		4		5		6	7	8	A. Sex.	
Circle.	Name and rank of Superintendent.	Number of Native Superintendents.		Number of Vaccinators.		Total number of persons vaccinated.		Collectorate, Political Agency or Native States, in which vaccinations were performed.	Population of area included in last column.	Name of portion of District or of Town.	Males.	Females.
		1876.	1877	1876.	1877.	1876.	From 1st January to 31st March 1877.					
							126	RAWALPINDI.	1,78,776	Tahsil Rawalpindi ...	59	67
							717		1,09,774	Do. Attock ..	398	319
							2,708		82,348	Do. Kahuta ...	1,494	1,214
		...	1	...	4		3,551			Total ...	1,951	1,600
							1,381	JHELUM.	1,43,169	Tahsil Chakwál ...	741	640
							3,211		1,51,096	Do. Pind Dádan Khan ...	1,785	1,426
		...	1	...	4		4,592			Total ...	2,526	2,066
							8,046	GUJRAT.	2,72,055	Tahsil Gujrat ...	4,126	3,919
							1,382		1,90,005	Do. Khárián ...	735	647
							4,155		1,54,287	Do. Phália ...	2,178	1,977
		...	7	...	28		13,583			Total ...	7,039	6,543
		...	28	...	121		1,56,847			Total of District ...	84,388	72,397
			...		...		...	NATIVE STATES.		Native States ...	...	...
			1		4		360			Kapurthala ...	185	175
			1		2		25			Jummoo ...	16	9
		...	2	...	6		385			Total of Native States ...	201	18
		...	28	...	121		1,57,232			Grand Total ...	84,589	72,581

9									10				11		12
Primary Vaccination.									Revaccination.				*Percentage of successful cases excluding those unknown from the total.*		
B. *Caste.*				C. *Age.*		D. *Results.*			A.	B.	C.	D.			
Christians.	Hindús.	Musalmáns.	Other castes.	Under 1 year.	Above 1 year.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	In primary vaccination.	In secondary vaccination.	Average number of persons vaccinated by each vaccinator.
...	29	97	...	72	54	123	3	...	126	...	...	...	...	97·79	...	
...	35	680	2	362	355	699	11	7	717	...	...	...	...	98·45	...	
...	294	2,414	...	939	1,769	2,640	31	37	2,708	...	...	...	...	98·83	...	
...	358	3,191	2	1,373	2,178	3,462	45	44	3,551	...	...	...	...	98·71	...	887·75
...	159	1,222	...	1,115	266	1,191	28	162	1,381	...	...	...	...	97·70	...	
...	184	3,027	...	3,099	112	2,730	35	446	3,211	...	...	...	...	98·73	...	
											...					
...	343	4,249	...	4,214	378	3,921	63	608	4,592	...	...	...	...	98·41	...	11·48
...	776	6,914	355	5,609	2,436	7,651	44	350	8,045	1	...	...	1	99·42	100	
...	56	1,320	6	662	720	1,206	29	147	1,382	...	...	...	...	97·65	...	
...	489	3,631	35	3,216	939	3,565	127	463	4,155	...	...	...	...	96·56	...	
...	1,321	11,865	396	9,487	4,095	12,422	200	960	13,582	1	...	...	1	98·41	100	485·10
89	56,159	77,898	22,639	94,197	62,588	1,48,850	1,781	6,154	1,56,785	11	45	6	62	98·81	19·64	1296·25
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	173	96	91	136	224	360	...	...	360	...	...	...	...	100·	...	90·
...	8	17	...	15	10	...	...	25	25	...	...	...	...	...	...	12·50
...	181	113	91	151	234	360	...	25	385	...	...	...	...	100·	...	64·16
89	56,340	78,011	22,730	94,348	62,822	1,49,210	1,781	6,179	1,57,170	11	45	6	62	98·82	19·64	1055·24

A.—VACCINE DEPARTMENT.

Statement No. II. showing the monthly Number and Results of the Vaccinations performed in the Punjab, during the three months ending 31*st. March* 1877.

1	2	3	4			5	6
MONTHS.	Districts in which operations were chiefly conducted in each month.	Total number vaccinated.	RESULTS.			Total of primary vaccinations.	Average percentage successful excluding those unknown.
			Successful.	Unsuccessful including doubtful.	Unknown.		
January	PUNJAB.	48,808	46,314	585	1,883	48,782	98·75
February		62,671	59,493	575	2,589	62,657	99·04
March		45,753	43,403	621	1,707	45,731	98·58
TOTAL ...		1,57,232	1,49,210	1,781	6,179	1,57,170	98·82

A.—VACCINE DEPARTMENT.

Statement No. III showing expenditure of Vaccine Establishment in Punjab during the three Months ending 31st March 1877.

1	2	3	4	5	6
	Sanctioned.	Expended.	Total number vaccinated.	Percentage of successful in primary vaccination, excluding those unknown from the total.	Cost of each successful case.
A. PAID BY GOVERNMENT.					
I.—Provincial Establishment.	Rs. A. P.	Rs. A. P.			Rs. A. P.
Superintendent General's salary at Rs. 1,250 per mensem ...	3,750 0 0	3,750 0 0			
Office Establishment at Rs. 65 per mensem ...	195 0 0	195 0 0			
Two Chaprássies at Rs. 5 each per mensem ...	30 0 0	30 0 0			
Travelling allowance ...	500 8 0	500 8 0			
Contingencies ...	348 0 8	348 0 8			
Total ...	4,823 8 8	4,823 8 8			
Superintendent's salary at Rs. 600 per mensem	1,800 0 0	1,800 0 0			
Office Establishment at Rs. 25 per mensem ...	75 0 0	75 0 0			
Travelling Allowance ...	613 10 0	613 10 0			
Contingencies ...	86 5 0	86 5 0			
Native Deputy Superintendent's salary at Rs. 150 per mensem ...	450 0 0	450 0 0	1,57,232	98·82	0-1-8·03
Do. Travelling Allowance at Rs. 45 per mensem ...	135 0 0	135 0 0			
28 Native Superintendents at Rs. 40 each per mensem ...	3,360 0 0	3,350 0 0			
24 1st class Vaccinators at Rs. 15 each per mensem ...	1,080 0 0	1,070 2 11			
23 2nd class Vaccinators at Rs. 12 each per mensem ...	828 0 0	808 0 4			
74 3rd class Vaccinators at Rs. 10 each per mensem ...	2,220 0 0	2,172 1 7			
2 Chaprássies at Rs. 5 each per mensem ...	30 0 0	30 0 0			
A Guard, 1 Jemadar, 8 Chaprássies at Rs. 58 per mensem	174 0 0	156 0 0			
Total ...	10,851 15 0	10,746 3 10			
II. Dispensary Vaccinators.					
18 Vaccinators at Rs. 10 each per mensem ...	540 0 0	530 0 0			
18 Vaccinators at Rs. 8 each per mensem ...	432 0 0	424 0 0			
Total ...	972 0 0	954 0 0	31,402	87·28	0-0-7·03
Total paid by Government ...	16,647 7 8	16,523 12 6	1,88,634	96·98	0-1-6·10

Statement No. III.—continued.

1	2	3	4	5	6
	Sanctioned.	Expended.	Total number vaccinated.	Percentage of successful in primary vaccination, excluding those unknown from the total.	Cost of each successful case.
B. Paid by Municipalities.	Rs. A. P.	Rs. A. P.			Rs. A. P.
6 Vaccinators at Town Delhi ...	235 0 0	235 0 0	1,695	92·40	
2 „ „ Rewári ...	32 0 0	32 0 0	578	96·02	
2 „ „ Palwal ...	32 0 0	32 0 0	334	95·63	
2 „ „ Firozpur ...	32 0 0	32 0 0	272	94·37	
1 „ „ Nuh ...	16 0 0	16 0 0	191	92·93	
2 „ „ Farukhnagar ...	32 0 0	32 0 0	505	95·96	
2 „ „ Hissar ...	32 0 0	32 0 0	343	79·60	
1 „ „ Bhiwáni ...	30 0 0	30 0 0	709	51·94	
3 „ „ Sirsa ...	133 11 9	133 11 9	1,424	72·97	
1 „ „ Umballa district — Jagádhri	26 12 0	26 12 0	139	92·53	
1 „ „ Umballa district — Búriya	...	...	153	92·82	
2 „ „ Ludhiána ...	54 0 0	54 0 0	919	95·72	
4 „ „ Amritsar ...	106 4 0	106 4 0	4,527	96·97	
5 „ „ Lahore ...	154 2 6	154 2 6	1,363	92·37	
1 „ „ Kasur ...	30 0 0	30 0 0	556	99·25	
1 „ „ Mooltan district — Shujabad	...	...	19	100	
1 „ „ Mooltan district — Kahror	24 0 0	24 0 0	136	86·99	
1 „ „ Mooltan district — Jalálpur	...	...	52	94·11	
1 „ „ Dera Gházi Khan...	6 0 0	6 0 0	160	90·62	
5 „ Pesháwar ...	137 15 6	137 15 6	2,314	86·63	
Total ...	1,113 13 9	1,113 13 9	16,389	89·83	0-1-3·28
C. Paid by Local Funds.					
11 Vaccinators at Gurgaon ...	176 0 0	176 0 0	3,392	95·87	
8 „ „ Rohtak ...	192 0 0	192 0 0	790	84·81	
3 „ „ Sirsa ...	51 13 9	51 13 9	2,031	76·19	
3 „ „ Fázilka ...	46 3 0	46 3 0	1,002	79·19	
2 „ „ Rúpar ...	14 1 9	14 1 9	1,960	95·20	
„ „ Hoshiárpur ...	73 11 10	73 11 10	...	...	
1 „ „ Gurdáspur ...	7 1 6	7 1 6	88	100	
„ „ „ ...	12 12 3	12 12 3	...	...	
10 „ „ Shahpur ...	291 10 10	291 10 10	5,443	96·04	
6 „ „ Jhang — Chiniot	...	...	947	89·33	
6 „ „ Jhang — Shorkot	241 10 3	241 10 3	1,581	49·19	
6 „ „ Jhang — Ahmadpur	...	...	1,516	89·28	
6 „ „ Jhang — Kot Isa Khel	...	...	1,199	90·71	
2 „ „ Muzaffargarh — Khángah	48 0 0	48 0 0	717	80·06	
1 „ „ Muzaffargarh — Sanahwán	24 0 0	24 0 0	301	76·55	
5 „ „ Dera Ismail Khan	112 0 0	112 0 0	3,141	91·28	
„ „ Rájanpur ...	3 0 0	3 0 0	...	...	
1 „ „ Shahkadar ...	41 11 3	41 11 3	571	85·26	
1 „ „ Haripur ...	30 0 0	30 0 0	657	96·86	
2 „ „ Mardán ...	54 0 0	54 0 0	338	83·01	
Total ...	1,419 12 5	1,419 12 5	25,674	88·39	0-1-0·62

Statement No. III.--concluded.

1	2	3	4	5	6
	Sanctioned.	Expended.	Total number vaccinated.	Percentage of successful in primary vaccination, excluding those unknown from the total.	Cost of each successful case.
D. Paid by Cantonment Funds.	Rs. A. P.	Rs A. P.			Rs. A. P.
1 Vaccinator at Delhi Cantonment ...	...	...	102	56·09	
1 „ „ Síalkot „ ...	...	...	34	100·	
1 „ „ Mecan Meer „ ...	30 12 0	30 12 0	443	92·39	
Total ...	30 12 0	30 12 0	579	87·45	0-0-11·78
Paid by Native States.					
1 Vaccinator at Baháwalpur ...	120 0 0	120 0 0	1,024	94·00	
1 „ „ Ahamdpur ...	120 0 0	120 0 0	657	84·73	
1 „ „ Khánpur ...	120 0 0	120 0 0	2,081	70·50	
1 „ „ Minchinabad ...	120 0 0	120 0 0	593	73·08	
Total ...	480 0 0	480 0 0	4,355	79·34	0-2-3·70
12 Hakíms at Baháwalpur ...	...	...	2,783	76·11	
1 „ „ Kángra (*Kulú*) ...	...	...	601	98·50	
Total	...	...	3,384	80·75	...
1 Hospital Assistant at Sonepat ...	...	...	200	83·75	
1 „ „ Hissar, Fatahbad ...	...	...	17	84·61	
4 „ „ Rohtak ...	...	...	334	95·19	
1 „ „ Umballa, Thanesar...	...	...	11	100·	
1 „ „ Ludhiána, Jagraon ...	...	...	296	96·95	
1 „ „ Kángra (*Kulú*) ...	...	...	59	100·	
Total ...	...	...	917	93.89	...
Grand Total ...	19,691 13 10	19,568 2 8	239,932	95·06	0-1-5·23

A.—VACCINE DEPARTMENT.

Statement No. IV showing Results of the three months ending 31st March 1877 as compared with those of each of the previous thirteen years in the Punjab.

1	2	3	4	5				6	7	8	9
				No. of vaccinators.							
Years.	Total number of persons vaccinated.	Number successful.	Ratio per cent. successful, excluding those unknown from total, (primary vaccinations).	A. Paid by State.	B. Paid by other sources.	C. Total.	D. No. previously employed as inoculators or native practitioners.	Cost of whole vaccine establishment.	Cost of travelling allowances and contingencies.	Total cost.	Cost of each successful case.
								Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1864	40,399	46,538	90·7	49	Not known.	49	Not known	Not known.	Not known.	Not known.	Not known
1865	1,33,045	1,23,536	92·8	79	ditto	79	ditto	Ditto	Ditto	Ditto	Ditto
1866	1,62,100	1,51,244	94·74	100	ditto	100	ditto	29,735 4 11	3,463 0 5	33,198 5 4	0-3-6·14
1867	1,34,820	1,26,402	95·01	104	ditto	104	ditto	34,680 13 1	2,745 5 4	37,426 2 5	0-4-8·00
1868	1,68,970	1,59,704	95·94	107	ditto	107	ditto	36,785 11 7	3,133 6 5	39,919 2 0	0-4-0
1869	1,80,368	1,69,537	96·04	112	25	137	ditto	44,149 10 4	3,945 12 1	48,095 6 5	0-4-6·0
70-71	1,44,224	1,31,228	97·10	120	27	147	ditto	39,450 0 0	5,805 0 7	45,255 0 7	0-5-5·60
71-72	1,96,435	1,83,050	98·00	139	1	140	ditto	43,454 12 4	6,410 13 2	49,865 9 6	0-4-3·33
72-73	2,81,776	2,64,957	98·19	139	57	196	ditto	44,068 1 2	7,530 5 7	51,598 6 9	0-3-1·24
73-74	3,43,322	3,25,027	98·45	191	123	314	ditto	46,249 12 8	6,555 4 6	52,805 1 2	0-2-7·18
74-75	3,74,615	3,56,611	98·36	191	155	346	ditto	48,820 3 5	8,395 3 5	57,215 6 10	0-2-6·80
75-76	2,99,872	2,82,935	97·94	184	162	346	ditto	54,374 13 4	7,545 1 0	61,919 14 4	0-3-6·01
*1876	4,05,950	3,65,674	90·96	191	137	328	ditto	62,315 5 6	6,410 2 3	68,725 7 9	0-3-0·08
1877	2,39,932	2,18,027	95·06	185	126	311	ditto	17,884 11 0	1,683 7 8	19,568 2 8	0-1-5·23

* Hitherto columns 2,3,4, &c, have included only the work of the Punjab vaccine establishment; from the year 1876 the whole number of vaccinations in the Punjab is given.

Statement No. V. showing particulars of Vaccination in the circle of Medical

1	2		3		4	5	6
Name and rank of Superintendent of Dispencary.	No. of Vaccinators attached to the Dispensary.		Total No. of persons vaccinated up to date of return.		Collectorate, Political Agency or Native State, for the population of which the Dispensary is provided.	Population of area included in last column.	Name of Dispensary and branch Dispensary.
	1876.	1877.	1876.	1877.			
H. Crow, Civil Surgeon ...		2		1,423	Gurgaon ...	6,90,522	2nd Class Dispensary ... ...
J. A. Cooper, Do. ...		2		1,140	Hissar ...	4,84,681	1st Class Ditto ... ...
J. Rehill, Do. ..		2		1,399	Sirsa ...	2,10,795	2nd Class Ditto ... ...
Do., Do. ...		2		1,295	Fázilka ...	...	1st Class Branch Do. ... ...
D. N. Martin, Do. ...		2		738	Ferozepore ...	5,49,253	1st Class Dispensary ... ...
F. G. Constant, Do. ...		1		630	Jhelum ...	5,22,840	2nd Class Ditto ... ...
J. O'Neil, Do. ...		2		2,724	Shahpur ...	3,68,796	Ditt Ditto ... ...
J. Penny, Do. ...	...	2	...	164	Mooltan ...	4,59,780	1st Class Ditto ... ...
				188	Do. Suburbs	...	...
R. E. Wrafter, Do. ...		2		731	Jhang ...	3,48,047	2nd Class Ditto ... ...
G. Kingsmill, Do. ...		2		1,072	Montgomery ...	3,59,437	Ditto ... ...
J. Connor, Do. ...		2		939	Muzaffargarh ...	2,95,547	Ditto ... ...
O. T. Duke, Do. ...		2		1,007	Dera Ismail Khan	3,89,533	Ditto ... ...
Do., Do. ...		2		2,236	Leiah ...		1st Class Branch Dispensary ...
E. Saunders, Do. ...		2		2,232	Dera Gházi Khan	30,840	2nd Class Dispensay ... ...
G. Thomson, Do. ...		2		1,086	Rájanpur ...		Ditto ... ...
C. Costello, Do. ...		2		9,553	Bannu ...	2,87,517	Ditto ... ...
Do., Do. ...		1		868	Miánwáli ...		1st Class Branch Dispensary ...
G. Farrell, Do. ...		2		926	Kohát ...	1,40,209	2nd Class Dispensary ... ...
J. R. Johnson, Do. ...		2		1,051	Hazára ...	3,64,324	Ditto ... ...
Grand Total ...		36	...	31,402	...	...	Totals ...

VACCINATION.

Superintendence in the Punjab, during the three months ending 31*st March* 1877.

7												8				9		10
Primary Vaccination.												Re-vaccination.				*Percentage of successful cases excluding those unknown from the total.*		
A.		B.				C.		D.										
Sex.		*Caste.*				*Age.*		*Result.*										
Males.	Females.	Christians.	Hindús.	Musulmáns.	Other castes.	Under 1 year.	Above 1 year.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	Successful.	Unsuccessful including those doubtful.	Unknown.	Total.	In primary vaccination.	In secondary vaccination.	Average number of persons vaccinated by each vaccinator.
1,020	377	...	819	109	469	500	897	1,324	58	15	1,397	20	...	6	26	95·80	100·	711·5
853	240	...	685	257	151	767	326	717	247	129	1,093	26	4	17	47	74·37	86·66	570·
759	640	...	725	399	275	967	432	937	379	83	1,399	...	...	...	...	71·20	...	699·5
734	491	...	708	409	108	829	396	992	153	80	1,225	45	15	10	70	86·63	75·	647·5
384	354	2	87	570	79	220	518	519	174	45	738	...	...	...	...	74·89	...	369·
377	239	8	87	409	112	430	186	556	36	24	616	13	1	...	14	93·91	92·85	630·
1,447	1,273	...	438	2,247	35	954	1,766	2,513	113	94	2,720	3	...	1	4	95·69	100·	1362·
72	92	...	119	45	...	123	41	153	11	...	164	...	...	...	...	93·29	...	176·
101	87	2	42	144	...	104	84	133	27	28	188	...	...	...	...	83·12	...	...
400	331	...	167	530	34	334	397	551	180	...	731	...	...	...	...	75·37	...	365·5
643	429	4	361	660	47	481	591	804	210	58	1,072	...	...	...	...	79·28	...	536·
572	367	...	184	747	8	206	733	616	136	187	939	...	...	...	...	81·91	...	469·5
655	352	20	90	882	15	394	613	807	140	60	1,007	...	...	...	...	85·21	...	503·5
1,215	1,021	...	144	2,055	37	606	1,630	1,868	297	71	2,236	...	...	...	...	85·95	...	1118·
1,330	902	...	595	1,637	...	1,251	981	2,055	119	58	2,232	...	...	...	..	94·52	...	1116·
656	430	...	473	613	...	513	573	726	177	183	1,086	...	...	...	...	80·39	...	543·
5,075	3,479	1	2,382	6,136	35	5,083	3,471	7,344	1,014	196	8,554	880	88	31	999	87·86	90·90	4776·5
461	316	...	21	...	...	180	597	534	111	132	777	58	17	16	91	82·79	77·33	868·
507	419	4	62	852	8	278	648	873	28	25	926	...	..	...	...	96·89	...	463·
590	461	13	38	1,000	...	852	199	975	30	46	1,051	...	..	...	...	97·01	...	525·5
17,851	12,300	54	8,227	20,457	1,413	15,072	15,079	24,997	3,640	1,514	30,151	1,045	125	81	1,251	87·28	89·31	872·27

Statement No. VI showing particulars of Vaccinators paid by Municipal Committees, Local Funds, Native Chiefs &c., in the Punjab during the three months ending 31st March 1877.

1	2	3	4												5				6		7
			Primary Vaccination.												Re-vaccination.				*Percentage of successful cases*		
			Sex.		*Caste.*				*Age.*		*Result.*										
Number of vaccinators.	From what sources paid.	District, towns or native states for which vaccinators are provided.	Males.	Females.	Christian.	Hindus.	Musalmáns.	Other castes.	Under 1 year.	Above 1 year.	Successful.	Unsuccessful and doubtfull.	Unknown.	Total.	Successful.	Unsuccessful.	Unknown.	Total.	In primary vaccination.	In secondary vaccination.	Average number of persons vaccinated by each Vaccinator.
6	Municipality ...	Town Delhi ...	928	757	27	860	518	280	945	740	1,339	110	236	1,685	1	...	9	10	92·40	100·	282·5
2	Do. ...	,, Riwári ...	291	271	2	213	250	97	231	331	532	22	8	562	14	...	2	16	96·02	100·	289·
2	Do. ...	,, Palwal ...	230	99	...	177	53	99	141	188	306	14	9	329	5	...	...	5	95·63	100·	167·
2	Do. ...	,, Firozpur	171	88	...	147	90	22	149	110	235	14	10	259	12	...	1	13	94·37	100·	136·
1	Do. ...	,, Nuh ...	174	14	...	22	141	25	141	47	171	13	4	188	3	...	...	3	92·93	100·	191·
2	Do. ...	,, Farukhnagar ...	312	190	...	299	82	121	328	174	476	20	6	502	3	...	...	3	95·96	100·	252·5
2	Do. ...	,, Hissar ...	240	103	...	132	158	53	179	164	242	62	39	343	...	...	...	...	79·60	...	171·5
1	Do. ...	,, Bhiwáni.	423	286	...	350	46	313	334	375	348	322	39	709	...	...	...	...	51·94	...	709·
3	Do. ...	,, Sirsa ...	777	647	...	744	431	249	957	467	972	360	92	1,424	...	...	..	...	72·97	...	474·66
1	Do. ...	,, Jagádhri.	65	69	...	112	13	9	105	29	124	10	...	134	5	...	...	5	92·53	100·	139·
	Do. ...	,, Búriya ...	84	69	...	88	55	10	106	47	142	11	...	153	...	...	...	...	92 82	...	153·
2	Do. ...	,, Ludhiána.	477	442	12	178	549	180	767	152	851	38	30	919	...	...	...	...	95·72	...	459·5
4	Do. ...	,, Amritsar.	3,034	1,268	24	1,403	2,659	216	463	3,839	4,104	128	70	4,302	164	51	10	225	96·97	76·27	1131·75
5	Do. ...	,, Lahore ...	964	388	44	433	814	61	904	448	1,091	90	171	1,352	...	11	...	11	92·37	...	272·6
1	Do. ...	,, Kasur ...	286	267	...	100	430	23	516	37	534	4	15	553	...	...	3	3	99·25	...	556·
	...	Mooltan. ,, Shujabad.	7	12	...	14	5	...	5	14	19	...	...	19	...	...	...	...	100·	...	19·
1	Do. ...	,, Kahror ...	84	52	...	67	69	...	33	103	107	16	13	136	...	...	...	...	86·99	...	136·
	...	,, Jalápur ...	29	23	...	22	30	...	44	8	48	3	1	52	...	...	...	...	94·11	...	52·
1	Do. ...	,, D.G. Khan	98	62	...	65	95	...	48	112	145	15	...	160	...	...	...	...	90·62	...	160·
5	Do. ...	,, Pesháwar.	1,350	964	29	756	1,374	155	974	1,340	1,996	308	10	2,314	...	...	...	...	86·63	...	462·8
41	...	Total ...	10,024	6,071	138	6,182	7,862	1,913	7,370	8,725	13,782	1,560	753	16,095	207	62	25	294	89·83	76·95	399·73

11	Local Funds...	Gurgáon ...	1,955	1,414	...	1,212	1,213	944	1,465	1,904	3,205	138	26	3,369	19	1	3	23	95·87	95·		308·36
8	Ditto ...	Rohtak ...	457	333	...	736	54	...	273	517	670	120	...	790	...	...	...	...	84·81	...		98·75
3	Ditto ...	Sirsa ...	1,082	949	...	1,059	606	366	1,256	775	1,360	425	246	2,031	...	...	...	...	76·19	...		677·
3	Ditto ...	Fázilka ...	543	399	...	385	479	78	505	437	651	171	120	942	41	12	7	60	79·19	77·35		334·
2	Ditto ...	Rúpar ...	1,070	829	...	1,010	450	439	1,758	141	1,746	88	65	1,899	42	12	7	61	95·20	77·77		980·
1	Ditto ...	Gurdáspur ...	51	37	...	20	53	15	34	54	88	...	...	88	...	...	...	...	100·	...		88·
10	Ditto ...	Shahpur ...	2,747	2,633	...	538	4,605	237	2,876	2,504	5,023	207	150	5,380	21	26	16	63	96·04	44 68		544·3
6	Ditto ...	Jhang: Chiniot ...	502	445	...	120	771	56	303	644	846	101	...	947	...	...	...	...	89·33	...		
	Ditto ...	Shorkot ...	726	642	...	294	932	142	637	731	659	681	28	1,368	78	131	4	213	49·19	37·32		873·83
	Ditto ...	Ahmadpur ...	873	643	...	142	1,328	51	1,125	391	1,316	158	42	1,516	...	...	...	...	89·28	...		
	Ditto ...	Khot Isa Khel	679	520	...	255	913	31	989	210	1,055	108	36	1,199	...	...	...	...	90·71	...		
2	Ditto ...	Muzaffargarh: Khángah ...	452	265	...	116	585	16	350	367	526	131	60	717	...	...	...	...	80·06	...		358·5
1	Ditto ...	Sánahwán...	177	124	...	49	250	2	75	226	209	64	28	301	...	...	...	...	76·55	...		301·
5	Ditto ...	Dera Ismail Khan	1,691	1,435	...	297	2,727	102	702	2,424	2,662	254	210	3,126	13	2	...	15	91·28	86·66		628·2
1	Ditto ...	Shahkadar ...	314	257	...	119	452	...	181	390	486	84	1	571	...	...	...	...	85·26	...		571·
1	Ditto ...	Haripur ...	369	286	...	29	626	...	476	179	587	19	49	655	2	...	...	2	96·86	100·		657·
2	Ditto ...	Mardán ...	156	162	...	41	274	3	126	192	264	54	...	318	20	...	...	20	83·01	100·		169·
56	...	Total ...	13,844	11,373	...	6,422	16,313	2,482	13,131	12,086	21,353	2,803	1,061	25,217	236	184	37	457	88·39	56·19		458·46
1	Cantonments	Delhi ...	62	20	...	53	29	...	11	71	46	36	...	82	20	...	...	20	56·09	100·		102·
1	Ditto ...	Siálkot ...	14	20	5	9	9	11	12	22	34	...	...	34	...	...	...	...	100·	...		34·
1	Ditto ...	Mecan Meer ...	288	155	...	241	121	81	168	275	401	33	9	443	...	...	...	...	92·39	...		443·
3	...	Total ...	364	195	5	303	159	92	191	368	481	69	9	559	20	...	...	20	87·45	100·		193·
1	Native State	Baháwalpur ...	534	433	...	300	667	...	513	454	909	58	...	967	44	13	...	57	94·00	77·19		1024.
1	Ditto ...	Ahmadpur ...	339	231	...	120	450	...	305	265	483	87	...	570	53	34	...	87	84·73	60·91		657·
1	Ditto ...	Khánpur ...	1,250	857	...	391	1,216	...	333	1,274	1,133	474	...	1,607	273	149	52	474	70·50	64·69		2081·
1	Ditto ...	Minchinabad ...	266	230	...	143	353	...	243	253	353	130	13	496	79	18	...	97	73·08	81·44		593·
4	...	Total ...	2,389	1,251	...	954	2,686	...	1,394	2,246	2,878	749	13	3,640	449	214	52	715	79·34	67·72		1088·75
12	Hakims ...	Baháwalpur ...	1,579	906	...	426	2,059	...	971	1,514	1,753	550	182	2,485	195	88	15	298	76·11	68·90		231·91
1	Ditto ...	(Kángra) Kulu ...	425	176	1	595	5	...	73	528	592	9	...	601	...	...	...	...	98·50	...		601·
13	...	Total ...	2,004	1,082	1	1,021	2,064	...	1,044	2,042	2,345	559	182	3,086	195	88	15	298	80·75	68·90		260·30
1	Hospital Asst.	(Delhi) Sonepat...	118	79	...	116	51	30	151	46	134	26	37	197	3	...	...	3	83·75	100·		200·
1	Ditto ...	(Hissar) Fatahabad	10	7	...	8	2	7	10	7	11	2	4	17	...	...	...	...	84·61	...		17·
4	Ditto ...	Rohtak ...	211	123	3	223	108	...	118	216	317	16	1	334	...	...	...	...	95·19	...		83·5
1	Ditto ...	(Umballa) Thánesar	7	4	...	8	3	...	8	3	9	...	2	11	...	...	...	...	100·	...		11·
1	Ditto ...	(Ludhiána) Jagraon	147	149	...	95	169	32	275	21	287	9	...	296	...	...	...	...	96·95	...		296·
1	Ditto ...	(Kángra) Kulu ...	38	21	...	54	5	...	14	45	57	...	2	59	...	...	...	...	100·	...		59·
9	...	Total ...	531	383	3	504	338	69	576	338	815	53	46	914	3	...	...	3	93·89	100·		101·88
126	...	Grand Total ...	29,156	20,355	147	15,386	29,422	4,556	23,706	25,805	41,654	5,793	2,064	49,511	1,110	548	129	1,787	87·79	66·94		407·12

STATEMENT No. VII.—showing the total of all Vaccine Operations in the Province of the Punjáb, during the three months ending 31st March 1877

	Population and area of Punjab.	Number of Vaccinators including Native Superintendents.	*Total number of persons vaccinated.*		*Percentage of successful cases, excluding those unknown from the total.*		Average number of persons vaccinated by each vaccinator.	Cost of each successful case.	Total deaths from Small-pox.
			Primary Vaccinations.	Secondary Vaccinations.	Primary Vaccinations.	Secondary Vaccinations			
								Rs. A. P.	
Punjab Vaccine Establishment ...	17,4,81,189 1,02,001 Square miles.	149	1,57,170	62	98·82	19·64	1,055·24	0-1-8·03	
Dispensary Establishment		36	30,151	1,251	87·28	80·31	872·22	0-0-7·03	
Municipal and other Vaccinators ...		126	49,511	1,787	87·79	66·94	407·12	0-1-1·66	
Total ...		311	2,36,832	3,100	95·06	75·10	771·48	1-5-23	

Comparative Statement showing the number of persons vaccinated and the number of those persons who were successfully vaccinated in the Punjab in each of the under mentioned official years.

NOTE.—Only the actual number of persons vaccinated and not the number of operations, is to be shown. Re-vaccinations are to be wholly excluded from the Statement.

Establishments	PERSONS PREVIOUSLY VACCINATED.																											
	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.
	YEARS ENDED 31ST MARCH.																											
	Years ended 30th April 1866.		1867.		1868.		1869.		1870.		1871.		1872.		1873.		1874.		1875.		1876.		1876 * See note.		Three months ending 31st March 1877.			
Governments ...	1,59,764	1,51,244	1,24,820	1,26,402	1,68,970	1,59,704	1,80,268	1,69,537	1,03,632	97,868	1,38,225	1,31,228	1,93,137	1,83,030	2,78,953	2,64,957	3,40,228	3,23,392	3,71,934	3,55,180	2,95,929	2,80,916	2,80,831	1,67,069	1,57,170	1,49,210		
Municipal ...	...	...	...	...	...	...	...	...	...	...	9,427	9,102	10,921	9,091	13,956	11,928	25,533	20,822	29,147	24,852	20,695	17,046	21,710	18,271	16,095	13,782		
Local Funds ...	...	...	...	...	...	...	...	...	...	...	3,191	2,143	740	610	11,373	8,068	35,242	27,346	45,968	35,903	43,057	34,204	46,413	36,908	28,217	21,353		
Native States ...	...	...	...	...	...	...	...	...	...	...	4,978	2,402	8,159	4,520	12,020	6,200	14,158	12,636	7,255	7,207	16,637	15,084	3,429	2,564	6,125	4,631		
Dispensaries ...	84,624	61,735	61,746	42,345	64,892	44,177	73,597	48,970	43,898	30,188	59,569	45,932	57,005	42,275	49,422	36,565	43,169	32,668	38,709	29,954	36,611	29,466	37,728	30,100	30,151	24,997		
Army ...																												
Europeans ...																												
Natives ...																												
Total ...	2,44,388	2,12,979	1,86,566	1,68,747	2,33,862	2,03,881	2,53,865	2,18,507	1,47,530	1,28,056	2,15,490	1,91,807	2,66,032	2,39,546	3,65,724	3,27,818	4,58,321	4,16,864	4,92,004	4,53,096	4,12,929	3,76,753	3,90,121	3,54,912	2,34,758	2,13,973		

*NOTE.—The time for submitting these Returns having been changed, that for 1876 shows the numbers vaccinated during the year ended 31st December 1876.

Report on Vaccine Operations in the Punjab, for the year ending 31st March 1878.

FROM

J. BENNETT, ESQUIRE, M. D.,
Officiating Superintendent General Vaccination, Punjab.

To

J. G. CORDERY, ESQUIRE,
Officiating Secretary to Government, Punjab.

SIR,

I have the honor to submit, for the information of the Hon'ble the Lieutenant-Governor, my report on vaccine operations for the year 1877-78.

2. The aggregate number of operations done by all establishments in the Punjab, during the year, is 495,441; the number of successful primary operations was 452,655; and of successful re-vaccinations 4,828; the ratios of success being 96·37, and 67·49 per cent., respectively.

The total expenditure amounted to Rs. 69,762-3-9; and each successful case cost annas 2 and pies 5·27. Taking the population of the province at 17,604,505; the assumed annual birth-rate (40 per mille) at 704,160, and the number of successful primary vaccinations under one year of age at 211,777, it is found that about 77 per cent., or rather more than three-fourths of the infantile population remained, at the end of the year under report, unprotected from small-pox.

3. The Provincial establishment consisted of :—

1 Superintendent General.
1 Superintendent.
1 Native Deputy Superintendent.
29 Native Superintendents.
121 Vaccinators.

Doctor Garden left for England on sick leave on the 20th October, from which date I have been in charge of the department.

4. During the hot weather, operations were conducted in twelve Native States, in Simla, Murree, and the adjoining hills, and in the hills of Kangra; and during the cold season six districts where wholly, and fourteen partly, overtaken.

The area of the circle, the vaccination of which is undertaken by the special establishment, has been enlarged by the inclusion of four new districts, *viz.*, Rohtak, Hissar, Sirsa and Shahpur, which have this year been systematically vaccinated for the first time.

5. The result of the year's operations done by the Provincial establishment, compared with that of 1876-77, is given as follows :—

Statement No. I.

Year.	Number of native Superintendents.	Number of vaccinators.	Total number of persons vaccinated.	PRIMARY VACCINATION.			Average number done by each vaccinator.	Cost of each successful case.
				Total number.	Total successful.	Per-centage of successful cases.		
								Rs. A. P.
1876-77 ...	28	121	288,527	284,771	270,434	98·67	2,384·5	0 3 6·37
1877-78 ...	29	121	373,577	371,821	356,589	98·81	3,087·4	0 2 8·18

This statement shows an increase in the total number vaccinated of 85,050, and in the number of successful primary operations of 86,155, as contrasted with the previous year. The average number vaccinated by each vaccinator is 3,087·4 against 2,384·5; increase 702·89. This increase in the numbers vaccinated is chiefly attributable to the favour with which vaccination was received, and the rapidity with which it was carried out in the districts of Shahpur, Hissar and Sirsa; the previous year too contrasted unfavourably in point of numbers with former years. The high standard of success attained in previous years has been maintained—98·81 per cent., being, if anything, a slight gain on preceding year. I would here note the fact, that out of 4,317 primary vaccinations inspected by me during the year, 4,257, or 98·61 per cent., were found to be successful, showing only 0·2 of a decrease below the average ratio given in the above statement. This highly satisfactory result is due to the invariable adoption of the arm to arm method of vaccinating, and to care being taken in the selection of lymph. The total expenditure amounted to Rs. 59,901-12-8, and each successful case cost annas 2 and pies 8·18, against annas 3 and pies 6·37 of previous year.

6. *Sex and age of the vaccinated.*—

Statement No. II.

Male.	Female.	Under a year.	Above a year.
52·1	47·9	48·91	51·09

(*a*) *Sex*—In 373,577 cases in which the sex was noted, 194,632 or 52·1 per cent. were males, and 178,945, or 47·9 per cent. were females—a difference of 4·2.

(*b*) *Age.*—Of the successful primary vaccinations, 174,403 were under, and 182, 186 were above a year, or 48·91 and 51·09 per cent., a difference of only 2·18. The proportion of those under one year was very small in the hill states, being only 26·8 per cent., or 46·4 under the per-centage of those above one year: in the newly vaccinated districts the proportion of those under one year was also low, being 33·5 per cent., against 66·5 per cent. of those above one year. The vaccination of infants is very unpopular as a rule with hill people, on account of the greater risks supposed to arise from the operation to those of tender years. In newly vaccinated districts also a great disparity between the two classes of cases in question will always be found to exist, not so much on account of any actual falling off in the number of infant vaccinations, but because of the former yearly accumulations of unprotected children remaining to be operated on.

7. *Valley of Kashmir.*—About two-thirds of this valley having been left uncovered the previous year operations in compliance with the wishes of His Highness the Maharajah, were again proceeded with during the hot season, beginning about the end of May, and brought to a close towards the end of September. The work was conducted by Dr. Garden with a staff of 4 native superintendents and 16 vaccinators. In the city of Srinagar, the operations, which at first appear to have been carried on with some success, about 70 being the daily average number, afterwards gradually diminished, and finally, the number of cases dwindling down to 4 and 5 a day, almost came to a stand-still. This falling off is ascribed by Dr. Garden to the absence of coöperation on the part of the Pundit government officials, who were suspected of secretly opposing the vaccinators, and of dissuading the people from bringing their children forward. In the villages, on the other hand, where the opposing influence of the Pundits was less felt, fairly satisfactory results were obtained.

The total number vaccinated was 13,197, of which 1,373 were performed in the city of Srinagar. There were 12,706 primary cases known to be successful, the per-centage of success being 98·48.

8. *Other Native States.*—During the hot weather months, the members of the staff under my superintendence were employed in the native states, given in this table, in which also the results are shown:—

Statement No. III.

Native State.	Total number vaccinated.
Nádaun	2,743
Lambagraon	2,821
Suket	2,986
Mandi	4,481
Bashahr	3,012
Jubbal	885
Keonthal	220
Theog	484
Balsan	406
Goler	611
Dadah	683
TOTAL, ...	19,332

The total number vaccinated was 19,332, of which 98.5 per cent. of the primary cases were successful. The best results were obtained in the Mandi state, owing to the efficient assistance rendered by the Rajáh, who, entertaining enlightened views regarding vaccination, is ever ready to encourage it. The Rajáh of Suket, on the other hand, at first raised great objections, and prohibited the vaccinators from commencing work. After some delay and difficulty, however, his interdict against the operation was removed, and the people showing great alacrity in bringing their children forward, vaccination was very satisfactorily carried on throughout the state. Permission was not obtained to vaccinate the members of his own family.

9. *Simla sanitarium.*—Operations were kept going here during the hot season with a great deal of difficulty, much opposition having been met with in the bazars.

The total number vaccinated was 509, of which 97·9 per cent. were successful. The number of successful cases under one year was 204, which, assuming the birth-rate during the year to have been 400, would show that nearly half of the infantile population remained unprotected.

ROHTAK DISTRICT.

10. This district, undertaken at the beginning of the cold season, had hitherto never been visited by the special establishment, and the people at first showed great reluctance in coming forward. The inhabitants of the town of Rohtak, and especially the families of the munshis in Government employ, were found extremely difficult to deal with; and the unfavourable attitude of the leading members of the municipal committee was also most marked. An epidemic of small-pox, of a virulent type, was raging in the town, the real extent of which was kept concealed until brought to light by the vaccinators, and every effort was made to arrest its further progress but without effect. About a fourth of the unprotected children was vaccinated; and all attempts at protecting the rest proving futile, the epidemic was left to complete its course unchecked. Unfortunately for the cause of vaccination in this district, owing to the utterly worthless nature of the work of incompetent district vaccinators employed in former years, a spirit of distrust had been widely diffused, which will be found difficult to eradicate. The primary vaccinations were 32,855, of which 31,707 or 98·48 per cent. were successful. Persons successfully vaccinated per mille of population were 57·69, while in the town of Rohtak this ratio was only 15·3 per mille.

The distribution of results is shown in this statement :—

Statement No. IV.

Tahsíl.	Total number vaccinated.	Ratio of successful cases per 1,000 of population.
Rohtak	7,599	42·3
Gohána	6,312	50·6
Sámpla	8,363	56·0
Jhajjar	10,838	87·3
TOTAL, ...	33,112	57·69

In 1877 the number of deaths from small-pox returned is 1,023, being in the ratio of 1·59 per mille of population ; in the town of Rohtak this proportion rises to 14·87 per mille. It may be here stated that the returns of small-pox received (with but few exceptions) from the Sanitary Commissioner, are for the calendar year.

HISSAR DISTRICT.

11. In this district also systematic vaccination was performed for the first time. The attitude of the people on the whole was favourable, and operations, with the able assistance given by Colonel Forster, the Deputy Commissioner, were rapidly extended throughout the district. There is, however, considerable difference in results when tahsíls are compared, as a glance at this table will show :—

Statement No. V.

Tahsíl.	Total number vaccinated.	Ratio of successful cases per1,000 of population.
Hissar ...	8,330	75·8
Hánsi ...	12,335	93·9
Bhiwani ..	6,013	54·3
Fatahabad ...	9,396	113·3
Barwála ...	7,409	108·5
Total ...	43,483	89·1

The tahsíls of Fatahabad and Barwála exhibit the highest ratios, being 21·9 above the average ; and Bhiwáni shows the lowest, 34·8 per mille below the average of the district ; this is due probably to the partial famine prevalent in the latter tahsíl at the time operations were going on. The mean ratio, 89·1, when compared with that of other districts, is seen to be unusually high. The total number of persons operated on was 43,483 ; 41,999 were successful, or 99·05 per cent. The number of deaths from small-pox in previous year was 466, or 0·96 per mille of population. Two inoculators were found at work in the Fatahabad tahsíl ; the majority of their patients were said to come from the neighbouring state of Bikaner. On the matter being brought to the notice of the Deputy Commissioner, he at once instructed the tahsíldár to limit the area of their operations as far as possible, if not, to put a stop to the pernicious practice altogether.

SIRSA DISTRICT.

12. This also was one of the new districts undertaken this year. There was no show of opposition, and as this statement will show, most favourable results were obtained.

Statement No. VI.

Tahsíl.	Total number vaccinated.	Ratio of successful cases per 1,000 of population.
Sirsa ...	8,194	90·8
Dabwáli ...	7,327	121·6
Fázilka ...	7,513	107·6
Total ...	23,034	105·5

For the tahsíl of Sirsa, which holds the lowest place in point of numbers, some allowance must be made in respect of the children vaccinated by the dispensary vaccinators. The mean ratio 105·5 per mille, when compared with those of the Hissar and Rohtak districts, shows an increase of 18·5 and 47·9 per mille of population respectively. The total vaccinations were 23,034, and the per-centage of success in primary cases was 99·44. The number of deaths from small-pox during preceding year was 92, only 0·44 per mille of population.

FEROZEPORE DISTRICT.

13. After finishing the work in Sirsa, operations were commenced in the district of Ferozepore about the middle of March. The local native superintendent had been at work in the Moga tahsíl during the whole of the season, but owing to the great opposition met with, and a good deal also, it must be admitted, to the indolence of the vaccinators, comparatively little was done. Two of the vaccinators were convicted of taking bribes from the lambardárs, and discharged ; while the native superintendent, who had been very careless and slack, was heavily fined, and removed to work under closer supervision. In the tahsíls of Zíra and Muktsar the people were favourably disposed ; and substantial aid was given by the zaildárs.

Statement No. VII.

Tahsíl.	Total number vaccinated.	Ratio of successful cases per 1,000 of population.
Zíra ...	6,051	42·4
Muktsar ...	4,212	42·6
Moga ...	3,126	16·2
Total ...	13,389	33·7

This table shows the results in the three tahsíls undertaken. Moga, it will be seen, is conspicuous for its extremely low ratio ; the ratios of the other two are about equal.

The number of successful primary vaccinations was 12,948, the per-centage of success being 99·1. The number of deaths from small-pox in the district during 1877 was 214—0·40 per mille of population.

This concludes that portion of the cold season's work, embracing in all 109,892 operations, performed by the staff (1 native deputy superintendent, 8 native superintendents with on an average 4 vaccinators each) employed under my direct supervision.

14. *Establishment of Superintendent.*—Dr. Massy took over charge of the office of superintendent from me at Rohtak on the 5th November, but, owing to unavoidable delay in being relieved of his former charge, he was unable to join the department till the end of the month. His establishment, at first consisting of 4 native superintendents and 16 vaccinators, was subsequently increased by the appointment of an additional native superintendent and 4 vaccinators; and these again were supplemented by the local staff of men belonging to the Jhelum district. The districts of Shahpur, Jhelum, the greater portion of Rawalpindi, and one tahsíl of Gujrat, were overtaken. This was a large area to cover; and Dr. Massy deserves much credit for the energy and success with which he conducted the work of his staff.

A summary of the proceedings in each district is given as follows:—

(*a*) *Shahpur district.*—This was new ground to the vaccinators of the establishment, but no active opposition was offered. Effective assistance was rendered by the civil authorities. The greatest success was met with in the tahsíl of Behra, the members of the municipal committee ably assisting. Total number of vaccinations 21,204, per-centage of success in primary cases 99·02, and the ratio of successful cases per mille of population 53·79, number of deaths from small-pox in previous year was 317.

(*b*) *Jhelum District.*—Some improvement in the attitude of the people, compared to previous years, was noticed, and notably so in Talagang tahsíl, where vaccination was most favourably received. Ganpat Rai, tahsíldár of Talagang, took no interest in the work; and the members of the municipal committee of Pind Dádan Khan are said to have shown utter indifference to the progress of vaccination in that town. Total number vaccinated (including 6,197 operations by the local staff) 24,913; per-centage of success in primary cases 99·23; and ratio successfully vaccinated per mille of population 44·90. Number of deaths from small-pox registered in 1877 is only 38.

(*c*) *Rawalpindi district.*—With the exception of the Pathan population inhabiting the Chach plain, no opposition was experienced. Extensive traces of inoculation were met with, and small-pox was prevalent throughout the district. The origin of the epidemic is ascribed to inoculation, but it is also admitted that infection was spread to a considerable extent by famine-stricken immigrants from Hazára and Kashmir, many of whom brought the disease with them. Mr. Knox, the Deputy Commissioner, rendered every assistance to the vaccinators.

Total number of operations 41,522, embracing 26,911 by Dr. Massy's staff, and 14,611 by the local vaccinators; per-centage of successful primary vaccinations 99·08; and the ratio of successful cases to population 55·75 p r 1,000; the tahsíl of Pindigheb gave by far the highest proportion, *viz.*, 111·91, or nearly 72 per mille above the birth-rate. Number of deaths from small-pox in 1877 was 252.

(*d*) *Gujrat district.*—This district was undertaken towards the end of the season, and operations as regards the plains were here brought to a close. Total number of vaccinations 13,789, of which 8,712 were performed by the local staff.

With regard to vaccination work conducted by Hospital Assistants attached to dispensaries of this district Dr. Massy writes:—"The inferior quality of work commented on in former years, when ignorant hakíms and female vaccinators were employed throughout the district without supervision or organisation, no longer exists, and the work attempted by the dispensary establishments, though on a small scale, possesses the advantage of being well done." This improvement is ascribed to Dr. Ferguson, the former Civil Surgeon. No returns have been f.rnished.

15. There remain 12 other districts in which vaccination was conducted during the cold season, and to each of which a staff of 1 native superintendent and 4 vaccinators was allotted. The total aggregate of operations performed in these districts amounted to 125,622, of which 98·78 per cent. were returned as successful. The inhabitants of the Jullundur, Hoshiárpur, Siálkot, and Gujránwala districts exhibited the same favourable disposition as noticed in previous years; and a marked improvement in this respect was observed in the Lahore, Amritsar, Ludhiána, and Kángra districts; the most backward, as usual, being Delhi, Karnál, and Umballa.

16. *Dispensary, muncipal, &c., vaccination.* In the following statement the results of the year's operations done by the different establishments are shown:—

Statement No. VIII.

Number of vaccinators.	Class of vaccinators.	Total number vaccinated.	Successful.		Per-centage of success.		Average number done by each vaccinator.	Cost of each successful case.		
			Primary vaccinations.	Re-vaccinations.	Primary vaccinations.	Re-vaccinations.		Rs.	A.	P.
35	Vaccinators, Dispensary	43,265	33,411	2,031	87·92	77·93	1236·0	0	1	8·24
42	Ditto Muncipal	34,392	27,777	1,059	91·06	66·98	818·85	0	1	9·33
55	Ditto Local	33,920	27,965	398	88·46	75·09	616·72	0	1	4·5
10	Hospital Assistants	1,352	987	64	86·05	62·74	135·2	...	...	...
6	Hakíms	2,645	1,890	...	74·61	...	440·83	...	...	...
3	Cantonments	1,179	1,041	44	94·46	73·33	393	0	1	11·9
4	Native States	6,290	4,036	504	80·14	63·71	1,572·5	0	1	8·29
155	Totals ...	123,043	97,107	4,100	88·33	72·31	793·82	0	1	6·9

The number of dispensary vaccinations exceed that of previous year by 4,522, while the number of vaccinators employed are less by 4.

The number of operations performed by municipal vaccinators was 34,392 as contrasted with 22,388 of the previous year—increase 12,004 ; and the number of vaccinators employed 42, against 34 of previous year. There was a decrease this year of 12,960 in local fund vaccinations, and the number of vaccinators falls short by 10. The grand total vaccinated by all establishments is 123,043, giving an increase of 2,161 over preceding year. There being no column in the revised statistical forms set apart for cantonment vaccination, these are not shown in the statements appended at the end of the report ; the returns of hospital assistants and hakims are included under dispensary vaccination.

(*a*). *Delhi city.*—There were 4,095 vaccinations performed by six municipal vaccinators, an increase of 972 over the number done in previous year. The per-centage of success was 90·87, and the ratio successfully vaccinated per mille of population was 20·7, about half of the birth-rate. Operations are performed with fresh lymph ; the vesicles inspected were found to be of excellent quality, but the work was desultory and ill defined as regards distribution. Much opposition continues to be shown by the city people generally, but the Punjabi element of the population is said to give no trouble. An epidemic of small-pox prevailed during the whole of the cold season. 1,783 cases and 255 deaths (Civil Surgeon's return) were registered from the time of its commencement in October till the end of March. It is reported that the disease was less prevalent among the poorer classes, whose children, as a rule, are better protected than those of the higher orders.

(*b*). *Umballa District.*—Vaccination in the town of Umballa continues in a backward state, and much opposition, especially from Hindus, is experienced. The number of vaccinations performed by two municipal vaccinators, working in the town, was 1,267 ; per-centage of success in primary cases was 66·74, and the ratio successfully vaccinated per mille of population was 34. Operations are said to be performed from arm to arm and with crusts, but the very low ratio of success given, and the extremely inferior character of the work inspected by me, would seem to show that the former method is seldom practised. In the town of Jagádhri less opposition appears to have been shown and better results were reported.

(*c*). *Rúpar Sub-division.*—Two vaccinators paid from local funds carried on work in the town of Rúpar and neighbouring villages, performing altogether 3,689 operations with 94·52 per cent. successful in primary cases. Dr. Ferguson reports that the cases inspected by him "will contrast favourably with dispensary vaccination anywhere else, though, as is to be expected, not quite equal to that of the regular vaccination establishment. Assistant Surgeon Brij Lal deserves commendation for the pains he has taken to make vaccination as perfect as possible."

(*d*). *Ludhiána District.*—Two permanent vaccinators paid from municipal funds worked in the town, and performed 2,589 operations, an increase of 1,137 over that of previous year ; and the per-centage of successful primary cases was 96·81 ; the proportion of successful vaccinations per 1,000 of population being 54 or 14 per 1,000 above the assumed birth-rate. Dr. Rouse reports,—"Although vaccination can not be said to be yet popular with the people, opposition is gradully yielding, and many parents bring their children willingly to the hospital, requesting that they may be vaccinated." In alluding to the efficient assistance rendered by Mr. Wakefield, the Deputy Commissioner, Dr. Rouse says :—"Such support and assistance from a district officer continued for a few years would entirely remove the slight opposition still remaining." Arm to arm vaccination alone is practised; and the work inspected by me showed results far above the average of dispensary work generally. With regard to the mortality from small-pox, an epidemic of which was more or less prevalent throughout the hot weather, Dr. Rouse draws pointed attention to the fact that "more than two-thirds of the deaths have occurred among Hindus, whereas the Hindu population is not more than one-fifth compared with Muhammadans." The explanation of this is obvious; the latter class accept vaccination readily, whereas the former, as a body, resist it.

Two temporary vaccinators paid from municipal funds were employed during a part of the season in the towns of Jagraon and Máchiwára, and performed 709 operations, 558 in the former and 151 in the latter.

(*e*). *Amritsar City.*—The returns show a total number of 10,759 operations, or 5,404 more than previous year ; per-centage of success in primary cases, 95·09. The results of my inspection of the work in this city are summarised as follows : —

There were four temporary men and one permanent vaccinator paid from municipal funds at work ; three of the temporary men were new hands and quite untrained. Of the 29 cases inspected and entered in the register as primary vaccinations, 8 only were found to be primary, 7 of which were successful, and 21 were re-vaccinations. Of the so-called primary cases, 12 had distinct old vaccine cicatrices, and 8 presented unmistakeable marks of small-pox, several being considerably pitted in the face. The addresses of many of the cases, returned as having been vaccinated the previous week, had not been entered in the register, and their abodes consequently could not be found ; so that no systematic inspection or verification of results by the vaccinators was or could have ever been made. Dr. Morice in his report states :—"I found the vaccinators were performing their duties in a very careless manner, vaccinating as many as 150 children from one arm, and as long as a scratch was made on a child's arm, and they could return it as one vaccinated, not caring whether it was efficiently done or not, I put a stop to the practice." Moti Ram the head vaccinator has several times been suspended and dismissed for grave misconduct, and as he appears to be incorrigible and utterly untrustworthy as a vaccinator, I think it would be an advantage to the cause of vaccination in the city of Amritsar were his services finally dispensed with. Dr. Morice reports that 756 deaths took place from small-pox during the year 1877-78.

(*f*). *Lahore City.*—The establishment consisted of 3 permanent and 4 temporary vaccinators, paid from municipal funds, and worked under the superintendence of Assistant Surgeon Brij Lal Ghose, Resident Surgeon in the Mayo Hospital. Total number of operations 3,123, an increase of 504 over that of 1876-77, and the ratio of success in primary cases was 90·78. The proportion successfully vaccinated per mille of population 26·6, rather more than half the birth-rate. There were 158 operations performed at the Mayo Hospital by the pupils of the Lahore Medical School, under Mr. Ghose's direct supervision. Work is carried on with fresh lymph taken either direct from the arm or from recently charged glasses. Operations are systematically carried out, one mahalla being done as thoroughly as practicable before another is proceeded with. Dr. Scriven reports—"The attitude of

the people towards vaccination is undergoing a change every year.....Many families now bring their children of their own accord to the hospital for vaccination, and even in some cases pay fees for having it done."

An epidemic of small-pox was prevalent throughout the cold season; 262 deaths (Civil Surgeon's return) up to end of March having been registered.

(g). Mooltan District.—Two Imperial fund and two municipal vaccinators were employed, and vaccinated altogether 1,905, the per-centage of success in primary cases being 91·63. The arm to arm method is said to be invariably adopted. Dr. Penny remarks—"The people are fully alive to the benefits of vaccination, and, as far as my last year's experience has gone, I have met with very little opposition."

(h). Shahpur District.—Ten vaccinators—two paid by Government and eight temporary men paid from local funds—worked in the town and rural circles, and performed a total of 5,737 operations, the ratio of success being 97·13 per cent. This ratio is suspiciously high, especially when it is considered that eight temporary vaccinators were employed. With regard to the work carried on in the towns, Dr. Massy reports:—"I have never seen dispensary vaccination carried out so efficiently on a large scale as at Bhera" &c. "I regret however," he continues, "that I am unable to report as favourably of vaccination in villages beyond the range of the Civil Surgeon's supervision."

(i). Kohát District.—Two vaccinators paid from Imperial funds worked from 1st January to end of March, and vaccinated 1,224. The per-centage of success, 97·52, is remarkably high, and due no doubt to the arm to arm method of vaccinating, which is said to be invariably adopted. The population is reported to be gradually becoming more favourably disposed towards vaccination.

(j). Bannu District.—Two vaccinators paid from Imperial funds were employed, and vaccinated 12,380 cases, or 7,917 more than in previous year; per-centage of success in primary cases 87·48. Dr. Moloney reports the attitude of the people to be favourable and that "a great many Wazírs and others from beyond the border flocked into the district to get vaccinated." The Assistant Surgeon in charge of the dispensary of Miánwáli reports that one Imperial fund vaccinator worked in the sub-division of that name, and vaccinated 929 persons.

(k). Dera Ismail Khan District.—Nine vaccinators—four paid from Imperial and five from local funds—worked in this district, and performed a total of 8,115, an increase of 741 over that of previous year; the ratio of success was 84·99 per cent. The attitude of the people continues to be favourable, the Hindús being the only class who offer serious opposition.

(l). Dera Ghazi Khan District.—Two vaccinators paid from Imperial and one from local funds were employed in the town and rural circles. The total number vaccinated was 6,161, or 4,025 more than previous year, the per-centage of success returned being 92·26. The men who worked in the rural circles were under no supervision, and their returns are not considered to be trustworthy.

(m). Rájanpur Sub-division.—Two vaccinators—one paid from Imperial and one from municipal funds—were employed, and vaccinated a total of 2,257 cases; ratio of success 88·28 per cent.

(n). Muzaffargarh District.—Six vaccinators—two paid by Government and four from local funds—worked, and performed altogether 3,161 operations, with 78·57 per cent. successful. The rural population is reported to be actively opposed, and in many parts, especially in that part of the district called the "Thul," are said to prefer inoculation, which appears to be extensively practised.

(o). Pesháwar District.—Four municipal vaccinators, three of whom were dismissed in January for inefficiency, and two vaccinators paid from local funds, were employed in the city and villages; altogether 4,808 cases were vaccinated, being 1,572 more than in 1877-78. The ratio of success in municipal vaccinations performed under close supervision was 86·53, while that shown by the temporary men working in the rural circles rose to the suspiciously high figure of 96·05. The work in the city was frequently inspected, and the registers checked, both by Dr. Courtney and the Assistant Surgeon, Thaker Das. Very substantial aid is said to have been given by two gúrús, Baba Khem Singh and Baba Ram Rattan, both men of considerable influence among Hindús: and as a result of the good example set by them, the Assistant Surgeon hopes—"That in future there will be very little or no resistance among Hindús, who have hitherto been very hostile and obstinate."

(p). Hazára District.—Three vaccinators—two paid from Imperial funds and one from local funds—were employed, and performed a total of 4,644 operations, the ratio of success being 96·16 per cent. Here, too, the vaccination carried on at a distance from the sadar station shows the highest ratio of success, *viz.*, 98·20 per cent., a suspiciously high figure.

(q). Jhang District.—Two permanent and eight temporary vaccinators were employed. Total number vaccinated 7,539 and the per-centage successful 81·33. "Most of these operations," Mr. Wrafter, the Civil Surgeon, admits, "were performed with fresh crusts taken from strong and healthy children only." The per-centage of success therefore is probably very much overstated. The attitude of the people is reported to be favourable.

(r). Hissar District.—Two vaccinators paid from Imperial funds and three municipal vaccinators were employed, and performed altogether 3,017 operations, with 82·03 per cent. successful. The work inspected by me in the town of Bhiwáni was of a very inferior stamp. The vaccinator was subsequently discharged on the ground of incapacity.

(s). Sirsa District.—Thirteen vaccinators—four paid from Imperial and six from local funds, and three hakims—were engaged in vaccination. The aggregate number of cases operated on was 8,031, and the per-centage of success 82·88. The work of the permanent vaccinators done in the town of Sirsa was of fairly good quality, but that done by the hakims and temporary men was of very inferior type. In 88 cases operated on by the hakim attached to the dispensary at Ránia, only 18, or 20 per cent., were found successful; and in 214 cases operated on by a second hakim, and examined by me at Ellenabad, but 42 per cent. were seen to be successful. Mr. Rehill takes much interest in vaccination, but finds considerable difficulty in obtaining the services of competent men to act as vaccinators.

(t.) *Gurgaon District.*—The vaccine staff employed in this district consisted of two permanent and eighteen temporary vaccinators, six "medical officers," and two hakíms—28 in all. Altogether 9,678 vaccinations were performed, with 86·34 per cent. successful. The total amount expended on the pay of the eighteen temporary vaccinators was Rs. 465-11-5, which, assuming that they were employed for five months, would give each man on an average a little over Rs. 5 a month, a pittance for which it would be difficult to find a man of sufficient education and inteligence to become an efficient vaccinator to give his services. Small-pox of an extremely virulent type has been prevailing in the district to a wide extent througout the cold season.

(u). *Firozpore Town.*—Here there is a decrease in the number vaccinated of 1,946 under last year; ratio of success low, 79·4 per cent. The number of vaccinators falls short by six.

(v.) *Bahâwalpur State.*—Four vaccinators employed by the state worked throughout the season, and performed altogether 6,290 vaccinations, with a per-centage of success of 80·14 as against 69·65 of the preceding year, an increase of over 10 per cent. Hakíms, it would appear, were not, as in previous years, employed in vaccination work during the year under report, hence probably the great rise in the ratio of successful cases above noted.

17. In bringing my remarks on dispensary vaccination to a close, I would briefly allude to the practice adopted by so many municipal and district committees of entertaining men who have never undergone any previous training, and employing them temporarily as vaccinators The pay of a lower grade municipal or local fund vaccinator is Rs. 96 a year, and where the funds can not afford to devote this amount annually to vaccination purposes, it is false economy and very unadvisable to waste smaller sums in employing ignorant, incompetent men to spread bad vaccination, and so do more harm than good. Another serious defect in the dispensary system of vaccination, which should not be left unnoticed, is the obsolete and imperfect method of performing the operation which still largely obtains. Instead of the operation being done, as should always where practicable be done, by transferring vaccine lymph direct from arm to arm, it is extensively done with crusts, with the inevitable result that more than half the cases are failures: whereas when the former method is adopted, the proportion of failures, with but a moderate amount of skill and care, seldom exceeds 10 per cent. By the introduction of these two changes alone, which would be attended with no difficulty, and would involve no additional expenditure, vaccination would make great progress throughout the Province, and the prophylactic, as is under the present system but too often the case, would not be brought into disrepute.

18. Great assistance was received from the under mentioned chiefs and native officials, and I have the honor to request that the thanks of Government be given to them :—

His Highness the Maharajah of Kashmir and Jummu.		
His Highness the Rajah of Mandi		
Munshi Sálig Ram,	Extra Assistant Commissioner.	Jhajjar.
Rái Gopal Sahái,	ditto.	ditto. Hissar.
Davi Sahái,	Tahsildár,	Jhajjar in Rohtak.
Dwárka Náth,	ditto.	Hânsi in Hissar.
Angan Lal,	ditto.	Fathabad, dittto.
Davi Ditta,	ditto.	Fazilka in Sirsa.
Kanoya Lall,	ditto.	Taran Táran, in Amritsar.
Mannu Lall,	ditto.	Ajnála, ditto.

19. Appended are the revised forms of statistical returns, which, in accordance with the orders of Government, have this year been adopted in supersession of those previously in use.

I have the honor to be,
Sir,
Your most obedient servant,

J. BENNETT, Surgeon Major,

Officiating Superintendent General of Vaccination.

STATEMENTS.

A.—VACCINE

Statement No. I.—Showing particulars of

1	2	3 *	4	5	6			7
Number.	* Circles and Districts.	Population of district according to census of 1868.	Average population per square mile.	Average number of vaccinators employed throughout the season.	*Total number of persons vaccinated.*			Average number of persons vaccinated by each vaccinator.
					Male.	Female.	Total.	
	Tahsíl Delhi ...	3,15,286	...	...	2,948	2,893	5,841	...
1	Delhi District ...	6,08,850	496	4	2,948	2,893	5,841	1,460·25
	Tahsíl Karnál ...	2,40,322	...	...	558	625	1,183	...
	Do. Pánipat ...	1,84,230	...	...	3,344	3,413	6,757	...
2	Karnál District ...	6,10,972	264	4	3,902	4,038	7,940	1,985·
	Tahsíl Hissar ...	1,07,442	...	...	4,194	4,136	8,330	...
	Do. Hánsi ...	1,26,404	...	...	6,206	6,129	12,335	...
	Do. Bhiwáni ...	1,04,170	...	...	3,087	2,926	6,013	...
	Do. Fatahabad ...	80,466	...	...	4,819	4,577	9,396	...
	Do. Barwála ...	66,199	...	...	3,699	3,710	7,409	...
3	Hissar District ...	4,84,681	137	35	22,005	21,478	43,483	1,242·37
	Tahsíl Rohtak ...	1,69,528	...	...	3,400	4,199	7,599	...
	Do. Sámpla ...	1,42,992	...	...	3,933	4,430	8,363	...
	Do. Gohána ...	1,19,506	...	...	2,952	3,360	6,312	...
	De. Jhajjar ...	1,19,840	...	...	5,149	5,689	10,838	...
4	Rohtak District ...	5,51,866	295	34	15,434	17,678	33,112	973·88
	Tahsíl Sirsa ...	86,305	...	...	4,446	3,748	8,194	...
	Do. Fázilka ...	66,970	...	...	3,919	3,594	7,513	...
	Do. Dabwáli ...	57,520	...	...	3,777	3,550	7,327	...
5	Sirsa District ...	2,10,795	68	34	12,142	10,892	23,034	677·47
	Tahsíl Naraingarh ...	1,42,350	...	...	3,916	3,620	7,536	...
6	Umballa District ...	10,35,488	394	4	3,916	3,620	7,536	1,884·
	Tahsíl Ludhiána ...	2,90,148	...	...	890	645	1,535	...
	Do. Samrála ...	1,43,458	...	...	2,326	1,907	4,233	...
	Do. Jagraon ...	1,39,639	...	...	3,018	2,379	5,397	...
7	Ludhiána District ...	5,73,245	429	4	6,234	4,931	11,165	2,791·25
	Simla ...	10,800	...	...	284	225	509	...
	Kassauli ...	...	...	...	74	84	158	...
	Tahsíl Bharauli ...	13,253	...	...	106	104	210	...
8	Simla District ...	33,995	1,888	4	464	413	877	219·25

DEPARTMENT.

vaccination in the Punjab during the year 1877-78.

8	9	10	11	12	13	14	15	16	17	18	19	20
PRIMARY VACCINATION.				REVACCINATION.		PERCENTAGE OF SUCCESSFUL CASES.			*Average annual number of persons sucessfully vaccinated during previous five years.*		*Average annual number of deaths from small-pox during previous five years.*	
	Successful.											
Total.	Under 1 year.	Over 1 and under 6 years.	Total of all ages.	Total.	Successful.	Primary.	Revaccination.	Persons successfully vaccinated per 1,000 of population.	No.	Ratio per 1,000	No.	Ratio per 1,000.
5,805	2,594	2,924	5,518	36	9	97·68	34·61	...	...	...	...	
5,805	2,594	2,924	5,518	36	9	97·68	34·61	9·07	8272·8	13·58	305·2	0·49
1,183	722	348	1,120	...	...	98·15	...	...	...	...	...	
6,746	4,491	2,000	6,492	11	...	98·15	...	...	...	...	...	
7,929	5,213	2,348	7,612	11	...	98·15	...	12·45	8285·6	13·56	1093·6	1·78
8,318	2,156	5,862	8,153	12	5	99·45	41·66	...	...	...	...	
12,145	3,981	7,899	11,880	190	96	98·86	52·74	...	...	...	...	
6,005	1,872	3,729	5,656	8	1	97·87	100	...	...	...	...	
9,377	2,685	6,178	9,122	19	11	99·20	61·11	...	...	...	...	
7,300	2,501	4,687	7,188	109	68	99·68	64·76	...	...	...	...	
43,145	13,195	28,355	41,999	338	181	99·05	55·69	87·02	...	...	418·	0·86
7,508	2,260	4,898	7,178	91	47	98·49	60·25	...	...	...	...	
8,322	2,793	5,209	8,010	41	17	98·06	48·57	...	...	...	...	
6,292	1,908	4,120	6,051	20	14	98·27	82·35	...	...	...	...	
10,733	3,280	7,136	10,468	105	57	98·92	54·80	...	...	...	...	
32,855	10,241	21,363	31,707	257	135	98·48	57·69	57·69	...	...	359·4	0·65
8,023	2,084	5,487	7,843	171	17	99·49	10·42	...	...	...	...	
7,358	1,988	5,137	7,211	155	52	99·16	36·87	...	...	...	...	
7,129	1,915	5,080	6,995	198	131	99·67	68·94	...	...	...	...	
22,510	5,987	15,704	22,049	524	200	99·44	40·48	105·54	...	...	376	1·78
7,536	1,616	5,421	7,154	...	..	97·35	...	...	...	...		
7 536	1,616	5,421	7,154	...	...	97·35	...	6·90	15,194·6	14·67	1405·8	1·35
1,535	1,095	430	1,525	...	...	99·67	...	...	...	...	...	
4,217	2,890	1,301	4,191	16	9	99·71	64·28	...	...	...	...	
5,394	2,953	2,425	5,378	3	3	99·83	100	...	...	...	...	
11,146	6,938	4,156	11,094	19	12	99·76	70·58	19·04	12,288	21·43	464·2	0·80
491	204	236	474	18	11	97·93	78·57	...	...	...	...	
158	61	86	147	...	...	98·00	...	...	...	...	...	
145	17	96	137	65	55	97·85	91·66	...	...	...	...	
794	282	418	758	83	66	97·93	89·18	24·23	1,746·4	51·37	6·8	0·20

A.—VACCINE

1	2	3	4	5	6			7
Number.	* Circles and Districts.	Population of district according to census of 1868.	Average population per square mile.	Average number of vaccinators employed throughout the season.	*Total number of persons vaccinated.*			Average number of persons vaccinated by each vaccinator.
					Male.	Female.	Total.	
	Tahsil Jullundur ...	2,60,885	...	...	2,553	1,894	4,447	..
	Do. Nakodar ...	1,85,666	...	...	2,278	2,049	4,327	...
	Do. Phillour ...	1,66,299	...	...	2,595	2,414	5,009	...
9	Jullundur District ...	7,94,764	596	4	7,426	6,357	13,783	3,445·75
	Tahsil Hoshiárpur ...	2,50,036	...	...	2,188	1,811	3,999	...
	Do. Dasúya ...	2,53,860	...	...	2,439	2,018	4,457	...
10	Hoshiárpur District ...	9,38,890	450	4	4,627	3,829	8,456	2,114·
	Tahsil Kángra ...	2,10,223	...	...	1,924	1,793	3,717	...
	Do. Kullu ...	54,967	...	...	17	21	38	...
	Do. Pálampur ...	...	...	...	1,001	1,089	2,090	...
	Do. Dera ...	1,26,350	...	...	2,436	2,160	4,596	...
11	Kángra District ...	7,43,887	87	4	5,378	5,063	10,441	2,610·25
	Tahsil Tarn Táran ...	2,41,150	...	...	3,184	2,404	5,588	...
	Do. Ajnála ...	2,09,540	...	...	2,475	1,992	4,467	...
12	Amritsar District ...	8,32,750	535	4	5,659	4,396	10,055	2,513·75
	Tahsil Gurdáspur ...	2,47,297	...	...	523	425	948	...
	Do. Batála ...	2,50,764	...	...	3,841	3,490	7,331	...
	Do. Pathánkot ...	1,63,350	...	...	139	132	271	...
	Do. Shakargarh ...	2,45,362	...	...	196	144	340	..
13	Gurdáspur District ...	9,06,773	496	4	4,699	4,191	8,890	2,222·5
	Tahsil Siálkot ...	3,80,031	...	...	4,816	4,119	8,935	...
	Do. Pasrur ...	2,44,997	...	...	3,276	2,835	6,111	...
14	Siálkot District ...	10,05,004	510	4	8,092	6,954	15,046	3,761·5
	Tahsil Chunian ...	1,67,457	...	...	4,420	3,572	7,992	...
	Do. Kasur ...	1,97,667	...	...	2,156	1,795	3,951	...
15	Lahore District ...	7,89,666	218	4	6,576	5,367	11,943	2,985·75
	Tahsil Moga ...	1,83,223	...	...	1,521	1,605	3,126	...
	Do. Zíra ...	1,39,693	...	...	3,228	2,823	6,051	...
	Do. Muktsar ...	94,837	...	...	2,198	2,014	4,212	...
16	Ferozepore District ...	5,49,253	204	39	6,947	6,442	13,389	343·30
	Tahsil Gujránwála ...	2,22,559	...	...	3,384	2,911	6,295	...
	Do. Háfizabad ...	1,76,986	...	...	2,891	2,128	5,019	...
	Do. Wazirabad ...	1,51,041	..	...	1,780	1,432	3,212	...
17	Gujránwála District ...	5,50,586	207	4	8,055	6,471	14,526	3,631·50

DEPARTMENT—*(continued).*

8	9	10	11	12	13	14	15	16	17	18	19	20
PRIMARY VACCINATION.				REVACCINATION.		PERCENTAGE OF SUCCESSFUL CASES.			*Average annual number of persons successfully vaccinated during previous five years.*		*Average annual number of deaths from small-pox during previous five years.*	
Total.	*Successful.* Under 1 year.	Over 1 and under 6 years.	Total of all ages.	Total.	Successful.	Primary.	Revaccination.	Persons successfully vaccinated per 1,000 of population.	No.	Ratio per 1,000	No.	Ratio per 1,000.
4,447	3,396	917	4,313	...	...	98·89	...	...	...	...	...	
4,327	3,572	639	4,211	...	...	98·98	...	...	...	...	...	
5,009	3,997	831	4,828	...	...	99·11	...	...	...	...	...	
13,783	10,965	2,387	13,352	...	...	99·00	...	16·79	21,847·4	27·48	347	0·43
3,999	2,798	985	3,783	...	...	96·21	...	...	...	...	...	
4,454	3,320	968	4,288	3	...	97·76	...	...	...	...	...	
8,453	6,118	1,953	8,071	3	...	97·03	...	8·59	35,073·2	37·35	310·4	0·33
3,717	779	2,906	3,685	...	...	100	...	...	...	...	...	
38	3	35	38	...	...	100	...	...	...	...	...	
2,076	328	1,701	2,029	14	14	100	100	...	...	...	...	
4,596	1,359	3,087	4,447	...	...	100	...	...	...	...	...	
10,427	2,469	7,729	10,199	14	14	100	100	13·72	22,915·4	30·80	77·8	0·10
5,582	3,728	1,689	5,419	6	3	99·35	75·00	...	...	...	...	
4,461	3,139	1,257	4,402	6	6	99·72	100	...	...	...	...	
10,043	6,867	2,946	9,821	12	9	99·52	90·00	11·80	10,234·8	12·29	1,244	1·49
948	491	453	944	...	...	99·78	...	...	...	...	...	
7,331	2,632	4,540	7,172	...	...	98·91	...	...	...	...	...	
271	134	124	258	...	...	99·23	...	...	...	...	...	
340	149	172	321	...	...	96·10	...	...	...	...	...	
8,890	3,406	5,289	8,695	...	...	98·90	...	9·58	15,852·2	17·48	759·6	0·83
8,926	7,385	1,266	8,651	9	7	98·87	77·77	...	...	...	...	
6,111	4,583	1,382	5,965	...	...	99·06	...	...	...	...	...	
15,037	11,968	2,648	14,616	9	7	98·95	77·77	14·55	26,409·8	26·27	610	0·60
7,983	3,898	3,881	7,790	9	2	98·97	28·57	...	...	...	...	
3,927	2,121	1,646	3,811	24	7	99·03	29·16	...	...	...	...	
11,910	6,019	5,527	11,601	33	9	98·99	29·03	14·70	13,304	16·84	942	1·19
3,126	1,607	1,367	2,975	...	...	98·64	...	...	...	...	...	
6,045	3,440	2,490	5,931	6	...	99·58	...	...	...	...	...	
4,192	2,595	1,447	4,042	20	11	98·80	55·00	...	...	...	...	
13,363	7,642	5,304	12,948	26	11	99·11	42·30	23·59	6,206	11·29	1,088·6	1·98
6,270	5,452	551	6,003	25	3	98·62	15·00	...	...	...	...	
5,017	3,643	1,228	4,871	2	...	99·14	...	...	...	..	...	
3,200	2,672	391	3,069	12	4	97·45	33·33	...	...	...	...	
14,487	11,767	2,170	13,943	39	7	98·54	21·21	25·33	15,027·8	27·29	212·6	0·38

A.—VACCINE

1	2	3	4	5	6			7
Number.	* Circles and Districts.	Population of district according to census of 1868.	Average population per square mile.	Average number of vaccinators employed throughout the season.	*Total number of persons vaccinated.*			Average number of persons vaccinated by each vaccinator.
					Male.	Female.	Total.	
	Tahsíl Rawalpindi ...	1,78,776	...	...	3,846	3,102	6,948	...
	Do. Murree ...	32,647	...	...	322	289	611	...
	Do. Fátahjang ...	94,716	...	...	3,825	3,536	7,361	...
	Do. Pindigheb ...	86,869	...	...	5,429	4,674	10,103	...
	Do. Kahuta ...	82,348	..	...	1,722	1,460	3,182	...
	Do. Gujar Khan ...	1,26,126	...	...	3,973	3,204	7,177	...
	Do. Attock ...	1,09,774	...	...	3,315	2,825	6,140	...
18	Rawalpindi Disiriet ...	7,11,256	114	26	22,432	19,090	41,522	1,597
	Tahsíl Jhelum ...	1,50,472	...	...	3,448	2,749	6,197	...
	Do. Pind Dádan Khan ...	1,51,096	...	...	2,785	3,022	5,807	...
	Do. Talagang ...	78,103	...	...	2,960	2,831	5,791	...
	Do. Chakwál ...	1,43,169	...	...	3,675	3,443	7,118	...
19	Jhelum District ...	5,22,840	128	22	12,868	12,045	24,913	1132·40
	Tahsíl Gujrat ...	2,72,055	...	...	3,389	2,847	6,236	...
	Do. Khárián ...	1,90,005	...	...	4,179	3,374	7,553	...
20	Gujrat District ...	616,347	324	17	7,568	6,221	13,789	811·11
	Tahsíl Shahpur ...	1,03,607	...	...	2,808	3,032	5,840	...
	Do. Khusháb ...	1,25,462	...	...	3,684	3,184	6,868	...
	Do. Bhera ...	1,39,727	...	...	4,212	4,284	8,496	...
21	Shahpur District ...	3,68,796	78	16	10,704	10,500	21,204	1325·25
	Tahsíl Abbott-abad ...	1,18,146	...	...	60	43	103	...
22	Hazára District ...	3,43,929	122	10	60	43	103	10·30
	Total of Districts ...	1,37,84,638	...	121	1,78,136	1,62,912	3,41,048	2,818·57
	NATIVE STATES.							
1	Jummoo and Kashmir ...	...	...	16	5,897	7,300	13,197	824·81
2	Bashahr ..	...	...	11	1,597	1,415	3,012	273·81
3	Jubbal ...	...	...	9	495	390	885	98·33
4	Keonthal ...	...	...	3	118	102	220	73·33
5	Theog ...	...	...	4	271	213	484	121·
6	Balsan ...	...	...	4	210	196	406	101·50
7	Goler ...	...	...	4	288	323	611	152·75
8	Dadah ...	...	...	4	385	298	683	170·75
9	Nádaun ...	...	...	19	1,434	1,309	2,743	144·36
10	Lambagraon ...	...	...	11	1,517	1,304	2,821	256·45
11	Suket ...	...	...	9	1,868	1,118	2,986	331·77
12	Mandí ...	...	...	12	2,416	2,065	4,481	373·41
	Total of Native States ...	...	...	...	16,496	16,033	32,529	...
	GRAND TOTAL ...	...	...	121	1,94,632	1,78,945	3,73,577	3,087·41

* NOTE.—The Province is not

DEPARTMENT—*(concluded).*

8	9	10	11	12	13	14	15	16	17	18	19	20
Primary Vaccination.				Revaccination.		Percentage of successful cases.			*Average annual number of persons successfully vaccinated during previous five years.*		*Average annual number of deaths from Small-pox during previous five years.*	
	Successful.											
Total.	Under 1 year.	Over 1 and under 6 years.	Total of all ages.	Total.	Successful.	Total.	Revaccination.	Persons successfully vaccinated per 1000 of population.	No.	Ratio per 1000	No.	Ratio per 1000
6,948	2,609	4,120	6,729	...	...	98·42	...	...	..	...	...	
611	329	221	560	...	...	93·33	...	...	...	...	...	
7,338	3,726	3,141	6,899	23	3	99·32	13·6	...	...	...	...	
10,103	3,481	6,118	9,722	...	...	99·42	...	...	...	...	...	
3,180	1,921	1,145	3,067	2	1	99·19	10	...	...	...	...	
7,177	3,951	2,789	6,740	...	...	99·13	...	...	...	...	...	
6,139	2,774	3,085	5,936	1	1	99·44	100	...	...	...	...	
41,496	18,791	20,619	39,653	26	5	99·08	20·83	55·75	15,388·4	21·63	351·2	0·49
6,196	3,820	1,730	5,569	1	...	98·86	...	...	...	...	...	
5,798	4,333	1,228	5,561	9	2	99·28	25·00	...	...	...	...	
5,788	3,224	2,268	5,494	3	...	99·33	...	...	...	...	...	
7,118	4,769	2,084	6,853	...	...	99·40	...	...	...	...	...	
24,900	16,146	7,310	23,477	13	2	99·23	22·22	44·90	14,535·8	27·80	115·2	0·22
6,236	4,285	1,112	5,397	...	...	95·67	...	...	...	...	...	
7,552	4,361	2,073	6,464	1	...	97·46	...	...	...	...	...	
13,788	8,636	3,185	11,861	1	...	96·64	...	19·24	14,033·8	22·76	541·4	0·87
5,748	2,535	2,734	5,345	92	20	98·87	29·41	...	...	...	...	
6,844	3,251	3,225	6,530	24	5	99·07	22·72	...	...	...	...	
8,453	3,496	4,359	7,930	43	8	99·07	24·24	...	...	...	...	
21,045	9,282	10,318	19,805	159	33	99·02	26·82	53·79	...	...	268·6	0·72
103	85	18	103	...	...	100·	...	...	...	...	...	
103	85	18	103	...	...	100·	...	0·29	3,376·8	9·81	420·2	1·22
3,39,445	1,66,227	1,58,092	3,26,036	1,603	700	98·84	47·84	23·70	2,59,992·8	18·86	11,717·6	0·85
13,064	4,428	8,001	12,706	133	60	98·48	100·	...	2,269	...	...	...
3,012	993	1,664	2,871	...	...	99·48	...	...	3,348·8	...	...	...
885	110	698	841	...	...	98·47	...	...	376·6	...	...	...
209	8	171	191	11	9	97·94	81·81	...	134·8	...	...	...
484	27	288	464	...	...	100·	...	...	...	...	...	...
406	28	323	351	...	...	100·	...	...	36·2	...	...	...
611	120	478	598	...	...	99·83	...	...	157·2	...	...	...
683	154	513	667	...	...	100·	...	...	141	...	...	...
2,742	310	2,159	2,469	1	1	97·51	...	...	575	...	...	...
2,813	969	1,722	2,691	8	2	98·82	25·00	...	2,974	...	...	...
2,986	361	2,113	2,474	...	...	98·17	...	...	643·6	...	...	...
4,481	668	3,562	4,230	...	...	97·87	...	...	4,738·6	...	...	...
32,376	8,176	21,692	30,553	153	72	98·51	90·00	...	15,394·8	...	...	...
3,71,821	1,74,403	1,79,784	3,56,589	1,756	772	98·81	50·03	...	2,75,387·6	...	...	...

divided into vaccine circles.

A.—VACCINNE DEPARTMENT.

Statement No. II showing the cost of the Department in the Punjab, during the year 1877-78.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		Establishment.							Expenditure.				Paid from							
Number.	Circles and Districts.	Superintendent General.	Superintendents of circles.	Deputy Superintendents.	Native Superintendents.	*Vaccinators.* 1st class.	*Vaccinators.* 2nd and 3rd class.	Chaprassies and other servants.	Pay of Establishment.	Travelling allowance.	Contingencies.	Total cost.	Imperial Funds.	Provincial Funds.	Local Funds.	Municipalities.	Native States.	Total.	Number of all successful vaccinations and re-vaccinations.	Average cost of each successful case.
									Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs.		Rs. A. P.	Rs. A. P.	Rs.	Rs. A. P.		Rs. A. P.
	Punjab ...	1	1	1	29	23	98	14	52,980 7 5	5,370 14 0	1,550 7 3	59,901 12 8	3,738	...	2,437 12 9	3,204 10 4	480	9,860 7 1	457,483	0 2 5·27
	Total ...	1	1	1	29	23	98	14	52,980 7 5	5,370 14 0	1,550 7 3	59,901 12 8	3,738	...	2,437 12 9	3,204 10 4	480	9,860 7 1	457,483	0 2 5·27

Note.—The Province is not divided into vaccine circles, and in several districts there are no fixed vaccine Establishments.

B.—DISPENSARY VACCINATION.

Statement No. III.—Showing dispensary vaccination in the Punjab during the year 1877-78.

1	2	3	4	5	6	7	8	9	10	11	12	13
Districts.	Number of dispensaries in each District to which a vaccinator is attached.	Average number of vaccinators attached to dispensaries during the season.	Total number of persons vaccinated.	Average number of persons vaccinated by each vaccinator.	Primary Vaccination.				Revaccination.		Percentage of successful cases.	
					Total.	Successful.			Total.	Successful.	Primary.	Revaccination.
						Under one year.	One and under six.	Total of all ages.				
Delhi ..	3	8	4,870	1,058·75	4,544	1,814	1,881	3,695	326	129	90·87	55·36
Gurgaon ...	5	28	9,678	345·6	9,501	3,495	4,444	7,954	177	106	86·34	68·38
Hissar ...	2	5	3,017	603·4	2,936	1,118	964	2,132	81	26	82·03	34·21
Sirsa ...	5	13	8,031	617·7	7,974	3,447	2,888	6,205	57	44	82·88	84·61
Umballa ...	4	6	5,668	944·6	5,367	3,512	1,129	4,641	301	221	91·26	82·15
Ludhiána ...	3	4	3,298	824·5	3,096	2,112	727	2,839	202	110	96·53	57·59
Kángra ...	1	1	711	711	711	199	370	569	...	...	82·46	...
Amritsar ...	1	4	10,759	2,689·7	9,752	2,322	6,441	8,763	1,007	711	95·09	75·43
Lahore ...	2	8	3,815	476·8	3,721	2,221	841	3,062	94	27	92·39	71·76
Ferozepore ...	1	2	1,749	874·5	1,749	633	686	1,319	...	...	79·74	...
Jhelum ...	1	1	473	473	471	316	119	435	2	2	94·97	100
Shahpur ...	2	10	5,737	573·7	5,737	2,389	2,970	5,359	...	...	97·13	...
Mooltán ...	5	4	1,905	476·2	1,903	532	952	1,633	2	2	91·63	100
Jhang ...	7	10	7,539	753·9	7,233	3,286	2,387	5,673	306	201	81·33	66·77
Montgomery ...	5	8	4,126	515·7	4,122	1,308	1,893	3,201	4	2	85·31	50
Muzaffargarh ...	5	6	3,161	526·8	3,158	630	1,475	2,112	3	...	78·57	...
Dera Ismail Khan ...	6	9	8,115	901·6	7,995	2,129	4,050	6,316	120	72	84·99	72
Dera Gházi Khan ...	2	5	8,418	1,683·6	8,334	3,151	4,206	7,357	84	58	91·22	76·31
Banna ...	2	3	13,309	4,436·3	10,844	5,843	2,848	8,947	2,465	1,741	87·64	79·02
Pesháwar ...	3	8	5,327	665·8	5,218	2,135	2,183	4,497	109	83	87·52	76·14
Hazára ...	2	3	4,644	1,548	4,610	2,505	1,634	4,139	34	17	96·16	100
Kohát ...	1	2	1,224	612	1,224	453	727	1,182	...	...	97·52	...
Baháwalpur ...	4	4	6,290	1,572·5	5,335	1,968	2,068	4,036	955	504	80·14	63·71
Total ...	72	152	121,864	801·7	115,535	47,518	47,883	96,066	6,329	4,056	88·27	72·29

Comparative Statement No. IV showing the number of persons primarily vaccinated and the number of those persons who were successfully vaccinated in Punjab in each of the undermentioned official years.

Establishments.	Persons primarily vaccinated.																									
	Years ended 31st March.																									
	1867.		1868.		1869.		1870.		1871.		1872.		1873.		1874.		1875.		1876.		1876.* See note.		For three months ending 31st March 1877.†		1878.	
	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.	Total number.	Number successfully vaccinated.
Government ..	134,820	126,402	168,970	159,704	180,368	169,537	103,632	97,868	138,325	131,228	193,137	183,050	278,953	264,937	340,228	323,392	371,934	355,180	295,929	280,916	280,831	267,069	157,170	149,210	371,821	356,589
Municipal ..	..	..	..	..	..	..	..	..	9,427	9,102	10,921	9,991	13,956	11,928	25,533	20,822	29,147	24,852	20,695	17,046	21,710	18,271	16,095	13,782	32,643	27,777
Local Funds ..	..	..	..	..	..	..	..	..	3,191	2,143	740	610	11,373	8,068	35,242	27,346	45,568	35,903	43,037	34,304	46,413	36,998	25,217	21,553	37,210	30,842
Native States ..	..	..	..	..	..	..	..	..	4,978	3,402	8,159	4,920	12,020	6,200	14,158	12,536	7,255	7,207	16,637	15,084	3,439	2,564	6,125	4,631	5,335	4,036
Dispensaries ..	61,746	42,345	64,892	44,177	73,097	48,970	43,898	30,188	59,569	45,932	53,095	42,275	49,422	36,565	43,160	32,668	38,700	29,954	36,611	29,403	37,728	30,100	30,151	24,207	40,353	33,411
Army ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
European ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Native ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	196,566	168,747	233,862	203,881	253,465	218,507	147,530	128,056	215,490	191,807	266,052	239,546	365,724	327,818	458,321	416,864	493,604	453,096	412,929	376,753	390,121	354,912	234,758	213,973	487,356	452,655

NOTE.—* The time for submitting these returns having been changed that for 1876 shows the numbers vaccinated during the year ending 31st December 1876.
† Three months intervening between the calendar year 1876, and the official year 1877-78.

REPORT

ON THE

SANITARY ADMINISTRATION

OF THE

PUNJAB

FOR THE YEAR 1877.

Lahore:
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