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REPORT

SANITARY ADMINISTRATION

OF THE

PUNJAB

FOR THE YEAR 1879.

Lahore:
PRINTED AT THE CENTRAL JAIL PRESS.
1880.

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REPORT

ON THE

SANITARY ADMINISTRATION

OF THE

PUNJAB

FOR THE YEAR 1879.

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Proceedings of the Hon'ble the Lieutenant-Governor of the Punjab in the Home Department, No. 2948, dated 10th September 1880.

READ—

Report by Surgeon-Major H. W. Bellew, C.S.I., Sanitary Commissioner, Punjab, on the Sanitary Administration of that Province for the year 1879.

OBSERVATIONS.—The Chapter on vital statistics which now forms the first portion of the report shows a death-rate in excess even of that of the previous year, 1878, in which the mortality had been greater than that of any former year since the introduction of the system of registration in 1868, as shown by the following figures taken from previous reports :—

	Deaths.
1868	... 267,785
1869	... 453,821
1870	... 418,926
1871	... 363,378
1872	... 430,608
1873	... 357,153
1874	... 316,713
1875	... 447,208
1876	... 496,844
1877	... 350,932
1878	... 628,771
1879	... 673,213

The excessive mortality of the past year is shown to be due to a visitation of cholera, to the prevalence of small-pox, and to the continuance throughout the first quarter of 1879 of the fever which had proved so fatal in the last quarter of the previous year. The causes which have contributed to this heavy death-rate are fully discussed in the chapter, which treats of the chief diseases from which the province has suffered during the year under report.

2. It has been observed in previous reports that the gradual improvement in the system of death registration must, in regard to the recorded death-rate, tell unfavorably against succeeding years in which the indications of such improvement become more apparent. This has to be borne in mind when comparing the figures of the present with those of the past year, as it may be assumed that the fewer number of persons fined this year for neglect to register may be accepted as a further indication of an approach to that degree of correctness in the system which is so much desired. This is of itself satisfactory, while it suggests the possibility that the actual difference in the death-rates of 1878 and 1879 may not be so great as shown in the above figures. It is, however, observed that some districts still show results too favorable to be correct, notably Jhang and Dera Ghazi Khan, where the recorded death-rates were 13 and 14 only respectively; and the attention of the local authorities should be drawn to this. It is hoped that the new system of *birth* registration, of which a brief description is given in Dr. Bellew's Report, will give, for the current and future years, something approaching to a reliable return of the provincial birth-rate. It has not been practicable heretofore to do more than provide for annual returns from municipal towns and two rural circles, and, under special arrangements recently made, for the registration of births and deaths in certain villages along the Western Jumna Canal. It is noted from the returns thus obtained that there is still a diminished birth-rate in the localities which suffered most from the unusual sickness of the two past years. These returns, though probably not absolutely reliable, will be valuable for comparison with the figures for future years, and more especially with reference to those villages on the Western Jumna Canal where a re-alignment of the channels is in progress with the view of correcting defects of drainage to which the heavy mortality in those localities has been attributed. The completion of this work, which is now

well advanced, will, it is hoped, result in a diminished death-rate in the affected localities, and future statistics will afford the means of useful and interesting comparison; but His Honor the Lieutenant-Governor must look to the local officers of the province affording every assistance in ensuring the successful working of the system which has just been started for providing for the registration of births throughout the province, and furnishing figures for the desired comparison as well as for other important objects for which the system has been introduced.

3. The section which deals with the chief diseases of the year is mostly occupied with the history, already forwarded to the Government of India, of the epidemic of cholera, which, appearing on the eastern confines of the province in the middle of April, reached its western limits at Peshawar by the 1st May. A special interest attaches to this epidemic from the fact of its outbreak coinciding with the dispersion of the pilgrims assembled at the Kumbh mela at Hurdwar, and the parallelism of its diffusion and course from that source with that of the great epidemic of 1867.

It was of great importance that the evidence bearing on the question of its origin from this fair should be carefully collected and clearly set forth, and this has been ably done by Dr. Adam Taylor, who was appointed Sanitary Commissioner during the absence of Dr. Bellew on special duty in Afghanistan.

4. In the epidemic now reported on, as in all former epidemics, the degree of severity with which it fell on different districts, and on different villages and towns within those districts, appears to have varied greatly; in the districts of Umballa and Delhi the population appears to have suffered at the rate of 0·52 and 0·78 per mille, in the districts of Sirsa and Hissar the mortality was 5·33 and 7·78 per mille—just ten times as heavy. In a large number of villages to which the disease was brought not more than one or two deaths occurred; in others the population was more than decimated. In the case of these localities in which the disease prevailed with violence, it may be presumed that the infection obtained access to some medium by which it was communicated to a large number of the population, or that some special insanitary condition was present, rendering the population susceptible to the action of the poison; and if it could be determined what this special medium or this special condition was, our power of controlling the ravages of epidemics would, without doubt, be greatly increased. Without this knowledge our efforts at protecting populations from the attacks of cholera must continue wanting in definiteness of aim.

5. The reports furnished from the districts of Hissar, Sirsa and Gujranwala give remarkable instances in which outbreaks of extreme severity followed pollution of the water-supply by infected pilgrims; but Dr. Taylor's main object in dealing with these reports was to trace the connection between the spread of the epidemic and the return of the pilgrims from Hurdwar, and but little information has been given regarding the local conditions of the towns and villages which suffered; the statistics, however, of the late epidemic, compared with those of the epidemic of 1867, seem to afford satisfactory evidence that the removal of the special condition, whatever it may be, which facilitates the diffusion of cholera, has, to some extent, been included with the sanitary improvements which have been effected in many of the municipal towns during the last ten years. The total number of deaths from cholera in the epidemic of 1867 amounted to 43,146. In the epidemic of 1869 it was 26,135, a diminution of about 40 per cent., but in the large towns the difference was still greater. In Delhi 273 deaths occurred in 1867, 14 only in 1879. In Amritsar 1,488 deaths from cholera occurred in 1867, 3,041 in 1869, and 524 in 1879. In Lahore the epidemics of 1867, 1869 and 1872 carried off 299, 212 and 300 souls, respectively; in 1879 the number was only 74. In Peshawar the number of deaths in the epidemic of 1867 amounted to 1,374, in 1869 to 1,488, in the last epidemic to 478. In the town of Rawalpindi, on the other hand, the diminution in the number of cholera deaths compared with the number in previous epidemics was very slight. The towns in the Hissar district also suffered very severely. The

epidemic, indeed, prevailed with exceptional severity over the whole district of Hissar, and two reasons are assigned for this, *viz.*, the drought from which the district had suffered during the previous two years, and the formation of a secondary centre of infection, at Pindori near Jhind, a violent outbreak of cholera having occurred at a large fair which was held there at the time when the pilgrims were returning from Hurdwar.

6. The report shows that small-pox again prevailed with great violence; the mortality from this cause considerably exceeding even that of the preceding year, which was very great. The number of deaths registered from this cause in the two years amounted to nearly 90,000. So great a mortality from small-pox is, no doubt, at first sight very disappointing, and appears to tell greatly against the efficiency of the system of vaccination which has hitherto been in force; but the effect of vaccination is to be looked for in prolonging the interval between epidemic exacerbations, as much as in keeping down the annual prevalence. Now, the provincial statistics show an interval of eight years during which the prevalence of small pox had remained at a comparatively low rate, and perhaps this is as much as could have been fairly expected from the imperfect system on which vaccine operations have been carried on. Endeavour is, however, being made to introduce from the ensuing cold season a more complete system from which more decided results may be looked for.

7. Heavy as was the fever mortality in 1878, that of 1879 was still greater; a great part of the excessive mortality was the result of the malarial and other unhealthy influences which, commencing in 1878, continued to prevail through the cold weather and spring of 1879; but the fever of the autumn of 1879 was again unusually fatal, and this was especially the case in the eastern districts of the province, which are within the area irrigated by the Western Jumna Canal. The causes of this excessive mortality from fever in this province, and the measures recommended with a view to mitigate their effects, have been referred to above, and were discussed in the report of the previous year. Dr. Bellew again brings forward evidence to show how greatly the mortality from fever is aggravated by the low vitality which is induced by insufficient food consequent on high prices, insufficient clothing, and insanitary evils of all kinds by which the inhabitants of the towns and villages are surrounded.

8. It is satisfactory to observe that, in almost all the districts, minor sanitary improvements have been undertaken by the municipalities chiefly in the way of town improvements and systematic conservancy. But the remarks in paragraphs 157 and 158 of the report on street conservancy and sanitary arrangements in towns are important, and the Lieutenant-Governor desires that all local authorities concerned will exert themselves to remove the evils and defects complained of. He fears, however, that they can do little to remedy the evils existing in private dwellings to which allusion is made in paragraph 159, beyond advising and using their influence to get the people themselves to move in the matter; and this much he expects of them. It is possible for them to bring about some good results by this means, and the matter is of sufficient importance to justify action on their part, to this extent, without interference with the prejudices of the people. In this, as in other respects, cordial co-operation with the Sanitary Commissioner must be insisted upon, and His Honor hopes that the orders already issued by this Government to arrange that the Deputy Commissioner or other local officer should always accompany and aid the Sanitary Commissioner in his tours of inspection will not be disregarded.

9. The report is, as usual, valuable, and the Lieutenant-Governor desires that his acknowledgments may be conveyed to both Drs. Bellew and Taylor for the very thorough way each officer has dealt with the subjects on which he has reported.

ORDER.—Ordered, that the above remarks be printed and circulated for general information.

Also, that the Review be published in the *Punjab Government Gazette.*

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

W. M. YOUNG,

Secretary to Government, Punjab.

Printed at the Punjab Government Civil Secretariat Press, Lahore.—16-9-80.—350.

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VITAL STATISTICS OF GENERAL POPULATION, 1879.

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Do. do. VI.—Deaths registered from different causes in the districts and towns of the Punjab during the year 1879 ... ...
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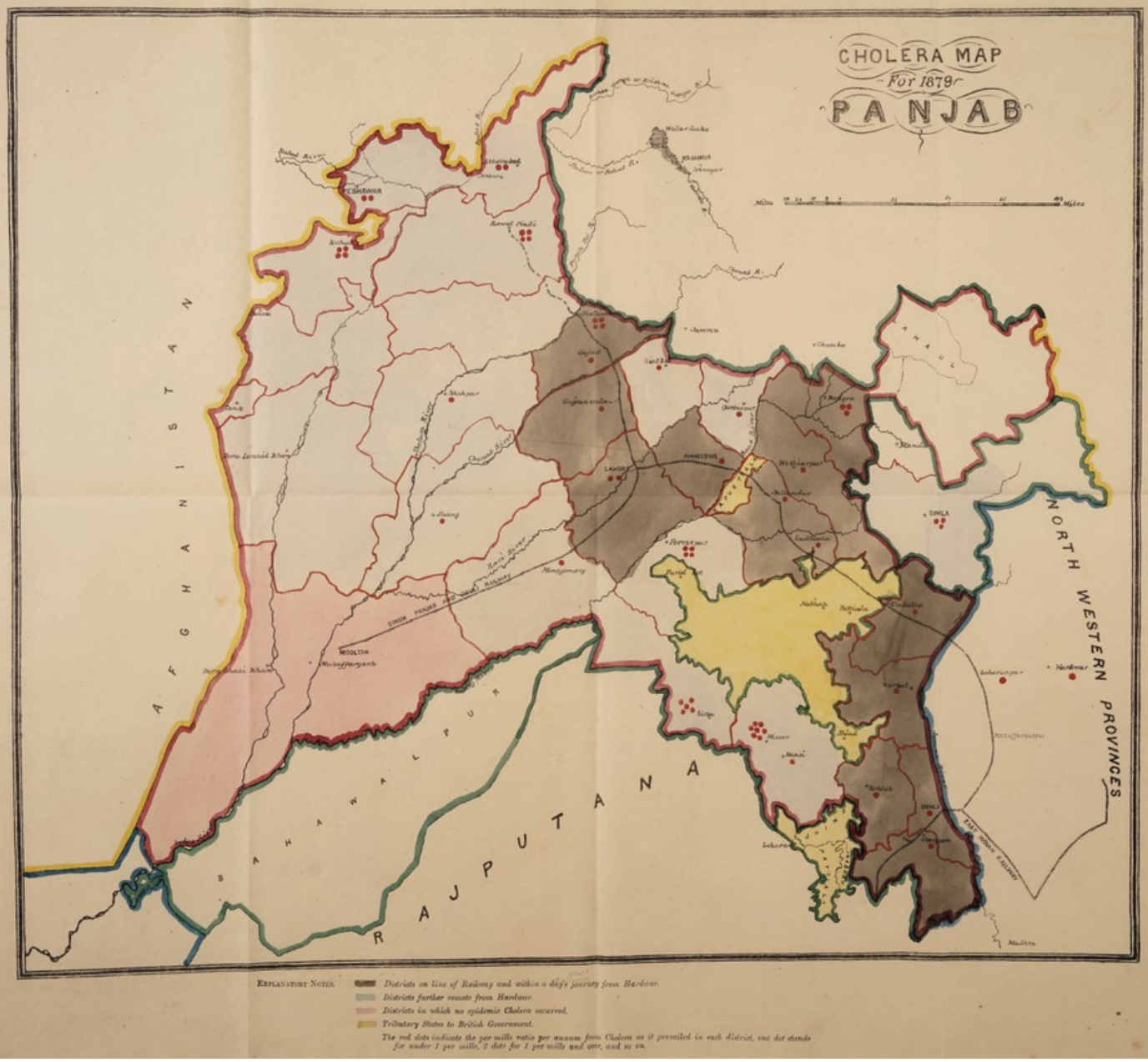
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EXPLANATORY NOTES.

Districts on line of Railway and within a day's journey from Hardwar.

Districts further remote from Hardwar.

Districts in which no epidemic Cholera occurred.

Tributary States to British Government.

The red dots indicate the per mille ratio per annum from Cholera as it prevailed in each district, one dot stands for under 1 per mille, 2 dots for 1 per mille and over, and so on.

SECTION I.—METEOROLOGY.

No Remarks.

(Omitted from the Report, vide Government of India No. 9—258, dated 4th September 1878, to address of Secretary to Government, Punjab).

SECTION II.—EUROPEAN ARMY.

No Remarks.

SECTION III.—NATIVE ARMY.

No Remarks.

SECTION IV.—JAILS.

No Remarks.

(Vide remarks on Section I).

SECTION V.—GENERAL POPULATION, VITAL STATISTICS.

1. The total deaths registered from all causes in the province during the year under report, amounted to 673,213 or at the rate of 38 per mille on the census population of 1868. This number of deaths exceeds even that of 1878, which was, as stated in the report for that year, "the most unhealthy since the introduction of registration in 1868."

The Mortality of 1879 exceeds even that of 1878.

2. The continuance of this unusually high figure of mortality is owing to the unabated prevalence of the small-pox and fever epidemics of the previous year, coupled with the outbreak of a very severe and wide-spread epidemic of cholera.

Causes to which due.

The mortality registered from this last disease rose suddenly from 29 in 1877 and 215 in 1878 to the high figure of 26,135 in 1879. This is a number about three times greater than that recorded in any of the previous epidemic years of 1869, 1872, 1875 and 1876, in which the highest mortality registered was 9258 in 1869 against 8727, 6246 and 5736 of the other years respectively; but it is less by 17,011 than the figures recorded for 1867 which was the first year in which registration was attempted in this province. The total mortality recorded under the head of cholera in 1867 was 43,146, and that year like the one under report was a *kumbh* year of the Hurdwar fair.

The subjoined statement shows the increase and decrease of mortality under the different death causes for the year under review and the year preceding it.

Diseases.	1878.	1879.	Increase.	Decrease.
Cholera	215	26,135	25,920	...
Small-pox	40,271	49,489	9,218	...
Fevers...	440,492	472,939	32,447	...
Bowel complaints	32,071	29,612	...	2,459
All other causes	115,722	95,038	...	20,684
Total	628,771	673,213	67,585	23,143
Net Increase	...	44,442	...	...

The increase due to cholera, small-pox and fevers.

3. The increase of mortality, namely, 44,442 deaths, it will be seen, is due to cholera, small-pox and fevers.

The epidemic of cholera, which in many respects bore a resemblance to that of 1867, commonly known as the Hurdwar epidemic, is described in the next section, in the report of its course and ravages by Surgeon-Major Adam Taylor. Small-pox also was abnormally prevalent. The total deaths being 49,489, which is the highest registered mortality from this disease since 1870. The persistence of this high mortality from small-pox, it will be seen by reference to the annexed table showing the increase or decrease of mortality under the chief diseases by quarterly periods, is owing to the continuance of the previous year's epidemic, the total mortality of which was exceeded by 9218 in the year under report. The increase under fevers, namely 32,447 is also very pronounced, and is also due to a continuance of the previous year's epidemic. The total mortality from "Fevers" namely, 472,939 for the year under report is the highest figure yet registered, by the excess above given, in any year since registration was introduced. Under the heads of "bowel complaints" and "all other causes," there is an aggregate decrease in mortality of 23,143, a figure which nearly counterbalances the excess mortality from cholera.

4. The comparative statement *in the margin* shows the periodic rise and fall in the monthly rate of mortality per mille for the year under report and the one preceding it.

Monthly Periodic rise and fall in the mortality of 1879, compared with 1878.

Months.	1878	1879	Months.	1878	1879
Jan. ...	23	41	July ...	23	24
Feb. ...	20	33	Aug. ...	24	31
Mar ...	22	30	Sep. ...	39	46
April ...	23	27	Oct. ...	73	63
May ...	33	42	Nov. ...	74	52
June ...	30	33	Dec. ...	47	39

It will be seen that in the first nine months of 1879, the monthly ratio was in excess of that of the corresponding months of the preceding year, and especially so in the first three months. In the last quarter of the year, that is during October, November and December, the ratio was considerably below that of the same months in 1878, thus indicating a final decline in the epidemic influences of the preceding 12 months; for the high figures of the first three months of 1879 are evidently a continuation of the rates of the last three months of 1878.

5. The subjoined statement of the incidence of mortality by quarters, shows to what diseases the increase in the mortality during the first three quarters and the decrease during the last quarter of the year under report are to be attributed, as compared with the corresponding periods of 1878.

Statement showing incidence of mortality by quarters.

1st Quarter.

Chief Diseases.	1878.	1879.	Increase.	Decrease.
Cholera	5	13	8	...
Small-pox	8,422	19,361	10,939	...
Fevers	53,764	103,419	49,655	...
Bowel Complaints ...	3,550	5,079	1,529	...
All other causes	30,288	23,260	...	7,028
TOTAL ...	96,029	151,132	62,131	7,028

2nd Quarter.

Chief Diseases.	1878.	1879.	Increase.	Decrease.
Cholera	2	18,872	18,870	...
Small-pox	16,653	22,851	6,198	...
Fevers	70,079	78,649	8,570	...
Bowel Complaints... ...	9,429	6,557	...	2,872
All other causes	29,739	22,410	...	7,329
TOTAL ...	125,902	149,339	33,638	10,201

3rd Quarter.

Chief Diseases.	1878.	1879.	Increase.	Decrease.
Cholera	172	7,076	6,904	...
Small-pox	7,546	5,815	...	1,731
Fevers	83,118	103,830	20,712	...
Bowel Complaints ...	7,312	7,963	651	...
All other causes	26,930	23,483	...	3,447
TOTAL ..	125,078	148,167	28,267	5,178

4th Quarter.

Chief Diseases.	1878.	1879.	Increase.	Decrease.
Cholera	36	174	138	...
Small-pox	7,650	1,462	...	6,188
Fevers	233,531	187,041	...	46,490
Bowel Complaints... ...	11,780	10,013	...	1,767
All other causes	28,765	25,885	...	2,880
TOTAL ...	281,762	224,575	138	57,325

In the first quarter the increase in the number of deaths compared with that of 1878, was due to small-pox, fevers and bowel complaints. The decrease was under "all other causes." The net increase was 55,103.

In the 2nd quarter the increase was due to cholera, small-pox and fevers. The decrease was under bowel complaints, and "all other causes." The net increase was 23,437.

In the 3rd quarter the increase was due to cholera, fevers, and bowel complaints. The decrease was under small-pox and "all other causes." The net increase was 23,089.

In the last quarter there was a decrease under all the different classes of diseases except cholera. The net decrease was 57,187.

6. Having compared the mortality of the year under review with that of the preceding year, it is necessary now to note the localities or districts in which this mortality was most prevalent. These, it will be seen by reference to Annual Statement No. II, were—

Districts in which high mortality occurred.

Gurgaon	Jhelum	Hoshiárpur.
Delhi	Hissar	Ludhiána.
Rohtak	Umballa	Jullundur.
Rawalpindi	Lahore	Gujránwála.
Karnál	Sirsa	Kángra.
Amritsar	Gurdáspur	Gujrat.

In these 18 districts, out of 32 in the Punjab, the aggregate population of which is 12,088,616 out of a total of 17,487,125 for the whole province according to the census of 1868, the mortality from the different diseases as classified in the Annual Statements appended to this report was in the proportions shown in the subjoined statement.

Diseases.	Total mortality in the 32 districts.	Mortality in the 18 districts, population 12,088,616.	Ratio per mille.	Mortality in 14 districts, population 5,398,509.	Ratio per mille.
Cholera	26,135	20,885	1·7	5,250	1·0
Small-pox	49,489	37,120	3·1	12,369	2·3
Fevers	472,939	394,348	32·6	78,591	14·5
Bowel complaints	29,612	25,244	2·1	4,368	0·8
All other causes	95,038	74,967	6·2	20,071	3·7
TOTAL	673,213	552,564	45·7	120,649	22·3

In drawing any conclusion from the data furnished by this statement, some allowance must be made for the fact that registration on the whole is not equally good in the two groups of districts thus compared together, many districts in the latter category being notoriously defective in this respect especially the several frontier districts and that of Jhang.

Statement showing deaths from different diseases in these 18 districts.

7. The annexed statement shows the total deaths registered from the different diseases in these 18 districts during the year under report, and the year preceding it, together with the ratio of mortality by way of comparison.

DISEASES.		Gurgaon.	Delhi.	Rohtak.	Rawalpindi.	Karnál.	Amritsar.	Jhelum.	Hissar.	Umballa.	Lahore.	Sirsa.	Gurdáspur.	Hoshiárpur.	Ludhiána.	Jullundur.	Gujránwala.	Kángra.	Gujrat.
Cholera	1879	753	416	2,020	2,914	1,606	868	1,962	3,674	609	1,673	1,088	20	82	253	87	430	2,048	389
	1878	165	44	...	...	...	...	...	...	1	1	...	1	...	...	...	2	1	...
Small-pox	1879	169	12	10	2,614	2,369	4,433	2,406	472	5,246	4,516	629	3,254	2,028	2,444	1,010	2,137	244	3,127
	1878	6,919	845	917	1,293	4,006	2,957	181	679	2,042	3,434	312	900	382	696	147	1,558	227	2,119
Fevers	1879	48,864	35,335	30,576	35,292	26,047	20,844	12,858	13,886	27,958	18,796	5,207	21,639	22,691	12,981	22,530	12,179	14,644	11,961
	1878	31,776	22,729	15,340	18,795	16,492	24,056	10,384	8,892	18,802	23,508	3,837	18,612	25,575	18,546	48,711	13,128	10,190	11,402
Bowel complaints ...	1879	2,977	2,285	908	1,789	1,443	1,852	1,162	720	3,177	952	355	1,607	2,135	747	454	526	1,680	535
	1878	3,828	2,079	1,218	914	1,509	1,855	775	736	2,772	873	367	1,336	2,939	1,525	854	540	1,467	777
All other causes ...	1879	3,474	5,496	2,268	4,266	4,757	7,668	3,316	1,709	5,442	5,935	1,218	5,541	5,676	3,341	2,796	3,540	5,519	3,005
	1878	4,620	8,043	2,705	5,033	4,922	8,524	3,481	1,775	6,029	7,817	1,153	5,393	7,133	5,415	6,628	3,438	4,829	3,419
Total ...	1879	56,237	43,484	35,782	46,875	36,222	35,665	21,704	20,461	42,432	31,872	8,497	32,121	32,612	19,768	26,877	18,812	24,135	19,008
	1878	47,308	33,740	20,178	26,035	26,929	37,392	14,821	12,082	29,646	35,633	5,669	26,242	36,029	26,182	56,340	18,666	16,654	17,708
Ratio per 1,000 of population	1879	81	71	67	67	59	43	43	42	42	41	40	35	35	34	34	34	32	31
	1878	68	55	37	37	44	45	29	25	29	46	27	29	38	45	72	34	22	29

8. It will be seen that in 1879, Gurgaon was the most unhealthy of all the districts in the province, the per mille death-rate being 81. Next in order follow Delhi, Rohtak, Rawalpindi and Karnál, the death-rates of which were 71, 67, 67, and 59, respectively. In the other 14 districts the minimum death-rate was 31 in Gujrat and the maximum 43 in both Jhelum and Amritsar. Whilst in 1878 Jullundur, with a death-rate of 72, was the most unhealthy, and next in order Gurgaon, Delhi, Lahore, Ludhiána, Amritsar and Karnál, with 68, 55, 46, 45, 45 and 44 as their respective death-rates. The minimum rate of mortality was in Kángra, with a ratio of 22.

The death-rates of these 18 districts during 1879 compared with the preceding year.

9. Thus of all the districts of the province, those of Gurgaon, Delhi and Karnál have for two successive years shown a most unprecedented high rate of mortality; and this mortality has not been confined to the town population only, but to the rural population likewise, as will be seen by the statement given below:—

Gurgaon, Delhi and Karnál show for two successive years an unprecedented high death-rate.

Deaths registered in the Towns and Rural Circles in the Districts of Delhi, Gurgaon, and Karnál during 1878 *and* 1879.

	Towns and rural circles.	Population.	1878.		1879.	
			Deaths in 1878.	Ratio per 1,000.	Total deaths.	Ratio per 1,000.
DELHI.	Delhi					
	Do. Suburbs	115,992	11,307	97	9,874	85
	Najafgarh	44,561	2,925	66	2,068	46
	Sonepat	4,309	217	50	469	109
	Balabgarh	13,637	342	25	582	43
	Faridabad	6,671	523	78	803	120
	Rural Circles (15 in No.)	7,583	862	114	560	74
		416,097	17,564	42	29,128	70
		608,850	33,740	55	43,484	71
GURGAON.	Farukhnagar	10,594	657	108	2,131	201
	Rewári	25,190	1,734	69	2,054	81
	Ferozpur	10,530	1,174	111	1,171	111
	Palwal	13,553	2,294	169	1,440	106
	Rural Circles (16 in No.)	636,779	41,447	65	49,441	78
		696,646	47,306	68	56,237	81
KARNAL.	Karnál	24,015	1,604	67	2,105	88
	Kunjpura	5,049	338	67	459	91
	Púndri	5,433	255	47	228	42
	Kaithal	15,799	803	51	551	35
	Pánipat	24,500	916	37	1,136	46
	Rural Circles (14 in No.)	536,131	23,013	43	31,743	59
		610,927	26,929	44	36,222	59

Remarks of Civil and Medical Officers explaining the causes which have operated destructively to human life in these parts of the province.

10. The following extracts from the Annual Sanitary Reports received in this office from the Civil and Medical Officers of those five districts in which mortality was highest, will serve to explain the causes which have operated so destructively to human life in these parts of the Province:—

Report of Civil Surgeon Gurgaon.

Regarding Gurgaon, the Civil Surgeon states:—

"The year under report was an exceedingly unhealthy one as compared with preceding years. After the disappearance of cholera, epidemic fever of a severe malarious character occurred among the general population, making great havoc throughout the district; the mortality among the rural, particularly the agricultural, population has been extremely great. Old inhabitants here state that they never experienced such unprecedented sickness. Some ascribe it to the unusual rains of the year, aggravated no doubt by want of food amongst the poorer classes. From this year's fever, scarcely any body escaped, as it would seem that about 95 per cent. of the population of the district suffered."

Commissioner of Delhi, Remarks of—on Civil Surgeon Gurgaon's report.

11. The Commissioner of the Delhi Division, in his letter forwarding the report of the Civil Surgeon of Gurgaon to this office, remarks—

"The causes of this immense mortality are by many ascribed to the fact of a year of plentiful rain-fall succeeding to one of drought; the amount registered in 1879 is given at 33 inches against 18 in 1878. The noxious properties of the soil usually washed out every year remained undisturbed for a lengthened period, and when copious rain did fall, the population appeared to succumb to the malarious influences generated."

Extracts from report of Civil Surgeon Delhi.

12. Of Delhi, the Civil Surgeon, Dr. Fairweather, observes as follows:—

"The year has again been very unhealthy everywhere * * * * Like the previous year this has been marked by the universal prevalence of fevers of the intermittent and remittent type. The cause of these fevers has no doubt been connected with the heavy rain-fall and other meteorological conditions of the season."

Extract from report of Deputy Commissioner, Karnál.

13. The Deputy Commissioner of Karnál remarks that—

"The year has been one of great mortality from epidemic fever, and I am of opinion that the scarcity of two previous years which lowered the vitality of a great portion of the population, coupled with the fact that these two preceding years were years of great drought when there was a very small mortality from malarious fevers, while this year, the rains while they lasted, were very abundant, is sufficient to account for it. The effect of these circumstances was, in my opinion, to cause the ordinary fever mortality of almost 3 years to be registered in one, and further, to cause the mortality to be intensified by the low vital condition of the people."

The Civil Surgeon Rohtak remarks thus :—

"The year under report has been an eventful one; its commencement found the population of the town and district decidedly unhealthy. Fever, which had been excessively prevalent during the preceding autumn, was yet common; the cold in January was very intense, and chest affections very prevalent. Pleurisy and pneumonia carrying off large numbers of the aged and weakly. There was not the usual winter rain-fall. At the end of April the cholera epidemic made its appearance in the district. This was followed by the fever epidemic. Fever, usually confined chiefly to places giving origin to malaria, was less prevalent amongst the inhabitants of irrigated portions than amongst the people living in dry sandy tracts. The climate did not differ materially from that usually observed. That the people of this district should have suffered so much from fever is due, in my opinion, to their being predisposed by impoverished health, the result of the previous year being feverish, following a year of scarcity and want. The types of fever that prevailed were intermittent and remittent. Deaths were due chiefly to coma, whilst in some cases they occurred as the result of collapse induced by excessive billious, vomiting and purging."

Dr. Henderson, Civil Surgeon Ráwalpindi, states as follows :—

"The year 1879 was the most unhealthy I have ever known, but I am at a loss to account for much of the sickness. During spring there were cases of typhus fever both in the jail and amongst the outside population. My impression is that the disease was imported from Kabul direction.

Several cases, of what appeared to me to be typhoid fever, were met with in the city amongst the better class of people, and this is only what we might expect from a defiled water-supply. Famine, diarrhœa, and dysentery have caused a great many deaths, particularly among the Kashmíris. Pneumonia and pleurisy were very fatal when the cold weather set in; the cold set in unusually early, and was very severe; then there was a dearth of fuel, so that the people were unable to warm their houses * * * I have already stated that I cannot account satisfactorily for much of the sickness and mortality of the past year, but I may enumerate some of the causes. In the first place we had a sort of permanent Hardwár fair along the whole of the Grand Trunk Road; then we had the next thing to a famine caused by the war and by the pushing on of the Railway works. All local carriage and labor was taken at fabulous rates, so that neither food nor fuel could be brought in. The Engineer-in-Chief of the Jhelum-Pindi Section of the Railway had to arrange a Commissariat of his own to feed his coolies, and had to get coal from Rániganj to work his pumping engines. This will give some idea of the actual state of affairs. The cause of the great mortality from fevers is not difficult to explain—bad food, impure water, defiled air, insufficient clothing, exposure to excessive heat in summer, owing chiefly to the want of shade all over the country, and exposure to great cold in winter, without proper arrangements for warming the houses. These causes make it a wonder to me that any native child ever reaches manhood; besides, the causes enumerated, however, and which exist more or less every year, there must have been something else about which we seem to know nothing.

Rate at which the mortality occurred in the remaining 14 districts of the province.

14. The mortality registered in the remaining 14 districts of the province, the majority of which are on the frontier, and the aggregate population of which by the census of 1868 amounts to 5,398,509, was not so excessive, as will be seen by reference to Annual Statement No. II; their total average annual death-rate not exceeding 23 per mille. In the hill sanitarium of Simla, and the districts of Shahpur and Ferozepore, the death-rates were 30, 29, and 26 respectively. In Dera Gházi Khan and Jhang they are shown at only 14 and 13 respectively. In the remaining 9 districts the ratio per mille ranged between 20 and 24.

Increase of mortality in 1879 due to high prices of food and unseasonable weather.

15. The mortality during the year under report has, however, been in excess of that registered in any of the previous 10 years in almost every district of the province, and this general increase of mortality is in a large measure due to the high price of food, and unseasonable weather.

Male and female death-rates compared.

16. The total male and female deaths registered during 1878 and 1879 are here contrasted.

	1878	1879
Males	343,955	374,451
Females	284,816	298,762

Their death-rates calculated on the basis of the census population which is 9,509,902 males and 7,977,223 females are 36 per mille per annum for each sex during 1878, and 39 and 37 respectively, for male and female in 1879. This result gives 121 as the excess of male to every 100 female deaths in 1878, and 125 in 1879, and this proportion has been observed, with slight variations for the past 10 years.

Districts in which female death-rate exceeded the male.

17. The female death-rate, however, under one year and from 1 to 6 was in excess of the male in the districts of Ludhiána, Jullundur, Hoshiárpur, Amritsar, Lahore, Gujránwála and Montgomery, notably in the districts of Jullundur, Hoshiárpur and Amritsar. I append the following statement showing the percentage of deaths at and under 6 years to total deaths for these 3 districts :—

	1877.				1878.				1879.			
	Under one year.		One year and under six.		Under one year.		One year and under six.		Under one year.		One year and under six.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Jullundur ...	3·75	4·87	5·54	6·54	11·02	13·46	15·12	18·79	3·67	4·49	6·30	7·02
Hoshiárpur ...	4·75	5·16	3·46	3·89	7·35	8·48	6·38	7·79	4·78	4·93	5·57	6·11
Amritsar ...	5·72	7·21	4·20	5·06	8·96	10·56	8·41	9·56	6·65	8·20	10·67	10·42

The excess of female child mortality in these 3 districts creates suspicion that the work of infanticide is not altogether quiescent.

The principal towns which show a very high death-rate.

18. Of the 52 principal towns, vide Annual Statement No. VI, 38 show a death rate of 35 per mille. Of these again, the following showed an exceedingly high death rate.

1.	Delhi	85 per mille.
2.	Farukhnagar	201 „ „
3.	Rewári	81 „ „
4.	Firozpur in Gurgaon District	111 „ „
5.	Palwal	106 „ „
6.	Karnál	88 „ „
7.	Jhajjar	107 „ „
8.	Amritsar	81 „ „
9.	Rawalpindi	144 „ „
10.	Jhelum	79 „ „
11.	Peshawar	86 „ „

The cause of this excessive mortality and the circumstances that gave rise to it will be explained in the next section.

BIRTH REGISTRATION.

Birth registration extended during 1880 to all the villages in each district of the Province.

19. The system of birth registration, which up to the end of 1879 was only confined to the Municipal towns and the rural circles of two districts, from which birth returns were submitted voluntarily, has, under the orders of the Punjab Government been extended from the beginning of 1880 to all the villages in each district of the province, an arrangement which will perfect the whole system of Registration and very much increase the value of the returns.

Procedure to be adopted for registering the same in villages.

20. In the proceedings of the Honorable the Lieutenant Governor of the Punjab in the Home Department No. 481 dated 2nd January 1880, the procedure to be adopted is thus briefly described. "The registration of births as well as of deaths to be reported by the village chowkidars, who will have two books, one for births and one for deaths in which the entries can, on the chowkidar's report, be made by any resident of the village who can write, and the lumbardars of each village are held responsible that these entries are made.

Each book which is intended to last for one year contains 60 pages; each page is calculated to contain the entries for one week, and the entries for each new week are to be always begun on a new page.

The chowkidars will bring their books with them to the Thana in their weekly visits, and from these books and oral inquiries from the chowkídár, the police moharrir will compile the fuller registers which they are to maintain. The police moharrir will sign the chowkídár's book in token of having seen it. The above description has been translated into Urdu and Hindi for the information and guidance of the chowkídárs, and other local officials concerned and should be widely distributed."

60,000 chaukídárs' memorandum books supplied at an expenditure of Rs. 12,266.

21. 60,000 copies of the Chaukídárs' memorandum books for the registration of births and deaths have been distributed according to the requirements of each district at an expenditure of Rs. 12,266. These returns are now being received in this office and with scarcely any ado, the performance of this work has been very cheerfully accepted by the chowkídárs and lumbardárs, who regularly present their registers at the Police thanahs, from which a copy is made and forwarded to the Police Head-quarters for transmission to this office.

Present system of recording births and deaths, enables any unusual prevalence of disease in any village to be at once detected and brought to notice.

22. I may here observe that the introduction of this system has come in very opportunely for, as the whole of India I believe is to be censused, next year, any particular information that may hereafter be required on matters connected with vital statistics will be easily available. A record of births and deaths is now kept for each village in this Province according to Rural circles, and any unusual prevalence of disease, such as small-pox, cholera, fevers and bowel complaints, can at once be detected and brought to the notice of the authorities concerned.

Birth and death rate of Municipal towns in 1879 compared with 1878.

23. During the year under review, there were 196 Municipal towns, the number in the previous year was 197, the town of Tank in the Dera Ismail Khan district having ceased to exist as a Municipality in January 1879. The birth and death rate of all the Municipal towns for 1878 and 1879 are shown in the following table :—

Statement showing birth and death-rates of all Municipal Towns.

Number.	Districts.	Municipality.	Population, census 1875-76.	1878.		1879.		Remarks.
				Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.	Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.	
1	Delhi ...	Delhi	115,992	40	97	36	85	
2		Do Suburbs	44,561	43	66	24	46	
3		Najafgarh	4,309	43	50	40	109	
4		Sonepat	13,637	31	25	23	43	
5		Ballabgarh	6,671	38	78	18	120	
6		Faridabad	7,583	41	114	27	74	
7	Gurgaon ...	Farukhnagar	10,594	37	62	40	201	
8		Rewári	25,190	34	69	34	81	
9		Firozpur	10,530	31	111	27	111	
10		Palwal	13,553	39	169	21	106	
11	Karnal ...	Karnál	24,015	36	67	25	88	
12		Kunjpura	5,049	45	67	29	91	
13		Púndri	5,433	18	47	16	42	
14		Kaithal	15,799	22	51	11	35	
15		Pánipat	24,500	38	37	29	46	
16	Hissar ...	Hissar	14,162	27	81	18	45	
17		Hánsi	12,210	22	61	18	44	
18		Ehiwáni	33,220	35	45	31	42	
19		Fatahabad	3,084	30	54	29	78	
20		Rattia	3,120	19	23	10	29	
21		Tohána	3,445	38	35	17	27	
22	Rohtak ...	Rohtak	14,994	28	56	15	38	
23		Beri	9,205	41	69	38	100	
24		Gohána	7,296	31	70	19	54	
25		Kharkhauda	4,185	38	62	26	85	
26		Bahádurgarh	7,127	37	54	34	132	
27		Jhajjar	12,456	24	35	24	107	
28	Sirsa ...	Sirsa	12,807	31	76	15	33	
29		Ránia	4,917	25	25	27	92	
30		Ellenabad	3,299	30	41	25	67	
31		Rori	2,728	29	39	34	59	
32		Fázilka	4,346	18	22	18	25	
33	Umballa ...	Umballa	26,258	35	58	31	49	
34		Jagádhri	12,522	26	32	20	67	
35		Búriya	8,197	27	50	14	52	
36		Ládwa	4,121	29	24	21	50	
37		Pihewa	3,569	31	67	15	37	
38		Shahabad	11,660	20	31	19	55	
39		Thánesar	7,111	26	105	13	61	
40		Radaur	4,098	26	27	30	60	
41		Sádhaura	11,167	29	35	19	41	
42		Kharar	4,847	30	46	20	73	
43		Rúpar	10,261	26	24	24	52	
44	Ludhiana ...	Ludhiána	40,385	42	111	22	55	
45		Raekot	8,262	52	67	38	63	
46		Jagraon	16,321	39	68	33	45	
47		Khanna	3,660	40	47	28	45	
48		Máchiwára	6,224	43	57	21	35	
49		Bilolpur	3,059	39	64	18	61	
50	Jullundur ...	Jullundur	35,222	50	94	19	41	
51		Do. Suburbs ...	15,702	47	107	15	32	
52		A'dampur	4,153	31	55	13	38	
53		Aláwalpur	4,836	26	58	10	52	
54		Kartárpur	11,053	28	38	13	27	
55		Bunga	4,817	36	69	21	41	
56		Ráhon	12,914	40	44	28	49	
57		Nawashahr	5,351	33	91	15	29	
58		Phillour	6,251	32	55	15	38	
59		Núrmahal	9,025	31	58	16	22	
60		Nakodar	9,780	26	145	5	18	
61		Mahatpur	6,853	36	117	12	27	

Statement showing birth and death-rates of all Municipal Towns—continued.

No.	Districts.	Municipality.	Population, census 1875-76.	1878.		1879.		Remarks.
				Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.	Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.	
62	Hoshiarpur	Hoshiárpur	13,138	42	58	28	43	
63		Do. Suburbs ...	8,178	45	55	27	40	
64		Hariána	7,802	40	53	23	43	
65		Garhdiwála	3,874	40	35	23	39	
66		Dasúya	8,675	27	43	19	40	
67		Urmar Tánda	13,971	31	43	16	41	
68		Miáni	7,993	36	39	15	47	
69		Mukerián	5,125	30	30	25	42	
70		Una	4,908	19	17	14	23	
71		Nandpur	6,405	25	29	16	42	
72	Kangra	Kángra	6,336	27	26	25	40	
73		Tira Sujánpur	3,393	36	32	29	60	
74		Haripur	3,842	23	32	14	39	
75		Jawalámukhi	2,844	30	40	19	61	
76		Núrpur	7,337	25	44	18	49	
77	Amritsar	Amritsar	136,166	42	72	33	81	
78		Do. Suburbs... ...	6,215	...	17	1	4	
79		Majitha ...	6,004	28	19	17	18	
80		Jandiála	7,037	30	56	26	44	
81		Rámdás	5,257	17	20	8	17	
82		Tarn Táran Khas ...	3,133	39	80	26	45	
83		Vairowal	5,958	32	64	16	33	
84	Gurdaspur	Gurdáspur	4,137	19	31	15	43	
85		Dinanagar	6,626	33	32	25	54	
86		Bahrámpur	3,477	31	28	32	47	
87		Kalánaur	6,051	33	37	19	53	
88		Pathánkot	4,507	26	55	27	58	
89		Sujánpur	6,557	31	34	24	64	
90		Narot	3,944	25	56	17	94	
91		Shahpur	1,336	37	37	33	51	
92		Sukhuchak	3,246	20	19	32	53	
93		Darman	1,607	19	25	26	54	
94		Kot Naina	1,726	25	45	13	45	
95		Batála	26,929	32	24	21	21	
96		Srigovindpur	5,531	32	40	17	36	
97		Fatahgarh	4,481	41	27	30	41	
98		Dera Nanak	7,212	34	57	21	53	
99	Sialkot	Siálkot ...	32,989	30	28	24	34	
100		Daska	5,401	24	19	11	20	
101		Jámki	4,359	29	28	33	34	
102		Mitránwála	3 095	44	23	34	45	
103		Kila Sobha Singh ...	5,159	29	32	17	25	
104		Pasrúr	8,276	26	25	22	19	
105		Zafarwál	4,975	23	20	17	31	
106		Sankhatra	2,390	45	30	35	48	
107		Nárowál	5,297	36	30	26	30	
108	Lahore	Lahore	92,035	39	57	27	51	
109		Do. Suburbs ...	36,406	13	39	9	41	
110		Sharakpur	4,425	45	34	34	41	
111		Chunián	6,469	53	35	42	31	
112		Khudián	3,322	44	50	33	33	
113		Kasur	16,793	26	33	25	29	
114		Khem Karn	5,860	34	61	16	45	
115		Patti	6,290	36	65	28	37	
116	Gujranwala	Gujránwála ...	20,362	40	46	32	45	
117		Eminabad ...	6,719	34	38	22	31	
118		Kila Didár Singh ...	2,214	38	42	34	36	
119		Wazirabad ...	15,346	34	20	24	51	
120		Sohdra ...	4,716	35	16	14	33	
121		Akalgarh ...	5,037	39	33	25	43	
122		Ramnagar ...	7,180	28	25	13	27	
123		Háfizabad ...	2,299	50	41	40	39	
124		Jalálpur ...	2,572	36	57	24	42	
125		Pindi Bhatián ...	4,188	32	23	29	19	
126	Ferozepore	Ferozepore ...	15,168	50	88	32	58	
127		Zira ...	3,471	36	92	22	31	
128		Fatahgarh ...	1,654	54	139	20	22	
129		Makhu ...	1,713	40	53	27	29	
130		Dharmkot ...	5,467	45	78	31	46	
131		Kot Isa Khan ...	1,520	36	124	15	24	
132		Muktsar ...	2,983	44	44	42	54	

Statement showing birth and death-rates of all Municipal Towns.—concluded.

Number.	Districts.	Municipality.	Population, census 1875-76.	1878.		1879.		Remarks.
				Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.	Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.	
133	Rawalpindi ...	Rawalpindi	20,802	38	93	30	144	
134		Pindigheb	8,223	41	29	37	45	
135		Makhad	4,252	34	49	22	40	
136		Hazro	7,950	44	48	28	57	
137		Attok and Malahi Tola ...	3,213	40	76	15	48	
138	Jhelum ...	Jhelum	11,319	16	64	11	79	
139		Chakwál	5,674	26	33	20	57	
140		Talagang	5,659	24	20	33	37	
141		Pind Dadan Khan ...	15,397	40	63	29	40	
142	Gujrat ...	Gujrat	17,401	42	37	37	31	
143		Jalálpur	14,014	36	54	29	43	
144		Kunjáh	5,355	31	30	26	36	
145		Dinga	5,086	38	35	36	39	
146	Shahpur ...	Shahpur	4,743	61	61	36	49	
147		Sahiwál	8,634	52	50	41	49	
148		Ghirot	2,799	29	18	29	16	
149		Bhera	14,710	52	53	41	33	
150		Miani	6,158	52	57	40	34	
151		Khushâb	8,344	49	47	37	34	
152	Mooltan ...	Mooltan	29,448	48	42	44	30	
153		Do. Suburbs ...	21,430	44	51	32	37	
154		Shujabad	6,280	32	47	29	36	
155		Jalalpur	3,525	47	46	41	33	
156		Karor	4,650	35	44	32	21	
157		Dunyapur	2,054	42	43	33	20	
158		Talamba	1,948	47	46	45	32	
159	Jhang ...	Jhang	8,609	27	22	21	35	
160		Maghiána	13,618	30	37	26	27	
161		Shorkot	2,478	46	31	29	22	
162		Ahmadpur	2,146	44	67	32	33	
163		Chinot	11,999	38	29	32	27	
164	Montgomery ...	Montgomery	2,588	21	22	14	20	
165		Kamália	5,900	36	41	31	31	
166		Pákpattan	5,723	31	49	39	33	
167		Sayadwála	3,437	42	47	42	23	
168		Dipalpur	3,407	42	66	29	40	
169	Muzaffargarh ...	Muzaffargarh	2,537	48	55	31	47	
170		Khangarh	2,802	25	51	12	28	
171		Shahr Sultàn	2,836	35	23	20	12	
172		Jatoi	4,814	15	21	10	12	
173		Alipur	2,282	49	56	40	39	
174		Setpur	1,753	41	39	44	46	
175		Khairpur	2,562	47	49	42	34	
176	D. I. Khan ...	Dera Ismail Khan ...	19,954	28	57	16	29	
177		Kulâchi	7,856	34	21	29	20	
178		Bhakkar	4,799	11	21	6	24	
179		Leiah	5,689	16	16	8	11	
180		Karor	2,766	36	44	29	25	
181	D. G. Khan ...	Dera Ghâzi Khan ...	19,133	36	55	24	34	
182		Jampur	4,209	41	59	19	55	
183		Dájal	5,016	38	58	24	28	
184		Rájanpur	3,548	35	32	32	33	
185		Kot Mithu	3,347	41	41	27	35	
186	Bannu ...	Edwardesabad	3,896	35	43	34	54	
187		Isa Khel	6,541	35	75	13	51	
188		Kalabágh	6,082	25	34	23	43	
189		Laki	4,406	36	35	25	40	
190	Peshawar ...	Peshâwar	58,430	41	96	24	86	
191		Shankargarh	1,017	53	65	13	73	
192	Hazara ...	Abbot-tabad	1,194	8	100	16	78	
193		Nawashahr	3,445	36	56	9	40	
194		Baffa	4,494	23	54	16	61	
195		Haripur	4,477	29	48	28	75	
196	Kohat ...	Kohát	11,043	10	19	6	37	

24. In my report for last year, para. 15 page 10, I gave a statement for the purpose of future comparison, showing the birth and death rates of those towns which were notoriously unhealthy with a view to ascertain whether the fecundity of the population had been diminished, and if so to what extent by the wide-spread sickness of the year. I now append the same statement adding to it the birth and death rates of the year under review.

Statement showing towns notoriously unhealthy with a view to ascertain whether the fecundity of the population had been diminished.

District.	Towns.	*Birth-rate.*				*Death-rate.*			
		1876.	1877.	1878.	1879.	1876.	1877.	1878.	1879.
DELHI ...	Delhi ...	50	53	40	36	42	52	97	85
	Ballabgarh ...	41	43	38	18	30	32	78	120
	Faridabad ...	48	57	41	27	33	40	114	74
GURGAON ...	Firozpur ...	61	49	31	27	33	42	111	111
	Palwal ...	50	56	39	21	47	36	169	106
HISSAR ...	Hissar ...	35	30	27	18	36	34	81	45
SIRSA ...	Sirsa ...	33	31	31	15	29	27	76	33
UMBALLA ...	Thánesar ...	25	29	26	13	42	28	105	61
LUDHIANA ...	Ludhiána ...	45	43	42	22	45	36	111	55
JULLUNDUR ...	Jullundur ...	38	28	50	19	138	24	94	41
	Do. Suburbs ...	41	28	47	15	112	26	107	32
	Nakodar ...	27	15	26	5	51	17	145	18
	Mahatpur ...	31	23	36	12	47	23	117	27
AMRITSAR ...	Amritsar ...	38	34	42	33	71	41	72	81
FEROZEPORE ...	Ferozepore ...	30	26	50	32	86	33	88	58
	Zira ...	29	19	36	22	126	30	92	31
	Fatahgarh ...	40	36	54	20	61	31	139	22
	Dharmkot ...	47	48	45	31	54	34	78	46
	Kot Isa Khan ...	37	28	36	15	107	27	124	24
RAWALPINDI ...	Rawalpindi ...	37	34	38	30	44	39	93	144
	Attock ...	41	40	40	15	32	25	76	48
PESHAWAR ...	Peshawar ...	44	42	41	24	35	34	96	86
HAZARA ...	Abbott-abad ...	23	17	8	16	8	9	100	78

It will be seen from the above table how general has been the decline in the birth rate for 1879 after an unusually sickly season of 1878.

25. The annexed statement shows the number of births and deaths registered in the 48 villages situate on the Western Jumna Canal, *viz.*, 25 in the Delhi and 23 in the Karnál district with their birth and death rates according to the population censused in 1877. This statement also is for the purpose of future comparison, after the new canal is opened.

Statements showing Births and Deaths registered in the 48 villages on the Western Jumna Canal.

48 Villages.	Population.	Total Births.			Total Deaths.			Birth-rate per 1,000 of population.	Death-rate per 1,000 of population.
		Males.	Females.	Total.	Males.	Females.	Total.		
25 villages in Delhi district	27,983	379	292	671	985	828	1,813	24	65
23 „ Karnál „	15,153	224	184	408	613	545	1,158	27	76

Statement showing Births and Deaths registered in the villages situated on the

1	2	3	4			5			6			7		8						
Number.	District.	Name of Villages.	Population according to census of 1877.			Total No. of Births registered.			Total No. of Deaths registered.			Birth rate per mille of population per annum.	Death rate per mille of population per annum.	Causes of Death.						
			Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.			Cholera.	Small-pox.	Fevers.	Bowel complaints.	Injuries.	All other causes.
1	DELHI.	Tájpur (Tihári Khúrd) ...	214	205	419	3	9	12	15	8	23	29	55	...	...	15	2	...	6
2		Bhatgaon ...	2,396	2,046	4,442	69	47	116	166	147	313	26	70	1	...	271	18	1	22
3		Barawasni ...	988	907	1,895	36	32	68	63	55	118	36	62	...	...	102	1	...	15
4		Mahra ...	873	773	1,646	29	7	36	50	41	91	22	55	...	...	63	1	1	26
5		Dabarpur ...	253	203	456	4	8	12	20	27	47	26	103	...	...	40	...	...	7
6		Hulaheri ...	478	416	894	11	6	17	26	24	50	19	56	...	..	47	...	...	3
7		Garhi Brahmnán ...	277	268	545	8	6	14	10	12	22	26	40	...	...	20	...	...	2
8		Bádshahpur Majri ...	196	181	377	2	2	4	11	13	24	11	64	...	...	22	...	...	2
9		Jáji ...	296	285	581	11	4	15	27	17	44	26	76	1	...	31	5	...	7
10		Kakrohi ...	1,089	1,020	2,109	30	18	48	90	70	160	23	76	...	...	106	22	...	32
11		Juan ...	1,563	1,476	3,039	36	32	68	83	66	149	22	49	...	...	122	1	2	24
12		Sitauli ...	432	403	835	16	1	17	26	25	51	20	61	...	...	43	...	1	7
13		Chitánah ...	442	393	835	10	13	23	25	26	51	27	61	...	...	45	1	...	5
14		Kheri Darya ...	332	304	636	12	10	22	18	13	31	34	49	...	...	28	2	1	..
15		Jafarabad ...	249	227	476	1	5	6	12	7	19	13	40	...	...	18	...	...	1
16		Khizarpur Ját ...	218	191	409	1	9	10	16	19	35	24	85	...	...	28	...	...	7
17		Maihlána ...	614	537	1,151	12	17	29	37	32	69	25	60	...	...	59	3	1	6
18		Kureori ...	403	353	756	5	8	13	28	36	64	17	85	...	...	55	...	2	7
19		Hassanyarpur (Tihári Kalan)	217	188	405	5	4	9	14	10	24	22	59	...	...	19	2	...	3
20		Bágru ...	381	322	703	5	2	7	15	12	27	10	38	1	...	22	1	...	3
21		Jharauti ...	261	253	514	5	2	7	14	10	24	14	47	...	...	21	...	...	3
22		Anandpur ...	151	136	287	4	1	5	13	5	18	17	63	...	...	17	...	...	1
23		Bhadhánah ...	648	585	1,233	20	12	32	57	43	100	26	81	...	...	67	20	...	13
24		Jharaut ...	318	261	579	6	6	12	23	26	49	21	85	...	...	44	...	...	5
25		Rohát ...	1,468	1,293	2,761	38	31	69	126	84	210	25	76	..	...	176	7	2	25
		Total ...	14,757	13,226	27,983	379	292	671	985	828	1,813	24	65	3	...	1,481	86	11	232
1	KARNAL.	Kharkali ...	72	50	122	3	...	3	5	3	8	24	65	...	1	4	1	...	2
2		Jhiwarheri ...	187	160	347	7	9	16	27	12	39	46	112	...	6	13	2	...	18
3		Hassanpur ...	207	190	397	5	8	13	23	11	34	33	86	...	...	32	1	...	1
4		Rasin ...	222	199	421	9	7	16	23	21	44	38	104	2	10	25	...	...	7
5		Phorlak ...	684	700	1,384	27	28	55	82	73	155	40	112	...	14	121	3	...	17
6		Opli ...	36	44	80	...	...	...	...	...	...	...	...	...	...	...	..	...	...
7		Garaundah ...	2,061	1,568	3,629	61	44	105	135	130	265	29	73	5	4	212	7	...	37
8		Malakpur ...	89	63	152	2	1	3	2	3	5	20	33	..	...	4	1	...	...
9		Bádshahpur ...	31	20	51	1	...	1	2	3	5	20	98	...	...	4	...	...	1
10		Ghora Gharri ...	89	75	164	3	7	10	9	4	13	61	79	...	...	9	2	...	2
11		Sheikhpura ...	395	379	774	18	12	30	24	28	52	39	67	...	...	45	...	...	7
12		Godah ...	627	551	1,178	17	10	27	37	35	72	23	61	...	...	50	8	...	14
13		Kohand ...	651	501	1,152	16	8	24	37	33	70	21	61	...	...	55	...	...	15
14		Ganjar ...	311	249	560	8	3	11	28	22	50	20	89	...	2	43	1	...	4
15		Barauli ..	406	361	767	14	8	22	30	30	60	29	78	...	5	49	3	...	3
16		Babárpur ...	202	183	385	5	3	8	14	10	24	21	62	...	...	20	1	...	3
17		Begampur ...	127	122	249	5	8	13	11	12	23	52	92	...	4	10	1	...	8
18		Dolánah ...	494	438	932	8	9	17	35	32	67	18	72	...	4	38	...	2	23
19		Kotánah ...	40	27	67	...	2	2	4	3	7	30	104	...	...	5	1	...	1
20		Baholi ...	363	235	598	9	7	16	21	22	43	27	72	...	...	33	...	...	10
21		Razapur ...	88	35	123	...	...	...	...	2	2	...	16	...	...	1	1	...	...
22		Khacroli ...	532	458	990	2	3	5	42	35	77	5	78	...	...	59	...	...	18
23		Muhammadpur ...	340	291	631	4	7	11	22	21	43	17	68	...	...	35	2	...	6
		Total ...	8,254	6,899	15,153	224	184	408	613	545	1,158	27	76	7	50	867	35	2	197

Western Jumna Canal in the Delhi and Karnál Districts during the year 1879.

9																10												11
AGES AT DEATH.																DEATHS BY MONTHS.												
Under 1 year.		*1 year and under 6.*		*6 and under 12.*		*12 and under 20.*		*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.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Number.
1	3	5	2	2	...	..	...	...	...	2	...	3	2	2	1	...	...	3	...	1	2	...	2	...	1	7	3	...	4	1
29	21	19	18	2	3	6	3	21	13	22	15	26	28	17	16	24	30	29	18	16	14	29	22	25	22	31	28	38	41	2
14	16	10	4	2	1	4	3	4	4	6	5	8	6	8	6	7	10	11	8	8	4	9	8	3	5	14	14	19	15	3
4	4	14	11	1	..	3	1	4	6	4	5	3	2	6	3	11	9	11	7	3	4	6	7	1	18	11	11	7	5	4
1	4	5	7	2	...	..	1	2	2	6	4	3	...	...	6	1	3	3	...	3	2	4	6	13	1	3	...	6	6	5
2	3	2	4	2	...	1	1	1	2	2	3	8	4	3	2	5	5	2	2	4	1	2	2	3	3	6	11	4	10	6
2	2	2	2	...	1	...	1	...	...	1	...	...	2	3	2	2	2	...	...	...	...	...	2	...	3	2	6	5	4	7
...	1	2	2	...	...	...	..	3	2	1	2	3	2	2	1	...	3	1	3	1	1	1	2	...	2	2	4	4	3	8
9	3	2	1	1	1	1	3	2	...	2	3	7	2	2	...	1	4	2	3	3	2	1	8	4	4	2	6	2	7	9
15	15	21	9	1	1	...	4	7	8	5	11	11	6	17	3	13	13	12	7	11	9	7	8	6	9	18	21	26	26	10
12	7	11	7	1	1	4	3	10	4	5	8	13	11	7	11	20	14	14	5	13	11	15	13	4	12	10	11	23	18	11
5	...	2	2	1	...	6	2	6	1	2	5	2	4	1	6	1	5	8	4	5	5	5	5	5	...	3	5	2	4	12
...	4	9	7	1	...	...	1	...	2	4	3	4	2	4	4	3	3	6	2	...	1	4	5	6	5	2	6	9	5	13
2	2	...	...	...	...	...	...	1	1	3	...	6	3	3	3	3	4	3	2	3	1	3	1	1	2	1	2	8	4	14
...	1	4	1	...	...	...	...	...	3	4	...	1	...	2	...	1	2	3	1	1	...	1	1	2	3	2	2	...	3	15
...	6	2	2	...	...	1	1	3	2	1	...	2	3	3	2	4	3	4	2	5	1	4	3	1	2	3	3	3	4	16
3	1	9	7	1	...	1	1	6	4	1	5	1	4	7	5	8	5	12	4	1	2	4	2	1	6	7	10	10	10	17
3	3	1	2	2	7	...	1	8	1	3	6	2	2	4	8	5	6	8	2	1	3	3	8	2	1	9	11	8	8	18
3	1	...	1	1	...	...	...	...	...	3	1	2	1	1	3	4	3	2	...	3	2	3	1	2	1	2	3	3	2	19
1	1	1	2	...	...	...	1	2	1	3	...	5	1	1	1	2	5	1	2	5	2	1	2	...	2	2	3	5	2	20
3	3	3	2	...	...	..	...	2	1	4	1	...	...	...	...	2	3	4	...	..	...	1	2	1	4	2	1	8	1	21
1	2	...	...	2	...	1	...	1	...	2	...	3	1	2	...	1	2	2	...	...	..	2	1	1	...	...	3	1	8	22
8	11	13	9	3	1	2	1	11	10	3	1	4	5	6	4	7	1	4	4	2	6	4	4	2	11	16	13	14	13	23
2	3	4	6	1	1	2	...	...	8	3	2	1	1	4	2	6	3	5	...	...	4	2	2	2	6	9	11	3	5	24
25	14	16	12	7	3	3	1	8	6	10	2	12	8	18	15	27	23	15	11	6	7	19	5	12	6	33	44	24	28	25
145	131	157	120	33	20	35	29	102	81	102	82	130	100	123	104	158	161	165	87	102	84	130	122	97	129	197	232	232	236	
1	...	2	1	...	...	...	...	...	...	...	...	2	2	...	...	...	...	...	...	...	...	1	...	...	2	...	1	...	4	1
7	5	9	4	1	...	1	1	2	...	3	..	...	...	1	...	3	2	1	3	1	...	...	1	4	9	10	3	5	2	2
6	3	6	4	...	..	1	1	3	..	4	...	1	2	1	1	1	...	2	..	...	...	6	...	1	10	9	2	2	2	3
6	4	8	8	.	2	...	2	3	...	...	4	5	1	1	...	...	...	2	...	...	4	6	3	9	5	4	9	...	2	4
21	17	22	15	2	...	1	1	3	3	8	5	7	6	10	6	8	20	7	7	3	4	10	9	9	12	32	26	16	20	5
...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
30	24	25	31	9	7	3	3	8	8	8	12	11	7	17	8	24	30	15	12	11	7	46	13	13	20	42	42	32	12	7
...	1	1	1	...	1	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	1	3	...	...	...	...	8
2	...	...	...	...	...	...	...	...	1	...	...	...	..	...	1	...	1	...	...	...	...	2	...	...	1	...	...	1	1	9
1	...	2	2	...	...	...	...	...	..	1	...	...	...	3	...	2	2	...	..	1	1	1	...	1	1	2	1	1	4	10
7	5	8	8	...	1	1	...	1	1	3	2	...	3	2	4	2	4	3	4	3	1	4	1	3	4	5	10	7	7	11
6	3	14	7	2	...	3	1	...	1	4	4	...	7	2	2	6	10	5	1	1	2	7	4	...	12	14	10	9	7	12
7	5	12	9	3	1	...	1	2	1	1	1	3	3	4	5	5	7	1	4	1	3	10	1	4	6	14	16	2	8	13
3	1	10	3	1	1	3	...	2	1	...	6	2	6	4	1	3	3	9	...	1	...	5	1	3	4	5	12	7	3	14
5	2	8	9	2	...	...	...	1	2	2	6	4	3	4	4	4	4	5	1	4	2	6	1	2	4	2	14	11	8	15
3	...	4	4	...	2	...	1	1	..	...	...	2	2	4	...	...	1	1	1	4	2	1	1	...	4	3	4	2	1	16
...	4	5	4	1	...	1	1	1	...	2	..	...	...	...	...	1	3	3	1	1	1	6	1	2	3	1	3	...	1	17
4	3	16	4	4	...	3	2	...	4	...	4	...	8	4	4	4	3	9	4	1	1	3	3	3	8	10	17	8	...	18
...	...	...	1	...	1	1	...	...	1	1	...	1	...	...	...	1	...	...	...	...	...	...	...	...	1	3	...	2	1	19
3	5	1	2	...	...	1	2	1	1	2	2	4	3	1	3	8	4	7	3	...	..	3	...	2	4	8	4	8	4	20
...	...	...	...	...	...	..	...	...	1	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...	...	21
3	4	12	5	2	1	2	2	6	3	1	4	7	5	1	6	8	5	6	4	8	7	8	4	3	5	7	12	8	5	22
1	3	4	2	...	1	1	1	2	2	5	3	5	3	3	4	1	2	7	5	2	...	...	5	2	5	1	7	7	2	23
116	89	169	124	27	18	22	19	36	30	45	53	54	61	63	50	81	101	84	51	42	35	125	48	62	124	172	193	128	94	

In the half year ending 31st December 1878, (vide Report for 1878) the death rate of the villages in the Delhi district was 63 per mille more than those in the Karnál district, but for the year under review, those of the Karnál villages are in excess of those of Delhi.

Death rate of the villages in the Karnál district compared with those of Delhi.

26. In the Karnál district all the villages, with the exception of those noted below, showed a very high death rate, *i. e.*, between 60 and 112 per mille.

Malakpur	...	...	33 per mille.
Opli	...	...	No deaths registered.
Razapur	...	...	16 per mille.

In the Delhi district the death rate ranged between 38 and 85, except in the village of Dabarpur where the mortality reached 103 per mille.

Deaths according to diseases in these 48 villages.

The deaths according to diseases and ages in the selected areas are as follows :—

DISEASES.

Villages.	Cholera.	Small pox.	Fevers	Bowel complaints.	All other causes	
25 Villages in the Delhi district	3	...	1,481	86	243	
23 Villages in Karnál district	7	50	867	35	199	

AGES.

Villages.	Ages at death.									Deaths at all ages	
	Under one year.	1-6	6-12	12-20	20-30	30-40	40-50	50-60	60 and upwards		
25 Villages in Delhi district	276	277	53	64	183	184	230	227	319	1,813	
23 Villages in Karnál district... ..	205	293	45	41	66	98	115	113	182	1,158	

Months in which high mortality occurred in the villages.

In the villages in the Delhi district, the mortality rose very high in the months of January, September, October, November, and December, the total deaths registered in these 5 months were 1062 out of 1813.

In the Karnál villages the most sickly months were May, August, September, October and November, 742 deaths out of a total of 1158 having been registered in these months alone.

Emigration and immigration in these selected villages.

27. The population of these villages was said to have been very seriously affected by emigration and immigration caused by scarcity and prevalence of malarious fever, but from returns received, I am convinced that, so far as the Karnál villages are concerned, the influx and eflux have been almost equal.

Number of persons fined for neglecting to register births and deaths in Municipal towns.

28. The number of persons fined for neglect to register births and deaths in the Municipal towns was 256. In the two previous years the number was 419 and 427, and the amount realized under this head was Rs. 205 in 1879, Rs. 214 in 1878, Rs. 238, in 1877.

Births and deaths registered amongst European and Eurasian population.

29. The following statement shows the births and deaths registered amongst the European and Eurasian population during the years 1878 and 1879.

Statement showing the births and deaths registered amongst the European and Eurasian population during the years 1876 *to* 1879.

No.	Names of Stations.	Population under registration.	*Deaths registered.*				*Births registered.*			
			1876.	1877.	1878.	1879.	1876.	1877.	1878.	1879.
1	Delhi	504	23	28	29	10	29	21	21	9
2	Gurgáon	6	...	...	2	...	...	...	...	...
3	Karnál	8	...	...	...	...	...	...	...	...
4	Hissar	63	1	...	...	2	2	...	...	...
5	Rohtak	28	1	...	...	...	...	...	...	...
6	Sirsa	23	...	...	...	...	1	...	1	...
7	Umballa *	58	...	...	1	1	...	...	2	...
8	Ludhiána	114	...	...	1	1	...	...	...	1
9	Simla	2,203	23	33	30	35	44	52	53	68
10	Jullundur	55	1	...	...	...	...	...	...	...
11	Hoshiárpur	21	...	...	...	...	...	...	...	...
12	Kángra †	63	2	1	1	2	...	...	...	...
13	Amritsar	196	1	1	2	3	...	...	...	...
14	Gurdáspur	344	10	7	2	3	10	10	4	14
15	Siálkot	2	...	...	...	...	...	...	...	...
16	Lahore	1,728	16	26	46	65	5	3	6	14
17	Gujránwálla	40	1	1	1	4	1	1	1	...
18	Ferozepore	unknown.	...	...	...	...	...	...	...	...
19	Rawalpindi ‡	1,526	33	9	19	45	26	12	30	6
20	Jhelum	58	...	...	...	1	...	...	...	...
21	Gujrát	278	...	...	...	1	...	...	...	...
22	Shahpur	unknown.	...	...	1	1	...	...	...	...
23	Mooltan	132	5	2	2	...	5	...	...	...
24	Jhang	42	...	...	...	...	...	...	...	...
25	Montgomery	9	...	...	...	...	...	...	...	...
26	Muzaffargarh	5	...	...	...	...	...	...	...	...
27	Dera Ismail Khan	11	2	...	1	4	...	...	...	...
28	Dera Gházi Khan	11	...	1	...	1	...	...	...	...
29	Bannu	unknown.	...	...	...	1	...	...	...	...
30	Peshawar	Ditto,	...	...	...	1	...	...	...	...
31	Hazára	2	...	1	...	14	...	...	...	2
32	Kohát	unknown.	1	...	5	15	...	...	...	...
	Total ...	7,530	120	110	143	210	123	99	118	114
		Ratio of deaths per 1,000	16	15	19	29	16	13	16	18

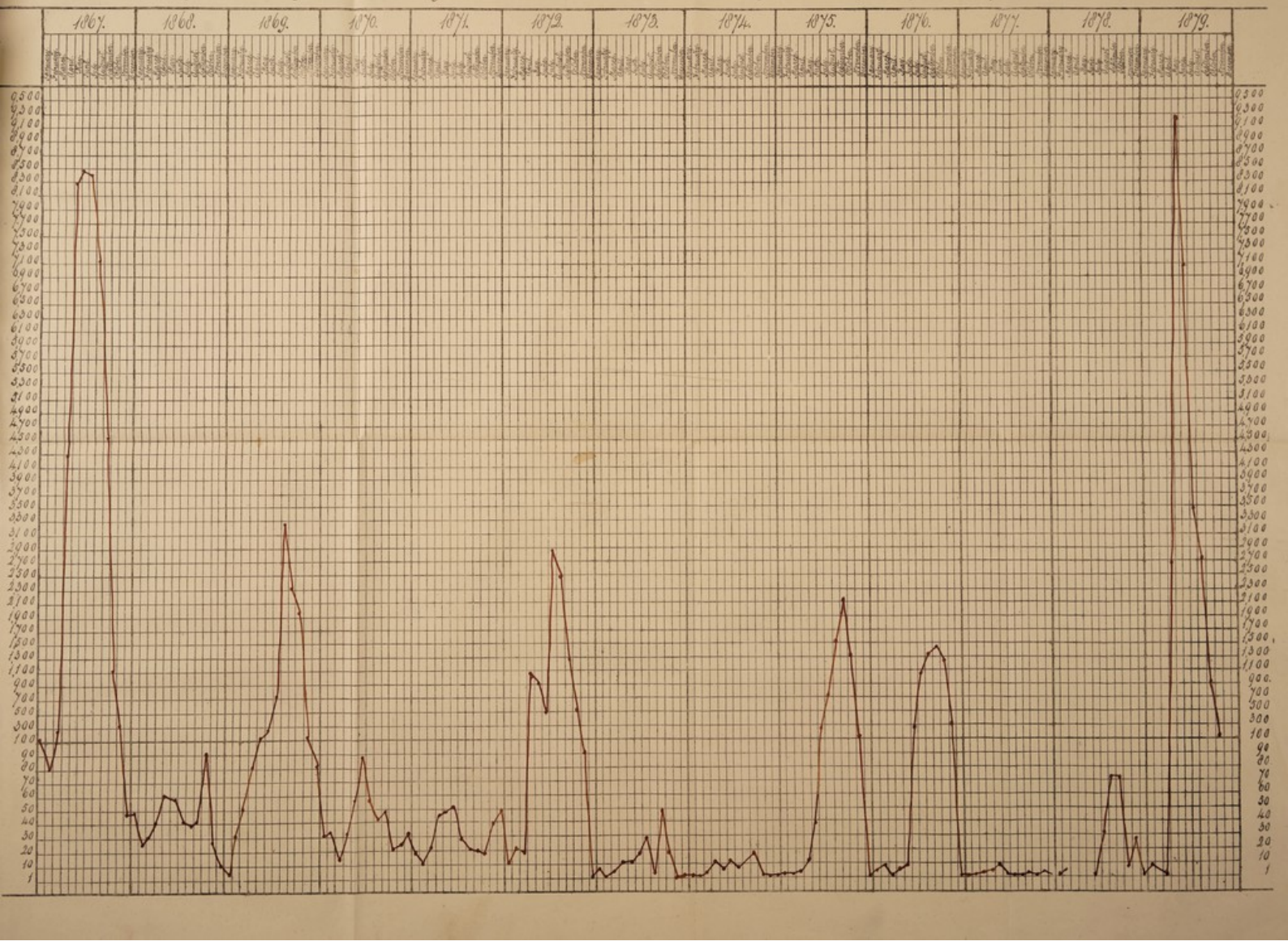
* Including Rúpar out-post.
† „ Pálampur Tahsíl.
‡ „ Murree.

Deaths from different diseases amongst the European and Eurasian population (under registration) in the Punjab during the years 1876, 1877, 1878 *and* 1879.

Year.	Cholera.	Small-pox.	Fevers.	Bowel complaints.	Injuries.	All other causes.	Total deaths from all causes.
1876	28	1	13	8	4	66	120
1877	...	3	14	12	5	76	110
1878	3	6	31	27	5	71	143
1879	40	1	33	23	2	111	210

This Section of the report has been prepared by Surgeon Major, A. Taylor, who was appointed Sanitary Commissioner of the Punjab, during my absence on Special Political duty in Afghánistán.—H. W. BELLEW, Surgeon Major, *Sanitary Commissioner, Punjab.*

Chart showing the monthly distribution of deaths from Cholera in the Panjab during the years 1867 to 1879 inclusive.



SECTION VI.—CHIEF DISEASES OF THE YEAR.

A. CHOLERA.

Account of previous epidemics of cholera appended as a prelude to the consideration of the present epidemic.

30. As a prelude to the consideration of the history of the cholera epidemic of 1879, I append below a statement showing the total deaths registered from cholera in this Province each year from 1866 to 1879 inclusive, with a brief account of the origin of the disease in each epidemic year, extracted from the several Punjab Sanitary Administration Reports in this Office :—

STATEMENT.

Year.	No. of deaths.	Remarks.
1866 ...	1,051	
1867 ...	43,146	Kumbh Mela Hardwar.
1868 ...	532	
1869 ...	9,258	
1870 ...	469	
1871 ...	389	
1872 ...	8,727	
1873 ...	148	
1874 ...	78	
1875 ...	6,246	
1876 ...	5,473	
1877 ...	29	
1878 ...	215	
1879 ...	26,135	Kumbh Mela Hardwar.

From the above statement it will be seen that 1866, 1867, 1869, 1872, 1875, 1876, and 1879, were the years in which the disease raged epidemically in this Province.

Epidemic of 1866.

31. Of the epidemic of 1866, in which 1,051 deaths are reported to have occurred, there are no *data* available in this office to enable me to reproduce the facts connected with the mortality from cholera in that year. The number of deaths therein exhibited is extracted from the Sanitary Report for 1869, and quite warrants the assumption that cholera was prevalent, if not epidemically, certainly with more than ordinary severity, though Dr. DeRenzy, in contrasting the number of cholera deaths in the early part of the year 1867, with that of the year previous, states "that the number of cholera deaths in the first five months of 1867 was not in excess of that shewn in 1866, a year in which the disease was nowhere known to have been epidemic."

Epidemic of 1867.

32. In 1867, 43,146 deaths occurred, and the Sanitary Commissioner of the Punjab gives in his report for that year, a brief outline of the facts so far as they are known, bearing on the origin and diffusion of the great cholera epidemic which overspread the Province. He states that (para. 49), "the Government of the Punjab knowing that the annual fair at Hardwár for April 1867 was to be a Kumbh fair, (the term *Kumbh* is applied to every twelfth fair), and that it was likely to be attended by vast multitudes of pilgrims from all parts of Hindústan and of the Punjab, and foreseeing the dangers likely to arise to the public health from so great a concourse of human beings, many of whom would be destitute and exhausted by the fatigues of a long journey, addressed the Government of the North-Western Provinces on the 28th January, drawing attention to the necessity of special precautions being taken, with a view to the prevention of cholera or other contagious disease. Further, on the 13th March a Circular was addressed to all Commissioners, whose divisions lay on the pilgrim routes, directing that all practicable measures should be taken for carrying out proper conservancy arrangements at the different pilgrim encampments, for preventing undue crowding, and securing ample supplies of good and wholesome water. Commissioners were further instructed to arrange that immediate information should be conveyed to them of the appearance of cholera, or any contagious disease, among the pilgrims. In that event, measures were to be taken for preventing the entrance of the disease into towns and cities by the establishment of quarantine, and also for providing medical assistance for those attacked."

"*Para.* 51.—"The Punjab was believed to be entirely free of cholera before the fair, but the present returns indicate that the disease existed in the Delhi District, in the month of March. The cases reported under that head are too numerous to be classed with the ordinary bowel complaints, of which a few appear in every monthly return as cases of cholera."

"*Para.* 58.—There is a general concurrence of testimony, that the health of the people at Hardwár was remarkably good up to the 11th April. Civil, Medical, and Police Officers all agree on this point, and say that up to that date there was no sickness. From the 3rd to the 13th April there were 1,352 patients treated, of whom nineteen died, two from diarrhœa, but none from cholera. On the 9th there had been a slight case of cholera in a grass-cutter of the cavalry detachment, and the police had previously reported four cases as such, but which were afterwards pronounced not to be so by Medical Officers."

"*Para.* 59.—Several cases of undoubted cholera occurred on the evening of the 12th. On the following morning the pilgrims began to disperse, and the result has shewn that by that time every section of the great multitude had become contaminated with cholera, for each and every one of the streams of returning pilgrims had cases of the disease within one day's journey from Hardwár, and it clung to them till their arrival in their homes in the most distant parts of the Province."

"*Para.* 60.—Dr. Murray, Inspector General of Hospitals, Upper Provinces, has noted in a very instructive table, the dates of the first cases that occurred along the pilgrim routes in the Punjab, distinguishing cases in pilgrims and in residents. The pilgrim cases take precedence in every case, and, with a few exceptions, the first cases among residents occurred in persons who had been in close contact with pilgrims. In no single instance did the disease appear in a station before the arrival of pilgrims. The facts leave no doubt of the transmissibility of the disease, and of the pilgrims being the vehicle of the importation into the Punjab."

Epidemic of 1869.

33. In regard to the epidemic of 1869, para. 64 of the Punjab Sanitary Report states, "cholera was epidemic in the Lower Provinces early in the year; but the existence of the disease in the Punjab was first reported on the 27th May 1869 by the Civil Surgeon of Amritsar. The returns for that year shew that deaths from cholera were registered in every district of the Province, except Muzaffargarh, and in every month of the year without exception; but the disease nowhere assumed an epidemic character till June or July, and the genuineness of many of the cases registered in the early portion of the year is very questionable."

Epidemic of 1872.

34. For the epidemic of 1872, two sources are assigned for the outbreak; 1st, the Pehowah fair, 2nd, to a band of pilgrims from Jummoo, and the neighbouring hill territory, who had gone to the Hardwár fair, and among whom several suspicious cases of diarrhœa had occurred while there (*vide* paras. 40, 41, 44 and 45 of Punjab Sanitary Report for 1872.)

Epidemic of 1875.

35. In the year 1875, the epidemic was very mild, and no reason is assigned for the outbreak, except that (para. 50, Sanitary Report for 1872) "cholera in a very fatal form had prevailed for some time previously in many of the districts of the North-Western Provinces and Oudh, with which the Punjab Districts are in constant communication by railway."

Epidemic of 1876.

36. The epidemic of 1876 is "a continuation apparently of the epidemic of the preceding year, (para. 44, Punjab Sanitary Report for 1876.)"

EPIDEMIC OF 1879.

Preliminary remarks and Statement showing monthly mortality from cholera during 1879.

37. I shall now confine myself to giving a concise history of the outbreak, arranging in their proper order, such facts as I have been able to gather from a pile of reports, and from a sea of statistical tables submitted by District Officers, Civil Surgeons, and others, on the subject, including a notice of all evidence on the existence of cholera in the Punjab prior to the Hardwár assemblage.

The following table shews, by months, the total deaths from the disease during the year under review, and the annual *per mille* death-rate:—

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Death-rate.
1879.	7	4	2	2,603	9,184	7,085	3,457	2,705	914	147	7	20	26,135	1·49

from which it will be seen that the disease raged epidemically only in the 2nd and 3rd quarters of the year, namely from April, the month in which it first appeared, to September, the month in which it almost completely abated; and in this period alone, of the 26,135 total deaths, no less than 25,948 occurred.

Statement shewing the real cause of death in 12 cases registered under the head of Cholera.

No.	District.	Police Station.	Town or Village.	By whom investigated.	Deaths. Males.	Deaths. Females.	Deaths. Total.	Age.	Duration of illness.	Date of death.	Disease to which death is attributed by district authorities.
	Umballa ...	Thánasar ...	Thánesar ...	Native Doctor...	1	...	1	25 Years	1 day.	17th February 1879	Swelling of the stomach and fever.
	Ludhiána ...	Dehlow ..	Rampur ...	Dy. Inspr. Police	...	1	1	60 Do.	2 Do.	29th December 1878	Indigestion.
	Ditto ...	Ditto ..	Ditto ...	Ditto ...	1	...	1	18 Do.	5 Do.	31st ditto 1878	Ditto.
	Amritsar ...	Kathunangal...	Burj ...	Ditto ...	1	...	1	30 Do.	6 hours	16th February 1879	Cold.
	Gurdáspur ...	Naroť ...	Rathour ...	Lambardar ...	1	...	1	25 Do.	1 day	29th March 1879	Fever.
	Ditto ...	Gurdáspur ...	Darangla ...	Dy. Inspr. Police	1	...	1	20 Do.	1 Do.	4th January 1879	Ditto.
	Siálkot ...	Zafarwál ...	Bhattian ...	Sergt. of Police	1	...	1	42 Do.	10 Do.	7th Ditto 1879	Indigestion.
	Ditto ...	Sambriál ...	Chak Baha ..	Dy. Inspr. Police	1	...	1	25 Do.	2 Do.	16th Ditto 1879	Pain in stomach.
	Ditto ...	Ditto ...	Sindu Vala ...	Ditto ...	1	...	1	60 Do.	8 Do.	12th Ditto 1879	Ditto.
	Lahore ...	Saral Mughal ...	Jamar Khurd...	Ditto ...	1	...	1	40 Do.	4 Do.	30th Ditto 1879	Fever and a pain in the side.
	Ditto ...	Mángtánwála...	Nankana Pukthta	Ditto ...	1	...	1	25 Do.	8 Do.	24th March 1879	Fever and pneumonia (gatuljam.)
	Gujrat ...	Jalalpur ...	Jalalpur ...	Civil Surgeon...	1	...	1	60 Do.	1 Do.	13th January 1879	Apoplexy.
	Kohát ...	Kohát ...	Tibbi ...	Nil ...	1	...	1	14 Do.	1 Night	7th February 1879	Information not available.
				Total ..	12	1	13				

38. From the 1st January to the 31st March there were in the mortuary returns furnished to the Sanitary Commissioner's Office, as per Statement given above, thirteen deaths reported from cholera. These cases were investigated by the police or others, in consequence of queries sent to them from this office ; and in all, except one in Tibbi, Kohát District, whence no information has been received, satisfactory evidence was given to shew that the entries of the causes of deaths were erroneous ; while, with regard to the solitary instance at Tibbi, the length of time elapsing between this case, which occurred in the week ending 8th February, and the epidemic outburst in the week ending 7th May, is sufficient to annul any idea of connection between them. In the first week of April, there were five cases reported ; of these, two, namely, one in the Lahore, and the other in the Siálkot district, are proved not to have been cholera. Another mentioned as having occurred in the Hissar District was diagnosed as such by a compiling clerk, who translated *dast aur kai* (purging and vomiting) into "cholera." The fourth case was reported by Assistant Surgeon Chetan Shah, Civil Surgeon of Gurgaon, (who saw and treated the patient) on the 2nd April, as one of genuine cholera. This case proved fatal. The man was a pilgrim on his way from Jeypore to Hardwár. There were no other cases, as a sequence of this one, nor was it apparently in any way directly connected with the outbreak of the epidemic some fortnight or so afterwards. The next known case, which occurred in the Kángra District, is of very much greater interest and importance ; it is that of a man named Jugger Nath, a *bania* by caste, resident of Jugroli or Jurowli, in the Jagádhrí Tahsíl of the Umballa District, who arrived at Kángra on the 2nd April, having passed through Jowalla Mukhi. He was taken ill that night in the house of Durga Pershád Bhojke, and died next day. The next case also was of a man (a servant) named (Gokal) from Jowalla Mukhi, who being taken ill with cholera at that place, was nevertheless removed by his master to Dehra, about seven miles or so, where he died. On the 5th April, a woman named Dwarka,* also of Jowalla Mukhi, was taken ill at that place, and there died, her death being followed by that of two at least of her relatives, one of them being her son, who caught the disease, it is presumed, from her. Three of her relations went off to Dehra, and the day after their arrival, a woman of the same family at Dehra took ill and died.

Comments upon the first 13 cases which occurred in the 1st quarter of the year.

39. The next return, that of the week ending 12th April, shews fifteen deaths in the whole Province, all of which were in the Kángra District, of which ten occurred in the town of Jowalla Mukhi.

Outbreak at Jowalla Mukhi in the Kangra District.

Now this outbreak of cholera being entirely distinct from the great epidemic, which appeared some fourteen days later all over the Punjab, requires separate consideration. It appears that there is a large annual fair at Jowalla Mukhi, about the date of the first appearance of cholera there, in fact the Deputy Commissioner of Kángra states in his report as follows :—"At the commencement *of the fair* at Jowalla Mukhi, there was a case of cholera reported to me by the Police Officer, who was on the spot, and all due precautions were taken, &c." Colonel Jenkins thought at first, that it was either not cholera at all, or only a sporadic case ; afterwards, however, he changed his mind, and he states that, "I have

*NOTE.—With reference to Mussamat Dwarká's illness, it is mentioned that a relative named Shib Churn Jogi, died of fever and pain in the side, (it is not stated at what place he had been previous to his illness) and was *buried* at Jowalla Mukhi on the 1st, and when the relatives came back from the burial, the woman *caught* cholera and died.

Now, when I was Civil Surgeon of Kángra District, I was told that the Hindu hill tribes burn their dead, except in cases of small-pox, cholera and typhus fever. Now is the word (buried) a mistake ? Or was he buried with salt (*loon diagya*), as is the habit with *fakir's* sometimes ? Or was he not burned, as having died of one of these dread diseases ?

some cause to fear that the first case *was one of cholera*, and that it is inclined to spread in an epidemic form." Now from the list of fairs published in Appendix C, of the Punjab Administration Report for 1871—1872, it will be seen that the *Mela* which takes place at Jowalla Mukhi in March, lasts for ten days and is usually attended by about 20,000 people, and that "nearly the whole number of them are strangers; the people come from great distances, they put up in shops, houses, dhuramsalas." During 1879, the fair lasted from about 23rd March to 1st April. The 31st March, the *Durga Ashtmi*, was the day when it was expected to be fullest.

Dr. Planck, Sanitary Commissioner N. W. P., thus states in his Annual Report of the Hardwár fair, "the fair may be said to have lasted from the 15th of March to the 16th of April, the most auspicious day for bathing being the 12th of April, and in all the period between the two dates first mentioned many pilgrims arrived, bathed, and departed to their homes daily." He also states in a demi-official letter to the Secretary to Government, North-Western Provinces, "that there were about a lac of people present at the fair by the 25th March." Now, it is the habit of "*Gunga bashes*," after having bathed at Hardwár, to visit as religious pilgrims any spots of reputed sanctity, which may happen to attract their notice, owing to there being a mela at their locality, or for any other reason. One of the most favored of all the Hindú shrines, is that of Jowalla Mukhi, and the Hindú (*Bunya*) Jugger Nath, who died at Kángra, after having passed through Jowalla Mukhí, was evidently bent on performing a circuit of visits to holy places in furtherance of the custom, and I think very probably "Musamat Dwarka's" relation, Shib Churn Jogi, was on the same errand, though, of course, this being conjecture goes for very little. Now it so happened that there was an auspicious day for bathing at Hardwár, namely "Chaitar Chaudas" on the 21st March, and four cases of cholera in all were reported to have occurred at the fair up to 26*th March*. The case therefore stands thus :—

The first indubitable case of cholera in the outbreak in the Kángra valley, was in the person of a pilgrim (Jugger Nath) who had been at Hardwár, where cholera existed prior to his leaving, that he came thence having started probably after a bathing day on the 21st March, to Jowalla Mukhi, he then proceeded to Kángra where he died of cholera on the morning of the 3rd April. Cholera appeared immediately afterwards, at Jowalla Mukhi, in the person of the woman Dwarka, and from her the disease undoubtedly spread to several others, her nearest relations being the first to suffer.

Outbreak at Firozpur Meo in the Gurgaon District previous to that of Hardwár.

40. The particulars of a sharp, but apparently local outbreak of cholera, in the Gurgaon District prior to the Hardwár epidemic, are gathered from the report of Assistant Surgeon Chetan Shah, Rai Bahadur, Civil Surgeon of that place. It appears that cholera had been known to exist at Muttra, North-Western Provinces, long before it had been heard of at Hardwár, having been demi-officially reported by the Magistrate of that place to the Deputy Commissioner of Gurgaon. A *garriwan* (a country-cart driver), resident of the village of Firozpur Meo in the Gurgaon District, when on his way from Muttra, to his home, was seized with diarrhœa and vomiting, and on his arrival on the 5th of April, had symptoms of undoubted cholera, which are reported by the Native Doctor, who inquired into the case as being "low voice, suppression of urine, diarrhœa, vomiting and cramps," terminating in death. This case was followed by others in the same place, in the very Mohalla in fact in which he lived. One case was on the 5th, and the second, on the 7th April. Altogether forty-two cases and twenty deaths occurred in this village, out of a population of 150 souls. There is no mention of the disease having spread from Firozpur Meo as a centre; the outbreak is quite unconnected with the epidemic after the return of the Hardwár pilgrims.

Details of first cases in each district arranged categorically.

41. Before entering into the general history of cholera in the Province, I propose to give an account of the commencement of the outbreak; first, detailing the earliest cases that occurred in those districts that are adjacent, in the closest proximity to, or easiest of access from Hardwár; and then to take two further consecutive groups, arranged according to their distance or accessibility from that place, noting particularly whether the early victims were pilgrims, persons in intimate connection with pilgrims, or residents having no known communication with them, and whether they were Hindús or Mahommedans. In the first category, as will be seen from the accompanying chart, come the districts of Delhi, Gurgaon, Karnal, Rohtak, Umballa, Ludhiána, Jullunder, Hoshiárpur, Amritsar and Lahore.

In the Second.—Hissar, Simla, Kangra, Gurdáspur, Sialkot, Gujránwála, Ferozepore, Gujrat, Jhelum, Rawalpindi.

In the Third.—Sirsa, Shahpur, Montgomery, Mooltan, Jhang, Muzaffargarh, Dera Ismail Khan, Dera Gházi Khan, Bannu, Peshawár, Hazárá, Kohát.

42. Dehli.—The first case from cholera is reported to have occurred in the city, on the 31st March, in a goldsmith, and no history of communication with a previously affected place could be ascertained. The second was that of a Brahmin, who was seized on the 14th of April (both recovered). The Civil Surgeon saw neither of these cases, and the Assistant Surgeon who did, describes them as very mild in their symptoms.

The third case was a *pilgrim*, a wealthy Hindú, travelling in his own carriage, who was taken ill on 16th April, when returning to Delhi from Hardwár (about five miles on the road from Delhi.) He died the same evening after arrival. The same day ten more cases occurred among passengers who arrived in Delhi by the Sindh, Punjab and Delhi Railway; eight were pilgrims, and two were the woman and child who had travelled from Meerut to Delhi, with the pilgrims.

Dr. Fairweather gives the following account of those cases: "The history of these two is of great interest as showing the extreme rapidity with which the poison of the disease may act under favorable circumstances. The two were the wife and child of a Hindú, who had got into the train at Meerut along with a crowd of Hardwár pilgrims, and had journeyed with them to Delhi. It was not supposed that they had, up to the time of getting into the train, come into contact with any cholera affected person or place, and got cholera in the short journey from Meerut to Delhi, which usually takes about three hours, but which may have taken more on this occasion, the disease had fully developed itself."

On the 17th three cases occurred, on the 18th fourteen, all pilgrims, and on this date, also the first case took place among the residents of Delhi, who had not been to Hardwár, this of course under the supposition that the two mild cases (which recovered) before the 12th April were not cholera. This was a little girl, the daughter of an European driver, in the Rajputana State Railway; she had been for twenty minutes or so, in a crowd of Hardwáris at the Station. On the 19th, there were thirteen Hardwáris, and one Hindu resident, and also a Mahommedan woman, as far as can be ascertained, neither of whom had had any communication with pilgrims. On the 20th, six cases were reported, only one being a pilgrim; but the five others are all worthy of note. One was a *kahár*, who had carried a cholera patient to hospital. Another was a beggar girl, who had been receiving alms from the Hardwár pilgrims. The third a Brahmin woman, who had been putting up at the *top khana* Serai, where pilgrims were living, among whom cholera had actually occurred. The fourth was a sister of a woman, who had been seized on the 16th, with cholera, and the fifth was a woman, who had been living in the cholera hospital, and had been in the habit of crawling among the cholera patients, and begging for scraps of food. From the 21st to the 25th, thirty-one cases occurred, six being Hardwáris, and twelve people in whom connection could clearly be traced with Hardwáris, or others actually effected with cholera.

43. GURGAON.—On the 16th of April, Naud Kishor pilgrim arrived from Hardwár at Gurgaon, on the 17th he was seized with choleraic diarrhœa, the algid symptoms setting in at night. On the 22nd, there were three seizures, and one death among people of the village of Gurgaon having free communication with, and drinking the same water as above.

44. KARNAL.—In Karnál the first case reported was at Pánipat, a pilgrim from Hardwár, taken ill on the 16th April, admitted into the Dispensary on the 17th, and died on 23rd. On the 17th at Karnál itself, two return pilgrims were attacked. On the 18th one, and on the 19th a Mahommedan carpenter, the situation of whose shop brought him in contact with returning pilgrims, as they entered the city.

45. ROHTAK.—In the Rohtak district cholera first appeared at Jhajjar, and Beri on the 19th, (probably simultaneously). The Civil Surgeon states that two men were seized with cholera, and died on the 19th of April at Jhajjar. They belonged to a party of pilgrims from Jeypur, among whom two men, a woman and a child, had already died of cholera at three several bathing places. At Beri, two residents of the town, returning from Hardwár by the same road as the above pilgrims, were the first cases; after bewhich the disease is reported to have spread through the place. At *Mehur and Gohana* it appeared on the 21st and 22nd among pilgrims.

46. UMBALLA.—The first two cases were on the 15th, both Hardwár pilgrims; one taken out dead from the train, and the other living, who afterwards died on the 16th. Seven pilgrims were admitted—on the 17th, two; 18th, four; 20th, one; 21st, one; all pilgrims who were apparently taken ill out of the train.

47. LUDHIANA.—The first case was a pilgrim removed from the Ludhiana Railway Station on the 14th of April, and between this date and the 25th of April, fourteen other pilgrims were also taken to hospital from the Railway Station; all proved fatal. At Khanna Railway Station, seven cases in pilgrims, between the 23rd April and 3rd of May. At Sanahwal (Railway Station) six cases, the first on the 19th, and the last on the 28th April.

In the town of Ludhiána, a female pilgrim belonging to Jhelum, stayed with friends in the city, while on her return from Hardwár. She was taken ill on the 17th; from this date, there were several cases among pilgrims, and others connected with pilgrims to the 23rd, when it appeared to break out in different parts of the town.

48. JULLUNDUR.—The particulars of the first cases are, a female taken out of the train at Phillour Railway Station on the 14th of April. On the 15th two pilgrims were taken out of the train for treatment, and on the 16th two were taken out dead; at the same place, on the 17th the first case was seen at Jullundur in a return pilgrim. On the 18th, two again were taken out at Phillour, and a case also occurred in the Jullundur City Serai. On the 19th and 20th, two pilgrims were taken out of the train, one at Kartárpur, and the other at Jullundur; and on the 21st, in addition to a pilgrim, a resident of the town of Jullundur, was taken ill, and the disease assumed an epidemic form.

49. HOSHIARPUR.—The first case occurred on the 18th April; a pilgrim who came by rail to *Phugwara*, and thence to Hoshiárpur enroute to his home at Kángra. On the 20th of that month, another pilgrim (also of Kángra) was taken ill outside the town of Hoshiárpur. He came from *Jullundur*, where he had left the rail. In the district, the first case mentioned is that in the village of *Poorheran*, of a woman who returned from Hardwár on the 21st of April; the day after her arrival sixteen cases of cholera occurred there, and subsequently other cases to a total number of twenty-seven, of which twelve were fatal.

50. AMRITSAR.—At Amritsar, the disease appeared on the 15th of April, in the person of a pilgrim from Hardwár; cases occurred daily among pilgrims on their arrival, till the 21st, when two persons having intimate connection with pilgrims were seized; one was a *dhobie*, who had washed clothes belonging to a pilgrim, the other had eaten some food given him by a pilgrim; and by the 25th, the disease had become general in the city. On the 26th, it broke out at Beas and Ajnala, and soon after cases were reported from every part of the district.

51. LAHORE.—In Lahore, two return pilgrims were attacked on the 15th of April, and in the two days following, sixteen cases occurred, of which twelve were Hardwáris and four residents of Lahore including a woman of European extraction taken ill in a public hack carriage. On the 23rd of April, the disease became more generally diffused in the city, and on the 29th in the district.

In the above districts first cases of cholera occurred amongst pilgrims returning from Hardwár.

52. It will thus be seen that in the districts classed in the 1st category, the first deaths from cholera, in every case, occurred amongst Hindu pilgrims returning from Hardwár, and that in the period between 14th and 28th of April.

2ND CATEGORY.

53. HISSAR.—The first six cases occurred at Hansi, which is about fifteen miles nearer Delhi than Hissar, on the road between those two places, all were return pilgrims, and are reported by the Civil Surgeon to have taken place on the 18th. On the 20th there were several cases at Hissar, the two first being pilgrims, and the third a wife of one of these (also a pilgrim). For a week the disease was exclusively confined to the pilgrims, after which it spread among others in the town, and on the 22nd broke out in different parts of the district.

At Bhiwani, the first death reported was on the 20th of April, and the Commissioner states that the Tahsíldár reports that the disease broke out in the city amongst the pilgrims on the night after they returned to their homes, and then spread. (The date is not mentioned in the Tahsíldár's report).

54. SIMLA.—At Kalka, Ram Singh, Hindú farrier and Mea Khan, Mahommedan, Bhistee, were attacked on the 24th after returning from the Pinjore fair. Cholera does not appear to have spread from these cases, as it did not assume anything like an epidemic form till July.

At Kasauli, two shop-keepers who were not pilgrims, but who had been in contact with people returning from the Pinjore mela, which was visited by Hardwár pilgrims, *en-route* to their homes; and where cholera was known to have occurred.

The first two cases reported at Simla, were on the 21st of April, both pilgrims from Hardwár.

55. KANGRA.—Details of first cases are already given.

56. GURDASPUR.—On the 19th, two cases are reported by the Deputy Commissioner to have occurred at Futtehgarh, and another at Batalla, both pilgrims. On the 22nd a return pilgrim was taken ill at Pathankote, and died. After this cholera seems to have dotted about the district, but very sparsely, there being sixteen cases in all.

57. SIALKOT.—In the Siálkot district, the first case was a return pilgrim at Agoki, on the 21st of April. On the same date another (pilgrim) at Kila Sobha Singh, a small town in the Pasrur tahsíl. On the 24th there was a sharp outbreak at a village called Auliapur, in the Rya tahsíl, about 58 miles due south from Siálkot; the first case being a Hindu, who had not been to Hardwár himself, though some of his relatives had returned to his house from that place a day or two previous to his seizure. None of *them*, however, had cholera.

In Siálkot itself, the first case mentioned is that of a Hindú female, who returned on the 5th of May, from a village named Girdore, in the Kashmir territory "where cholera was raging fearfully at the time." She was seized suddenly on the 6th, and died eight hours afterwards. Another fatal case imported from Kashmir, occurred on the 15th of May.

58. GUJRANWALA.—According to Dr. Calthrop, Civil Surgeon of Gujránwála, the first case in this district is that of a fakir (beggar) who arrived from Hardwár by the midday train on April the 18th. He was suffering from cholera when be arrived, was taken in a *dooly* to Akalgarh, where he died at 3 A. M. on the 19th. On the 20th of April, at Gujránwála, a son of a pilgrim, who had returned the day before from Hardwár, fell ill. It is not reported whether the boy had been himself to the Ganges.

On the 21st of April, a man named Chet Ram, from Jhelum, was taken ill. He bad come to meet his parents, who had arrived from Hardwar, and was seized with cholera shortly after joining them. None of his relatives were ill or subsequently attacked with cholera.

Almost simultaneously with the outbreak at Gondlanwálla, a case occurred in the village of Lakhyea; a man called Dallamull, who had come from the front on the 24th was taken ill on the 26th; this was also the first case of the epidemic that broke out here subsequently. After this the disease appeared here and there, in different parts of the district.

59. FEROZEPORE.—The first case was reported on the 21st of April, in the village of Bajnama, Thana Bagupura, in a return pilgrim, who died at that place when on his way to his home in the village of Jilwallee. The next three cases are reported by the Police, to have occurred on the evening of the

24th April, in the Butcher Mandi Ferozepore, and are supposed to have been imported from Amritsar by men who had contracted the disease when on a visit to that place. Two other cases are mentioned in the returns, about which no details are obtainable beyond that they were both Hindús; one a woman aged 25, in the village of Zira, on the 20th, and another in village Minah Thanna Moga.

60. GUJRAT.—The first case reported by the Civil Surgeon, was on the 29th of April, in a man named Sadr-din. He had come from Wazirabad on the 28th, having travelled in the same train with Hardwár pilgrims. The second case did not occur till the 25th of May, in the Killa Mohalla, in which locality several other persons were taken ill. This Mohalla was the home to which most of the Hardwár pilgrims returned.

In the district it broke out about the 4th or 5th of May; and the Native Doctor reports that the disease was imported partly from Jummoo, by persons engaged in the wheat trade, and partly by pilgrims from Hardwár.

61. JHELUM.—The Civil Surgeon points out that the first undoubted case of cholera, was one that occurred in the Railway workshops on the 20th, and the second that of the Post Master's child, aged fifteen months. The third case was on the 21st that of a servant in the Railway Refreshment tent, and on the 22nd, it broke out in the city, cantonments, and neighbourhood, and then seems to have spread. Previous to these three cases, there were three unauthenticated ones; one a Hardwár pilgrim, on the 19th, and two others reported on the 17th and 20th in the city of whom no particulars are mentioned beyond that they died of fatal diarrhœa at the Dispensary, and that one was a beggar, the other a man who had been to Amritsar.

62. RAWALPINDI.—Sifting the reports from various Officers, it seems that the first case was that of a bullock-driver, who had just returned from Jhelum, and who was taken ill at the Sadr Bazár, at Rawalpindí, on the 20th April. The next was that of a private named Heames, of the IXth Lancers; he came with a detachment from Siálkot; eight cases occurred subsequently in the same Detachment. A case also occurred in Her Majesty's 1—5th Regiment, in the Sohawa encamping ground, (date not stated), and simultaneously with Heames' case a pilgrim returning from Hardwár took cholera in Rawalpindi city. On the 22nd two more pilgrims were taken ill there.

In the district there were a few cases in return pilgrims, one at Mouzá Sáipur, on the 21st and one at the Sohan river. After this, cases occurred in considerable numbers on the Grand Trunk Road, in Rawalpindí and in the district. It is mentioned by the Deputy Commissioner, that the earliest cases were either among pilgrims just returned from Hardwár, or people who may have been infected by them. Commissariat coolies, and other camp-followers also seem to have been among the first attacked.

3RD CATEGORY.

63. SIRSA.—The first case was on the 21st of April; a return pilgrim from Hardwár was taken ill on the road, and died on the 25th, the second case is not authenticated; it also occurred on the 21st, and terminated fatally on the 25th. On the same date the bodies of three female pilgrims, who had died from cholera (authenticated by a *post mortem* examination) were found near Niza Kheri, a village about two miles South of Sirsa, on the Hissar road. On the 22nd, there were four deaths from cholera at Sirsa, namely, two cartmen from Rohtak, and two return Hardwár pilgrims. On the 23rd of April cholera broke out at Jodka, Badun, Singhara and Ellenabad, pilgrims having passed through all these places, after which the disease seems to have rapidly spread all over the district.

64. SHAHPUR.—The two first cases in this district occurred on the 20th of May in the person of two women who had been, on the 18th of May, to a small village outside the district to attend the funeral of a woman who had died of cholera. They both died. The third case was on the 21st, in a man who had been to a village called Miani, close to Pind Dádan Khan, where cholera existed. No particulars regarding the appearance of cholera in other villages are given, except the general statement that the disease was imported from without.

65. MONTGOMERY.—Cholera broke out at Chichawatnee on the 24th of April. The first case was Kishni, a female pilgrim from Hardwár, *enroute* to Dera Ismail Khán; taken ill on the 24th and died on the 25th. The second case was of one Bagá, who had come from Muzaffarnuggár, but who is described as a Hardwár pilgrim, and who had travelled with a party, of whom several were seized with cholera at Saharanpore, Jagádhri, Phillour, Amritsar and Atári. He took ill on the 24th, his wife and mother-in-law were also afterwards attacked on the 28th, on which date, an attendant on Kishní, and two of the attendant's sisters took ill. Beyond this outbreak at Chichawatnee, there does not seem to have been any epidemic of cholera in this district.

66. MOOLTAN.—In this district, there were only two deaths from cholera, one in a man coming from Pind Dádan Khan in the Jhelum District, by rail in company with Hardwár pilgrims, was taken ill on the 5th of May, and died on the 7th. The other was a traveller from Kandahar, *viâ* Sukkar, who was seized on the 16th of May, and died on the 18th. A few cases seem to have occurred both prior and subsequent to this date, but as this disease never assumed an epidemic form, it suffices to say that the two first cases (which recovered) were on the 19th of April; one a Hardwár pilgrim, and the other a prisoner in the Jail.

67. JHANG.—Cholera appears to have broken out in this district on the 25th of June, when a report was received that it had appeared in a village called Masan, about seven or eight miles distant from the town. The report is extremely scanty, but the Civil Surgeon states, on information received from the Assistant Surgeon, that some Povindas (travelling traders) had arrived from Shahpur, through whom the cholera was introduced. The whole matter, however, is uncertain and unsatisfactory especially as regards the origin of the epidemic.

68. MUZAFFARGARH AND DERA GHAZI KHAN.—In these districts only single cases occurred. One in August and the other in September, and no cholera report has been received from either.

69. DERA ISMAIL KHAN.—There was no cholera that could possibly be traced directly to infection by Hardwár pilgrims, as the first case during the year detected, occurred on the 17th of August in a small village called *Sandilla*, in two people who had come from *Chaborari* in the Jhang District where cholera was prevailing.

70. BANNU.—The first case of cholera occurred in this district on the 17th of June, in a man who had come into the station the previous morning from Hazara, *viâ* the Kohat District, where cholera had existed. It terminated fatally. On the same date a resident of Hazara who came to visit some of his relatives in the Regiment, and who had travelled *viâ* Koshalgarh, was taken ill.

71. PESHAWAR.—The first case was on the 28th of April, in a pilgrim who was detected as suffering from cholera by a Native Doctor, posted at the bridge near Attock. The first batch of pilgrims who had left Hardwár on the 12th of April, arrived at Pesháwar on the 19th. They were healthy; but the next batches which spread all over the city, are known to have been suffering from diarrhœa, though no case of collapse from cholera was reported. In the city on the 1st of May, a Hindu female who had not been to Hardwár, nor, as far as could be found out, had any communication with pilgrims, was taken ill and died. On the 2nd of May, a Hindu Ekka driver who had carried up in his conveyance Hindu pilgrims from Jhelum, was seized with cholera at Pesháwar. He arrived in the town the day before; the case was authenticated by the Civil Surgeon. The next was a city prostitute, about whom nothing is known; and the fourth was a Hindu lad who lived in a situation which rendered him liable to infection by returning pilgrims. He was taken ill on the 3rd; after that date cholera became general all over the town. The Civil Surgeon reports that cholera appeared on the road to Cabul simultaneously with the arrival of the pilgrims.

At Tangi, a village in the interior of the district, cholera made its appearance on the 9th of May, one Lalai of independent territory being seized there. He stated that he had been to see his friends at Peshawár and on his return from that place, he was seized with cholera and died the same day. At Hoti Mardan, the Civil Surgeon, Dr. Jackson, reports that the first case of cholera occurred on the 13th of May in a traveller who had arrived from Ajmere on the 12th of that month. Another case also occurred on this date, the mother of a return pilgrim, named Surjin, who also arrived on the 12th took ill and died the next day. The disease then spread in the homes around her dwelling. On the 16th of May a vegetable seller, in the 2nd Punjab Infantry bazar, who had been on a round of villages to make his purchases, was taken ill and died of cholera. On the 17th a sepoy of the Regiment (2nd Punjab Infantry) was taken ill, and on the 31st another.

72. HAZARA.—In this district, the first case appears to have been at *Dhindar*, Thanna *Harripore*. On the 4th and 5th of May four Pathans residents of which village, were taken ill and died. Pilgrims do not appear to have passed through the place at all, but they had returned to *Harripore* itself, which town the villagers of *Dhindar* were in the habit of frequenting. At *Harripore* itself, cholera appeared on the 11th of May. No information regarding the outbreak has been given beyond a statement that large numbers of Hardwár pilgrims, among whom cholera existed in a fatal form, had returned to *Harripore*.

In Abbott-abad, the first case occurred on the 21st of June, the day after the arrival of the 5th Fusiliers. Cholera had been in the Regiment, and among the camp-followers, one (a cook) being seized on the day of their arrival.

73. KOHAT.—The only information obtainable, is that contained in a register of cholera cases, furnished by the Civil Surgeon, in which it is stated, that the first case was a *cooly* from Sherkot, taken ill on the public road, on the 18th of May, who died on the 21st of May. The next two cases were reported as having occurred in the Kohat city, on 24th and 25th of May. The other cases seemed to have occurred promiscuously.

CHOLERA ON DIFFERENT LINES OF RAILWAY.

74. SINDH, PUNJAB AND DELHI RAILWAY.—The unmber of seizures and deaths that occurred at the various Railway Stations on the Sindh, Punjab and Delhi Railway, extending from Mooltan to Delhi, with the dates of attack, is given in the accompanying return furnished by Mr. Dav. Ross, Traffic Manager.

SINDH, PUNJAB AND DELHI RAILWAY.

Statement showing cases of Cholera which occurred on S. P. and D. Railway.

Month and Date.		Station.	No. of cases.	No. of Train.	Died.	Removed to Hospital.	Pilgrims from Hardwár or otherwise.
1879.							
April	15	Saharanpur ...	1		1		Not known.
,,	,,	Do. ...	6		2	4	Do.
,,	,,	Ludhiána ...	1	26 Up Goods ...	1		Do.
,,	,,	Sanahwal ...	1	50 Up Mixed ...	1		Do.
,,	14	Muzaffarnuggar ...	4			4	Pilgrims from Hardwár.
,,	15	Umballa City ...	1		1		Do.
,,	,,	Ghazeeabad ...	1	59 Down Mixed ...	1		Do.
,,	16	Amritsar ...	2	36 Up Goods ...		2	Do.
,,	,,	Umballa City ...	2	50 Up Mixed ...		2	Do.
,,	,,	Phillour ...	1	18 Up Goods ...	1		Unknown.
,,	,,	Meerut Cantonment	2	27 Down Local ...		2	Do.
,,	,,	Umballa City ...	2	A. Special ...		2	Do.
,,	,,	Do. ...	2	18 Up Goods ...		2	Do.
,,	,,	Do. ...	2	50 Up Mixed ...		2	Pilgrims from Hardwár.
,,	,,	Ghazeeabad ...	4		2	2	Do.
,,	17	Meerut Cantonment	1	59 Down Mixed ...		1	Not known.
,,	,,	Umballa City ...	1	50 Up Mixed ...	1		Do
,,	,,	Ludhiána ...	2	20 Up Goods ...	2		Pilgrims from Hardwár.
,,	,,	Do. ...	1	50 Up Mixed ...		1	Do.
,,	,,	Phillour ...	3	46 and 14 ...	2	1	Do.
,,	,,	Do. ...	1	46 Up Goods ...	1		Do.
,,	,,	Meerut City ...	1	27 Down Local ...		1	Not known.
,,	18	Ludhiána ...	1	14 Up Goods ...		1	Do.
,,	,,	Jagádhri ...	2	6 Up Local ...		2	Pilgrims from Hardwár.
,,	,,	Umballa City ...	1	46 Up Do. ...	1		Do.
,,	,,	Amritsar ...	2	Do.		2	Not known.
,,	,,	Do. ...	1	Do.	1		Do.
,,	,,	Do. ...	4	50 Up Mixed ...		4	Do.
,,	,,	Jagádhri ...	1		1		Do.
,,	19	Jullundur City ...	1	8 Up Mixed ...	1		Do.
,,	20	Umballa City ...	1	Up Mail ...		1	Do.
,,	,,	Mooltan ...	1	23 Down Mixed ...	1		Do.
,,	,,	Amritsar ...	2	50 Up Mixed ...		2	Do.
,,	21	Meerut Cantonment	1		1		Do.
,,	23	Do.	2	50 Up Mixed ...		2	Do.
,,	,,	Jullundur City ...	1		1		Do.
,,	24	Ludhiána ...	1	50 Up Mixed ...		1	Do.
,,	25	Umballa City ...	1	Do.		1	Do.
,,	26	Do.	1	17 Down Mixed ...		1	Do.
,,	30	Muzaffarnuggar ...	1		1		Do.
		Total ...	67		24	43	

75. Sixty-seven cases in all are recorded in the period from 14th to 30th April 1879, of which 24 died before they could be taken away, and 43 were removed to Hospital. On the 14th of April, four persons (all Hardwár pilgrims) were taken out at Muzaffarnuggar station suffering from the disease. On the same date, a case was also detected at the Phillour Railway station, of which no mention is made in the above return. On the 15th, eleven more cases occurred, one in Ludhiána, one in Umballa City, seven in Saharanpur (of which three died), one in Sanahwal, and one in Gházeeabad. Now taking Saharanpur which is the starting point by Railway of pilgrims on their homeward or return journey from Hardwár, as the centre from which the disease extended, the return witnesses to two important facts, namely, (1) that its progress was not merely upwards, in one direction, as has been stated by some authorities; but on the contrary it appeared in localities lying in opposite directions from that centre, on one and the same day, the first three stations being in the Punjab Province to the West, the latter four in the North-Western Provinces to the East of Saharanpur. (2) That the first victims appear to have been Hardwár pilgrims. On this latter point, however, the Traffic Manager remarks that "it is difficult to distinguish between ordinary passengers, and Hardwár pilgrims," yet he believes that "nearly the entire cases occurred among the latter."

Statement witnesses to two important facts.

76. The particulars of first cases among Railway employés, on the different lines of Railway are thus stated:—

Particulars of 1st cases among Railway employés.

UMBALLA.—One case occurred at the station, in the person of a Goods' *cooly*, employed at the Railway station at Barara; the man was seized on the 27th April. He recovered.

JULLUNDUR.—Six cases are reported thus:—

(1). Mr. Davies, Engine Driver, attacked at Phillour on the 21st April, while in the train. He recovered.

(2). Mrs. Rega, wife of Station Master, Jullundur City, taken ill at that place (Jullundur City) on same date as case No. 1. She also recovered.

(3). Dhit Ram, Assistant Station Master, Jullundur City, seized on 24th, and died the same day.

(4). Mrs. Davies, wife of Engine Driver, (case No. 1) took ill in the train at Phillour *on 24th*, and died same day.

(5). A Police constable (name unknown) took ill at Phillour on 24th April, and died on 29th of that month.

(6). A gate-keeper, named Kandu, took ill at Jullundur City, on the 27th April, and died the same day.

AMRITSAR.—Five cases occurred among Railway employés, as follows:—

(1). A cooly employed on the platform removing passenger luggage, was seized on 20th April.

(2). A Sergeant of Police, who in the discharge of his duties, came constantly in contact with pilgrims, helping to remove them to hospital, on 21st April.

(3). The third case was the son of an Inspector of Permanent way. This boy took ill on the 16th of May. Nineteen days after all cases among pilgrims had ceased. He recovered.

The fourth case was on 21st May. The wife of a Sub-Assistant Station Master. She took ill four days after her arrival in the place, from Lahore. The houses in which those two last mentioned resided, were close together; no communication took place between the families, nor were visits interchanged between them. No particulars are known of the 5th case.

77. PUNJAB NORTHERN STATE RAILWAY.—Details of first cases have already been given in the report of the first appearance of the disease (see Jhelum, Gujránwála and Gujrat Districts). The particulars of the two cases at Shahdàra about 5 miles from Lahore, are summarized from the report of the Manager P. N. S. Railway. On the 20th of April, a driver named Clark was taken ill with diarrhœa at Jhelum which was unchecked, though he had been treated for it until the 29th, when it turned into cholera, and proved fatal on the 1st May at Shahdàra, to which place Mr. Clark had returned. On the 22nd May, Locomotive Foreman, A. Patterson, was taken ill at Shahdára, with cholera, after an attack of fever. He died the next day. He had been in attendance on Clark some twenty days or so, before he was seized.

Particulars of first cases.

78. RAJPUTANA STATE RAILWAY.—No report has been furnished of first cases among Railway employés on the Rajputana State Railway.

No report received of first cases.

79. INDUS VALLEY STATE RAILWAY.—The prevalence of the disease in the Northern and Southern portions of the Indus Valley State Railway, is furnished in the subjoined reports of the Medical Officers in charge of each, respectively:—

Prevalence of cholera on I. V. S. Railway.

Southern districts of the I. V. S. Railway.

Cholera first made its appearance in the Southern District at Rookh on the 13th May 1879, in a passenger from Sukkur, a *banya* by caste. He died within six hours after removal from train. Cholera was prevalent at Sukkur at the time, and the man was a resident of Sukkur.

At Rodhun on the 19th May 1879, the second case occurred. This man also was a *banya*, an inhabitant of a village five miles South-East of Rodhun. He had been to Kotri, where cholera was epidemic. He arrived at Rodhun in the forenoon by the mixed down train, and appeared in perfect health, when he left the train. He stayed with some of his friends outside the railway boundary until 5 P. M., when he started for his home. He was observed by a villager late in the evening two miles from Rodhun, lying on the road. Information was given to the Police, who brought him into Rodhun for treatment.

On the 2nd June 1879, the work people between Sehwan and Bhan (where there are several bridges building) began to be attacked; the first two cases occurring in one of the brickfields. From the 2nd to the 15th June 1879, twenty-two cases in all occurred, in a length of twelve miles. Of this number fourteen proved fatal and eight recovered.

Of choleraic diarrhœa, there were seven cases, six between Sehwan and Bhan, and one at Rookh. All recovered.

Cholera had spread all over Lower Sindh before any of the Railway work-people were attacked; and they were very fortunate in escaping so long. The only way I can account for its non-appearance earlier among them, is the scant intercourse kept up with the peasantry and towns-people. They never left the works night or day, and what they required in the way of food, was brought them by their own *banya*, living among them.

There were in all twenty-four seizures, of these were, passengers *banya* caste, two; Railway masons, one; brick-moulders, two; coolies, nineteen.

I am perfectly satisfied that none of the cases treated for cholera in the Southern District, Indus Valley State Railway, whether passengers or work-people, had any intercourse with pilgrims from Hardwár, or had been to Hardwár themselves.

Northern districts of the Indus Valley State Railway.

The first appearance of cholera in the district was on the 12th May last at the station of Pano Akil, 20 miles on the Railway Line North of Sukkur, where some 10 or 12 pilgrims a few days before had arrived by train from the Punjab (station not known) seeking employment, and located themselves under the trees opposite the station building, where also in huts, lived some mechanics and about 60 brick-moulders. Amongst the pilgrims one man was attacked and died the same day, the 12th, the remainder of them were ordered to leave the premises at once, by the Engineer Officer, Mr Knolles, as he had no need of their services, but it is not known whether these men were from Hardwár, nor can it be ascertained where they went to, after leaving Pano Akil. On the 13th, amongst the brick-moulders, two men were attacked, and on the 14th there were five cases, of which one died.

At the new works opened out near *Sangi*, a distance of 13 miles, North of Sukkur, about 1,300 men are employed, and amongst them three cases of cholera occurred on the 13th May, which proved fatal that day. Nearly half of this large body of men are Poorbeah and Punjabees; they belong chiefly to the Commissariat Department connected with the Kabul Forces, and had returned from Dadur to Sukkur for final settlement, at which latter station cholera for days was prevailing. The demand for laborers at the *Sangi* new works at that time was great, and these Poorbeahs and Punjabees, as their services could be engaged, were

employed. They doubtless brought the disease with them from Sukkur, as the three fatal cases of the 13th were Punjabees. On the 14th there were no admissions, but on the 15th seven were attacked, and of them three were Punjabees, two Poorbeahs, and two Afghans.

On the 19th a petty contractor, by caste a Hindu, died at *Walhar*. He went into Sukkur for settlement of his accounts, and on his return took sick and died. Although Rohri, so to speak, was surrounded with cholera, yet there were no cases in it until the 22nd of May, and this was a Poorbeah out of employment brought to the railway cholera hospital by the Police in a state of collapse, and died shortly after admission. He was not a pilgrim. Two cases occurred in the station of Khanpur, a distance of 130 miles North of Sukkur. The first was on the 29th of May, who died 3 hours after admission into the railway cholera hospital. He was a resident of that town and had not been to Hardwár. In the town of Khanpur and surrounding villages, cholera was daily carrying off its victims by twos and threes, yet in the railway station itself, only the two above mentioned cases occurred.

Amongst the European Railway staff, Mr. Jones, an Engine driver, was the first attacked, on the 5th June at *Rohrí*. He had been working for more than a month on a Ballast train at the *Sangi* new works, and had been suffering from diarrhœa a fortnight before cholera set in. His case excited in me serious apprehensions, and I once thought I should have lost him. The second European was a young Guard by name Fisher, who recently arrived in the district and lived at *Rohrí*. He had a mild attack, and recovered soon.

The last and fatal case of cholera on the 18th June at *Sangi* was the Hindu *bhisti* employed at that station, who died eight hours after admission.

Detail of outbreak in each district

80. Hitherto I have traced the appearance of cholera in all the stations and districts of the Punjab which became affected by it after the return of the Hardwár pilgrims. I now propose giving a short account of the manner in which it behaved in each of these districts, following the same order as was adopted in the foregoing account of the commencement of the epidemic, describing the character of the disease, the duration of its stay, the area ove which it spread, the extent of its ravages as far as can be ascertained from the number of deaths, the rate of mortality to the population and to the number attacked. A table is appended showing the diffusion of the malady chronologically and locally in each district.

DELHI.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Delhi during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Suburbs of Delhi	44,561	...	...	45	16th April.
Delhi city	115,992	...	..	14	17th ,,
Sonepat ...	13,637	...	...	18	19th ,,
Ballabgarh	6,671	...	...	47	13th May.
Faridabad	7,583	...	...	5	16th June.
TOTAL OF MUNICIPAL TOWNS ...	...	...	...	129	..
RURAL CIRCLES.					
Larsouli	35,728	63	9	31	20th April.
Sonepat	111,767	111	8	37	20th ,,
Najafgarh	22,567	64	1	3	26th ,,
Alipur ...	60,145	89	7	27	27th ,,
Sabzimandi	5,468	10	1	2	29th ,,
Mehroli ...	20,437	51	3	8	1st May
Nangloi ...	36,207	56	1	7	2nd ,,
Faridabad	24,701	42	4	31	9th ,,
Badarpur...	9,868	32	4	13	18th ,,
Jhánsá ...	17,834	30	7	100	26th ,,
Manjauli	6,747	25	1	5	30th ,,
Ballabgarh	52,472	67	2	23	3rd June.
TOTAL OF RURAL CIRCLES ...	...	640	48	287	...
	GRAND TOTAL ...		...	416	...

Delhi District.

81. There were 416 deaths registered from cholera in the district of Delhi in 53 different localities. According to Dr. Fairweather's report there were 411 deaths out of a total number of 897 cases. Almost all the deaths occurred in the months of April, May, and June. The total number of villages in the district is said to be 743. Cholera was most virulent in the small village of *Joh*, Thana *Jhansa*, in it there were no less than 69 deaths in a population of about 1,500. In the town of *Ballabgarh*, 47 deaths were recorded, and in the extra and intramural Delhi 14 and 45 respectively ; *Korali* and *Nujoli* (small hamlets in the *Jhansa*

and *Faridabad* rural circles) also suffered severely. In 32 out of the 53 localities affected with the disease, the number of deaths did not exceed 5; 14 of them having only single deaths. In the other places the number ranged between 6 and 18.

21,550 persons are said to have attended the Hardwár fair from this district, of which none died on the road going to it, but 6 of them died of cholera at the fair, and 19 on the road on their return journey.

Dr. Fairweather's remarks regarding prevalence of the disease in the city.

82. Dr Fairweather states as follows with regard to the prevalence of the disease in the district:—

The total number of cases recorded in the city and suburbs of Delhi in April were 107, of whom 85 were Hindus. In May 31, of whom 24 were Hindus. In June 8, of whom 6 were Hindus. The last case recorded in the city was on 3rd July. The total number of cases was 147, of whom 84 died. Out of the total of 147 no less than 116 were Hindus. There can be nothing clearer than that the origin of this epidemic was the importation of the disease by pilgrims from Hardwár and its immediate spread from them to the inhabitants of Delhi. The histories of the 1st cases, are sufficient to prove this, and there were many more which might convince the most sceptical of the communicability of the disease. Some of these I shall put on record. (1) It has been mentioned that on the 20th April, or just 4 days after the opening of the cholera hospital, which, be it remarked, is outside the city at some distance from its walls; a woman belonging to the small community of water carriers who had made their abode in a corner of the compound, had been seized with cholera. The day after her seizure, a woman living with her in the same house was seized. On the 23rd a boy who lived not more than a hundred yards from these, but outside the cholera hospital enclosure, was taken ill. Besides being in regular communication with previously affected community he was in the habit of helping his uncle to bring water for the cholera patients. On the 24th a boy living with the two women previously affected in the cholera hospital compound was seized, and on the 28th, the mother of the first mentioned boy who had attended on him while ill was taken ill herself. A clearer history than this of the spread of a communicable disease from a known origin could hardly be conceived.

"(2nd).—A *banya* with his mother went from Jeypore to the Hardwár fair. They were both seized with cholera at Delhi on their way back. The *banya's* uncle who had not accompanied them to Hardwár, but had remained behind at Jeypore, as soon as he heard that the nephew and mother were laid up in the cholera hospital at Delhi, hurried up by train to attend on them. He remained in attendance on them for about a week, and was then seized himself on the 27th April, but recovered.

"(3rd).—A destitute boy was brought to the cholera hospital, as he was found lying by the road side and was supposed to be suffering from cholera, but after being kept under observation for some time he was discharged as he had no symptoms of cholera about him. He lay about the road side near the cholera hospital for some days begging from pilgrims and other passers by. At last it was reported to me that the boy would starve if left where he was; and as I was afraid to send him to the poor house in case he should introduce the disease there,—he having been so much in contact with cholera-stricken people—I gave orders that he should be brought within the cholera compound and fed, but to be kept apart from the cholera cases. Whether this order was strictly carried out or not I cannot say; but at all events the boy got cholera a day or two after this and died.

"(4th).—The little girl of whom mention has already been made as being the first of the inhabitants of Delhi who took the disease after the pilgrims began to arrive in the city, had a companion of her own age who lived next door, and who came to see her while ill. The mother of the girl allowed her to kiss the sick child although she had been told not to do so, but she laughed at the danger. The girl got cholera a day or two afterwards."

Dr. Fairweather's remarks regarding prevalence of the disease in the Rural Circles.

83. The history of the epidemic in the district: continues Dr. Fairweather "points as clearly as its history in the city does to the introduction of the disease through pilgrims from Hardwár and its immediate spread from them to the inhabitants." The disease first showed itself in the district at the towns of *Sonepat* and *Márthal* on the 18th April. From both these places a considerable number of pilgrims had gone to Hardwár. Several of them died of cholera on the road on their return journey, and others were either suffering from the disease on their arrival or were seized immediately afterwards. The first case among the people of the district who had not gone to Hardwár was a cartman who had put up with some Hardwár pilgrims at *Baghpat* on the 16th April, and was himself seized on the following day. In nearly all the earlier cases in the district, communication could be clearly traced to previously infected persons or places.

UMBALLA.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Umballa during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total number of villages in each cholera affected rural circle.	Number of villages affected with cholera.	Number of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Jagádhri	12,522	...	...	44	15th April.
Umbalia	26,258	...	...	23	17th „
Thánesar	7,111	...	...	15	17th „
Sadhaura	11,167	...	...	14	18th „
Ladwa	4,121	...	...	7	21st „
Shahabad	11,660	...	...	8	23rd „
Rúpar	10,261	...	...	21	25th „
Kharar	4,847	...	...	11	30th „
Pihewa	3,569	...	...	8	19th May.
Radhaur	4,098	...	...	1	8th July.
TOTAL OF MUNICIPAL TOWNS	...	...	...	152	...

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total number of villages in each cholera affected rural circle.	Number of villages affected with cholera.	Number of cholera deaths registered during the year.	Date of 1st death.
Rural Circles.					
Jagádhrí	67,694	141	14	31	14th April.
Molánáh	83,436	146	25	116	15th „
Balaspur	49,282	116	11	12	17th „
Chappar	43,572	104	5	22	17th „
Pihowa	45,024	94	9	23	17th „
Garhi	22,063	95	9	12	18th „
Naraingarh	77,986	120	9	25	23rd „
Ladwa	24,413	76	2	4	25th „
Rúpar	59,806	171	9	67	25th „
Shahabad	70,619	130	1	1	26th „
Radhaur	29,110	59	10	20	26th „
Kharar	79,201	197	2	13	26th „
Chandigarh	79,713	195	20	37	27th „
Sangor	17,993	65	2	17	29th „
Umballa	92,105	144	11	16	1st May.
Mabárakpur	...	...	4	1	1st „
Pipli	15,105	34	2	3	2nd „
Morindá	79,843	177	1	1	6th June.
Sadhaura	54,280	112	3	27	17th „
Total of Rural Circles	...	2,176	149	457	...
Grand Total	...	...	...	609	...

Umballa District.

84. The district of Umballa had 609 deaths, and in a period extending from the middle of April till October; but the duration of the disease as a severe epidemic, did not extend further than June. The number of deaths registered in any one of the remaining 3 months, not exceeding 20. According to Police monthly reports there were, during the year, 1,239 cases and 749 deaths. The approximate number of pilgrims who attended the Hardwár fair from the district is said to be 15,250; of whom 180 are said to have died, on their return, from cholera. There were altogether 159 localities out of 2,225, in which cholera deaths were reported to have occurred, but an analysis of the weekly death registers shows that in no less than 87 of them only single deaths were recorded; and in 44 others the number was over 1, but not exceeding 5. The town of Jagádhri lost 44 of its population, Umballa 23, Rúpar town and suburbs 23, Rúpar Jail 26. The small village of *Vin*, Thana *Mullana*, lost 41 or about 2 per cent. of its population. The small hamlets of *Mukhrim*, Thana *Bhhahir Kúnd*, *Loknarah* and *Fatahpur*, Thanah *Sadhaura*, and *Mundwarah* Thana Rúpar also suffered severely.

Summary of cholera report of Dr. Bateson and Assistant Surgeons Duni Chund and Sobhan Ali.

85. After describing the first cases which occurred from the 16th to the 21st April, Dr. Bateson, the Civil Surgeon, gives the following narrative :—

"On 21st April the mother of a boy in the Government Wards' Institute, a recent arrival from Hardwár was taken ill. She was passing through Umballa city on her way home, and thought that she would see her boy. She arrived here on the 18th and was seized on the 21st, she was isolated and got better. Subsequently some cases occurred in persons who had not been to Hardwár, but who had been staying in Serais or under trees in neighbourhood of tanks, which places had been used as resting places by pilgrims from Hardwár."

* * * * * * *

"None of the attendants at this (cholera) camp hospital got cholera, but the mother of one of the attendants took it. The attendant was a student of the Umballa city dispensary, and while on duty at the cholera hospital had had communication with his mother."

Dr. Bateson appends an account given by Assistant Surgeon Duni Chund of 5 cases of persons, not Hardwár pilgrims, who became affected with cholera contracting the disease at a *Tebaru*, (seraie) or other places of shelter which had been used for Hardwár pilgrims. He (Dr. Bateson) goes on to state that there was a fair at Pinjore in the Patiála territory about the 22nd of April, that this fair was attended by Hardwár pilgrims, who brought cholera to it and affected the people attending it; who again spread the disease to other villages. From a perusal of a report on the outbreak of cholera in the city of Jagádhrí, by Assistant Surgeon Sobhan Ali, it appears that the disease at first was prevalent among pilgrims alone, but afterwards broke out among the sweepers, who are described as having appropriated and worn clothes of deceased cholera patients, and even to have taken and eaten food left by them.

KARNAL.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Karnál during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
Municipal Towns.					
Karnàl	24,015	...	...	26	16th April.
Kaithal	15,799	...	...	28	19th „
Panipat	24,500	...	...	14	21st „
Kunjpura	5,049	...	...	3	6th May.
Pundri	5,433	...	...	5	22nd „
Total of Municipal Towns	...	...	...	76	
Rural Circles.					
Karnál	38,073	90	14	70	16th April.
Alipur	73,600	56	35	370	18th „
Panipat	66,430	70	6	80	19th „
Indri	24,007	100	9	42	19th „
Rajwind	37,451	70	38	450	19th „
Nathaná	43,341	90	15	114	20th „
Gohelàh	42,906	107	13	113	20th „
Garoundáh	45,028	55	9	90	23rd „
Nasang	21,514	26	10	19	23rd „
Kaithal	55,568	90	7	14	23rd „
Rasindah	11,255	29	11	51	23rd „
Samalka	35,960	40	10	30	26th „
Pundri	25,623	30	1	1	11th May.
Badlàdàh	9,630	15	10	86	12th „
Total of Rural Circles	...	868	188	1,530	
Grand Total	...	...	...	1,606	

86. Cholera killed 1,606 persons in this district. The Police monthly cholera returns show 3,028 cases, and 1,650 deaths during the year. The disease began in April and ended in September; but May was the month in which it proved most fatal. During this month no less than 1,071 deaths were reported to have occurred, the number in the previous month being only 181. In June the mortality declined to 330, while in the following three months the number did not exceed 13. The highest number of deaths registered in any one locality, *viz*, 100, occurred in village *Allewa*, Police Station *Rajwind*, having a population of only 2,500. In a very interesting and carefully prepared statement furnished by the Deputy Commissioner, it appears the disease was introduced in this village by one Atma Rám, who took the cholera on 24th April in Jind territory from pilgrims who had returned from Hardwár. On his return to the village several of the inhabitants went to see him as he had extensive dealings with them. The second case which occurred on the 27th, was in the person of one Sirya, jat by caste, who was attending on Atma Rám. The subject of the 3rd case was a Brahmin lad by name Hetu. He was playing about in the village when he met some pilgrims returning from Hardwár fair, and took cholera on the 27th. The 4th case, that of Bhagtu Mali, took place on the 28th. He contracted the disease from Atma No. I, whom he was attending. After these cases cholera spread itself in all parts of the village, and in a short space of 19 days 100 persons had fallen victims to the disease. The places next in the order of fatality were *Kavi* in *Allupur*, and *Siwa* in *Panipat*, Police Stations; in them the number of cases were 89 and 110, deaths 77 and 55, respectively, and almost all of them were registered in the month of May; their population is said to be 2,600 and 2,060. Both these villages are on the road to Hardwár, and it is stated by the Deputy Commissioner, that the disease broke out in the village of *Kavi* on the return of pilgrims. In the following small hamlets with populations not exceeding 600, the disease was most severe. *Bazid Jatan*, thana *Karnál*; *Basad Hárah* in thana *Garaondah*; *Dadalah*, *Samdhu*, *Lodhar* and *Badhanah*, thana *Rajawind*; *Jabalah*, Police Station *Asindah*; *Chhabika*, Police Station *Goilah*; *Baháwah*, Police Station *Allupur*. In all these places the disease was either imported by pilgrims or by travellers from the neighbouring affected districts. In 111 places the mortality was trifling, that is, not exceeding 5 in any one of them; in 52 it was between 5 and 20, and in 11 between 21 and 28. Of the remaining cholera affected places, *Mung*, Police Station *Garaoudah*, population 3,098 had 41 deaths; *Jabar* and *Nagraon*, thana *Rajwind*, population about 3,000, 39 deaths each; *Begum*, population 1,055 in the same thana 37; *Ahmedpur*, Police Station *Badládah*, population 1,183 had 37; *Asranah*, Police Station *Allupur*, population 2,229 had 30. Altogether 193 villages out of a total of 868 were attacked by the disease.

Karnál District.

The number of pilgrims who attended Hardwár from this district is reported to be approximately 5,082, of whom 15 died on the road when returning from the fair.

Summary of reports of Civil and Medical Officers.

87. The Civil Surgeon, after detailing the first 4 or 5 cases which occurred at Karnál and Panipat goes on to state that "reports of cholera cases were afterwards received from *Kaithal, Bazida, Asanah* and other villages. On enquiry the disease was traced to have been brought by the agency of pilgrims." The Deputy Commissioner Karnál, Mr. Benton, has furnished this office with a statement* showing the names of 169 villages affected with the disease up to 21st July 1879, and the dates of the first appearance of cholera in them. It appears from the remarks given in the statement that in most of them the first case of cholera occurred amongst pilgrims on their return from Hardwár, or amongst persons from the Jind or Patiala territories, and other cholera affected localities. "These notes," observes Mr. Benton, "have been prepared through the Police which was the only agency at disposal for an enquiry so extended †

* Which has been omitted for want of space.

† It is to be regretted they are not fuller and more circumstantial.

* * * * * * *

"It will be observed" he continues, "that cholera was imported from the Hardwár fair by pilgrims returning home suffering from the disease, and passing through villages on their way home. In some instances the disease was contracted in the Jind territory, where people from the district had gone to bathe at fairs, and had communications with pilgrims returning from the Hardwár fair. The persons who were attacked by cholera died on their return home, and thus spread the disease in their respective villages. The village of Allewa affords a specially fatal instance of this sort. Evidently the disease was imported from Hardwár, as no case of cholera had been heard of in the district before the return of pilgrims from the Hardwár fair; but immediately on their return cholera broke out wherever they made their appearance. They were the first victims, numbers dying along the road, some returned home suffering from cholera, while others became ill on reaching their destination and thus they spread the disease throughout the district."

GURGAON.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Gurgaon during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Rewari	25,190	...	...	20	20th April.
Palwal	13,553	...	...	6	21st May.
TOTAL OF MUNICIPAL TOWNS	...	...	...	26	
RURAL CIRCLES.					
Gurgaon	52,298	91	17	109	2nd April.
Nuh	60,904	118	13	59	12th ,,
Punahána	43,360	113	1	12	14th ,,
Palwal	87,374	127	25	193	18th ,,
Firozepúr	70,695	136	5	20	25th ,,
Shahjahanpur	9,728	12	3	21	30th ,,
Farukhnagar	22,812	42	7	76	2nd May.
Rewári	81,129	178	12	81	3rd ,,
Hattín	61,190	87	5	48	14th ,,
Sehnah	25,899	48	10	91	23rd ,,
Pahorah	17,826	30	1	12	25th ,,
Játusána	20,708	46	1	5	1st June.
TOTAL OF RURAL CIRCLES	...	1,028	100	727	
GRAND TOTAL	...	...	...	753	

Gurgaon District.

88. In Gurgaon the disease seems to have exploded in various parts of the district between the 17th and 29th April. The total number of deaths registered during the year was 753; the Police monthly returns show 781 deaths during the year, out of 1,514 cases or 51·58 deaths to 100 seizures. The disease continued to prevail from April to August; but nearly all the deaths occurred in the first three months. There were 102 places affected out of a total of 1,239; but in 61 of them the mortality did not exceed 5. In Gurgaon, Thana Gurgaon, the

highest number of deaths, *viz*, 51 was reported; but the following hamlets having a population under 200 suffered most terribly from the epidemic; *viz*, *Bailaka*, thana *Sohna*; *Koganah* and *Kisauli*, thana *Farukhnagar*; *Tikari*, thana Gurgaon; *Kishwarpur* and *Tharki* thana *Palwal* with population not exceeding 700, had 37 deaths each. *Saroli*, thana *Hattín*, population 548, had 24 deaths, and *Sailabi*, thanah *Sohnah*, population 830, had 22. In the remaining 33 villages the deaths ranged between 6 and 21.

Approximately 5,028 persons went to the Hardwár fair from this district; of which only 1 died on the road while going, and 40 on the road on the return journey.

89. The Civil Surgeon gives the following particulars of the first case at Rewarí town:—"The first case occurred in a Railway *employé*, who had not been to Hardwár, but who must have come in contact with several pilgrims returning to their homes by rail. He was seized on 19th April while at the Rewarí Railway Station on duty, and died next day."

LUDHIANA.

Statement showing the diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Ludhiána during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
Municipal Towns.					
Ludhiána	40,385	...	...	22	16th April.
Khanna	3,660	...	...	4	17th ,,
Raekot	8,262	...	...	12	28th May.
Total of Municipal Towns	...	...	...	38	...
Rural Circles.					
Khanna	76,263	152	6	14	17th April.
Dehlon	79,975	102	6	28	27th ,,
Raekot	46,420	60	6	35	28th ,,
Sahnewal	41,812	111	3	22	14th May.
Ludhiána	99,926	140	4	37	23rd ,,
Jagraon	81,316	112	15	42	29th ,,
Shahnah	25,709	28	10	25	5th June.
Machhewara	42,977	99	1	1	5th ,,
Vagah	28,432	47	4	13	6th ,,
Total of Rural Circles	...	851	55	217	...
Grand Total	...	...	...	255	...

90. In this district 255 deaths were reported to have occurred in 58 out of a total number of 841 villages. In 43 the deaths did not exceed 5; 26 of them having only single deaths. In the remaining 15 it was between 6 and 22. According to the Police monthly returns there were up to the end of June, 469 cases with 226 deaths. 1245 persons are said to have attended the Hardwár fair from this district, and only 2 cases of death were reported amongst them, *viz*. 1 from cholera and 1 from fever, and these when they reached their homes. The disease appeared in this district in April and lasted till August. In the weekly registers only 23 deaths were registered in April, *viz*, 19 in the town of Ludhiána, 1 in village *Tounsa*, 1 in *Khannah* town, and 2 at the Railway station of that name. The highest number of deaths, *viz*, 120, was recorded in June. In the small village of *Jagianah* with a population said to be 441, there were 16 deaths; in *Bariwal* in the same thana 19. In *Hiran*, thana *Sahnewal*, population 648, there were 20 deaths. *Tibi Wazirah*, thana *Raekot*, population 839, had 16. *Aitáwah*, in the same thana, 15.

Statement showing progress of cholera in this district by Mr. Warburton, District Superintendent Police.

91. I herewith append a very interesting statement showing the progress of cholera in this district from 15th April to 20th June, furnished by the District Superintendent of Police, Mr. Warburton.

Statement showing Progress of Cholera Epidemic in the Ludhiána District during the year 1879.

Serial No.	Date of first case.	Name of Police station.	Locality.	Total No. of cases reported up to date.	Number of deaths during the year to date.	Number of recoveries to date including persons still ill.	Remarks.
1	April 15	Ludhiána ...	Ludhiána ...	44	39	5	Excepting Gungrana village, where the Assistant Surgeon reported that the cases were not of cholera in the month of April, cholera was confined exclusively to localities on the line of route taken by return pilgrims from Hardwár; that is through Khanna, Sanewal and Ludhiána by rail and the Grand Trunk road leading to Ferozepur.
2	... 17	Khanna ...	Khanna ...	10	6	4	
3	... 19	Sanewal ...	Sanewal ...	6	2	4	
4	... 25	Dakha ...	Dakha ...	2	...	2	
5	... 27	Jugraon ...	Jugraon ...	1	1	...	
6	... 30	Dehlon ...	Gungrana ..	54	10	44	
7	... 30	Raekote ...	Raekote ...	1	1	...	
8	May 3	Khanna ...	Khanna Khurd ...	2	...	2	
9	... 14	Sanewal ...	Heeran ...	43	17	26	
10	... „	Do. ...	Jandialee ...	3	1	2	
11	... 16	Dehlon ...	Bair Kallan ...	6	1	5	In this month the contagion spread to 11 localities, of which all, except Bairi Kallan, are comprised within the limits of the five Police stations, which, as stated above, lie directly on the line of route.
12	... 17	Sanewal ...	Chaksarwanath ...	11	7	4	
13	... 17	Do ...	Karour ...	1	1	...	
14	... 19	Ludhiána ...	Jograna ...	21	16	5	
15	... 20	Khanna ...	Jotana ...	8	7	1	
16	... 26	Sanewal ...	Mangli Occhi ...	3	1	2	
17	... 29	Khanna ...	Chak Jotana ...	1	1	...	
18	... 30	Jugraon ...	Dangian ...	10	7	3	
19	June 4	Do. ...	Sodhiwálla ...	13	7	6	
20	... 5	Do. ...	Dallah ...	8	4	4	
21	... 6	Dakha ...	Mandiáni ...	1	1	...	
22	... 7	Khanna ..	Mahawan ...	1	1	...	
23	... „	Jugraon ...	Aligarh (road post)	2	2	...	
24	... „	Do. ...	Kaonki ...	3	...	3	In this month the disease seems to have spread exceedingly, affecting 21 new localities. The reasons are given in the letter to which this is an enclosure, but it may be as well to remark here that though numerically the cases have increased, the rate of mortality prevailing in the two previous months has decreased.
25	... 9	Saihna ...	Saihna ...	7	2	5	
26	... „	Dehlon ...	Syah Khurd ...	35	8	27	
27	... 9	Raekot ...	Ityana ...	36	10	26	
28	... 11	Jugraon ...	Russulpur ...	1	1	...	
29	... „	Dakha ...	Pomal ...	1	1	...	
30	... „	Saihna ...	Pakhoki ...	6	6	...	
31	... „	Do. ...	Bakhtgarh ...	2	2	...	
32	... 13	Ludhiána ...	Buddowal ...	1	1	...	
33	... 15	Dehlon ...	Maharna Kalla ...	19	3	16	Into the Dehlon jurisdiction, cholera would seem to have been carried from the Ludhiána station by some infected individual.
34	... „	Saihna ...	Mulleah ...	1	1	...	
35	... 17	Jugraon ...	Jupper ...	4	3	1	
36	... „	Dehlon ...	Gujarwal ...	1	1	...	
37	... 18	Jugraon ...	Shaikh Dowlut ...	2	2	...	
38	... „	Ludhiána ...	Barrawal ...	33	15	18	
39	... 19	Saihna ...	Bhutna ...	2	2	...	
40	... 20	Jugraon ...	Sangatpurra ...	4	...	4	
			Total ...	410	191	219	

JULLUNDUR.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Jullundur during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
Municipal Towns.					
Phillour	6,251	...	...	12	14th April.
A'dampur	4,153	...	...	1	17th „
Banga	4,817	...	...	3	18th „
Kartárpur	11,053	...	...	11	20th „
Jullundur	35,222	...	...	17	22nd „
Nakodar	9,780	...	...	17	22nd „
Aláwalpur	4,836	...	...	1	26th „
Nawashahr	5,351	...	...	3	28th „
Suburbs of Jullundur	15,702	...	...	2	29th „
Total of Municipal Towns	...	...	...	67	...
Rural Circles.					
Phillour	92,026	130	2	7	27th April.
Shahkot	99,120	183	2	5	30th „
Banga	89,892	129	2	2	2nd May
Nakodar	85,373	140	3	3	3rd „
Nurmahal	62,502	86	1	3	28th „
Total of Rural Circles	...	668	10	20	...
Grand Total	...	...	...	87	...

Jullundur District.

92. Only 87 deaths occurred from cholera in this district. *viz.*, 37 in April, 29 in May, and 9, 6, and 4 respectively, in the three following months; in November and December only single deaths were registered. 2,344 of the inhabitants of which are said to have attended the Hardwár fair as pilgrims; of whom 59 died, *i. e*, 4 on the road when going and 55 when returning. Of these 59 deaths, 23 were from cholera and 36 from other diseases. The 4 deaths which occurred on the road when going are said to have resulted from *cholera*, but the dates and particulars of these are wanting. Of the total district cholera mortality, *viz.*, 87, the towns of Jullundur, Kartarpur, Nakodar and Phillour alone had 57. Besides these, 15 other localities were attacked by the disease, but in none of them did the number exceed 4; 7 of them having only single deaths. The total number of villages in this district is 1,233. The District Superintendent of Police has furnished a statement from which it appears that of the first 9 cases in the Jullundur district, between the 15th and 20th April, 7 were pilgrims and two travellers by Railway. Of the next 13 cases from 21st to 26th April, 4 were pilgrims, one a Railway passenger, two, a Railway Engine Driver and his wife, one a Railway Telegraph Clerk, one a constable on duty at Nakodar, and the remainder were residents of Jullundur city. Of these 22 cases, 10 proved fatal. Altogether according to the District Superintendent of Police's statement, there were 98 cases, and 62 deaths between the 15th April and 28th May. On enquiries being made as to what connection, if any, existed between the constable on duty at Nakodar with pilgrims, and the 3 cases among the residents of the Jullundur city; the District Superintendent of Police, Mr. Rotton, states thus:—

"The Police constable who died at Nakodar on 23rd April was supposed to have come in contact with the pilgrims who returned from Hardwàr. A *khatri*, resident of Jullundur who died of cholera on 21st of April was suddenly seized. He did not go to Hardwár, and no special cause for his death can be given; the other two who were taken ill on the 25th and 26th April were also suddenly seized with cholera, and the only grounds the undersigned can give for their being attacked is that cholera was prevalent at the time in the town to which it had undoubtedly been brought by the pilgrims returning from the Hardwár fair."

AMRITSAR.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Amritsar during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of first death.
MUNICIPAL TOWNS.					
Amritsar	136,166	...	...	524	17th April.
Suburbs	6,215	...	...	1	30th „
Tarn Táran	3,133	...	...	4	1st May.
Majittha	6,004	...	...	1	3rd „
Jandiála	7,037	...	...	2	5th „
Vairowál	5,958	...	...	2	27th „
TOTAL OF MUNICIPAL TOWNS	...	...	...	534	...
RURAL CIRCLES.					
Wazirbhullar	27,561	70	13	87	23rd April.
Garonda	52,753	67	14	81	23rd „
Ajnála	114,751	254	8	12	25th „
Lopoke	67,101	120	18	68	26th „
Tarn Táran	166,807	123	2	11	1st May.
Kathunangal	92,179	145	1	1	3rd „
Vairowál	39,937	59	3	15	9th „
Sarháli	60,586	79	1	28	5th June.
Amritsar	41,820	60	5	31	24th „
TOTAL OF RURAL CIRCLES	...	977	65	334	...
GRAND TOTAL	...	...	...	868	...

Amritsar.

93. There were 868 deaths from cholera in 71 different localities, out of 1078 in the whole district; and in a period from April to October, There were 196 deaths registered in the month of April. Of these, 160 occurred in the city of Amritsar, 9 at the Railway station *Beas* in the thana of *Wazirbhuller*; 14 in certain villages within the jurisdiction of the same circle; 7 at Atári on the line of Rail, midway between Amritsar and Lahore; 3 in the villages in the Rural circle of *Garaondah*, and 2 in those of the *Ajnalah* and *Lopoke* rural circles.

Of the 868 deaths registered in the whole district, 524 occurred in the city of Amritsar alone. High as this mortality in the city appears to be in comparison with that in the rural circles, it is far below that registered in the former epidemics of 1875, 1869 and 1867, when the deaths were 1,269, 3,608 and 3,561 respectively. Whatever may be the cause or causes that give rise to foster the development, sustain the existence, and further the propagation of this malady, it is hardly to be doubted that the improvements that have of late years been carried on in the sanitation of this city had material effect in checking its ravages.

Of the rural population, the villages of *Bobhari* and *Raya*, thana *Wazirbhuller* had 27 and 18 deaths in a population of 508 and 1072 respectively; *Vadhan*, thana *Sarhali* population about 1,000 had 28; *Dhania Kulan* thana *Graindak*, population about 800, had 20. In 52 places the disease did not seem to have prevailed epidemically, the deaths in any one of them not having exceeded 5. In 15 others the deaths varied between 7 and 16. The number of persons who attended the Hardwár fair from the district is, as stated by the Deputy Commissioner, Mr. Hawkins, "conjectured to have been about 15,400. The number of those who died on the road in going and returning cannot be given, it was probably but few as they returned quickly by rail. The number of pilgrims who have died since their return may be estimated at about 250. 120 pilgrims are known to have died in the city." The arrangements carried out by the Civil, Medical and Police authorities for the prevention of the disease were most creditable. Surgeon Major J. C. Morice's timely and energetic measures to prevent the introduction of the disease into the city, no doubt, very materially retarded its progress. I give an extract from his able report regarding the huddling up of passengers in Railway carriages, an opinion in which I entirely agree. "The cruel way in which natives are crowded into Railway trains in the hot weather is a most fertile source of disease, and it would he advisable to insist on the Railway authorities being made to treat their native passengers as human beings, and not packing them as close as sheep in a truck."

LAHORE.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Lahore during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
Municipal Towns.					
Lahore city	92,035	...	...	64	21st April.
Kasur	16,793	...	...	22	23rd ,,
Suburbs of Lahore	36,406	...	...	34	25th ,,
Patti	6,290	...	...	9	27th ,,
Khem Karn	5,860	...	..	11	3rd June.
Sharakpur	4,425	...	...	6	18th ,,
Chunián	6,469	...	...	10	23rd ,,
Khudián	3,322	...	...	5	18th July.
TOTAL OF MUNICIPAL TOWNS	...	...	...	161	...
Rural Circles.					
Mananwan	35,314	95	9	31	26th April.
Patti	42,452	72	20	172	28th ,,
Anarkalli	59,221	66	9	21	29th ,,
Valtoha	30,354	65	18	179	29th ,,
Luliáni	11,708	26	9	137	30th ,,
Kasur	82,860	127	38	224	3rd May.
Shahdara	33,061	87	3	6	5th ,,
Moridki	30,533	85	11	44	5th ,,
Raiwind	19,264	47	17	71	6th ,,
Kána Kácha	25,784	75	13	94	8th ,,
Lahore	89,415	13	1	1	9th ,,
Khálráh	40,892	52	9	93	9th ,,
Chung	19,006	53	12	57	15th ,,
Bhái Pheru	22,667	50	13	47	18th ,,
Khudián	36,782	108	16	42	1st June.
Sharakpur	58,277	200	20	52	5th ,,
Sarai Mughal	22,856	51	13	32	6th ,,
Chunián	27,564	97	14	110	10th ,,
Mángtánwála	44,827	194	28	88	16th ,,
Kanganpur	33,090	109	8	11	27th ,,
TOTAL OF RURAL CIRCLES ...	...	1,672	281	1,512	...
GRAND TOTAL ...	...		...	1,673	...

Lahore District.

94. From the statement compiled from the Weekly mortuary returns received in this office, it appears that 1,673 deaths from cholera were reported to have occurred in the district of Lahore. The disease commenced in April (in the city of Lahore), and lasted till October; but the months in which it was very prevalent were May, June, and July. In April only 16 deaths were recorded, viz., 8 in Lahore, 2 in its suburbs, 1 in thana *Monawa*, 1 in Kasur town, 3 in thana Anarkalli, and 1 in the town of Patti. There were 289 localities out of 1,672 in the whole district affected by the disease, but of this number there were no less than 227 in which the mortality was very trifling, that is, not exceeding 5 in any one of them; half of that number had only single deaths. The principal towns did not suffer greatly,—the highest number of deaths registered in any one of them being 64 in Lahore, 34 in its suburbs, 22 *Kasur*. Of the rural circles, the village of *Garrialla*, thana *Patti*, suffered the most. It had 93 deaths all in May and June, in a population said to be 2,021. In *Luliani*, thana *Luliani* and *Wan*, thana *Khálara*, population between 1,000 and 1,500, there were 69 and 62 deaths respectively. In *Dussowal* and *Rajoke*, thana *Valtoha*, population 1,473 and 547, there were 49 and 43. The mortality from cholera in the following hamlets with a population under 1,000 was also very high: *Khanna-Nepal* in thana *Chung*; *Shaduki* and *Lakhuke*, thana *Kána Kácha*; *Nurpur-Warkan*, thana *Sharakpur*; *Wan Khara* and *Moridke*, thana *Chunian*; *Kotli*, *Ginkar* and *Mamkoke*, thana *Kasur*; *Sitarshah*, thana *Moridke* and *Chhajur*, thana *Mungtanwala*. The number of persons stated to have gone to Hardwár from this district is 2,152. Of these 16 are said to have died at the fair and 16 on the return journey; but the Deputy Commissioner states that as these figures have been obtained from chowkedárs, they are not in the least to be relied upon.

Report of District Superintendent Police, Lahore.

95. The first few cases have already been detailed; but the following particulars of those which occurred on the 23rd of April and subsequently after the disease had become general are of interest as furnished by the District Superintendent Police, Lahore:—

"The report of the 23rd April, indicates a more general diffusion of the disease; five fresh seizures were reported, one of a *Bhisti*, attached to the 8th N. I. at Meean Meer, one of a prisoner in the judicial Lockup in the Court House compound, one from the city, one in Anarkalli, and one of a return pilgrim. The return of the 25th April gives 9 cases. It includes the two first cases reported from the district (as distinguished from the city and Anarkalli); these cases occurred at Kasur, and one of the persons attacked was a return pilgrim. The report received on the 28th April includes in the 5 cases reported, one from *Monawan* on the Trunk Road between Amritsar and Lahore, and one at *Patti*, a vegetable seller recently returned from Amritsar was attacked. The report of the 29th includes the seizure of an European Soldier of Artillery, who was attacked on the 26th; a second case in the R. A. occurred on 28th. From 29th to date (28th May 1879), the disease has spread generally in the district, but not very much in Lahore and Anarkalli. About the 8th May the first case occurred in the 68th Queen's at Meean Meer. The villages, chiefly attacked have been on the main lines of road communication, particularly on the road between Ferozepore and Lahore, though *Rajoke*, in the *Waltoha* jurisdiction, which is not on any line of extensive communication has suffered exceptionally severely. The following facts with regard to the outbreak of the disease in particular localities may be worth consideration."

"(*a*). The first cases reported at *Bhumba*, thana *Raiwind*, are ascribed to introduction by a marriage party from *Rajoke Waltoha* 8 cases occurred in quick succession and were reported on the 9th May. (*b*). The report of the 10th May included, two cases from Raja Jang, Raiwind; the first seizure was that of a cartman, who had come back from Jhelum where the disease was prevalent. (*c*). On the 23rd May, a Police guard of 21 men returned from Ferozepore, on the same evening one of the guards was attacked with cholera in the lines; on the 24th (morning) two others were attacked, also in the lines, and on the 26th, a fourth man also of that guard was attacked."

Civil Surgeon's Report.

96. The Civil Surgeon, Dr. Scriven, states as follows regarding the outbreak of the disease in Lahore:—

"The experience of many epidemics has satisfied me that cholera never arises spontaneously in Lahore. In all the epidemics that I have known, it has travelled up country and has been regularly traced along the Grand Trunk Road or Railway. Hence, in the present day when cholera is heard of at Umballa or Phillour, we know pretty certainly that sooner or later, during the same season, it will reach Lahore. In former days it was often some weeks in travelling from Umballa to this place, but now that the railway is open, it comes within a few days.

"Having heard of the first cases at Hardwár and of others at Phillour in April, I considered the conveyance of cholera to Lahore a matter of certainty. Up to this time no cases had been reported here. I was startled, however, on the afternoon of April 16th, by hearing casually of some cases at Amritsar; upon which I immediately consulted with my colleagues; arrangements were at once made for the examination of passengers arriving by train from below; the city was divided into sections and Native Doctors posted on them; a cholera hospital was opened, and on the morning of the 19th two pilgrims just arrived by train were admitted into it, both of whom died. The next day (20th) furnished ten cases, of which 7 were pilgrims and 3 residents of Lahore. On the 21st there were five cases, of which two were pilgrims and 3 residents. On the 22nd there were four cases, of whom three were pilgrims and one a railway porter who had been engaged handling pilgrims' baggage.

"This short account of the commencement of the epidemic is sufficient proof of its propagation by the pilgrims; and in this opinion Major Harcourt, the Deputy Commissioner also agrees. The further history from other places above and below Lahore, when the whole is put together, will, I doubt not, furnish overwhelming evidence of the spread of cholera in the Punjab by human agency, but for those who for years have been accustomed carefully to watch the progress of these epidemics, no further proof is needed."

ROHTAK.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Rohtak during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of Villages in each cholera affected rural circle.	No. of Villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Beri	9,205	..	...	167	18th April.
Rohtak	14,994	...	...	54	23rd „
Gohána	7,296	...	...	10	20th „
Bahádurgarh	7,127	...	...	3	4th May.
Jhajjar	12,456	...	...	8	14th „
Kharkhauda	4,185	...	...	3	20th „
TOTAL OF MUNCIPAL TOWNS	...	...	...	245	
RURAL CIRCLES.					
Gohána	108,300	80	41	490	18th April.
Sámpla	49,492	50	23	182	20th „
Bahádurgarh	20,139	41	15	98	20th „
Rohtak	115,433	60	20	199	21st „
Mahm	28,401	18	18	413	23rd „
Kalánaur	25,612	17	10	106	27th „
Kharkhauda	34,296	33	7	30	27th „
Beri	43,659	18	4	70	28th „
Sáliávás	40,959	71	20	110	29th „
Bavli	22,962	27	4	12	8th May
Jhajjar	50,347	83	12	65	14th „
TOTAL OF RURAL CIRCLES	...	498	174	1,775	
GRAND TOTAL	...	...	...	2,020	

97. In Rohtak 2,020 deaths were registered from cholera. According to the Police monthly returns, there were 1,930 deaths out of 4,094 cases. There were 331 deaths in April, 1,462 in May, 215 in June and 12 in July. 180 villages out of a total of 498 were affected by the disease. In 103 of them the deaths did not exceed 5. The Deputy Commissioner, Mr. Wood, has furnished a statement from which it appears that out of 168 villages affected in this district from 20th April to 20th May in no fewer than 135 the first cases were either Hardwár pilgrims or traceable to pilgrims. In the remaining 33, the disease is said to have been spontaneous. The small town of Beri, with a population about 9,200, had no less than 167 deaths. The disease in this place is said to have broken out on the 18th April. *Mahm* had 71, *Sanghi* 55, Rohtak 54, *Majrah* 52, *Butanah* 39, *Kalánaur* 26. In all these towns, as also in almost all the villages given below in which in proportion to the population the disease was most severe, the first cases in almost all of them were those of returned pilgrims from Hardwár or others connected with them.

Rohtak District.

Name of Thana,	Name of village.	No. of deaths registered from cholera.
Rohtak	Kheroáli	80
Mahm	Nadána	87
„	Bhultak	56
„	Farmánah	43
„	Kharkharah	32
Kalánaur	Kelgah	38
Gohána	Rokhi	48
„	Kanorah	35
„	Mahomedpur	43
„	Kánpur kalan	40
„	Kharnal	37
„	Jasranah	31
Bahádurgarh	Asindah	36

The hamlets of *Moakhan* and *Sainjanah*, Thana *Sampla*, and *Newlah*, Thana *Saliawas* also suffered terribly.

About 3,700 persons are said to have attended the Hardwár fair, of which 234 died of cholera on their return from that place.

HOSHIARPUR.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Hoshiarpur during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population	Total No. of Villages in each cholera affected rural circle.	No. of Villages affected with cholera.	No. of cholera d registered during aths g the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Hoshiárpur	13,138	...	...	3	19th April
Una	4,908	...	...	9	24th „
Nandpur	6,405	...	...	6	14th June
TOTAL OF MUNICIPAL TOWNS	...	...	..	18	
RURAL CIRCLES.					
Una	85,807	166	3	4	15th April
Balachor	60,237	176	4	17	20th „
Hoshiárpur	129,707	225	2	14	23rd „
Garhshankar	73,556	152	1	2	29th „
Hajipur	30,234	137	1	1	5th May
Nûrpur	34,852	108	2	4	17th „
Nandpur	32,280	96	6	11	15th June
Mahilpur	80,891	166	3	11	12th July
TOTAL OF RURAL CIRCLES ...	...	1,226	22	64	
GRAND TOTAL	...	...	...	82	

Hoshiárpur District.

98. This district had only 82 deaths from cholera, and in a period extending from the middle of April till September; in this latter month only one death was registered, the highest number, *viz.* 27, in any one month was recorded in June. 2,980 persons are said to have attended the Hardwár fair from this district, of whom about 68 died from all causes on the road w hen returning. Only 25 out of 2,178 localities in the district were affected with the disease, but in only 4 it may be said to have assumed an epidemic character, *viz.*, *Purhiran*, thana Hoshiárpur, *Ratiwal*, thana *Balachor*, having 13 deaths each; Unah town 9; *Sarhali Kalan*, thana *Mahilpur* 8. In none of the remaining localities did the number exceed 4 except *Anandpur* which had 6.

Report of Civil Surgeon.

99. The following interesting particulars regarding the disease in the Hoshiárpur Town and District, subsequent to the occurrence of the first few cases (which have been already mentioned,) are extracted from the report of the Civil Surgeon:—

In the town itself 3 cases occurred, the first on the 5th May was that of a *Bhisti* belonging to the Municipality, who was an old man and had been much exposed to heat and fatigue, and two cases on the 8th, in that of a *washerman* and a *dyer*, two out of the three cases proved fatal. Besides a patient in Hospital who took ill on the 6th and had just recovered from small-pox, This case also proved fatal a few days before these occurred, a few Pilgrims had passed through the town.

Purhiran

The first case of cholera in village *Purhiran* occurred on the 21st April * This village is situated *West* of Hoshiárpur at a distance of 3 miles. The person that contracted the disease was a woman of the village, who had left for Hardwár on the 31st March. She stated that she was quite well when she left home and also well when she *left* Hardwár on the 10th April. She travelled by road from Hardwár to Jagádhri when she took *ill* of cholera. She is a very old woman and stated that the weather was very hot and oppressive, and that she was much fatigued and drank largely of water. The purging and vomiting continued, and in that state she travelled from Jagádhri to Raipur and Jullundur. She arrived at her village (*Purhiran*) on the 21st April, still suffering from vomiting, purging and cramps. On the day of her arrival, all the *stained linen* was washed at home, and on the following day her clothes were washed in a Toba (tank) near the village, which the Dhobis of the village used, and in which a large number of the village population perform their ablutions. The people do not drink the water of this tank, neither do they use the water for culinary purposes.

On the 22nd April, the 2nd day of the woman's arrival, 16 cases of cholera occurred, out of which *one* proved fatal. On the 23rd 2 fresh cases and 4 deaths. On the 24th one fresh case, and 2 deaths in the house in which this case occurred, one of its members had been to Hardwár, and two days after his arrival, this case occurred, but the man who had been to Hardwár remained quite well. On the 25th, 2 new cases and 2 deaths. On the 26th, one case and no death. On the 27th one death. On the 28th 3 fresh cases and one death. No cases occurred in the village after this date, but of those remaining, 2 deaths occurred on the 30th April and one on the 2nd of May. The number of cases that occurred was 27 and 12 deaths. The woman who, as it would appear, *imported* the disease, *recovered*.

Rattiwal.

Rattiwal, a village in the Garhshankar Tahsil, was reported to have had an outbreak of cholera on the 5th June, and had every appearance of the disease being imported. It was reported that six men had come from Rupar who had been working at the 'canal' and when cholera made its appearance there, the works were stopped, and the men discharged, who returned to their respective homes. These men were inhabitants of this place, and

* *Note by Sanitary Commissioner.*—On examining the registers it appears that two men, aged 27 and 25 years, Hindus, residents, died from "Dast Kai, and Kulanj" (purging, vomiting and pain in the stomach) within twenty hours on the 15th April in the small village of Randoga, thana Unah. Another death of one Hindu fakir, by name Bává Gopál Das, aged 65 years occurred from cholera in the city of Hoshiárpur on the 19th of April after three days illness. No mention is made of these deaths in any of the cholera reports received from the district, and neither were they authenticated, although they were returned under the head of cholera, in the Weekly mortuary returns.

prior to their coming, the village was quite healthy and free from cholera. Immediately on their arrival, cholera made its appearance, and in 10 days 25 cases occurred, out of which 13 succumbed to the disease. It could not be ascertained whether any of the six men who came from Rupar were attacked with the disease, and if any proved fatal.

"The atmosphere was very dull and oppressive at the period when cholera made its appearance at Hoshiárpur, *Purhiran* and *Rattiwal*. The thermometer ranging from 66° to 90° in the shade. The wind moderate in force, East and South-East, but very sultry towards evening. No rain, thunder or lightning where the outbreak took place.

HISSAR.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Hissar during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Hissar	14,162	...	...	86	5th April.
Hánsi	12,210	...	...	132	18th „
Bhiwani	33,220	...	...	148	20th „
Fattahabad	3,084	...	...	81	24th „
Tohána	3,445	...	...	10	6th May.
Rattia	3,120	...	...	6	13th „
TOTAL OF MUNICIPAL TOWNS	...	...	...	463	
RURAL CIRCLES.					
Bálsamand	10,829	29	15	84	19th April.
Fattahbad	54,430	94	48	483	19th „
Bhiwàni	45,411	21	11	72	19th „
Hissar	35,620	85	57	364	20th „
Barwálá	38,527	54	48	458	20th „
Kairu	15,087	39	23	201	21st „
Hansi	127,486	153	66	846	22nd „
Toshám	45,862	62	11	45	24th „
Tohaná	20,654	82	34	353	25th „
Rattia	19,929	53	4	125	26th „
Sewáni	16,376	38	6	120	28th „
Behl	5,318	8	5	60	14th May.
TOTAL OF RURAL CIRCLES	...	718	328	3,211	
GRAND TOTAL	...	...	...	3,674	

Hissar district.

100. This district stands first in the order of the severity of the epidemic. The disease killed no less than 3,674 in a population of 4,84,681, or at the rate of 7·58 per 1,000; and attacked 334 different places out of a total number of 724 in the whole district. The registers show that the disease commenced in April. In this month it killed 988. The next month, the number rose to no less than 2,269, in June it suddenly fell to 390. There were only 25 deaths reported in July and 2 in August. From an analysis of the returns prepared from the weekly registers received in this office through the Police, it appears, that in 195 out of the 334 villages affected by the disease, the mortality did not exceed 5; and that in 86 others the number ranged between 6 and 20. Of the Municipal towns of the district, the deaths were most numerous in Bhiwáni, *viz.*, 148; Hánsi 132; Hissar 86; in the small town of Fatahabad with a population of 3,084, the deaths were 81, or at the rate of 2·6 per cent. Of the rural population the following were the greatest sufferers, *Ladoy* and *Kori* in the Police Station of Hissar; *Daroli* in the *Bálsamand* thana. In the village of *Barwah*, thana *Sewáni*, the number was 69. out of a population said to be 1,800. In the Hánsi thana, the villages of *Dhavithah* had 72, *Lisay* 61, *Mahotah* 47, *Kot Kalan* 46, *Kot Khurd* 33, *Garri Jállah* 43, *Nála Mahomedpur* 32. In the Bhiwáni thana, the deaths mostly occurred as already stated in the town of the same name. In the other villages in this thana, the highest number, *viz.* 18, occurred in the small village of *Khuskani*. In *Kero* rural circle, the villages of *Hassan*, *Mehtampurah* and *Joy Khurd*; and in the *Behl* thana, *Sidhvas*, and *Nurpur Kalan* suffered severely. The hamlet of *Paya Dalánwálla* lost no less than 55 of itspopulation. *Bhagranwal* and *Sandalpur* 49 and 43. In the hamlets of *Bhatan kalan* and *Kheratigarh* cholera was also most fatal. In *Rathia* thana the disease was almost confined to two hamlets, *viz.*, *Rattangarh* and *Bharpur* which had 97 and 25 deaths each Out of the total of 458 deaths registered in 48 villages of the *Barwalli* thana, those of *Bianahgarh Khark* and *Papra Niamatpur* alone had 84, 57 and 51 respectively. In the Police Station of *Tohána*, the villages of *Dangrah*, *Hyder Kalan*, *Ayati* and *Saman*, and the small hamlets of *Garri*, *Modiawallah*, *Dangor* and *Tharwallah* also suffered most severely in proportion to their population.

Summary of reports of Civil, Medical and Police Officers.

101. The cause of the wide spread prevalence and fatality of the disease in the Hissár District is thus accounted for by Colonel Minchin, Commissioner, Hissar Division :—

Roughly speaking I should say about 16,750 persons went from this district to Hurdwar ; and the number of pilgrims belonging to foreign states who passed through it is 33,000. The majority of the pilgrims were Bagris, who are notoriously very saving and hate to spend money. I am told that they took with them a month's supply of provisions, chiefly small cakes made of atta, (flour) cooked in oil and sweetmeats also cooked in oil, which may have been wholesome enough when they started, but must have become thoroughly indigestible before they finished their long journey ; they returned via, Kárnal and Sufedon and along the canal road to Hansi, diverging to their homes from the nearest point ; the cholera first broke out in Jind and Hansi and the worst ravages have been along this line of country. It was at first confined to the pilgrims and then spread to the population at large, at a rough calculation (writing under date the 21st May) about 4,000 persons in Hissar District have been seized from the 18th April to 21st May ; of whom half have died. * * * * * *

We had a very severe storm on Sunday night, which must have cleared the atmosphere ; there was a sensible decrease in the number of seizures and deaths about the middle of last week ; then it rose again, and is now once more declining. Most of the victims are Hindus, and their habit of burning the bodies will prevent the disease breaking out again. The Tahsildár of Bhiwani informs me that 7,000 people went from that town in a body and returned together ; that he stopped them outside the city; and inspected them and found apparently only 3 sick amongst them, who were sent to Hospital and the others went to their homes ; that night, however, cholera broke out in the town very violently amongst the pilgrims, but as arrangements had been made to supply medicines, the mortality was small, not more than 70 dying. A second attack broke out later with greater mortality. There can be no doubt that the disease broke out among the pilgrims first, and then spread, and that it was worse among the Bhagris than other classes. It must be remembered too, that the district has suffered from the drought of the last two years, and had not time to recover, and my wonder is, that so few have died. Another reason is given for the ravages of cholera in Hissar, *viz.*, that there was a Tirut or Mela (fair) at a place called Pindora, about 5 miles from Jind which was attended by the pilgrims returning from Hardwár. I am told the tank there is very small, and the number of pilgrims very large and the water became very foul and the outbreak commenced here ; more than 300 dying in the first day or two. I was told of this at the time and I dare say it aggravated the disease.

In continuation of the above, Colonel Minchin in a demi-official letter, dated 28th May, states thus about the Pindora Tirut, (fair) :—

From the enquiries which I have since made, I have little doubt that the Pindora Tirut was the cause of the great increase of cholera in Hissar and Rohtak ; upwards of 20,000 pilgrims are stated to have been present at the gathering, that there was only one well in the place, so the people were obliged to drink the filthy water of the pool in which they had all bathed. They were, no doubt, prepared for cholera and had it working in their system, so that it broke out at once with great virulence. I hear that Jind has suffered as much as we have from cholera. The storms on the night of the 18th did affect it slightly and is still very bad both here and at Rohtak. The weather is very hot and there is no wind, and what there is, is either Southerly or South-East ; and wind in the East is always bad for man and beast.

The District Superintendent of Police, Mr. Dunsford, states :—

That the village of Pindora in the Jind territory, appears to have been a rendezvous for large parties of pilgrims on their return ; and immediately subsequent to the date of their assembly there, cholera spread rapidly, and the main route of the pilgrims on their return is markedly followed throughout by virulent and numerous cases of cholera. The disease was afterwards disseminated, no doubt by intercourse among villages in all directions, but it is, I think, an established fact, that at the outset those villages only were attacked in which the returning pilgrims resided. The above points I think sufficiently settles the question as to whether the cholera was brought into the district and disseminated by the pilgrims returning from Hardwár or otherwise.

The Civil Surgeon gives the following account of the above fair :—

The majority of the Hissar pilgrims when returning from Hardwár stopped at a place called Mungalore near Dabraon, in the North-Western Provinces, where the first death from cholera occurred, and a few every day afterwards, until the Hissar pilgrims arrived at Pindora in Jind, some 40 or 45 miles from this, where disease and death made rapid havoc which alarmed and terrified the pilgrims and made them hasten home.

In submitting the cholera reports from the Civil Surgeon and the District Superintendent of Police, the Deputy Commissioner, Colonel Forster, states thus in his letter dated 6th June 1879 :—

There can be no doubt whatever that the disease was imported by the return of pilgrims from Hardwár, as not a single case occurred prior to the 18th April. The first outbreak of cholera which spread very rapidly in all parts of the district was confined to the pilgrims alone, following their wake along the villages where they put up in their way home, and afterwards extending to non-pilgrims, as it was impossible to stop all intercourse between them. I am afraid no reliable statistics can be obtained of the number of pilgrims who have succumbed to the disease on the road going and returning ; but the total number of cases up to date (6th June) is 5,534, of which 2,781 have died.

SIMLA.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Simla during 1879.

Name of Municipal Town or Rural Circle affected with Cholera.	Population	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Simla	17,440	...	...	84	24th April.
TOTAL OF MUNICIPAL TOWNS	...	...	...	84	
RURAL CIRCLES.					
Behrouli	3,469	95	7	10	20th April.
Kalka	3,990	2	1	14	24th April.
TOTAL OF RURAL CIRCLES	...	97	8	24	...
GRAND TOTAL	...	...	...	108	...

Simla District.

102. The Mortuary returns show that 108 deaths were due to cholera in the Simla District; of which no less than 84 occurred in the Simla sanitarium alone. The disease appeared in April, but it was in July that it broke out epidemically in the station. In this month 49 deaths were registered; in August the number fell to 28. Cholera finally disappeared in September, after causing 4 deaths in that month. The town of Kalka at the foot of the hills had 14 deaths, *viz.*, 5 in April and 9 in May. The small village of Nànga had 4 deaths, all in April. There were besides 5 other hamlets in which single deaths were recorded; in two villages they occurred on the 23rd and 29th April; and in the other 3 on 1st, 2nd and 3rd May, all in the persons of travellers. There were altogether 9 localites affected by the disease out of 238 in the district

In forwarding his cholera report, Major Nisbet, the Deputy Commissioner observes, that "the fair at Pinjore on the Umballa and Kalka road in the Patiála territory occurring just as pilgrims were returning from the Hardwár fair, numbers from the latter place attended and cholera was thus disseminated."

This fair is also mentioned by the Civil Surgeon, Umballa, as having helped in diffusing the disease.

KANGRA.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Kangra during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths during the year.	Date of 1st Death.
MUNICIPAL TOWNS.					
Kangra	6,336	...	...	4	3rd April
Jawalamukhi	2,844	...	...	16	6th ,,
Sujanpur	3,393	...	...	15	18th ,,
Dharmsala	2,862	...	...	26	4th Septr.
TOTAL OF MUNICIPAL TOWNS	...	...	...	61	
RURAL CIRCLES.					
Barsar	43,910	23	22	364	6th April
Dehra	15,292	37	12	29	8th ,,
Jawalamukhi	41,576	32	11	79	9th ,,
Pálampur	99,419	113	45	216	10th ,,
Harripur	54,556	100	2	23	15th ,,
Kangra	67,481	78	2	2	22nd ,,
Sorwan	27,733	67	5	22	22nd ,,
Sujanpur	44,236	24	12	109	22nd ,,
Hamirpur	52,593	15	18	1,062	4th May
Palach	43,924	25	1	9	25th June
Kúllu	51,928	26	4	27	2nd August
Dharmsala	21,071	21	4	7	24th ,,
Shahpur	13,801	14	5	38	5th Septr.
TOTAL OF RURAL CIRCLES	...	575	143	1,987	
GRAND TOTAL	...	..	...	2,048	

Kángra District.

103. There were 2,048 deaths registerd from cholera in the Kàngra District, the number of seizures up to end of October was 2,956 with 2,304 deaths according to Police monthly reports. The disease began to prevail from the beginning of April (vide Statement given above), and lasted till November. In April 98 deaths were recorded. Almost all the deaths in this month took place in the villages lying within the jurisdiction of the Police stations of Jawallajee, *Dera Gopi*, *Sorwan* and *Bassar*. The mortality fell in May to 52 and still further to 35 in June, in July it rose to 156; reaching its maximum of 1,370 in the following month (August). The Hamirpur thana suffered most severely; out of the 1,370 deaths in August, no less than 876 occurred in it alone. In Hamirpur thanah the "tappas" (group of small hamlets in a hilly country), of *Machhaltah*, *Mevah* and *Samsan* were the greatest sufferers, in *Bassar* thana deaths were most numerous in those of *Garli*, *Tira*, *Dhatwal*, *Bansi* and *Kotlah*. In September the deaths suddenly fell to 323 and to 12 in October. There were altogether 147 tappas affected with the disease out of a total of 704.

About 3,267 persons are said to have left the district for the Hardwár fair, of which 111 died on the road, *viz.*, 11 when going, 14 at the fair, and the rest on the return journey; all the cases but one resulted from cholera. No dates or any other particulars of the deaths which occurred on the journey to Hurdwar have been given.

GURDASPUR.

Statement showing diffusion of Cholera chronologicallly and locally in the different towns and rural circles in the District of Gurdáspur during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Fatahgarh	4,481	...	...	4	19th April.
Páthankote	4,507	...	...	2	20th ,,
Batala	26,929	...	...	1	20th ,,
Kalánaur	6,051	...	...	1	26th ,,
Dínanagar	6,626	...	...	1	27th ,,
Shahpur	1,336	...	...	1	28th ,,
Gurdáspur	4,137	...	...	1	14th May.
Narote	3,944	...	...	1	20th August.
TOTAL OF MUNICIPAL TOWNS	...	...	...	12	...
RURAL CIRCLES.					
Narote	26,995	88	1	1	29th March.
Gurdáspur	58,917	201	2	2	24th April.
Srigobindpur	47,972	121	1	1	25th ,,
Batala	75,472	181	2	4	28th ,,
TOTAL OF RURAL CIRCLES	...	591	6	8	...
GRAND TOTAL	...	...	...	20	...

Gurdáspur District.

104. Cholera did not prevail epidemically in the Gurdáspur District. There were only 20 deaths in 14 different localities, out of a total number of 2,302, and in a period extending from April to September. About 1,952 persons, it is stated, attended the Hardwár fair, of whom 28 died while going, *viz.*, 12 from cholera, of which no information is forthcoming, and 16 from other diseases. 62 persons died on the return journey, *viz.*, 28 from cholera and 34 from other causes. Particulars as to dates and the localities where the deaths occurred are not given.

The following remarks, extracted from the Deputy Commissioner's report, seem worthy of record:—

"25*th April, Kalánaur*—The wife of Hospital Assistant died of cholera. This Hospital Assistant had just been transferred from Narot to Kalánaur and travelled by Ekka (Native vehicle) through Gurdáspur; at the latter place he put up in the Serai and is said to have been in close proximity to a party of Hardwár pilgrims. 26*th April, Dinanagar.*—Amir Chund, Judicial, Moharrir, was taken ill while travelling by Ekka from Gurdáspur to Pathankot. He was admitted into the Dinanagar Dispensary and he died there the day following. He showed all the symptoms of cholera. 28*th April, Pathankot*—Rámdhan, son of the last named, who took the body of his father to Pathankot, was also seized with the disease, and it proved fatal. A child was also attacked here the same day, but was reported as doing well. 30*th April, Ekka stand Batala.*—A man returning from Amritsar was taken ill with cholera, but recovered. 1*st May Dharm Kot.*—Two deaths, Sardar Bhup Singh and Kashi Ram, Sonar. The Dharm Kot Bhagga outbreak is attributed to a party of pilgrims who lodged in the Dharmsálá (a Sikh resting place), and drank water from the well in which the Hindu villagers obtained their water.

"It will be seen that in two or three cases the cholera patients brought the disease with them from the Amritsar District, but there is every reason for thinking that the importation of the disease into this district was due to pilgrims. It is curious that at least two cases are traced to Ekkas, which were much used by Hardwár pilgrims returning viá Amritsar."

SIALKOT.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Siálkot during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Siálkot	32,989	...	...	5	7th May.
TOTAL OF MUNICIPAL TOWNS	...	...	...	5	...
RURAL CIRCLES.					
Zafarwál	100,349	250	1	1	7th January.
Satrah	70,552	172	1	1	4th April.
Miani	36,356	96	1	10	24th ,,
Pasrur	85,681	189	1	8	10th May.
Siálkot	177,965	401	1	1	14th ,,
Dharmkot	33,18	68	1	9	5th June.
Sambrial	87,844	199	3	3	20th August.
Narowal	59,913	168	1	3	27th ,,
Phalorah	81,771	220	1	1	15th November.
TOTAL OF RURAL CIRCLES	...	1,763	11	37	...
GRAND TOTAL	...	...	...	42	...

Siálkot District.

105. This district had only 42 deaths from cholera, and in a period extending from the last week of April to September, 12 places out of a total number of 2,315 were affected, but in only 3 the disease may be said to have assumed an epidemic character, *viz.* *Oliapur*, in thana *Miana* having 10 deaths; *Kotli Assadulla Khan*, thana Dharm Kot 9; *Budha Jariya*, thana Pasrur 8. The town of Siàlkot escaped with only 5 deaths. In three villages single deaths were recorded. The approximate number of pilgrims to Hardwár from this district is stated to be 2,709, of whom 16 are said to have died on their way back. 13 deaths are said to have been from cholera, 2 from other diseases and one doubtful.

The Civil Surgeon, remarks thus:—

"That the disease found its way into the district through the agency of the pilgrims from Hardwár, there can be no manner of doubt, as nearly all the first cases are traceable to pilgrims or to pilgrim contact, and that it was propagated by, contact, direct or indirect, most probably by the drinking water; that probably a fresh impetus may have been given by a return wave from the Jummoo district, where the disease, meeting with no opposition, formed, as it were, a fresh centre of diffusion and was carried back by the terror-stricken people who fled into British territory."

FEROZEPORE.

Statement shewing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Ferozepore during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total number of villages in each cholera affected rural circle.	Number of villages affected with cholera.	Number of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWN.					
Zira	3,471	...	...	4	20th April.
Ferozepore	15,168	...	...	13	5th June.
Makhu	1,713	...	...	1	5th „
Muktsar	2,983	...	...	37	6th „
Kote Isa Khan	1,520	...	...	2	17th „
Fattahgarh	1,654	...	...	1	29th July
TOTAL OF MUNICIPAL TOWNS	...	...	...	58	...
RURAL CIRCLES.					
Bágha Parana	53,772	59	26	266	h April
Moga	48,283	74	33	240	20t „
Nathána	31,944	36	23	179	7th May
Ghel	22,446	57	34	170	13th „
Zira	26,356	151	29	119	17th „
Kot Bhai	16,505	46	28	227	20th „
Nihal Singhwála	31,066	37	19	114	25th „
Ferozepore	27,657	176	22	53	26th „
Muktsar	32,116	101	42	307	26th „
Dharmkot	61,316	121	11	111	27th „
Mamdot	9,698	109	14	34	30th „
Mohanka	10,775	102	15	57	4th June
Bagheki	8,898	82	7	12	7th „
TOTAL OF RURAL CIRCLES	...	1,151	303	1,889	...
GRAND TOTAL	...	...	...	1,947	...

Ferozepore District.

106. Of the 1,947 deaths registered from cholera in this district, no less than 1,271 were recorded in the month of June alone. In May and July 394 and 262; in August 16; April 3; and September 1. Out of a total number of 1,276 villages in the district, 309 were attacked by the disease; but in 230 of them the mortality was insignificant, that is, not exceeding 5 in any one of them. 895 persons are said to have attended the Hardwár fair, of whom 20 died on the road when returning.

As will be seen from the table given above, the Municipal towns had a very few deaths, with the exception of Muktsar in which 37 were recorded. Of the rural circles, the hamlets of *Gori* and *Lobnian-*

wala in the *Kotbhai* and *Muktsar* thanas suffered most terribly. The following hamlets with a population said to be under 1,000, were almost decimated by the disease, *viz.* :—

Village.	*Police Station.*
Bhallawala.	Zíra.
Mutvani.	Moga.
Kokri Piran.	Do.
Pholianwala.	Muktsar.
Sanguwala.	Do.
Kirpalke.	Do.
Mosriwala.	Mamdot, Kadirwalla, Dharmkot.
Kadirwalla.	

In proportion to population, the following somewhat larger villages also suffered very severely:—

Village.	*Thana.*
Ghel.	Ghel.
Mudki.	Do.
Sodiwallah.	Zira.
Darapur.	Muga.
Rajianah.	Bágha Parana.
Landah.	Do.
Sakhya Kalan.	Do.
Goliah.	Do.
Phallon.	Do.
Dina.	Nihal Singhwála.
Balaspur	Do.
Mehraj.	Nathána.
Kot Bhai.	Kot Bhai.
Kahnanwala.	Mohenke.

The above 24 places had no less than 778 deaths,; out of the total district mortality of 1,947, the highest number of deaths registered being 115 in *Lobnianwalla*; 85 *Kadarwalla*; 55 *Kote Bhai*; 53 *Sukhya Kalan, Gori* and *Sodiwalla*, 41 each.

I append extracts from the Police Officer's report regarding a few cases that occurred subsequent to those already mentioned :—

"On the 5th May a man died at village Talwandi Jalla, Police Station Zira. He arrived ill on the 4th instant from village Mandi, Police Station Shah Kot, Jullundur District. On the same date an outbreak of the disease was reported from village Matvani, Police Station Moga, which is close to the grand trunk road, and only two miles from Mehna encamping ground, on the road to Ludhiána; 18 persons were taken ill and 10 died. This outbreak was traced to Gunda, a baildar (cooly) on the road, who would have come in contact with travellers from the Ludhiána direction. He was first taken ill (he lives at Mutwani) but recovered. The outbreak in this village commenced from his illness.

On asking further particulars of the outbreak in this village, and the circumstances that led the District Superintendent Police to suppose that the disease was traced to Gunda baildar, he states that—

"Further enquiry respecting the outbreak of cholera at village *Matwani*; does not show any clear cause for the outbreak of the disease beyond that already given. The grand trunk road from Ludhiána to Ferozepore passes through the lands of *Matwani* and the encamping ground of *Mehna* is about 2 miles nearer to Ferozepore than *Matwani*, Gunda the baildar went to, and returned from Mehna daily, and had intercourse with returning pilgrims. The inhabitants of *Matwani* also had intercourse with pilgrims. No one went to Hardwár from *Matwani*. It is possible that pilgrims from the Kulsia and Faridkot States may have passed through this place unknown.

"On the 8th May cholera broke out at *Kokri Hirauwalla* and close to *Matwani*; 31 cases and 18 deaths occurred in this village up to 11th May. Since the above deaths, the disease has steadily spread along the road towards Ferozepore to villages adjoining the Grand Trunk Road in the *Moga* and *Ghil* Police Stations jurisdiction."

GUJRANWALA.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Gujranwala during 1879.

Name of Municipal town or rural circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Gujránwála	20,362	...	...	9	21st April.
Sohdra	4,716	...	...	2	29th "
Wazirabad	15,346	...	...	16	1st May.
Háfizabad	2,299	...	...	5	1st July.
Jalalpur	2,572	...	...	6	7th "
Pindi Bhatián	4,188	...	...	1	12th "
Akálgarh	5,037	...	...	1	24th August.
Total of Municipal Towns ...	...	...	...	40	...

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
RURAL CIRCLE.					
Hâfizabad	65,344	238	2	30	1st May.
Gujranwala	97,328	138	7	77	2nd „
Wazirabad	98,163	148	4	16	4th „
Kámoke	86,351	210	11	76	19th „
Kila Didár Singh	40,842	100	4	27	8th June.
Pindi Bhatián	34,287	101	7	14	15th „
Khângah Dogrân	35,309	89	20	135	24th „
Sheknupura	22,219	55	4	15	25th „
Total of rural circles ...	...	1,079	59	390	...
GRAND TOTAL	...	...	...	430	...

Gujránwála District.

107. The mortuary returns show 430 deaths from cholera in the Gujránwála District, according to Police reports there were 454 deaths out of 936 cases, 66 out of a total of 1,177 villages having been attacked by the disease. 1,556 pilgrims are said to have attended the Hardwár fair from the district, of whom 24 died *viz.*, 9 when going, (5 from cholera and 4 from other diseases,) 15 when returning (9 from cholera 6 from other diseases.) The dates and the localities where these deaths occurred, are not mentioned. Of the 430 deaths only 2 were registered in April. The returns for May show 57; in June the number rose to 84 and still further to 185 in July. In August it was 74 and in September 28. During the latter four months, *viz.*, from June to September the following villages suffered very severely from the disease. *Kotli Machhiwaran Kot Piru* and *Kotli Muglan*, in the Gujránwála thana; *Baher*, thana *Kamouke*; *Chhabhah*, thana *Kila Didár Singh*; *Pur Lakhan* and *Kot Nikah* thana *Khangarh Dogran*. In 39 other localities the deaths did not exceed 5. In the Municipal towns the mortality was trifling.

The weekly mortuary returns show that the 59 deaths from 21st April to 31st May occurred in the following 8 localities *viz.*, Gujránwála, Sodra, Gondlanwalla, Muddo Khalil, Lakhya, Chariala, Ghakkar and Wazirabad; 23, 20 and 7 respectively having been registered in Lakhya, Gondlanwala and Chariala alone.

The following remarks regarding the outbreaks at the above places are taken from a very interesting report furnished by the Civil Surgeon Dr. Calthrop, the first few cases which occurred in the Gujránwála district have already been mentioned :—

"The next case in Gujránwála was that of Mrs. Solomon, the wife of a Bombay native christian, (a *Khansama*) having a contract at the railway refreshment rooms. One portion of the Gujránwála Serai is separated from the rest by a wall and forms a small quadrangle with Bangalows at the corners inhabited by a colony of Eurasian clerks and their families. Mr. Solomon resided in a set of rooms in this quadrangle, his wife was attacked with cholera on the forenoon of April 27th and died on the early morning of 29th. I visited her and can certify that the case was one of perfectly genuine cholera. It is not known in the least how she became affected, but pilgrims of all sorts pass through the Serai, and her servants may have brought it in.

Sodra out-break

"The Hakim at *Sodra*, a small village about four miles from Wazirabad, reported that 3 cases of cholera occurred on the 29th April, one case was fatal, two ended in recovery, and on May 10th I received reports from the Police that two fresh cases had occurred at *Sodra* of which one had been fatal. Nothing is known as to the particulars of these except that four persons had returned from Hardwár to this village before the outbreak, but that none of these four persons were sufferers, and further that the disease was raging in Jhelum at the time, and communication was free between *Sodra* and Jhelum.

Gondlánwála out-break

I here describe the outbreak at *Gondlánwála* a large village five miles from Gujránwála on the main road leading to *Akalgarh*. On the 19th April, Talla Shah Arora returned from Hardwár and with him came also 8 other men, all residents of this place, and one man from a neighbouring village. On the 20th April *Mani Rám Nauria* returned alone from Hardwár. None of these men were ill, but on April 20th Ram aged 15, the son of Talla Shah fell sick with cholera and remained ill for three days ultimately recovering. Tulla Shah called in Mussamat Bhaggan a sweeper woman, to clean away the excreta of Rám, and Mussamat Bhaggan remained in tolerably close attendance, so much, that her eldest daughter *Musamat Kamó* (20 years of age) brought her infant sister for her mother to suckle it, this she did in Ram's sick room. *Mussamat Kamó* also brought another young woman, her cousin named Fatteh Bibi with her. These women after cleaning went home, and during the course of the day (20th April) *Mussamat Kamo* and *Mussamat Futteh Bibi* were both attacked with cholera and died the same evening at night.

"On April 21st Fuzla *chura* (sweeper) was attacked and died on April 28 h, another sweeper named Baisakhi was attacked and died after one day's illness, the exact date of this man's death is not known, but it was after 21st and before the 28th April, probably about the 24th. Three other sweepers died between April 21st and May 1st.

"A boy named Nand Lál was attacked on April 30th and eventually recovered, and it is to be noted that his grandfather, Bhoj Shah, a sonar (wealthy man) returned from Hardwar on April 28th; Bhoj Shah states that his family party consisting of Bishen Dás his son and Khushia his nephew and Mussamat Vir Kour his wife with Nihala a friend, Gurnanditta a water bearer and Mussamat Jindán, a Brahmin servant, went together to Hardwar and returned together; on their road home on April 26th, Mussamat Jindán was attacked with cholera, but they brought her on in the Train and arrived at Gujránwála on April 28th; Bhoj Shah and his wife rode on ponies, but Mussamat Jindán had to walk to Gondlanwálla, a distance of some 5 miles, and the exertion in her weak state brought on a return of the disease which was thus communicated to Bhoj Shah's grandson Nand Lál. Khushia (the nephew) was also attacked in May but he recovered.

"Amongst others who were attacked on April 30th was a *Thathiar* or brass worker named Wazir Singh. Now Wazir Singh together with some of his relatives, amongst whom were Mehr Singh and Boota went to Lahore on April 24th to arrange about a marriage and returned on April 28th. On April 30th Wazir Singh and Mehr Singh and Mussamat Jewan (one of Wazir Singh's relations) were attacked with cholera; Wazir Singh died but Mehr Singh and Mussamat Jewan recovered."

" Boota after staying at Gondlanwálá until May 1st, thought he had seen enough, and started to return to his own house in the Sialkot district, and with this intention he came to Gujranwala which was on his road at 3 P. M. on May 1st, and sat down to rest by the side of a tank ; he presently began to feel uneasy, and went to the house of a relative in the city, where he got rapidly worse and died about midnight of May 1st, or early on the morning of May 2nd, that is after an illness of some 6 or 8 hours duration. Before he died he said that there had been a great deal of sickness in Gondlanwálá, and that many people, including some of his own relatives, had died of cholera ; and he also said the people were trying to conceal the presence of cholera amongst them. This was the first report any of the authorities received, and directly I heard it, I sent out to ascertain the true state of affairs and take proper precautionary measures to prevent the further spread of the disease. Rám Sahai, the brother of Mani Rám above mentioned, who returned from Hardwar on April 20th, was attacked on May 4th and died on May 5th. In all 30 cases, of which 21 were fatal, occurred from the outbreak to May 15th, after which no fresh cases were reported nor any more deaths among the old cases. Besides the people whose names are given above, many others came about this time from Hurdwar, and it must be remembered that nothing was reported voluntarily, every detail given above has only been got by careful enquiry, and testing the reports of men sent especially to the village. I believe the facts as stated to be correct. The population of Gondlanwála is 2,936."

Muddo Khalil outbreak.

" Amongst the measures taken to prevent the spread of the disease, a certain amount of inspection was exercised over the sellers of vegetables and cooked food of sorts, so that stale food might not be used ; a certain Halvai (sweetmeat seller), named Basawa Singh, possibly finding his trade interfered with, or possibly in the ordinary course of his business, took to going daily to a village called Maddo Khalil, distant two miles from Gondlanwálá in the Gujranwála direction. On May 4th one man was seized with cholera at Maddo Khalil, and died on May 11th, another was seized on May 6th and died on the 13th May, and a third was attacked on May 13th and recovered. It is doubtful whether these were cases of true cholera or not, anyhow 2 out of 3 died, the people themselves and a compounder sent out there say it was true cholera, and they believe it to have been imported by the *Halvai* as above mentioned. I give the case for what it is worth."

Lakhiya outbreak.

" Almost simultaneous with the outbreak at Gondlanwálá was one at Lakhiya, this is a small village 6 miles from the Háfizabad Tahsil. The history of the commencement of cholera in this village is very definite, a man named Doola Mull returned from the Frontier where he had been with our troops, and travelled *via* Jhelum and Wazirabad, the whole village turned out to welcome him and conduct him to his house. This was on April 24th. Doola Mull fell sick with cholera on April 26th and recovered after 15 days severe illness. During his sickness he was visited by nearly the whole village, who came to make friendly enquiries about him. On April 27th, the son of Doolá's brother who lived in the same yard, began to suffer from vomiting and purging and died on April 28th; Doolá's sister confessed that she took the soiled clothes to the village well and washed them there, not knowing that there was any thing wrong in so doing. The disease then burst out violently, 16 people were attacked on May 1st, of whom 4 died, and by the evening of 2nd of May, 26 cases had occurred with 8 deaths. The individual cases could not be further traced, but between this time and May 14th, 37 cases occurred of which 25 were fatal. Here, as at Gondlanwala, as soon as reports were received, medical help was supplied, and every effort made to arrest the disease. The total population of Lakhiya is 318."

Chariala out-break.

" Chariala, a small village not far from the Kamoke Railway Station, was the scene of the next outbreak. A Kashmiri named Fattehdin, resident of Chariala went to Jhelum to drink the water from a particular well near there, and supposed to have certain medical properties. He returned to his village on May 6th, and was seized with cholera on May 7th and died the same day; his death was concealed until May 11th, and then reported as having been due to fever. On May 18th three other people were attacked *viz.*, a chura (sweeper) named Sutti, and Mussamat Mira a Jat woman, and Mussamat Jawaya a young girl, daughter of a Zamindar—Mussamat Mira died on the evening of the 19th May, Sutti on the night between 19th and 20th May, and Musssamat Jawaya recovered. None of these people were relatives or in any way connected with each other. On May 20th another woman named Mussamat Amir Bibi was attacked and died the same day. One or two cases then occurred daily, and on the 24th no less than 13 people fell ill, of whom fortunately only two died. In all 28 cases occurred of which 10 were fatal. Nothing further can be made out as to the circumstances which caused the disease to spread, but when Fattehdin died, all the village came to his house, his wife washed the clothes somewhere, and the next day left the village, and has not since been heard of. The total population of Chariala is 386. One of the people attacked at this village was a Police Sergeant, who had been sent out to make enquiries and he unfortunately died."

Ghakkar outbreak

" From the Railway Station of Ghakkar the following cases were reported, a Sepoy named Bir Singh, returning on sick leave from Kabul, got into the train at Jhelum and was removed at Ghakkar at 2 A. M. on May 4th suffering from vomiting and purging, he was treated by the Hakim posted there, and died some time in the afternoon of the same day, *viz.*, May 4th. On May 24th, a man named Boota Singh travelling from Umballa to Peshawar was removed from the midday train with symptoms of cholera. He does not appear to have been very bad, and recovered in the evening, and was allowed to proceed by the early morning train of the 25th May."

Wazirabad outbreak.

" A man was travelling down country from Fatahjung with two sons, one was attacked with cholera at Jhelum and died there on April 30th, the father then brought the other boy named Jitu to Wazirabad by the early morning (2 A. M,) train of May 1st, this boy was reported to be suffering from cholera at 9 A. M. on May 1st, and died at 1 P. M. on May 2nd at the Dispensary. On May 8th, another traveller by name Sirdara coming from Jhelum was removed from the train and treated by the Hospital Assistant, he recovered from the first effects of the disease, but died afterwards from some secondary complication on May 23rd. On May 10th, a case was reported as having occurred at Wazirabad itself, in the person of a Hindu woman, named Hookum Dai, a resident of the place. She was treated by the Hospital Assistant at her own house and recovered. None of this woman's relatives had been either to Hardwár or to Jhelum, nor is there any history of any change in the quantity or quality of her diet. About midnight of May 21st or early in the morning of May 22nd, Babu Wàzir Baksh, railway clerk, was seized with cholera, this man had just returned from Jhelum, where he had been staying on a visit for three days. He was treated by the Hospital Assistant, but died on the morning of the 23rd May. "

From these different outbreaks it seems to be pretty clear that (see history of first few cases) Hira Dass, a pilgrim fakir, brought cholera with him from Hardwár on April 18th, but that the spread of the disease was prevented by precautions taken, and by the fact that Hira Dass was, owing to circumstances, almost isolated from the time he returned until his death.

How Chit Ram (*vide* history of first few cases) contracted the disease is not certain, he may have got it in Jhelum or he may have got it at Gujranwala from his relatives who were pilgrims.

The case of Mrs. Solomon proves nothing, nor do the cases at Sodra.

That the outbreak at Gondlanwala was due to direct importation from Hardwár, on one or more occasions can hardly be questioned, if any reliance is to be placed on the accounts received, and I have taken the utmost care to verify them as far as possible.

The Muddo Khalil cases are inconclusive.

The outbreak at Lakhiya is a capital instance of the importation of cholera from a distance and its rapid diffusion by infection of the water-supply, it would be difficult to my mind to get a clearer case than this, it must be remembered that cholera was very bad at this time in Jhelum.

The attack at Chariala is also a good case of importation by a single person ; it is most probable that here again as at Lakhiya, the water-supply of the village was infected by water, in which clothes soiled with cholera dejecta had been washed, finding its way back again into the well.

The cases at Ghakkar and Wazirabad are all single isolated ones, and only go to show how cholera may be conveyed by rail from place to place, and the value of intercepting sick people at the Railway station.

GUJRAT.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Gujrat during 1879.

Name of Municipal town or rural circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Gujrat	17,401	...	...	24	2nd May
Jalálpur	14,014	...	...	21	10th „
Dinga	5,086	...	...	15	30th „
Kunjah	5,355	...	...	3	5th June
Total of Municipal towns	...	...	...	63	...
RURAL CIRCLES.					
Kothála Shekhan	67,062	118	15	184	29th April
Dinga	68,590	154	7	9	30th „
Lála Músa	71,130	207	4	8	9th May
Karián wála	101,840	193	2	4	10th „
Khárián	83,205	237	6	51	11th „
Gujrat	154,896	266	11	36	25th „
Parianwali	93,766	178	9	24	7th June
Kádirabad	25,594	63	1	1	3rd September
Total of rural circles	...	1,416	59	317	...
GRAND TOTAL	...	...	...	380	...

108. GUJRAT DISTRICT.—There were 380 deaths registered from cholera in this district; the number of villages affected was 59 from a total number of 1,416 in the whole district. The approximate number of pilgrims who attended the Hardwár Fair was 1,969, of whom 11 died on their way to the Fair, 26 on their return journey, and 13 during their stay there. All these deaths resulted from cholera. Of the 380 deaths, 90 were reported to have occurred in May, and 212 in June. The last death was registered in September. In proportion to population the following villages in the Police station of Kothala Shekhán were the greatest sufferers, *viz.*, *Vásu*, *Begi*, *Ahlah*, *Kathiwal*, *Soháwa*, *Attowál*, *Lákhiwál* and *Chhamn*. In all these the disease did not break out earlier than the 19th May, except in the last named village in which the date of first death is stated in the weekly registers to have been 29th April. In the Police monthly returns and the Medical Officer's report, the first death here is said to have taken place not before the 2nd May. In *Dinga* Police station one village by name *Attovalah* had one death in the person of a "traveller" as early as the 30th April. The villages of *Barnali* and *Dhuvaya* in the Police station of *Kharian* also suffered severely.

JHELUM.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the district of Jhelum during 1879.

Name of Municipal town or rural circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Jhelum	7,947	...	...	199	22rd April
Pind Dádan Khan	15,397	...	...	6	28th „
Talagang	5,659	...	...	5	17th May
Chakwál	5,674	...	...	3	10th June
Total of Municipal towns	...	...	...	213	...
RURAL CIRCLES.					
Jhelum	32,363	170	38	122	21st April
Dina	28,177	112	56	208	24th „
Sohawa	16,805	72	49	232	25th „
Domaile	34,075	110	22	78	26th „
Chakwál	65,027	148	39	212	26th „
Pind Dádan Khan	48,654	88	12	68	1st May
Jalálpur	34,766	79	4	19	1st „
Talagang	42,872	48	25	586	3rd May
Kallar Khár	37,548	66	16	47	14th „
Ahmadabad	18,305	32	18	139	1st June
Douman	28,783	77	4	5	3rd „
Tamman	8,430	40	6	33	12th „
Total of rural circles	...	1,042	289	1,749	...
GRAND TOTAL	...	...	...	1,962	...

1,962 deaths were registered from cholera in this district. According to Police monthly cholera returns ending September, there were 1,906 deaths out of 2,843 cases or 66 per cent. of cases. The Civil Surgeon states there were 1,916 deaths. The number of localities affected was 293 out of 1,042 in the district. Of the 1,962 deaths, 124 occurred in the month of April, *viz* 68 in the city of Jhelum, Cantonment, Commissariat encamping ground, &c., 5 in the villages in the thana of Jhelum, 24 in Police Station *Sohawah*, of which 12 were in the *Sohawah* village on the Grand Trunk Road, 22 in Police Station *Dina*, of which 7 occurred in *Dina* encamping ground and 13 in *Rhotas* also on the Grand Trunk Road, 2 in *Pind Dadan Khan*, 2 *Chukmuluk* in *Chakwal* thana, and one in Domeli. In the month of May the district mortality rose to 542, and still further in June to 760. It then suddenly fell to 224 in the following month and lingered on till October. Of the municipal towns, Jhelum was the only one in which the disease was epidemic; in it, no less than 199 deaths were returned, and most of them in the months of April, May, and June. Of the rural circles, the following villages in *Talagang* thana were the greatest sufferers:—*Thoa Marum* with a population said to be 2,296, having 196 deaths; *Chinju*, population 1,309, number of deaths 113; *Jhantla* and *Bhelomar*, population 1,009 and 780, deaths 50 and 47 respectively. Cholera was also fatally prevalent in the villages of *Bishandaur*, *Sohan*, *Nathupatti*, in the *Sohawah* thana; *Katrala* in *Domeli*; *Nanwal*, *Barhal*, *Ranjah*, *Muli* and *Beri* in *Chakwal*; *Bhairjir* in *Talagang*; *Chuha Saidan Shah* in *Pind Dadan Khan*; *Kodal* and *Dhunde* in *Ahmedabad*; *Rawal* in *Jalalpur*; *Paras Dina*, *Rhotas*, *Khojke* and *Satli* in Dina; out of the 293 affected localities in 220 the deaths did not exceed 5. About 1,300 persons are said to have attended the Hardwár fair, of whom 49 died, but the Deputy Commissioner states that these figures must not be accepted as quite reliable.

The excessive increase of cholera deaths in the district is thus accounted for by the Civil Surgeon:—

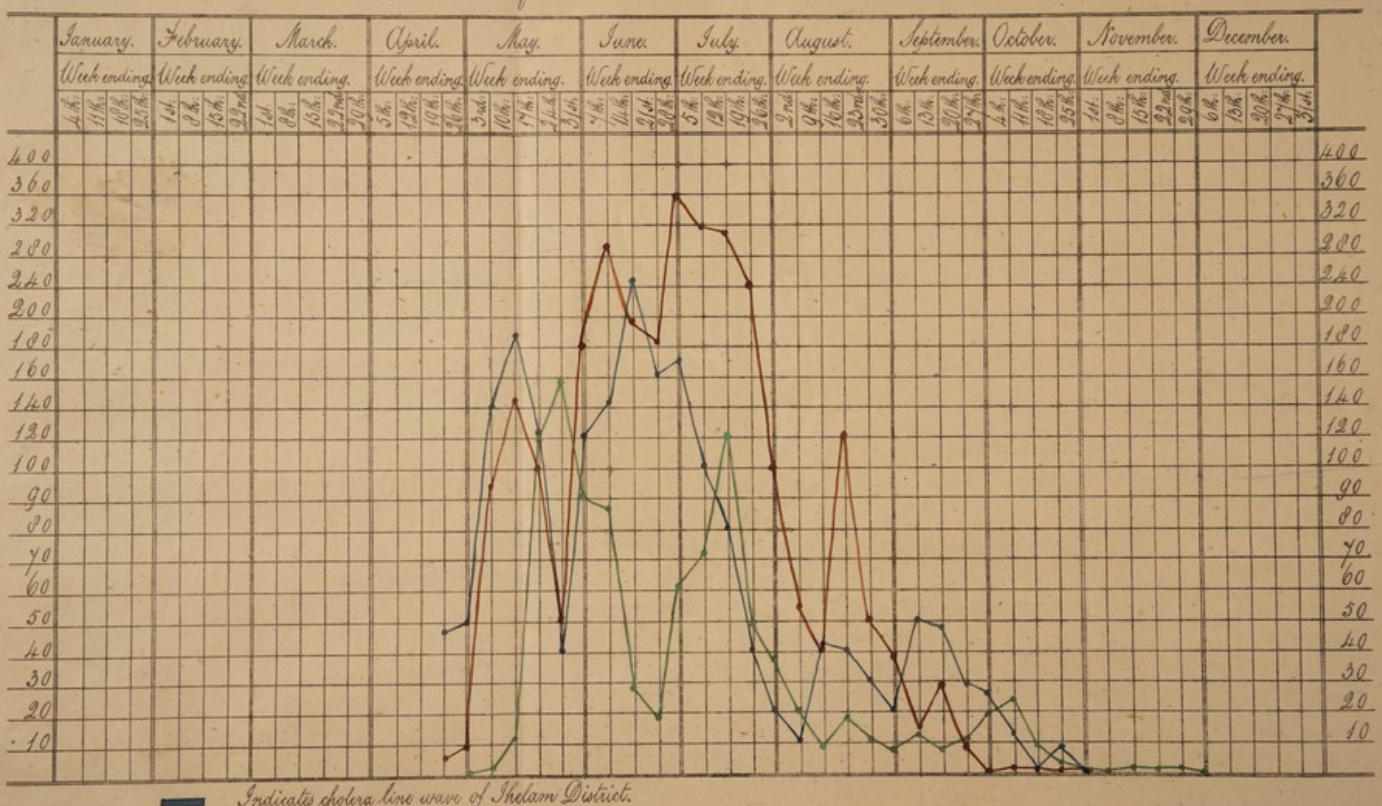
"There was great overcrowding of men and animals in Jhelum during the year. Prices of the necessaries of life were high; a famine in Kashmir sent many starving Kashmiris to Jhelum. These circumstances increased the number of cases of cholera in the district acting as predisposing causes. They had nothing to do in originating the disease. Troops coming from the front also left their cholera cases behind."

RAWALPINDI.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Rawalpindi during 1879.

Name of Municipal town or rural circle affected with cholera	Population	Total Number of villages in each cholera affected rural circle.	Number of villages affected with cholera.	Number of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Rawalpindi	20,802	...	...	163	21st April
Hazro	7,950	...	...	8	5th May
Murree	7,939	...	...	57	7th „
Makhad	4,252	...	...	4	7th June
Pindigheb	8,223	...	...	49	18th „
Attock	3,213	...	..	7	7th July
Total of Municipal towns	...	...	...	288	...
RURAL CIRCLES.					
Rawalpindi	93,147	224	111	513	22nd April
Gujarkhan	50,068	145	75	220	22nd „
Játli	95,456	155	35	212	26th „
Riwat	39,146	165	71	374	27th „
Mandra	15,954	81	42	147	29th „
Hasan Abdal	32,149	77	31	121	30th „
Pindsultani	38,767	51	24	102	2nd May
Makhad	14,414	40	8	41	2nd „
Sangjáni	25,629	70	34	105	3rd „
Fatahjang	46,323	99	41	174	6th „
Hazro	55,266	84	4	19	10th „
Attock	18,412	37	9	20	15th „
Murree	17,431	76	19	54	15th „
Chontrah	42,978	94	21	176	25th „
Pindigheb	36,514	62	14	146	28th „
Kahuta	40,340	144	27	64	31st „
Kotli	11,811	26	8	9	3rd June
Kallar	42,704	95	21	129	3rd „
Total of rural circles	...	1,725	595	2,626	...
GRAND TOTAL	...	...	...	2,914	...

Chart showing the weekly rise and fall of deaths from Cholera in the Jhelam, Rawalpindi and Peshawar Districts, during the year 1879.



Indicates cholera line wave of Jhelam District.
Do: do. Rawalpindi do.
Do: do. Peshawar do.

Rawalpindi District.

109. This district stands next to Hissar as regards the fatality and prevalence of the cholera epidemic of the year under review. There were no less than 2,914 deaths registered in 601 out of 1,725 villages. According to Police monthly cholera returns there were 2,990 deaths out of 4,777 cases, or in a proportion of 62 to 100. It appears from the Mortuary returns compiled in this office, that the disease broke out in April and continued to prevail till October, the highest number of deaths, *viz*, 1,157 and 859 were registered in June and July respectively. In May the number was 533 and in August 257 ; 50 and 52 deaths respectively were reported to have occurred in April and September, in October there were only 6. 1,705 persons are said to have attended the Hardwàr Fair from this district, of whom 4 died while going, and 78 when returning. All these deaths are reported to have resulted from cholera.

Of the municipal towns, Rawalpindi had 163 cholera deaths, Murree Sanitarium 57, and *Pindigheb* 49. On analysing the returns of rural circles, it appears that in proportion to population the following small villages suffered most terribly. In thana Rawalpindi, *Kotáh Kalan* having no less than 96 deaths, *Chhaili* 45, *Jhangi* 40, *Suraour* 27, *Saiadpur* 30. In thana *Rawal*, *Dhok Budhal* 42, *Dugialah* 34, *Hamak* and *Rawal* 26 each. *Bagga Shurkan* 22. In thana *Sangjáni*, *Barkat* and *Sagarmi* 17 and 15 respectively. In thana *Kallar*, the small village of *Arazi* had no less than 65 deaths. In thana *Mundra*, *Kangrelah*, *Bochha*, and Aryan had 22, 16, and 15, respectively. In *Jatli* thana there were 60 deaths in the small hamlet of *Satial*, *Bara* in the same thana had 25. In *Fattehjung* thana, 42 deaths were registered in the village of *Dariál*. In *Chauntra*, *Sayál* and *Hukumtál* 38 and 37, *Ráoká* and *Rathanráh* 28 and 26 respectively. In the thana of *Pind Sultani*, *Jund* had 46. In *Pindigheb* thana 84 deaths were registered in the small village of *Karchak*. The village of *Hassan Abdál* thana *Hassan Abdál* had 56. In these 27 places alone 1,127 deaths were registered out of the total district cholera mortality of 2,914. In 485 out of the 601 places attacked by the disease, the mortality was very trifling, that is not exceeding 5 deaths in any one of them. 299 of them having only single deaths. The 50 deaths registered in April occurred in the following localities:—

Rawalpindi city	...	...	...	21
Do. thana	...	...	...	11
Rawat do.	...	...	...	10
Gujar Khan do.	...	...	...	4
Mundra do.	...	...	...	3
Jatli do.	...	...	...	1

The following chart will show more clearly the rise and fall of the disease in this district, as well as in those of Jhelum and Peshàwar. It must be remembered that Rawalpindi also, was exposed to numerous chances of infection from camp followers and others going to the front, or returning therefrom besides reflux waves from Jummoo, Hazára and Peshàwar.

MONTGOMERY.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Montgomery during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total number of villages in each cholera affected rural circle.	Number of villages affected with cholera.	Number of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Kamalia	5,900	...	...	2	23rd April
Sayadwala	3,437	...	...	1	1st August
TOTAL OF MUNICIPAL TOWNS	...	...	...	3	...
RURAL CIRCLES.					
Chichawatni	4,025	31	2	15	1st May
Atári	26,589	90	2	8	15th June
Bojke	15,888	94	6	16	20th ,,
Pakpattan	32,220	153	1	1	28th ,,
Tibbi	25,146	153	2	3	1st July
Chochak	23,614	85	3	7	4th ,,
Báhak	9,349	53	5	12	9th ,,
Sayadwala	26,813	129	4	13	25th ,,
Hujrah	35,928	121	5	17	25th ,,
Dipálpur	47,586	152	1	2	25th ,,
Harappa	10,290	44	1	1	28 h ,,
Kamalia	15,101	91	1	1	16th August
Kalleanwala	10,214	41	2	2	19th ,,
TOTAL OF RURAL CIRCLES	...	1,237	35	98	...
GRAND TOTAL	...	...	...	101	...

Montgomery District.

110. The district of Montgomery had 101 deaths in 37 different localities; and during a period extending from April to August. Only 37 out of a total of 1,518 places were affected. In 31 of these the number did not exceed 5, 20 having only single deaths, in 5 it ranged between 6 and 9. The highest number of deaths recorded in any one place was 14, and these were reported to have occurred in the small town of *Chichawatni*. There was no cholera in the district previous to the outbreak of the disease at this place. The two deaths which were reported in the Kamália town, as having occurred from cholera on the 23rd and 25th April were found on personal enquiry by the Civil Surgeon not to be true cases of the disease.

Civil Surgeon's remarks regarding origin of the disease.

111. The following very interesting facts in connection with the outbreak at Chichawatni are taken from the report furnished by the Civil Surgeon :—

II.—Chichawatni is a large village situated on the left bank of the Ravi, about 2½ miles from the Railway station of the same name.

III.—There were altogether 26 cases reported including 5 doubtful ones. The casualties were 16.

IV.—I think however, as there is a connecting link between the doubtful cases and those recognized as cholera, all should be treated as such.

V.—The first case occurred on the 24th April, the last on the 15th May; the first casualty on 25th April, the last on 17th May.

VI.—There were altogether 18 places attacked, the following statement will give particulars.

Number of case.	House number	Name, caste and sex of those attacked.	Date of Attack.	Date of Death.	Remarks.
1	Market	Kishni, Hindu, female	24th April ...	25th April ...	A pilgrim from Hardwár *enroute* to Dera Ismail Khan, putting up in village for night.
2	1	Bagi, Hindu, male	24th „ ...	Recovered ...	A Hardwár pilgrim who returned on 23rd, took ill the day following and was removed to Mooltan district on 27th still suffering.
3	1	Rajan, Hindu, female	28th Apl. (D)...	„ ...	Wife of Bagi.
4	1	Mehran, Hindu, female.	28th „ (D)...	„ ...	Mother-in-law of Bagi.
5	2	Churi, Muhammaden, female.	28th April ...	1st May ...	Attended on Kishni case No. 1, and received the deceased woman's cast off clothes. (*Note by Sanitary Commissioner* —This fact is confirmed by the District Superintendent Police, who mentions that the petticoat belonging to Mussamat Kishni was given to Mussamat Churi who was taken ill of cholera on the 28th and died 2 days after she became possessed of the infected article.
6	3	Shiban, Muhammaden, female.	28th „ (D) ..	Recovered ...	Own sister of Churi whom they attended during illness
7	3	Bebi „ „	28th „ (D) ..	„ ...	
8	4	Bhain, Hindu, female.	28th „ (D)...	„ ...	Close neighbour and visitor of Bagis.
13	4	Devi, „ „	4th May ...	6th May ..	Mother of Bhain.
9	5	Bhuggi „ male	3rd „	Recovered ...	
10	6	Satto, Muhammaden, female.	„ „ ...	4th May ...	A prostitute who visited Mussamat Kishni on night of her illness.
11	7	Hazara, Muhammaden, male.	3rd May ...	Recovered ...	
12	8	Talian, Hindu, female	„ „ ...	9th May ...	A frequent visitor of Bagi's family.
14	9	Narain, Hindu, male	4th „ ...	9th „ ...	Ditto ditto.
15	10	Kurram, Muhammaden, male.	5th „ ...	13th „ ...	
16	11	Bhag Bhari, Muhammaden, female	6th „ ...	7th „ ...	A constant visitor of Mussamat Sutto whom she attended during illness.
17	12	Háji, Muhammaden, male.	7th May ...	7th May ...	This man was called by Mussamat Sutto, case No. 10 to receive her dying direction regarding disposal of property, &c., &c.
18	12	Bahádur, Muhammaden, male.	7th „ ...	12th „ ...	Son of Haji.
24	12	Kurram Muhammaden, male.	7th „ ...	14th „ ...	„ „
19	13	Naba, Muhammaden, male.	7th „ ...	8th „ ...	Was employed in rubbing hands and feet of Mussamat Sutto, case No. 10.
20	14	Soban, Muhammaden female.	8th „ ...	9th „ ...	Close neighbour and visitor of house No. 12 and was in and out during Haji's illness.
21	14	Girl, Rosham, Muhammaden, female.	8th „ ...	9th „ ...	Daughter of Soban.
22	15	Boy, Ramzan, Muhammaden. male.	8th „ ...	Recovered ...	
23	16	Do. Chandi, Hindu, male.	11th „ ...	13th May ...	
25	17	Chala, Hindu, male	15th „ ...	Recovered ...	
26	18	Sawaya, Hindu, male	15th „ ...	17th May ...	

Note.—The market place at which Mussamat Kishni, case No. 1 slept, is in centre of village. Houses Nos. 1, 16 and 17 are in nearly the same position. Nos. 2, 3, 4, 5, 7, 8, 9, 10 and 18 are towards the West, and Nos. 6, 11, 12, 13, 14 and 15 East.

" The letter (D) marks those regarding whom doubt existed."

The Civil Surgeon then continues to remark that after careful enquiry made on the spot, the following facts were elicited :—

Four pilgrims Mohri 1st, Jowaya, Bagi and Mohri 2nd left Chichawatni on 4th April to visit Hardwár, and from there in company with one Bishen of Kamalia, (a town about 11 miles from Chichawatni.) went to Muzaffurnagar (in North-Western Provinces) on business, which kept them for 5 or 6 days. (This is confirmed by District Superintendent Police, A. T).

On the 21st April these men moved homewards, all travelling in the same compartment of the Railway carriage. On the way, Bishen was taken ill with cholera and died before the train reached Jagádhri, where his corpse was removed from the carriage. Bishen did not feel well at starting, but none of his companions suspected that he would have become so seriously ill so soon after. The other four continued their journey. Mohri 1st and Jowaya were attacked with purging and vomiting at Phillour, and were removed from the carriage on arrival of the train at Amritsar. (Confirmed by District Superintendent Police A. T). These two men recovered and returned to Chichawatni on 28th April. Note date.

Bagi and Mohri 2nd the other companions of the deceased Bishen reached Chichawatni on 23rd April, the former took ill the day after with purging and vomiting ; on 27th while still suffering, he was removed by his friends to a place called *Dadhi* in the Serai Sidhu Tahsil Mooltan district and eventually recovered. (Confirmed by District Superintendent Police A. T).

VIII.—Another family of pilgrims returning from Hardwár, *enroute* to Dera Ismail Khan, put up at Chichawatni on the afternoon of 24th April in consequence of the illness of one of their party.

The sick woman named Kishni was found to be suffering from cholera of which she died on morning of 25th.

On the 22nd between Amritsar and Lahore, this woman lost a grown up son of cholera, this affected her much ; she refused all food, and fell an easy victim to the terrible disease, which three days before carried off her son (confirmed by D. S. Police A. T).

IX.—The enquiry thus far brings us to the 24th April, before which date there was not a sign of cholera and as the place had not had such a visitation, for, according to the statement of the inhabitants, 20 years, they did not look upon the first cases in any thing like a serious light, and it was not till evening of 28th that the first information reached me that cholera had attacked the village.

"X.—On morning of 29th April, I visited the village and found 6 women down with purging and vomiting, but only one (Churi) gave cause for alarm, but even in her case, though she was very low, up to the time I saw her, she had not true symptoms of cholera. The others were exhausted but still had a fair pulse and warm skin, cramps were absent. *Note by Sanitary Commissioner.*—It is persumed that the symptoms of the cholera were developed in the other five, they being the persons named in the form as taken ill on the 28th April A. T.

On the 30th Churi had all the symptoms of cholera and she died on 1st May.

XI.—It is noteworthy that all six of the cases reported as occourring on 28th April had connection in some way or other with the first two, Kishni and Bagi, as will be seen from Statement under para VI.

XII.—Accepting just for the sake of illustration that the disease was conveyed by person to person, I will show how this was possible.

The number of cases in brackets will correspond with that shown in Statement under para. VI.

Mussamat Kishni (1). Attacked 24th April ; died 25th April.

I.—Mussamat Churi (5). Admitted 28th April ; died 1st May.
1. Mussamat Shiban (6). Admitted 28th April ; recovered.
2. Mussamat Bibi (7). Admitted 28th April ; recovered.

II.—Mussamat Sutto (10). Admitted 3rd May ; died 4th May.
1. Mussamat Bhagbhari (16). Admitted 6th May ; died 7th May.
2. Haji (17). Admitted 7th May ; died 7th May.

I.—Bahadar (18). Admitted 7th May ; died 12th May.
II.—Soban (20). Admitted 8th May ; died 9th May.
1. Girl, Roshan (21). Admitted 8th May ; died 9th May.
III.—Kurum (24). Admitted 11th May ; died 14th May.
3. Naba (19). Admitted 7th May ; died 8th May.

Thus ends the first series. To explain ; Kishni would convey the disease to Churi and Sutto." "Churi would pass it on to Sahiban and Bibi." "Satto would give it to Bhagbhari, Haji and Nabb." "Haji would effect Bahadar, Soban and Kurum." "Soban would effect Roshan.

"XIII.—The next set of cases would begin with Bagi."

Bagi (2). 24th April ; recovered.
I.—Mussamat Rajan (3). 28th April ; recovered.
II.—Mussamat Mehra (4). 28th April ; recovered.
III.—Mussamat Bhian (8). 28th April ; recovered.
1. Mussamat Devi. 4th May ; died 6th May.
IV.—Mussamat Talian (12). 3rd May ; died 9th May.
V.—Narain (14). 4th May ; died 9th May.

The latter two visited both the Bagi family (cases 3 and 4), and Mussamat Bhian and Devi, (cases 8 and 13) it is therefore not certain where they caught the disease.

Nos. 9, 11, 15, 22, 23, 25 and 26 were cases occurring without any proof of personal contact with anybody suffering from the disease.

XIV.—It will be observed that the disease conveyed by Kishni was twice as fatal as that by Bagi. The former resulted in over 80 per cent. of deaths to attacks, the latter to 40.

The Deputy Commissioner has not furnished any report of the number of pilgrims that attended the Hardwár fair from this district.

Mooltan District.

112. MOOLTAN.—There was no epidemic outbreak of cholera at Mooltan ; a few cases did occur, of which two proved fatal (see preceding chapter).

SIRSA.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Sirsa during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circles.	No of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Ellenabad	3,299	...	...	19	23rd April.
Sirsa	12,807	...	...	35	25th „
Rania	4,917	...	...	184	28th „
Fázilka	4,346	...	...	2	28th May
Rori	2,728	...	...	6	4th June
TOTAL OF MUNICIPAL TOWNS	...	...	...	246	...
RURAL CIRCLES.					
Trail	8,264	23	11	215	20th April.
Sirsa	34,408	65	15	104	22nd „
Ellenabad	7,875	36	11	27	22nd „
Rania	23,191	54	22	80	22rd „
Jamal	7,918	18	8	11	24th „
Chotàlâh	7,020	22	8	27	29th „
Rori	29,917	67	28	287	30th „
Abohar	10,080	45	9	26	7th May.
Divali	17,942	64	13	37	10th „
Fázilka	25,363	127	1	1	29th „
Malot	13,923	63	15	27	12th June
TOTAL OF RURAL CIRCLES	...	584	141	842	...
GRAND TOTAL	...	...	...	1,088	...

Sirsa District.

113. This district had altogether 1,088 deaths from cholera, *viz.*, 170 in April, 668 in May, 216 in June and only 34 in July. According to Police monthly cholera reports, there were 2,069 cases and 1,105 deaths. There were 146 villages out of a total number of 626 in this district attacked by the disease, but from an analysis of the returns prepared in this office from the Weekly registers, it appears that in no less than 117 of them the mortality was trifling, that is, there being not more than 5 deaths in any one of them; in 16 other places the number was above 6 and under 14. The following 5 places suffered most from the epidemic:—*Alika* in thana Rori, population said to be 613, had 131 deaths. *Dung* and *Jodhka* in thana *Trail*, population 205 and 862 had 65 and 85 deaths respectively. Rania town had 184 out of a population of 4,917. *Suriah*, thana *Rori*, population 874 had 53. Altogether 518 deaths were reported in these 5 places, or a little less than half of the entire cholera mortality of the district. The town of Sirsa had 35 deaths; the village of *Madho Sanganah* 33, *Mangalah* 18, *Ellenabad* town 19. The small hamlets of *Kakdanah* and *Chhaharwalla* in thana *Trail*, *Kharian* thana *Rania*, and *Lalri* thana *Rori* also suffered very severely.

The number of persons who attended Hardwár fair from the district is said approximately to have been 2,935; of whom 81 died of cholera on the return journey.

The following interesting account of the outbreak at Alika and Jodhka is extracted from the Police Officer's Report:—

At Alika a small mahommedan village the mortality was very heavy, none of the inhabitants went to Hardwár, but on the 29th April it was reported that out of 15 persons attacked, 5 had died. It was generally rumoured at the time that some cartmen coming from Hissar had brought the disease into the village, as one of them died there and the corpse had been washed* in the only tank in that village, near which the man stayed, and that the deceased's clothes were picked up by a sweeper of the village because the first case is said to have occurred in his house, and afterwards spread rapidly throughout the village. Out of 244 cases, 142 died.

Outbreak at Alika and Jodhka.

No pilgrims, says the Deputy Commissioner, went to Hardwár from Jodhka, but the village is situated on a road used by some of the people who came back from thence. These pilgrims began passing through Jodhka on 17th April. The village had also been visited by a number of cartmen from the Rohtak District. The Police Officer remarks that about 22nd April pilgrims halted a day, washed aad bathed in the tank, and of 117 persons attacked belonging to the village, 84 died within a fortnight.

* *Note by Sanitary Commissioner.*—The Civil Surgeon deputed a Hospital Assistant to personally investigate the accuracy of this statement, and it is thus stated in his report "about the 30th April some cartmen came to the village to purchase grain, one of the cartmen died from cholera, and was washed in the village tank by his brother cartmen. The tank water is used for drinking purposes, as no well exists in the village, and the Hospital Assistant recommended that the tank water should not be used, but to obtain their drinking water from the village Nago which is a mile off. He also reports the village to be full of refuse on all sides and that it would take about a month to clear ".

In forwarding the above report the Deputy Commissioner makes the following remarks :—

"I have endeavoured without success to verify the story of the corpse said to have been washed in the village tank. It was also reported at one time that the out-break of the disease had occurred immediately after some article of clothing belonging to a cartmen who had died of cholera was brought into the village, but I can procure no distinct evidence on the point. It is generally believed, however, in the neighbourhood of the village that the corpse was washed in the tank, and the clothing brought into the village and it is a fact that as soon as cholera appeared the villages ceased to drink the tank water and began to bring the water from a village at a little distance between 1 and 2 miles."

JHANG.

Statement showing diffusion of cholera chronologically and locally in the different towns and rural circles in the District of Jhang during 1879.

Name of Municipal Towns and Rural Circles affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Jhang	8,609	...	...	61	29th June.
Maghiana	13,618	...	...	82	4th July.
Chiniot	11,999	...	...	1	6th September.
TOTAL OF MUNICIPAL TOWNS	...	...	...	144	...
RURAL CIRCLES.					
Jhang	49,710	145	6	19	3rd June.
Kádirpur	43,220	163	4	38	30th „
Bhavárnáh	22,070	87	1	4	10th July.
Lalian	33,005	117	1	2	16th „
Gani	2,429	59	12	21	2nd August.
Uch	36,500	119	2	6	8th „
Chiniot	30,632	88	1	1	15th „
Ghorianwálá	1,781	80	3	7	18th „
TOTAL OF RURAL CIRCLES	...	858	30	98	...
GRAND TOTAL	...	...	...	242	...

Jhang District.

114. 242 deaths were registered from cholera in the Jhang District, *viz.*, 7 in June, 144 in July, 84 in August. In September and October there were only 3 and 4 respectively. Of the 7 deaths in June, 2 occurred in village *Haveli Bahadur Shah*, thana Jhang on 3rd June; 2 in village *Massan* in the same thana, the date of first death being 24th June; and 3 in the town of Jhang, *viz.*, 1 on the 29th and 2 on the 30th June. There were 33 villages affected with the disease out of a total number of 976, but it may be said to have been prevalent in an epidemic form in only 3, *viz.*, the Municipal towns of Jhang and Maghiana and the village of *Harsan Khan*, thana *Kadarpur*. In these alone 61, 82 and 34 deaths respectively were recorded. Approximately 264 persons are said to have attended the Hardwár fair from this district. Only 8 deaths it is stated occurred amongst them on their return journey.

No mention is made in any of the district reports about the two deaths that occurred in the village of *Haveli Badadur Shah* on the 3rd June.

The following account of the out-break of the disease is taken from the report of the Civil Surgeon, Mr. Wrafter :—

"On the 10th June intimation was received from the Deputy Commissioner of Shahpur of an outbreak of cholera having occurred in his district. Shortly after this information was received, the Native Doctor at Kot Isa Shah reported that some Melas (fairs) were to take place in the vicinity of Kot Isa Shah, and that the people from the Shahpur District were likely to attend them. This report was sent to the Deputy Commissioner for information. On the 25th June a report was received that cholera had appeared at Massan a large village on the left bank of the river Chenab about 7 or 8 miles distant from the town of Jhang. Assistant Surgeon, Sobhá Ram reports that he was informed that some beggars from the Shahpur District had arrived at Jhang on the 29th June, two of whom were suffering from diarrhœa and one died, after this the out-break occurred at Jhang. I am therefore disposed to believe that cholera was imported into the district."

"The first person attacked", says the Civil Surgeon, "went to sell *dahi* at Maghiana on the 29th June and returned to his house at about 1. P. M. in an exhausted state. On arriving at his house he ate melon (khurboza) and drank *lassi* (butter milk); a little while after he was attacked with vomiting and purging."

No particulars, as to what connection, if any, between this case and the two beggars supposed to have imported the disease, have been furnished by the Civil Surgeon.

The 3rd and 4th cases mentioned were in persons attending on the two first.

SHAHPUR.

Statement showing diffusion of cholera chronologically and locally in the different towns and rural circles in the District of Shahpur during 1879.

Name of Municipal Towns or Rural Circles affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Miani	6,158	...	...	2	21st May.
Bhera	14,710		..	6	21st June.
Sahiwal	8,634		...	1	17th July.
TOTAL OF MUNICIPAL TOWNS	...	...	...	9	...
RURAL CIRCLES					
Miani	25,218	35	1	2	20th May.
Nosheráh	27,941	33	5	9	25th „
Jhávarrian	16,588	25	4	29	29th „
Kond	30,191	16	8	90	10th June.
Sahiwal	62,667	171	4	6	15th „
Chak Ram Dass	11,329	19	2	8	22nd „
Mitha Laq	1,729	3	1	3	9th July.
Koshále	22,165	31	2	11	13th „
Shahpur	33,217	52	1	1	27th „
Madh	12,979	34	2	10	8th August.
TOTAL OF RURAL CIRCLES	...	419	30	169	...
GRAND TOTAL	...	...	...	178	...

Shahpur district.

115. The district of Shahpur had only 178 deaths from cholera; of these 92 and 56 occurred in June and July respectively. There were 8 deaths in May. The disease lingered on till September. Altogether 33 villages were affected by it, out of a total number of 632; but the villages which suffered most were *Jaswál* and *Náli*, in *Kund* thana and *Kot Bhai* in *Chhawarian* thana. In 24 villages the highest number registered did not exceed 4.

465 pilgrims are said to have attended the Hardwár fair from the district, of whom 5 died, *viz.*, two at Hardwár from cholera; of the remaining three, two died of cholera at Amritsar and one of fever at Delhi on their return journey.

The Deputy Commissioner in submitting his cholera report which fully corroborates the account given by the Civil Surgeon already mentioned in the former chapter of this report, further adds that "the result of enquiry in this district leaves no doubt that whenever cholera has broken out, it has occurred immediately on the admission of persons from infected villages in their midst, or the disease had seized those who returned from such localities, and these persons disseminated the disease."

MUZAFFARGARH.

Muzaffargàrh district.

116. No epidemic cholera occurred in the district. A few pilgrims attended the Hardwár fair. Only 1 death was registered from cholera, it occurred on the 1st September in the town of Muzaffargarh in the person of a Hindu male, aged 25 years. He had not been away from the town previously to his illness and had had no communication with any person coming from other districts.

DERA GHBZI KHAN.

Dera Ghazi Khan.

117. In this district also only a single death was registered, *viz.*, on the 1st August in the town of that name. The deceased was a prisoner in the Jail. The approximate number of persons who went to Hardwár from the district is said to be 541, of whom 5 died when going. None of these deaths were from cholera.

HAZARA.

Statement showing diffusion of cholera chronologically and locally in the different towns and rural circles in the District of Hazára during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Haripur	4,477	...	...	45	30th April
Baffa	4,494	...	...	24	2nd June
Abbott-abad town	1,194	...	...	4	27th „
„ Cantonment	2,894	...	...	3	18th July
Nawanshere	3,445	...	...	4	8th August
TOTAL OF MUNICIPAL TOWNS	...	...	...	80	
RURAL CIRCLES.					
Haripur	15,715	144	56	211	5th May
Khânpur	23,268	86	7	13	13th „
Abbott-abad	38,626	143	51	125	15th „
Serwan	14,946	93	14	33	15th „
Sangari	29,816	78	20	69	31st „
Manserâh	44,413	101	27	129	7th June
Tarbelah	11,631	27	4	4	8th „
Bâlakote	19,789	33	6	37	9th „
Bakote	8,759	45	10	28	23rd „
Karballian	4,625	40	5	10	27th „
Dongagalli	1,868	7	14	30	30th „
Narâh Nilan	15,815	58	6	8	5th July
Garri Habibullâ	1,789	16	2	3	6th „
Nurah	9,529	36	1	1	16th „
TOTAL OF RURAL CIRCLES	...	907	223	701	
GRAND TOTAL	...	...	...	781	

Hazára district.

118. 781 deaths were registered from cholera in the Hazára District. The number of localities affected was 228 out of 1,013 in the whole district. The disease prevailed from May to October; but it was most fatal in the months of June, July and May. In April only one death was registered, *viz.*, in the small Municipal town of Haripur. It appears from the Weekly registers that of the 228 places attacked by the disease, 194 had an insignificant mortality that is not exceeding 5, 102 of these had only single deaths. The highest number, *viz.*, 45 was recorded in the town of Haripur. The following places also suffered severely, *viz.*, *Sherkot*, thana *Mansehra* 24; *Baffa* 24; *Anaitabad*, thana *Sangjani* 16; *Balakot* 24; *Mulkhar*, *Serai*, *Sulhai* and *Baga*, thanah Haripur 21 each. In 24 villages the number varied between 6 and 15.

582 persons are said to have attended the Hardwár fair from the Hazára District, of whom 1 belonging to the village of Balakot died when going, 28 on the return Journey and 6 at the fair. All these deaths, says the Deputy Commissioner, were "found on enquiry to have resulted from cholera with the exception of one which was from fever."

Cholera, as will be seen from the table given above, broke out some 5 or 6 days previous to these 4 cases already mentioned in the town of Haripur, but no particulars of the first cases here have been furnished beyond this (*vide* Civil Surgeon's report) "that the large number of Hindus who left Haripur (157 out of 582 from the whole district) for the purpose of visiting Hardwár began returning to their homes, and within a few days after their arrival the first case of cholera occurred: they had had cholera on the road up, and several of their number had died."

DERA ISMAIL KHAN.

Statement showing diffusion of cholera chronologically and locally in the different towns and rural circles in the District of Dera Ismail Khan during 1879.

Name of Municipal Towns or Rural Circle affected with cholera	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Bhakkar	4,799	...	...	2	20th August.
Dera Ismail Khan	19,954	...	...	2	29th September.
Kulâchi	7,856	...	...	2	12th December.
TOTAL OF MUNICIPAL TOWNS.	...	...	...	6	
RURAL CIRCLES					
Mankera	18,258	22	1	2	30th August.
Leiah	4,790	35	1	1	8th September.
Niabat Chowdwan...	7,473	15	2	14	24th ,,
Chowdwan	8,796	22	2	6	3rd October.
Kulâchi	25,636	27	3	9	11th December.
TOTAL OF RURAL CIRCLES	...	121	9	32	
GRAND TOTAL	...	...	...	38	

Dera Ismail Khan District.

119. Only 38 deaths were recorded from cholera in the Dera Ismail Khan District, *viz.*, 2 in Bhákkar town and 2 in *Chah Haidarabad*, thana *Mankera*, in the last weeks of August; 8 in village *Chowdwan* and 1 in *Thori* during September; 2 in Dera Ismail Khan town, 5 in village *Chowdwan*, 1 in *Kot Musa* and one in *Darában* in October. There were no deaths in November, but the disease made its re-appearance in December and caused 16 deaths in the sub-division of Kulâchi and *Chowdwan*. 250 persons from this district went to Hardwár, of whom 8 died on the road, two of them when going and the remaining 6 on their return journey. None of these deaths is reported to have resulted from cholera.

The Civil Surgeon states that the first cases of cholera in this district occurred as follows:—

17th August.—At a village called *Chak Sandila*, the Assistant Surgeon Bhakkar, reports that two cases occurred. They had recently come from *Chak Bareri* where cholera was pervailing. No further cases occurred since in the village itself.

August 19th.—At Bhakkar two deaths from cholera occurred, both arrived there from Dera Ismail Khan the day before.

Regarding the re-appearance of the disease in December, Dr. Taaffe gives the following remarks:—

The first case was discovered on the 7th instant, amongst some Povindas near a village called *Zuffur Kot* about 10 miles from Kulâchi and 35 from Dera Ismail Khan. At that time the 4th Punjab Cavalry and 3rd Punjab Infantry were in camp close to the village. The case above referred to was seen by Dr. Blood of the 4th Punjab Cavalry, who reported same to me. During the night this case died and another Povinda was attacked. Dr. Blood and myself saw and examined this case and came to the conclusion that there was no doubt about the nature of the disease. This man died on the 8th instant. I reported these cases at once to the officer commanding the District, and took all necessary precautions to prevent the outbreak of the disease amongst the troops. These Povindas were at once removed some distance away, and none others allowed to come near camp. No cases occurred then or since amongst the troops, who shortly afterwards changed camp. I was informed that the Povindas above referred to had lost 4 of their number shortly before from the same disease. No more cholera occurred in the vicinity of *Zuffer Kot*, then, or since.

With reference to the 25 cases reported from Kulâchi [(a city about 28 miles from Dera Ismail Khan), the following particulars are furnished: Assistant Surgeon, Ramzan Baksh, Kulâchi Dispensary, was ordered on 10th instant to enquire into and report as to the pervalence or not of cholera amongst Povindas in the vicinity. The substance of his report is as per attached cholera Registers. The cases in No. 1 Register all occurred outside the town and amongst Povindas. Those in No. 2 Register occurred inside the town. On the night of the 11th instant two cases (included in No. 2 Register) occurred in the Dispensary compound, *viz.*, the wife of the compounder and daughter of the Hospital cook, both proved fatal on the 12th instant.

With regard to the origin and propagation of the disease, the following appears probable. The Povindas have been suffering more or less from cholera for some time as on enquiry it has come to light that they have had a considerable number of deaths amongst them on their march from Afghanistan, whence I think there can be little doubt they brought the disease with them. There can be no reasonable doubt that the disease was propagated from individual to individual amongst the Povindas; there personally filthy habits and total disregard of all Sanitary Rules rendering them particularly liable to any form of infection or contagion.

REGISTER No. 1.

Daily Register of Cholera cases occurring in Kulachi, Tahsil, Dera Ismail Khan District.

No.	Villages.	Name.	Age.	Sex.	Religion.	Date of attack.	Date of recovery and death.
1	Kirri Sulaiman Khel outside the town.	A Povinda was taken ill and died before the Assistant Surgeon was informed.					
2		Surfaraz	39	Male ...	Muhammedan...	7th Decr.	10th Decr. died.
3		Durkhani	46	Female ...	,, ...	8th ,,	12th ,, ,,
4		Amir Khan...	36	Male ...	,, ...	8th ,,	19th ,, relieved.
5		Ali Khan	12	,, ...	,, ...	12th ,,	19th ,, ,,
6		Khadar Ram	36	,, ...	,, ...	,, ,,	19th ,, ,,
7	Rana-zai.	Zamani	33	,, ...	,, ...	,, ,,	16th Decr. died.
8		Sultani	24	,, ...	,, ...	,, ,,	relived.
9		Name not known.—A Povinda.—Died.					
10		Amir Beg	32	Male ...	Muhammedan	14th ,,	16th Decr. died.
11	Garra Islan Khan	Nazoo	A Povinda reported after death.				
12	Zaffar yar	Admi	49	Male ...	Muhammedan	15th ,,	15th Decr. died.
13	Rana zai	Sabhoo	40	Female ...	,,	,, ,,	16th ,, ,,
14	Garra Islan Khan	A Povinda.—Reported after death.					
15		Mahomed Naroat... ...	12	Male ...	Muhammedan	14th Decr.	Convalesant.
16		Pathoo	6	Female ...	,, ...	14th ,,	,,
17		Gano	7	,, ...	,, ...	15th ,,	,,
18		Zanif	16	Male ...	,, ...	15th ,,	,,

REGISTER No. 2.

1	Kalachi.	Sehran	5	Female ...	Muhammedan	11th Decr.	12th Decr. died.
2		Bussoo	39	,, ...	,, ...	,, ,,	,, ,,
3		Mehrani	5	,, ...	,, ...	12th Decr.	,, ,,
4		Jewai	5	,, ...	,, ...	,, ,,	,, ,,
5		Ahmed Khan	12	Male ...	,, ...	,, ,,	18th Relieved.
6		Bahu	30	Female ...	,, ...	13th ,,	14th died.
7		Fatma	36	,, ...	,, ...	14th ,,	,, Cured.

PESHAWAR.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Peshawar during 1879.

Name of Municipal Towns or Rural Circle affected with cholera	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
Municipal Towns.					
Peshawar	58,430	...	...	478	2nd May.
Mardan Cantonment	1,964	...	...	7	18th ,,
Shankargarh	1,017	...	...	3	28th June.
Total of Municipal Towns	...	...	...	488	
Rural Circles.					
Peshawar	75,572	50	25	59	8th May.
Tangi	19,106	25	4	20	9th ,,
Mutra	7,878	39	7	18	13th ,,
Matanni	7,473	14	7	27	14th ,,
Mardan	34,878	50	11	70	15th ,,
Katlang	19,213	44	10	32	16th ,,
Taro with Charal	28,783	51	14	116	16th ,,
Khazana	20,055	69	13	23	16th ,,
Badhair	21,253	24	10	23	17th ,,
Burj Harri Singh	19,353	28	5	14	23rd ,,
Rustam	11,610	29	2	5	24th ,,
Akora	12,443	32	5	41	26th ,,
Blak	18,309	23	4	4	3rd June.
Mitha Mogal Khel...	30,518	47	3	7	6th ,,
Mian Khel	7,695	48	3	3	8th ,,
Chahar Sadab	30,268	27	6	16	23rd ,,
Swabi	39,016	40	6	36	25th ,,
Total of Rural Circles	...	640	135	514	
Grand Total	...	...	...	1,002	

120. 1,002 deaths were registered from cholera in the Peshâwar District, but no less than about half this mortality occurred in the town of Peshâwar itself. Altogether 138 out of a total of 730 localities were affected with the diseaes, but in 103 of them the mortality was insignificant, 4 being the highest number recorded in any one of them. In 59 there were only single deaths. In 30 the deaths ranged between 5 and 10. In the following, the disease was very severe. *Ahbeg, Charoyah* and *Jathh* in thana *Taru*, and *Charat, Mali Khail* in thana *Akuri*.

Peshâwar District.

After having broken out, as before described, in the city of Peshâwar the disease rapidly assumed an epidemic form, the daily number of cases gradually increasing from the 3rd of May to the 16th when 40 were reported. On the 17th, 50 seems to have been the climax, after that the number gradually went down ranging from 12 to 20 per diem, and the decline lasted till the latter part of June or the beginning of July, but it again rose from 25 to 30 per diem. This is due to the return of infected troops and camp followers from Afghanistan. It again fell to a very small number in the latter part of this month and the beginning of August, but it had a slight exacerbation in the 4th week of August, after which occasional cases cropped up till the end of November. The type of the disease was not apparently of a virulent nature there being 55 cases to 35 deaths in the cholera Hospital, which is a very favorable result considering the circumstances; for it must be remembered that almost all cases admitted into this Hospital were destitute way-farers and others whose friendless and homeless condition compelled them to resort for medical aid at the public hospital. A number of them, in fact, being picked up in a moribund state in the highways and bye-ways by the Police. The Civil Surgeon reports that of the Medical Establishment, one Native Doctor was taken ill with cholera and recovered. A compounder who was at the cholera Hospital was seized with cholera and died from it; the wife of the native doctor in charge of the Police also died. A peculiar fatality seems to have attended the people from the outside, visiting the city during the time when cholera was at its height, as several of the Jail contingent guard and of the Police Force employed at the Jail or on other extramural duties were seized with cholera on their return from a surreptitious visit to the town, such visits being strictly prohibited.

There were 3 cases in the Jail; two of them terminated fatally, but the disease, however, did not assume an epidemic form amongst the prisoners. One of the two fatal cases being an isolated one among the women; the other which took place some considerable time after the first, was that of a man employed in the garden who may have drunk some of the Bara river water which flows through it for irrigation purposes. The 3rd case, a mild one, occurred the same day as the last, in a boy in the solitary cell having no connection with the others. A fatal case also occurred amongst the *barkandazes* (jail guards) about the same time. The Darogah of the Jail was also attacked, though not severely, at a period distinct from that at which all the other Jail cases happened. A second *barkandaz* died, but not in the Jail itself; he absented himself without leave from Mukri Bazar about 3 or 4 miles from the Jail, where some of the prisoners were located on account of Typhus fever. His absence being reported to the Superintendent of the Jail, he was ordered to be placed under arrest on his return; in consequence of which he was seen immediately he came back. He was found to be suffering from cholera which attacked him directly after his arrival, he being perfectly in good health when he left the convict camp in the morning.

It must be remembered that Peshâwar formed the base for military operations in the Cabul war to that division of the Army which went up by the Khyber route, that cases were being continually imported into the military station by troops going and coming, and that numerous camp followers among whom the disease was prevalent and fatal infested the town and its suburbs.

The accompanying chart shows the rise and fall of the disease in the city of Peshâwar during the epidemic of 1879.

With regard to the district, the first case was at Tangi in a man who had been at Peshâwar.

KOHAT.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Kohat during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Kohat Town	11,043	...	...	115	21st May.
Kohat Cantonment	5,210	...	...	8	23rd „
TOTAL OF MUNICIPAL TOWNS	...	...	...	123	
RURAL CIRCLES.					
Kohat	39,744	85	22	61	17th May.
Hangu	14,138	42	18	133	29th „
Garad	...	...	2	3	1st June.
Gummat	...	...	9	20	3rd „
Gandpur	11,069	15	6	85	9th „
Shakroráh	...	...	4	40	11th „
Taláb Nuh	8,600	42	2	2	12th „
Láchi	...	...	8	21	12th „
Tiri	60,049	270	24	98	14th „
Bahádar Khel	...	...	7	47	15th „
Tal	...	...	3	9	23rd „
TOTAL OF RURAL CIRCLES	...	454	105	519	
GRAND TOTAL	...	...	...	642	

Kohat District.

121. 642 deaths from cholera were reported to have occurred in 107 different localities, out of a total of 454 in the district. Of the total district mortality, no less than 115 were recorded in the town of Kohát alone. The first death, as will be seen from the statement given above, occurred in the town itself on the 21st May. Here the disease caused almost all the deaths in June and July, but in the district it reached its climax in May and continued to prevail till October.

The village of *Hangu*, thana *Hangu* had 44 deaths from cholera; *Darsmand*, thana *Tal*, 39. The small hamlets of *Shakardara*, in the thana of the same name; and *Anar Chattah* in the *Hangu* thana, also suffered severely. In 10 villages the cholera death ranged between 10 and 20; in 16 others between 6 and 10, and in the remaining 77 they did not exceed 5.

Only 82 pilgrims in the Kohát District attended Hardwár; of whom 2 died, one male from cholera and one female from fever, on the return journey. But there was a constant traversing of the district by cartmen employed by the Commissariat Department between Rawalpindi and Thull. The ground in and about the station and encamping grounds was polluted in consequence of the passage of large numbers of troops from Khushalgarh to the Kurrum Valley. Some of these regiments remained in one spot for some months; at one time there were no less than 7,000 troops collected in this small station. This alludes to the time when the Punjab Chief's contingent was passing through.

BANNU.

Statement showing diffusion of Cholera chronologically and locally in the different towns and rural circles in the District of Bannu during 1879.

Name of Municipal Town or Rural Circle affected with cholera.	Population.	Total No. of villages in each cholera affected rural circle.	No. of villages affected with cholera.	No. of cholera deaths registered during the year.	Date of 1st death.
MUNICIPAL TOWNS.					
Edwardes-abad Cantonment	3,224	...	...	16	18th June.
Do. town	3,896	...	...	25	6th July.
Kàlabàgh	6,082	...	...	1	7th „
Lakimurat	4,406	...	...	5	8th „
TOTAL OF MUNICIPAL TOWNS	...	...	...	47	
RURAL CIRCLES.					
Lakimurat	21,285	36	3	4	1st July.
Dehkwith-Nimal	16,704	46	1	3	3rd „
Bannu	49,592	21	3	4	6th „
Kamarmashàni	10,063	11	2	19	17th „
Músa Khel	21,378	39	7	38	21st „
Mazbân	14,390	34	1	49	26th „
Mochhà	36,541	62	1	1	1st October.
TOTAL OF RURAL CIRCLES	...	249	18	118	
GRAND TOTAL	...	...	...	165	

Bannu District.

122. As will be seen from the statement given above, the first death from cholera in the Bannu District occurred in the Edwardes-abad cantonment, on the 18th June; but it was not until the 6th July that the disease showed a tendency to increase. 298 persons are said to have attended the Hardwár fair from the Bannu District, of whom 243 returned; 45 proceeded onwards to Benares and the rest died on the road. Further particulars about these are not available.

An analysis of the Mortuary Returns shows that cholera pervailed in an epidemic form in only 6 places; of which *Haved*, thana *Mizhan*, *Vali*, thana *Musa Khel*, the town and the cantonment of Edwardes-abad, were the greatest sufferers, that is, having 49, 24, 25, and 16 deaths respectively, out of a total of 165 in the whole district. The village of *Chapri*, thana *Kamar Miani* also suffered severely. In 11 villages single deaths were registered. 3 villages had two deaths each, 2 villages had 3 and 5 respectively. Altogether 22 places were affected out of a total number of 553 in the distirict. There was only one death registered in June; in July the number rose to 73, it then fell to 53 in August. In September there were 3 deaths. The disease reappeared in October and carried of 35 souls, *viz.*, 13 in Edwardes-abad cantonment, 21 in village *Vali* and 1 in village *Sortas*.

The following telegrams dated 18th and 19th June respectively, were received from the Deputy Commissioner and District Superintendent of Police.

Dated 18th June.—"A fatal case of cholera occurred in the Fort last night. The man had only come yesterday morning from Hazára, *via.*, the Kohát District."

Dated 19th June.—"One case cholera, 17th, terminated fatally, midnight. One fresh case yesterday, hopeful. Both natives from Hazara, visiting relatives in Regiments here. Travelled *via* Khushalgarh)."

Two other cases were reported by the Civil Surgeon as having occurred in the Edwardes-abad cantonment, the one in the person of Lance Naik Dulla Singh, of A company 4th Regiment, on the 22nd June; this man ultimately recovered, but the other case, *viz.*, of Recruit Sahibdin of D company, 3rd Sikh Infantry which occurred on the 1st July, proved fatal.

After the most careful enquiry the Civil Surgeon was unable to discover any intercourse between these and the two previous cases; and neither was he able to learn that the 4th case had any intercourse with the 3rd one.

SUMMARY OF DISTRICT CHOLERA REPORTS.

Summary of District cholera reports.

123. In the reports received from the various officers in the 32 districts, the first cases are stated to have been undoubtedly among pilgrims, who returned from Hardwár leaving after the great bathing day on the 12th April, in the following:—

Umbálla, Ludhiána, Karnál, Jullundur, Amritsar, Lahore, Rohtak, Hoshiárpur, Hissar, Sirsa, Simla Gurdáspur, Siálkot, Ferozepore, Gujránwála, Montgomery and Pesháwar.

In Delhi and Gurgaon, although cases were reported to have occurred before the Hardwár fair, returning pilgrims were undoubtedly seized in the towns and rural circles, and their cases were stated to have been the nuclei of out-breaks of epidemic cholera quite independent of the one or two isolated cases previously detected. The Kángra valley was infected by a man from Hardwár, returning a week or two before the break up of the *Kumbh* mela.

The first men seized in Mooltan and Gujrat were travellers, who had been mixed up with returning Hardwáris. In Rawalpindi a cartman who came along the road by which pilgrims had returned to their homes; and at Jhelum, a workman in the Railway who was employed at the Station, where the pilgrims left the train for the road. At Házára, the origin of the out-break is uncertain; it is ascribed to intercourse between the village affected, and *Hurripore*, to which place pilgrims had come.

Of the other districts most remote from Hardwár, namely, Muzaffargarh and Dera Ghazi Khan there were only single deaths registered during the year. At Dera Ismail Khan, Jhang, Shahpur, Kohát and Bannu, the first cases occurred late, that is, after 25th May, or even considerably later; they were imported from different localities, but had no direct or traceable connection with the Hardwár out-break.

Observations by Sanitary Commissioner.

124. With regard to the point of the greatest interest and highest importance in the consideration of the entire history of the epidemic, namely, its connection with the *Kumbh mela* at Hardwár, and to which Dr. Cuningham, the Sanitary Commissioner with the Government of India, draws attention in his memorandum, dated 5th June. The following facts are deducted from the above reports, tables and charts:—

(1). Cholera undoubtedly was present in the Punjab before the date of the great bathing day at Hardwár. The following are the known instances:—One solitary case on the 2nd of April in the Gurgaon District, a pilgrim from Jeypore to Hardwár.

In the Kángra District there was actually a small epidemic out-break, excited apparently by the case of a man who left Hardwár some days before the great bathing day, where, however, cholera had appeared in the place, and who, returning to Kángra, was seized in the valley on the 5th April with cholera, and died.

Again, another and a sharper out-break, took place on the 5th April at Ferozepur Meo, in the Gurgaon District, causing the deaths of 20, out of 42 people seized.* This was originated by the case of a cartman, who brought the disease with him from Muttra, where it was raging at the time; and lastly, two cases were reported at Delhi; but as they were both very mild, and both recovered, I cannot in my own mind, even though they were seen by the Assistant Surgeon, bring myself to conclude that they were undoubtedly cases of genuine Asiatic cholera.

(2). It is clearly shown by the history of these cases and out-breaks, that they were entirely distinct from the epidemic explosion which took place after the 12th April, and that no direct communication can be traced between them and it, though an indirect one is possible, for the occurrence of cases of cholera at places which furnished pilgrims to Hardwár on the line of road by which those pilgrims travelled, and even among pilgrims themselves, clearly demonstrates how the malady might be carried among the masses of people assembled round the bathing *ghat*. As, however, this point of the question is for the Sanitary Commissioner of the North-Western Provinces to work out, I have only to point out that even by the Punjab pilgrims it is possible that the multitudes gathered at Hardwár may have been infected, though the cases detected were, with the exception of the two doubtful ones at Delhi, singularly enough, imported from stations external to the Province.

* *Note by Sanitary Commissioner.*—Neither the date nor the number of deaths reported, by Assistant Surgeon, Rai Bahadur Chetan Shah, to have occurred at this place tally with the weekly Mortuary returns submitted to this office by the Police authorities. In these returns the 1st death is entered as having occurred on 12th and not 5th April, and the total number of deaths as 62 and not 20, but I am inclined to place more reliance upon the figures given by the Civil Surgeon.

Statement showing Cholera deaths Registered

Number.	District.	January.				February.				March.					April.				May.				
		4th January.	11th "	18th "	25th "	1st February.	8th "	15th "	22nd "	1st March.	8th "	15th "	22nd "	29th "	5th April.	12th "	19th "	26th "	3rd May	10th "	17th "	24th "	31st "
1	Delhi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18	39	40	36	34	15	36
2	Gurgaon	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	7	40	45	70	120	74	101
3	Karnál	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	131	224	342	293	114	143
4	Hissar	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	3	327	983	890	431	380	242
5	Rohtak	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	101	416	452	372	291	150
6	Sirsa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	45	251	340	79	50	73
7	Umbalia	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	59	81	66	80	59	37	43
8	Ludhiana	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11	10	10	4	1	25	15
9	Simla	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	6	5	3	2	...
10	Jullundur	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	11	28	10	2	3	4
11	Hoshiárpur	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	15	7	3	...	3	...
12	Kángra	...	...	...	...	...	...	...	...	...	...	...	...	...	1	15	21	39	27	11	9	21	6
13	Amritsar	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	18	118	133	75	28	16	24
14	Gurdáspur	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	7	4	...	1	2	...
15	Siálkot	...	...	3	...	...	...	...	...	...	...	...	...	...	1	...	...	6	4	1	9	1	...
16	Lahore	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	6	34	49	61	67	149
17	Gujránwála	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	12	30	10	7	...
18	Ferozepore	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	25	78	77	214
19	Rawalpindi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	95	143	105	50	182
20	Jhelum	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	48	147	187	122	43	119
21	Gujrat	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	13	6	16	47
22	Shahpur	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	4
23	Mooltan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...
24	Jhang	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25	Montgomery	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	9	5	...	...
26	Muzaffargarh	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
27	Dera Ismail Khan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28	Dera Gházi Khan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
29	Bannu	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
30	Peshawar	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	13	124	155	90
31	Hazára	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	11	56	54	34
32	Kohát	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	14
	Total for the Province ...	2	1	4	...	1	1	...	2	...	...	...	...	1	5	15	154	1,046	2,545	2,800	2,018	1,515	1,690

by weeks in each district of the Punjab for the year 1879.

JUNE.				JULY.				AUGUST.					SEPTEMBER.				OCTOBER.				NOVEMBER.					DECEMBER.				
7th June.	14th "	21st "	28th "	5th July.	12th "	19th "	26th "	2nd August.	9th "	16th "	23rd "	30th "	6th September.	13th "	20th "	27th "	4th October.	11th "	18th "	25th "	1st November.	8th "	15th "	22nd "	29th "	6th December.	13th "	20th "	27th "	31st "
105	58	10	14	...	2	..	...	1	...	..	6	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
113	53	36	45	6	1	1	8	17	4	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
138	99	59	43	10	1	2	...	...	...	...	4	3	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
170	74	19	113	28	5	4	1	2	...	...	...	1	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
137	52	18	7	6	1	3	3	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
77	61	44	28	11	4	7	17	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
78	41	17	7	3	4	2	3	1	2	...	...	10	13	7	...	1	2	1	...	...	...	...	...	...	...	...	...	...	...	...
15	38	48	15	10	2	15	6	19	4	4	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	1	3	19	14	15	8	4	8	5	1	2	1	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...
3	5	1	...	...	...	2	2	4	...	...	...	2	...	...	...	...	...	..	...	...	...	...	...	1	...	...	...	...	1	...
3	14	8	2	...	...	7	4	...	3	4	4	2	...	1	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...
11	3	3	11	28	28	24	29	89	216	380	406	306	159	104	36	37	14	2	...	...	...	2	...	...	...	...	...	...	...	...
50	33	15	16	10	35	46	36	30	40	40	24	21	14	10	10	10	3	4	1	3	...	...	...	...	...	...	1	1	...	...
...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	7	..	2	...	...	...	...	...	..	...	1	3	...	3	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
237	136	140	122	73	73	179	108	78	62	37	33	8	2	5	8	5	...	6	...	2	...	...	...	...	...	1	...	...	...	...
2	1	30	39	61	41	49	23	23	21	10	37	3	12	9	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
424	471	255	101	44	54	123	42	19	11	4	1	...	..	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
290	197	186	356	302	309	241	97	57	41	118	47	35	15	29	8	1	2	2	1	2	...	...	...	...	...	...	...	...	...	...
144	251	161	169	101	84	43	17	14	42	41	29	20	51	48	28	25	13	2	7	1	...	...	...	...	...	...	...	...	...	...
86	50	49	22	8	8	10	5	...	3	5	5	10	12	12	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	7	7	22	48	22	12	13	1	1	7	3	4	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	1	18	52	33	52	15	11	30	28	11	4	1	...	...	...	...	4	...	...	...	...	...	...	...	...	...	...	...
...	...	1	19	4	4	18	6	13	2	8	8	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	2	2	...	1	...	3	12	1	...	...	1	...	...	...	..	...	2	11	3	...
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	..	..	...	...	...	...	...	...	...	...	...	...	...
...	...	1	...	3	22	12	15	49	26	5	3	...	...	...	...	...	11	16	10	1	...	...	...	...	...	...	...	...	...	...
86	28	17	63	73	121	45	34	19	8	16	11	7	13	8	11	18	24	7	4	2	1	...	1	1	1	...	...	...	...	...
29	48	60	73	52	64	75	36	20	24	25	14	10	13	29	28	4	4	1	2	3	...	...	...	...	...	...	...	...	...	...
37	75	120	83	50	25	18	16	2	6	43	21	35	24	15	10	38	1	1	...	...	...	...	...	...	...	...	...	...	...	...
2,263	1,796	1,308	1,373	950	956	990	577	481	525	782	396	502	445	288	156	142	87	43	29	14	2	2	2	2	1	1	3	12	4	...

Referring to the above table showing the return of cholera deaths by weeks in each district of the Punjab, it will be noticed that in the week ending 12th April, only one district, namely that of Kángra, gave any deaths; another district also, namely Gurgaon, was affected, but owing to the fact that the returns showing the out-break having been received in this office some time after the Hardwár out-break, the usual enquiries regarding its origin, &c,. were in this instance not instituted, and hence particulars regarding it were omitted to be published in the *Punjab Gazette*; while in the week subsequent to it, namely that ending the 19th April, no less than 11 out of a total number of 32 districts reported deaths from cholera. A circumstance thus commented on by Dr. Fairweather, then Officiating Sanitary Commissioner, in his remarks on the general health of the Province for that week :—

> The returns of this week show a sudden and remarkable diffusion of cholera unparalled in this Province since 1867, and without doubt owing to the same cause which produced the great out-break of that year, namely, the dispersion over the country of the cholera tainted mass of human beings collected at the great 'Kumbh' fair held at Hardwár every 12th year. The dispersion commences immediately after the great bathing day on the 12th April, and the Mortuary Returns received in this office, show that in the following week (that under review) no fewer than 137 deaths occurred from cholera in 47 localities; the greater number of which were in the more Southern Districts of the Punjab, and notably in Umballa, where 19 places were affected. In more than half of the affected places, the first deaths occurred in pilgrims returning from Hardwár, and in the remainder, the first cases either occurred in those who had come in contact with pilgrims or coincided in point of time with their arrival in the different places.

The cholera chart showing the dates on which each district was affected during the months of April and May, will show that in the next week, that ending on the 26th April, 9 more districts came under the influence of the disease, making a total of 20; in the week subsequent to that 4 more, and by the end of May, all but 5 districts, had returned a greater or less number of deaths from cholera.

The epidemic of 1879 contrasted with that of 1867, both being Kumbh fairs.

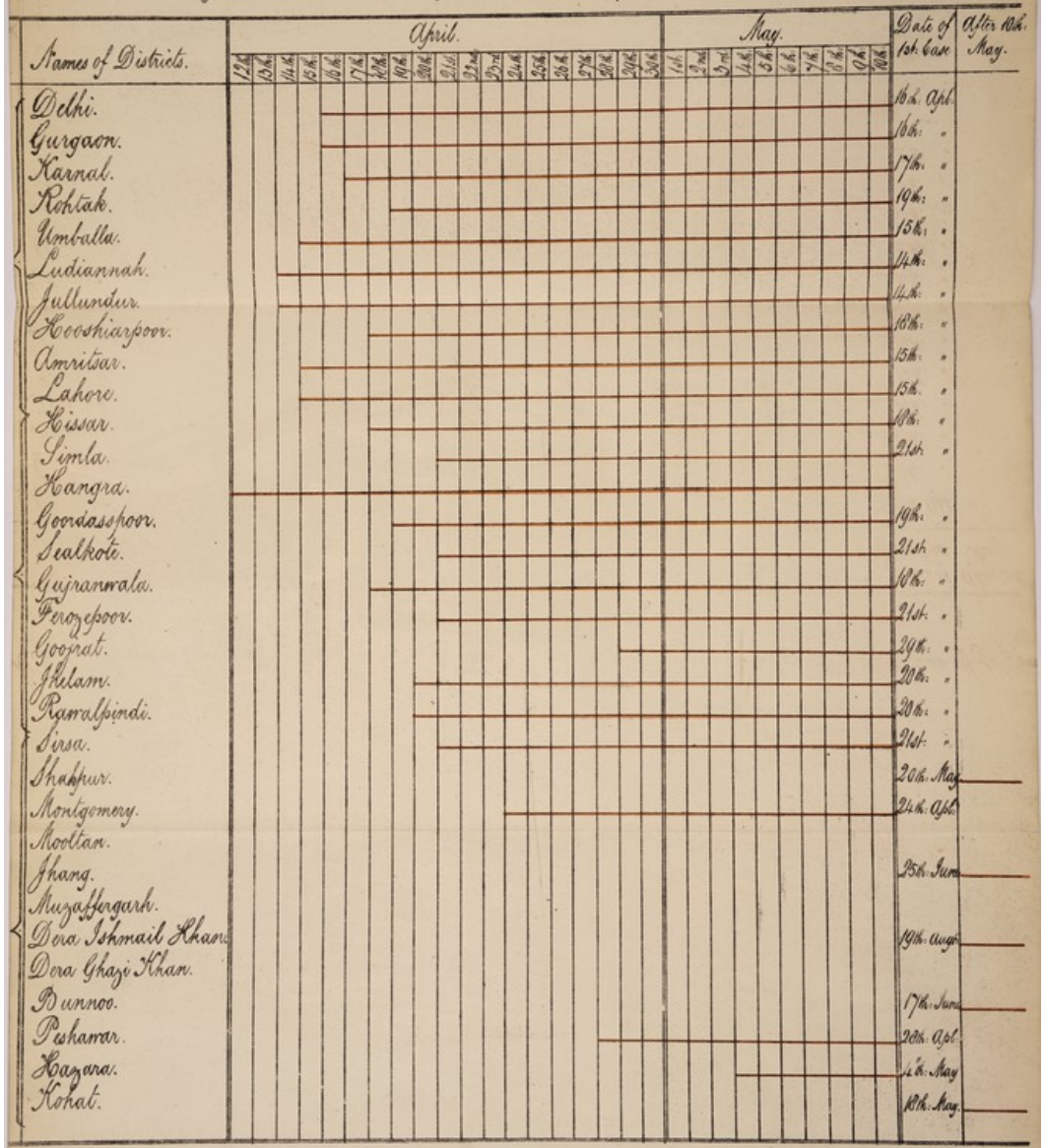
125. With reference to the effect produced on the population of the Punjab by the dispersion of the pilgrims from the Hardwár *mela*, and the consequent infection of the Province by cholera brought by these pilgrims, the report would be incomplete were mention of the effects of the last similar gathering at Hardwár in 1867 omitted. I will now endeavour to compare the conditions under which each of these large Kumbh fairs was held, and contrast the circumstances attending the subsequent development of the disease to each of them. The grand point of difference, as far, at least, as regards the upper part of the Province, is, that in 1879, owing to the completion of the Railway, communication between Saharanpore and various central towns of the Punjab is much more rapid, and consequently, one would expect to find the towns and districts of the Province, especially those on the line of Railway, earlier affected than in 1867. The great bathing day in each year was the 12th of April, and people left for their homes on both years immediately after that date. I give below in juxtaposition a list showing each district of the Punjab with its urban and rural population with the addition of two columns, one for the mortality from cholera, and the other for the dates on which the first cases occurred, for all of these, so far as it has been possible to ascertain in each of the years under consideration.

Statement showing the mortality and date of 1*st death from cholera in the Urban and Rural population of the Punjab Province during* 1867 *and* 1879.

No.	Names of Stations.	1867.			1879.			Date of 1st death in 1867.	Date of 1st death in 1879.
		Urban.	Rural.	Total.	Urban.	Rural.	Total.		
1	Delhi	201	1,020	1,221	129	287	416	April 17th ...	April 16th.
2	Gurgaon	608	2,540	3,148	26	727	753	„ 21st ...	„ 5th.
3	Karnál	339	1,313	1,652	76	1,530	1,606	„ 16th ...	„ 16th.
4	Hissar	1,689	1,576	3,265	463	3,211	3,674	„ 20th ...	„ 18th.
5	Rohtak	313	753	1,066	245	1,775	2,020	„ 14th ...	„ 19th.
6	Sirsa	25	1,052	1,077	246	842	1,088	„ 22nd ...	„ 21st.
7	Umballa	481	2,136	2,617	152	457	609	„ 16th ...	„ 15th.
8	Ludhiána	303	1,235	1,538	38	217	255	„ 18th ...	„ 14th.
9	Simla	153	130	283	84	24	108	„ 21st ...	„ 21st.
10	Jullundur	196	543	739	67	20	87	„ 19th ...	„ 14th.
11	Hoshiarpur	130	745	875	18	64	82	„ 19th ...	„ 18th.
12	Kángra	166	1,636	1,802	61	1,987	2,048	„ 23th ..	„ 3rd.
13	Amritsar	1,775	1,786	3,561	534	334	868	„ 21st ...	„ 15th.
14	Gurdáspur	77	192	269	12	8	20	May 1st ...	„ 19th.
15	Siálkot	102	562	664	5	37	42	April 20th ...	„ 21st.
16	Lahore	663	1,432	2,095	161	1,512	1,673	„ 21st ...	„ 15th.
17	Gujránwála	620	1,004	1,624	40	390	430	„ 28th ...	„ 18th.
18	Ferozepore	56	2,129	2,185	58	1,889	1,947	„ 24th ...	„ 21st.
19	Rawalpindi	682	2,040	2,722	288	2,626	2,914	May 2nd week.	„ 20th.
20	Jhelum	86	771	857	213	1,749	1,962	April 30th ...	„ 20th.
21	Gujrat	212	221	433	63	317	380	„ 28th ...	„ 29th.
22	Shahpur	360	261	621	9	169	178	August ...	May 26th.
23	Mooltan	51	565	616	2	...	2	April 26th ...	„ 5th.
24	Jhang	9	94	103	144	98	242	Not Stated ...	June 25th.
25	Montgomery	53	445	498	3	98	101	April 25th ...	April 24th.
26	Muzaffargarh	142	1,002	1,144	1	...	1	Not Stated ...	Nil.
27	Dera Ismail Khan	2	230	232	6	32	38	August ...	August 17th.
28	Dera Ghazi Khan	198	659	857	1	...	1	June	Nil.
29	Bannu	46	586	632	47	118	165	July	June. 17th.
30	Peshawar	1,374	535	1,909	488	514	1,002	May 11th ...	May 1st.
31	Hazára	524	1,041	1,565	80	701	781	„ 17th ...	„ 4th.
32	Kohát	656	520	1,176	123	519	642	July 26th ...	„ 18th.
	Total	12,382	30,764	43,146	3,883	22,252	26,135		

Note.—The Urban deaths in 1879 comprise all Municipal Towns in which Registration bye-laws are in force. In 1867 only those having a population of 3,000 and upwards.

Chart shewing the dates on which Cholera appeared in the several districts of the Panjab after the dispersion of Pilgrims from Hardwār, commencing from 12th April 1879.



Beyond this, I fear the figures are not sufficiently exact to be reliable. The reports received in this office for 1879 (from which I have already given extracts), in almost every case, whether from District, Medical or Police Officers, state that the disease was imported by returning Hardwár pilgrims.

In 1867, out of 32 districts, 21 attribute the outbreak to pilgrims; and the remaining 11 are either uncertain or afford no remarks. It will be noted that the mortality from cholera in this year (1867), was at least double that of 1879; there is nothing to account for this, beyond the fact, that the assemblage in 1867, was supposed to be much larger;* but as unfortunately the Punjab Statistical Records for that year, do not give the number of separate villages in which cholera occurred, I am unable to trace the effect of this larger number of people in producing a corresponding increase in the number of localities primarily affected. In fact the estimate regarding the number that attended the Hardwár fair in 1867, seem to have been based so much upon mere guess work, rather than any accurate observation, that any correct inference is impossible.

Prevalence of cholera in 20 principal towns.

126. The ravages of the disease in the 20 principal towns from 1867 to 1879, will be seen from the subjoined statement.

Deaths registered from cholera at the undermentioned Municipal Towns in the Punjab during the years, from 1867 *to* 1879.

No.	Districts.	Population.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
1	Delhi	115,992	273	5	13	7	2	5	1	...	44	2	...	12	14
2	Rewari	25,190	...	1	8	4	9	2	...	...	35	1	1	49	20
3	Karnál	24,015	46	...	...	...	1	62	1	...	...	...	...	...	26
4	Pánipat	24,500	...	2	4	...	1	18	1	2	34	...	..	...	14
5	Bhiwáni	33,220	...	...	1	...	...	2	...	...	80	...	...	...	148
6	Umballa	26,258	40	2	2	1	1	28	...	1	1	...	...	...	23
7	Ludhiána	40,385	251	...	1	1	1	266	..	...	1	...	...	...	22
8	Jullundur	35,222	43	...	1	2	...	137	...	...	3	...	...	...	17
9	Hoshiárpur	13,138	27	1	1	...	1	200	..	...	...	...	...	...	3
10	Amritsar	136,166	1,488	41	3,041	2	1	7	..	...	756	...	1	...	524
11	Batála	26,929	...	3	45	3	3	102	1	1	162	...	...	...	1
12	Sialkot	32,989	20	...	3	1	...	34	...	1	2	177	...	...	5
13	Lahore	92,035	299	7	212	15	11	300	4	4	27	30	1	...	64
14	Gujránwála	20,362	263	4	31	1	...	154	...	...	9	11	...	...	9
15	Ferozepore	15,168	5	...	...	...	...	...	1	...	...	...	...	...	13
16	Rawalpindi	20,802	193	...	..	3	2	42	...	...	...	198	...	...	163
17	Mooltan	29,448	186	...	...	...	...	...	...	...	...	...	...	...	1
18	Dera Ismail Khan	19,554	...	...	...	3	1	...	...	...	...	18	...	...	2
19	Dera Gházi Khan	19,133	167	...	...	...	...	1	...	2	1	...	...	...	1
20	Peshawar	58,430	1,374	3	1,480	3	1	252	...	1	...	187	...	...	478

It is remarkable how very much less the towns suffered in 1879 than in 1867 and subsequent years, and I can ascribe this to no other reason but to that of improved sanitation carried out in each town during the last 12 years, as well as to the excellent and timely precautionary measures taken by the several district officers to retard the progress, reduce the prevalence, and stamp out the existence of the disease on its first appearance in any one locality.

The particulars, required by Dr. Cuningham, Sanitary Commissioner, with the Government of India in the memorandum above stated regarding the epidemic in this Province, have already been given in the detail reports of each district, so far as it has been possible for the district authorities to ascertain. To answer the 9 questions categorically would be simply to re-write in another form the information already given regarding the 10 localities selected by Dr. Cuningham.

Meteorology and food supply.

127. The subjoined statement shows parallel with a column giving the cholera mortality, the meteorological conditions of the Province for each quarter of the years from 1867 to 1879, inclusive. A table also indicating the average price of the staple articles of food for the same number of years is also noted therein. It will be seen, however, in comparing the figures, that it is not safe to form any deductions therefrom. The price of provision being remarkably low in 1867, 1875 and 1876 (all of them epidemic years); in 1869 it was high, in 1872 moderate, and again in 1879 high; while of the years in which cholera was not epidemic, it was high in 1878, 1868 and 1870, and moderate in 1871 and 1873, and cheap in 1874 and 1877.

* NOTE.—About 3 millions are supposed to have congregated in 1867, and only 600,000 in 1879.

Statement showing the Meteorological observations and cholera deaths by Quarters in the Punjab Province from the years 1867 *to* 1879 *inclusive and the price current of the principal articles of Diet.*

Years.	1st Quarter.					2nd Quarter.					3rd Quarter.					4th Quarter.					Price current.			
	Meteorological observation.					Meteorological observation.					Meteorological observation.					Meteorological observation.								
	Mean Atmospheric pressure.	Temperature mean daily range.	Mean relative humidity.	Total average Rain-fall.	Total Cholera Deaths.	Mean Atmospheric pressure.	Temperature mean daily range.	Mean relative humidity.	Total average Rain-fall.	Total cholera Deaths.	Mean Atmospheric pressure.	Temperature mean daily range.	Mean relative humidity.	Total average Rain-fall.	Total cholera Deaths.	Mean Atmospherice pressure.	Temperature mean daily range.	Mean relative humidity.	Total average Rain-fall.	Total cholera Deaths.	Wheat.	Barley.	Rice.	Total cholera Deaths.
																					Sérs	Sérs	Sérs	
1867 ...	29·217	32·79	42·7	2·03	512	28·931	32·02	31·5	4·57	20,919	28·895	24·83	50·3	15·84	20,105	29·42	35·68	46·3	0·67	1,610	23	31	11	43,146
1868 ...	29·19	25·11	54·6	5·34	105	28·921	29·94	33·9	4·75	166	28·642	27·43	42·6	9·89	125	29·19	36·18	40·5	0·67	136	18	27	10	532
1869 ...	29·18	27·51	56·0	7·94	101	28·86	33·50	30·3	2·23	414	28·619	23·06	49·4	18·69	6,426	29·17	36·16	38·4	0·85	2,317	14	19	9	9,258
1870 ...	29·010	36·42	41·2	3·00	76	28·776	35·66	26·5	4·71	173	28·857	25·75	50·6	16·62	143	29·177	36·36	38·6	0·67	77	16	23	11	469
1871 ...	28·295	29·12	46·7	3·50	53	27·979	28·87	35·0	7·63	142	27·948	24·09	50·3	13·79	67	28·123	34·25	41·6	1·00	107	22	28	12	369
1872 ...	28·223	27·53	50·6	4·37	52	28·519	32·17	33·3	5·23	2,149	28·665	23·66	53·9	22·33	5,772	29·000	35·85	48·1	0·67	754	20	28	7	8,727
1873 ...	26·325	29·45	44·4	2·04	10	28·053	31·92	27·2	2·54	35	27·889	25·23	56·4	19·36	82	27·920	31·53	44·0	1·46	21	22	32	9	148
1874 ...	27·610	24·94	55·5	4·44	5	27·622	30·96	39·1	4·50	31	27·662	23·28	59·1	17·21	33	28·056	27·82	41·0	0·02	9	24	36	9	78
1875 ...	28·007	31·90	46·1	2·66	12	27·719	35·67	30·6	2·36	367	27·700	21·20	60·0	28·88	4,379	27·958	27·92	51·9	1·74	1,488	25	36	9	6,246
1876 ...	27·954	25·00	47·5	3·02	13	27·810	29·8	30·1	3·50	250	27·797	18·4	63·2	19·69	3,913	28·441	26·3	47·0	1·95	1,560	25	37	9	5,736
1877 ...	28·161	21·8	55·8	7·46	6	27·897	23·4	43·4	6·49	13	27·819	23·4	44·3	7·17	7	28·145	21·2	57·3	7·97	3	23	35	9	29
1878 ...	28·161	22·3	54·1	3·82	5	27·623	23·8	43·1	5·83	2	27·796	17·4	63·6	20·41	172	28·088	29·3	40·6	0·44	36	15	20	6	215
1879 ...	28·116	59·1	42·0	0·92	13	27·817	84·2	35·0	1·59	18,872	27·766	83·1	63·0	5·69	7,076	28·121	62·2	44·0	0·18	174	13	17	7	26,135

With regard to the rain-fall, although in the 3rd or monsoon quarter of some years, *viz.* 1869, 1872, 1875 and 1876 a comparatively high death-rate from cholera accompanied an unusually large fall of rain; in the two years of the greatest cholera mortality, 1867 and 1879, especially the latter, the rain-fall was below the average, and in 1878 when 20·4 inches were registered, and in 1873 when 19·6 in the same quarter, the number of deaths from cholera was very small, and hence no deduction can be made of the influence of excessive moisture, the result of an extraordinary rain-fall, in producing epidemic cholera or in aggravating its effects.

As to the temperature, although the thermometrical ranges of representative localities, *viz.*, Lahore, Mooltan, Murree are given, it would be *extremely* unsafe, considering the want of accuracy that must attend any average deduced, as these are, to offer any but the most general theories regarding the effects of heat upon health of a population of a very large area living under the most widely differing climatic and domestic conditions. The only tangible fact being the well-known one that all, or almost all, the mortality from the disease now under consideration, occurred in the middle or hottest half of the year.

Conclusion.

128. In conclusion I have to remark that the report has been written with the object of deducting facts and of collecting such opinions as seem worthy of record. The searching enquiry and investigation by Civil, Medical and Police Officers regarding the origin of the cholera epidemic in each district is undoubtedly in favor of the idea that cholera was communicated, and communicated alone, by human intercourse. In those districts where it appeared during the latter half of April, or beginning of May, it is stated universally, to have been brought directly or indirectly by pilgrims, and in those where its later appearance precluded the idea that Hardwár pilgrims were the exciting causes, other and equally satisfactory proof has been brought to show that the disease did not spring up spontaneously, but that it was directly due to the dissemination of distinct cholera virus by people either suffering from the disease themselves or having such connections that according to the knowledge we have of the nature of contagion they may have imported the contagia in their person, clothes, &c.

I cannot close this report without recording my indebtedness to the various Civil, Medical and Police Officers in each district for their interesting and useful reports, and to the ready and willing assistance rendered in answering the numerous enquiries made from this office on the subject of the present epidemic. My thanks are especially due to the following:—Messrs Benton and Wood, Deputy Commissioners, Karnal and Rohtak, Surgeons-Major Fairweather, Bateson, Morice, Surgeon Calthrop, Hony. Surgeon Fox, Mr. Crossley, Civil Surgeon of Montgomery, and Messrs. C. H. Lemarchand and Warburton, District Superintendents of Police, Montgomery and Ludhiána.

SURGEON-MAJOR A. TAYLOR.

Mean mazimum and Mean minimum temperatures in shade in the undermentioned stations for the years 1867 *to* 1879.

Stations.	1867.		1868.		1869.		1870.		1871.		1872.		1873.		1874.		1875.		1876.		1877.		1878.		1879.	
	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.	Mean maximum.	Mean minimum.
Lahore	91·2	60·1	...	...	93·1	60·7	94·03	60·0	91·54	60·35	...	...	89·54	63·73	89·01	61·27	92·56	63·49	87·4	62·5	87·8	64·0	88·1	62·6	90·3	62·4
Mooltan	92·0	61·1	95·03	...	92·83	61·96	...	...	...	...	100·42	...	97·72	60·04	95·52	61·39	95·45	64·16	92·7	63·9	88·6	65·1	92·2	65·8	91·4	63·2
Murree	...	...	...	...	...	...	...	...	71·70	50·35	70·34	49·73	71·64	47·69	71·13	47·84	72·99	43·88	68·9	48·1	65·1	50·9	65·4	51·5	67·0	51·8
Mean	91·6	60·6	95·03	...	92·92	61·01	94·03	60·0	81·62	55·35	85·38	49·73	86·30	57·15	85·22	56·83	87·00	57·17	83·0	58·1	80·5	60·0	81·8	59·9	82·9	59·1

B.—SMALL-POX.

Rise and fall of small-pox mortality for 1869 to 1879 inclusive.

1869	...	53,169	1875	...	13,594
1870	...	27,163	1876	...	16,254
1871	...	29,534	1877	...	12,296
1872	...	23,728	1878	...	40,271
1873	...	25,699	1879	...	49,489
1874	...	12,026			

129. For a series of eight years in succession, *i. e.*, from 1870 to 1877, the mortality from small-pox, as will be seen from the figures given in the margin, had been steadily declining. In 1878, however, it rose to 40,271, and in the year under report, it has risen still further to 49,489.

Seasonal rise and fall during 1878 and 1879.

130. The seasonal rise and fall of the disease will be seen from the following statement showing the total small-pox mortality during each month of the year under review. The figures for 1878 are also given in juxtaposition for the sake of comparison :—

Months.		1878.	1879.
January	...	2,231	5,779
February	...	2,626	6,250
March	...	3,565	7,332
April	...	4,927	6,396
May	...	6,483	9,701
June	...	5,243	6,754
July	...	3,877	3,315
August	...	2,444	1,744
September	...	1,225	756
October	...	984	501
November	...	2,258	436
December	...	4,408	525
	Total ...	40,271	49,489

Deaths according to age in the whole Province.

131. The deaths according to age were as follows :—

Ages.	1878.	1879.
Under one year	8,598	9,832
One year and under 12 years	30,018	36,326
12 years and over	1,655	3,331

The numbers for 1879 correspond very closely to what occurred in 1878, as will be seen by the figures exhibited opposite each age.

Districts which show a high death-rate from small-pox.

132. The districts in which the ratio was over 3 per mille of population were Lahore, Gujrát, Umballa, Amritsar Jhelum, Ludhiána, Karnál, Siálkot, Gujránwála, Ferozepore, Gurdáspur, Rawalpindi, and Shahpur. In the first four of these above mentioned districts the death-rate exceeded 5 per mille of population.

Death-rate according to age in each district of the province during 1879, compared with 1878.

133. A comparison of the total deaths with their ratios in each district of the province for the years 1878 and 1879, classified according to age will be seen from the subjoined statement.

Statement showing the deaths registered in each District of the Punjab, during the years 1878 *and* 1879

No.	Names of Stations.	1878.					1879.				
		Under one year.	One year and under 12 years.	12 years and over 12 years.	Total.	Death rate.	Under one year.	One year and under 12 years.	12 years and over 12 years.	Total.	Death rate.
1	Delhi ...	133	703	9	845	1·39	2	9	1	12	0·02
2	Gurgaon ...	1,150	5,688	81	6,919	9·93	15	148	6	169	0·24
3	Karnal ...	955	2,947	104	4,006	6·59	355	1,900	114	2,369	3·88
4	Hissar ...	113	553	13	679	1·40	59	393	20	472	0·97
5	Rohtak ...	124	783	10	917	1·71	1	9	...	10	0·02
6	Sirsa ...	50	240	22	312	1·48	66	514	49	629	2·98
7	Umballa ...	490	1,457	195	2,042	2·02	776	4,055	415	5,246	5·20
8	Ludhiána ...	149	520	27	696	1·19	451	1,913	80	2,444	4·19
9	Simla ...	...	...	2	2	0·06	2	2	28	32	0·95
10	Jullundur ...	36	102	9	147	0·19	148	765	97	1,010	1·29
11	Hoshiárpur ...	123	238	21	382	0·41	478	1,233	317	2,028	2·16
12	Kángra ...	17	58	152	227	0·30	13	40	191	244	0·33
13	Amritsar ...	812	2,059	86	2,957	3·51	1,035	3,243	155	4,433	5·32
14	Gurdáspur ...	205	588	7	900	0·99	599	2,351	304	3,254	3·59
15	Siálkot ...	212	440	37	689	0·69	802	2,179	177	3,158	3·17
16	Lahore ...	877	2,427	130	3,434	4·43	1,031	3,281	204	4,516	5·82
17	Gujránwála ...	552	939	67	1,558	2·83	682	1,352	103	2,137	3·88
18	Ferozepore ...	104	470	8	582	1·09	348	1,603	52	2,003	3·75
19	Rawalpindi ...	350	815	128	1,293	1·85	599	1,745	270	2,614	3·74
20	Jhelum ...	50	121	10	181	0·36	490	1,741	175	2,406	4·82
21	Gujrat ...	421	1,680	18	2,119	3·44	736	2,332	59	3,127	5·07
22	Shahpur ...	131	533	9	673	1·82	295	821	18	1,134	3·07
23	Mooltan ...	309	1,222	108	1,639	3·56	45	149	41	235	0·51
24	Jhang ...	70	284	13	367	1·05	146	471	37	654	1·88
25	Montgomery ...	633	2,337	116	3,086	8·58	226	713	50	989	2·75
26	Muzaffargarh ...	212	700	95	1,007	3·41	96	633	116	845	2·86
27	Dera Ismail Khan ...	57	224	33	314	0·79	56	319	51	426	1·08
28	Dera Gházi Khan ...	62	511	38	611	1·97	58	483	62	603	1·94
29	Bannu ...	44	244	30	318	1·10	57	332	21	410	1·42
30	Peshawar ...	117	612	21	750	1·50	103	892	29	1,024	2·05
31	Hazára ...	39	505	55	599	1·63	53	633	83	769	2·09
32	Kohat ...	1	18	1	20	0·14	9	72	6	87	0·60
	Total ...	8,598	30,018	1,655	40,271	2·30	9,832	36,326	3,331	49,489	2·83

Causes to which the high mortality is due.

134. The high mortality registered from small-pox in 1878 was attributed to the scarcity and distress which prevailed in that year, favoring the epidemic force of the disease. In 1879, as will be seen by reference to the food-supply statement appended to this report, the like conditions have continued to prevail without abatement, and we find, consequently, that the mortality registered in that year under small-pox is even greater than the mortality of the preceding year. The result is no more than was to be expected under the circumstances of the case.

But whatever may be the cause or causes that have operated to favor the growth of the disease in its wide spread epidemic form, or to aggravate its virulence and fatality, there can be no doubt that the protective powers of vaccination have not been realized to the extent justly anticipated, as the result of the operations of the large staff of vaccinators employed in the diffusion of the prophylactic in this province. This failure is to some extent, and in my opinion no inconsiderable one, attributable to the faults of the multifarious system of vaccination which has hitherto been pursued in this province. One set of vaccinators, those of the Government Establishment, working upon a uniform system under the direct supervision of the Superintendent General of Vaccination, and another set, those employed by Municipalities, Dispensaries and Local Boards, &c., working in no systematic order, and with few exceptions under no efficient control or supervision, and with, in many instances, no guarantee of the fitness of the vaccinators for the work they undertake to perform.

Deaths in 1878 and 1879, compared with 1869.

135. It is true that the high number of deaths registered from this disease during the prolonged epidemic of the successive years 1878 and 1879, is considerably less, in either year than the number registered during the last great epidemic of the disease in 1869, which was also a year of scarcity and high prices, although registration was then in its commencement, having been fairly established only in the preceding year and initiated in the year before that; whereas now it is very considerably advanced towards perfection. The registered mortality from these three great epidemic years is as follows :--

1869.	Deaths from small-pox	...	...	53,169
1878.	,, ,,	...	...	40,271
1879.	,, ,,	...	...	49,489

136. These results, so far as they go, coupled with the very noteworthy and steady decline (with some unimportant fluctuations) in the number of deaths registered from smallpox, under an annually improving system of enumeration from the years 1870 to 1877 inclusive, as shown in the statement at the commencement of this section, tell in favor of the effects produced by the yet very imperfect and undevoloped system of vaccination provided for this province, and afford a very encouraging incentive to the steady pursuit of the operation, and the adoption of measures for its performance on the most comprehensive and perfect scale possible.

These results tell in favor of the effects produced by the yet very imperfect system of vaccination provided for the province.

The favorable influence of vaccination against small-pox, and its undoubted power to check the spread and virulence of that pestilence, whether the disease prevail in its normal epidemic activity, or with immensely increased force as the consequences of fortuitous circumstances favoring its growth, or aggravating its mortality as above shown, are not mere accidents; but they are the well known issues of cause and effect. And they are, although on a small and incipient scale in the case under consideration, entirely in accordance with the facts which have been observed, ackowledged and benefitted by in every civilized country throughout the world, in which vaccination has been adopted, and is carried out on a comprehensive scale and in a systematic order.

137. With these facts and statistics concerning themselves before them, it behoves the people of this province to exert themselves to secure for their children and posterity (nearly the whole of the mortality from small-pox being in children under 12 years of age) the inestimable benefit of an assured immunity from the ravages of so loathsome a pestilence and fatal a disease as small-pox, the ordinary mortality from which is at least twenty per-cent. or one out of five, and is oftentimes very much higher. And this without taking into account the disfiguration, loss of sight, deafness and other injuries inflicted by a natural attack of the disease. The assured immunity from small-pox which vaccination gives is not entirely without exception, but it is just so much so, as one attack of small-pox assures the individual from a second attack of that disease. For the vaccinia, or cow-pox, which is introduced into the body by the operation of vaccination, is the same disease as variola, or small-pox, but in the mildest of its known forms. In a form so mild and so benign, that it is uncommunicable except by direct inoculation. And when so communicated, it is never of itself fatal, and rarely produces more than a very trifling amount of constitutional disturbance, which is limited in duration to a few days at most. Moreover, it never produces the disfiguration, loss of sight, deafness, and other injuries, which are the well-known, frequent, and dreadful consequences of the natural small-pox.

Advantages of vaccination, the assured immunity it gives from small-pox, and how it can be made generally known.

Such are the undoubted benefits conferred by vaccination, and these are the characteristics which have secured for it an almost universal adoption in all civilized countries throughout the world; and with the happy result of a vastly diminished prevalence of small-pox, and the reduction of the ordinary mortality from that disease to a minimum.

138. Advantages such as these are of themselves alone sufficient to establish the great value of vaccination as a prophylactic against small-pox. This value is recognized and acted upon by all civilized and enlightened Governments, and a wider experience of the benefits to be derived from the operation of vaccination must naturally lead to the universal adoption of the practice.

The advantages above described sufficient to establish the great value of vaccination.

And this simply because vaccination is known, and is proved by practical experience extending over upwards of eighty years, to afford protection against small-pox to just the same extent, as one attack of small-pox affords protection to the individual from a second attack of the disease. But to secure this amount of assured immunity against small-pox, it is necessary, of course, that the vaccination be genuine vaccination, and not a mere sham and make believe of vaccination; the operation must be successfully performed, and be of the best quality and leave marks of its success. These marks are the very characteristic and permanent scars left on the arm after the fall of the vaccine scabs. Each scar is circular, depressed and indented with minute pits. Unless such scars are left after the operation of vaccination, there is no reliance on the success of that operation, and it will require to be repeated.

139. This Report is not the place to enter into a detailed description of the natural progress of the operation of vaccination when successfully performed, but I have considered it expedient to make the above brief remarks on the advantages to be derived from vaccination, because, now that the Vaccination Department of this province has by the orders of Government been amalgamated with the Sanitary Department, its operations for the spread of that prophylactic against small-pox will come more directly under my immediate supervision, and it becomes my duty to use my utmost endeavours to secure for the operations of the vaccinating establishment the greatest possible amount of success.

Amalgamation of Vaccination Department with Sanitary Commissioner's Office.

140. Success in the practice of vaccination depends in the first place upon the efficiency of the agents employed in the performance of the operation, and in the next upon the assistance rendered by the people themselves, especially as the practice is not yet made compulsory by Law in this Province. It is therefore of the highest importance that Municipalities and District Committees should devote earnest attention to secure for their several populations, the best and surest means of protecting them from the ravages of small-

The causes on which success in the practice of vaccination depends.

pox, by the most thorough and comprehensive practice of vaccination. And this end is to be attained by the employment of properly qualified vaccinators, working upon a well arranged and organized system of procedure supervised by the head of the vaccination branch of the Sanitary Department of this province. The more perfect the system of vaccination, the more complete the immunity from small-pox. This is well illustrated by the small-pox statistics of those towns and districts in which vaccination is well established and freely accepted by the people, in comparison with those in which the opposite conditions obtain, as was explained in Section VI of the Sanitary Report for 1877.

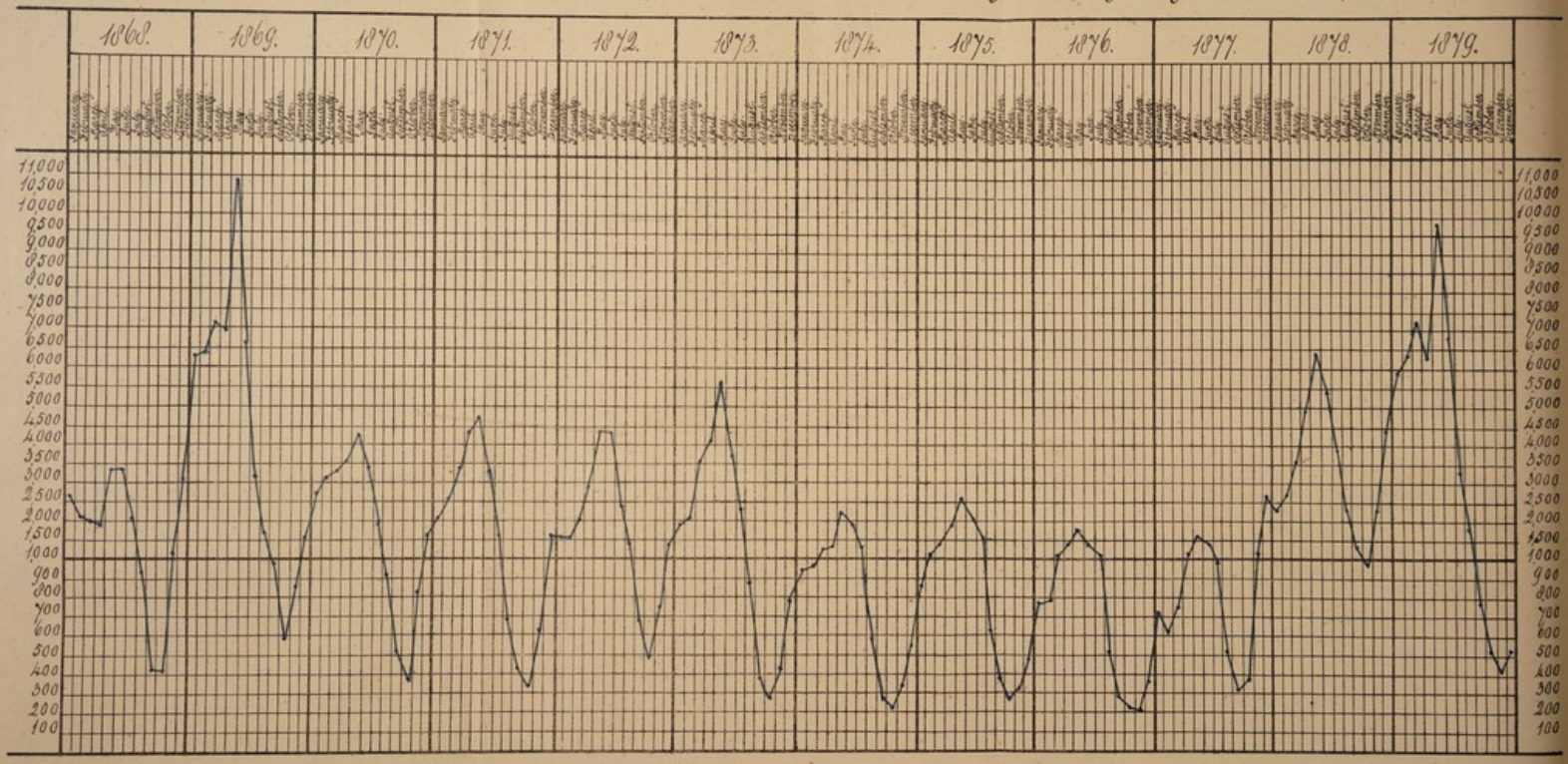
As a copy of the Annual Sanitary Report is furnished to the office of every Commissioner of Division, every Deputy Commissioner of District, and every Civil Surgeon in the province, I hope the remarks I have made in this Section will engage attention, and be communicated to the several Municipal and District Committees, because it is of great importance that they should thoroughly understand the absolute necessity of genuine work to ensure a successful result in the adoption and practice of vaccination. The employment of unskilful and unqualified vaccinators does more harm than good, chiefly because their work is faulty and secures no protection against small-pox.

That a proper attention to this most important subject and the adoption of the requisite measures for the comprehensive and systematic diffusion of vaccination, especially in Municipalities, where its operations can be more thoroughly carried on, will be rewarded by results of a satisfactory nature, we have every reason to believe from the already established good effects of the practice, even under the very disadvantageous conditions under which it has been heretofore pursued, as shown in para. 134 of this Section. We have seen under Part A (Cholera,) of this Section, how the various sanitary improvements carried out during recent years in our several Municipal towns, have operated to reduce the mortality suffered by them from epidemic cholera, and there is every reason to hope that a like amount of attention bestowed upon the subject of vaccination within Municipal limits, will also produce similar satisfactory results in respect to small-pox.

Small-pox chart showing monthly line wave of disease from 1868 to 1879.

141. I append a chart showing the monthly line wave of the disease during the series of years from the commencement of Registration in 1868 to 1879. It shows the unerring regularity with which the epidemic acme of the disease is attained in the month of May, and the minimum of decline in the months of October or November.

Chart showing the monthly distribution of deaths from Small-Pox in the Panjab during the years 1868 to 1879 inclusive.



142. The subjoined statement gives the total number of deaths registered from the diseases classed under the head "Fevers" during each month of the series of years from 1868 to 1879 inclusive, together with the aggregate amount of rain-fall measured in the 32 district stations of the province, during each month of the same period, and it is supplemented by a statement of the average annual price of the principal food grains during the same series of years:—

Statement showing aggregate rain-fall and total fever deaths registered in the Punjab by months for the years 1868 to 1879, inclusive, as also average annual price of principal food grains.

Aggregate Rain-fall and total of fever deaths registered in the Punjab by months for the years 1868 *to* 1879.

Months.	1868.		1869.		1870.		1871.		1872.		1873.		1874.		1875.		1876.		1877.		1878.		1879.	
	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.	Aggregate rain-fall.	Fever Deaths.
January	34·2	13,398	53·1	13,596	9·5	23,396	7·6	21,420	60·2	15,146	31·8	17,075	54·3	17,170	6·7	21,534	19·3	19,815	85·7	22,411	31·5	19,507	0·7	43,248
February	73·6	10,607	22·7	9,930	9·4	16,148	100·4	16,450	33·4	12,667	8·6	12,781	32·1	12,637	68·2	18,534	18·3	13,570	102·4	16,962	83·7	16,818	6·4	32,994
March	63·1	10,440	178·4	8,730	77·3	15,854	4·3	15,839	46·2	13,169	24·9	13,717	55·6	12,543	10·3	15,419	59·0	12,771	50·6	16,569	7·3	17,739	66·2	27,177
April	64·0	9,122	9·7	8,869	15·1	14,561	13·1	16,614	30·0	11,827	2·6	12,291	14·9	11,265	1·3	16,224	41·3	11,973	83·1	14,011	75·9	17,930	0·2	22,066
May	21·9	14,281	1·7	15,168	2·9	18,267	31·3	17,032	44·0	15,533	67·9	15,613	11·3	15,617	39·6	17,856	24·0	13,588	59·6	18,012	89·0	25,722	5·0	31,702
June	66·1	14,011	60·0	13,534	131·7	15,585	199·1	15,290	93·5	15,858	10·2	14,857	117·8	13,327	34·6	16,133	36·4	14,182	72·1	21,329	21·6	26,267	139·1	24,881
July	193·6	11,763	275·4	11,582	198·0	13,734	270·4	14,281	329·0	11,229	202·3	11,195	271·4	11,265	259·7	14,310	266·0	12,712	87·4	17,770	221·7	19,576	169·8	19,333
August	98·2	11,019	115·4	15,807	253·8	15,593	128·0	16,434	268·3	17,862	208·8	13,595	192·8	14,682	331·5	15,164	183·9	17,475	36·8	15,769	385·6	20,599	281·4	30,905
September	24·6	12,169	207·8	24,010	80·2	31,997	42·9	29,858	117·4	43,836	168·3	29,955	86·6	16,379	233·1	27,595	80·1	53,465	105·4	14,038	45·9	42,942	58·9	53,592
October	2·3	15,033	20·6	56,622	9·0	44,221	0·5	19,166	4·9	45,019	20·7	32,292	0·2	23,274	24·3	48,698	47·0	87,052	43·1	18,623	8·6	89,687	0·3	78,173
November	..	16,064	0·1	59,917	..	36,332	..	19,069	0·5	37,416	1·8	25,838	..	20,932	10·2	39,807	12·4	57,186	76·2	21,214	..	90,689	..	63,833
December	19·2	13,428	6·7	35,180	12·5	29,793	31·7	21,085	16·1	25,128	24·3	20,700	0·4	21,549	21·1	28,501	2·1	37,497	135·8	21,650	5·4	53,175	22·8	45,035
Total	660·9	151,337	951·6	272,946	800·4	275,020	829·9	213,548	1043·5	264,711	813·1	219,909	837·6	190,631	1140·8	279,823	991·2	351,286	931·2	219,281	976·2	440,492	752·0	472,939

Average Annual price of principal Food grains.

	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Wheat ...	18	14	16	22	20	22	24	25	25	23	15	13
Rice ...	10	9	11	12	7	9	9	9	9	9	6	7
Pulses ...	13	9	12	16	15	19	19	19	21	17	9	10

143. It will be seen that the mortality under the head of "Fevers" which in 1878 had reached the unprecedented high figure of 440,492, has, during the year under report, risen still higher, to the number of 472,939. This excessive mortality in 1879, which exceeds that of the preceding year by 32,447, is owing to a continuance of the unusually severe and wide-spread epidemic which commenced in September of the latter year and its extension through the cold weather months into the spring of the year under report. This will be seen by reference to the statement given above, the mortality during the first four months of 1879 being nearly double that of the same months in 1878, the number being 125,485 against 71,754. This high figure of mortality during the first four months of the year under report is quite exceptional, and holds a more or less equal proportion in excess of the mortality during the same months through the whole series of years back to 1869.

Cause of high fever mortality in 1879.

144. The explanation of this unusually high mortality from diseases of this class in 1878 and 1879 is attributable to the effects of very wide-spread distress produced by the exceptionally high prices that have prevailed during the past two years combined with an abundant rain-fall in the monsoon season. The relation of fever mortality to climatic influences as indicated by the rain-fall, and to the body vitality as affected by the price of food will be seen by reference to the annexed charts A. B. and C. which show respectively the range from lowest to highest prevalence by months for fever mortality, by quarters for rain-fall, and by years for food prices. The fever mortality represents the actual number of deaths registered under that head throughout the province. The rain-fall represents the aggregate quantity measured in the 32 district stations in the province, and the food prices, the average rate for the year in these stations.

Charts A. B. and C. explain the causes of the unusually high mortality from diseases of this class in 1878 and 1879.

It will be seen that (Chart A.) Fevers, annually attain the acme of their epidemic activity during the last quarter of the year (most frequently in the month of October) with a very remarkable uniformity, whilst the rain-fall (Chart B.) reaches its highest aggregate amount for the province in the quarter preceding it with a like regularity. This regularity in both charts is broken only by the exceptional conditions, which obtained in 1877, and which, as explained in my Sanitary Report for that year, owing to the abnormal distribution of the rain-fall during that period rendered it the most healthy of any year of the series since registration was fairly started in the province in 1868.

The influence exercised by the price of food is illustrated by (Chart C.) the exceptionally high prices of 1878 and 1879 tallying with the exceptionally high mortality of the same years, and also in the year 1869.

The influence of these two factors—rain-fall and food price in the increase and aggravation of Fever prevalence as guaged by the registered mortality—has been so far shown only in a general way for the whole province. But the incidence of fever prevalence and the mortality resulting from it, is not by any means uniform in all parts of the province, as is abundantly proved by the mortuary statistics of the several districts, 32 in number. And this is the fact which calls for our careful study and attention and the exercise of our best endeavours to investigate the causes which operate to favour the prevalence in certain localities more than in others of the province of the class of disease ranged under this head "Fevers" the annual mortality from which is considerably more than half the total number of deaths registered from all causes whatsoever.

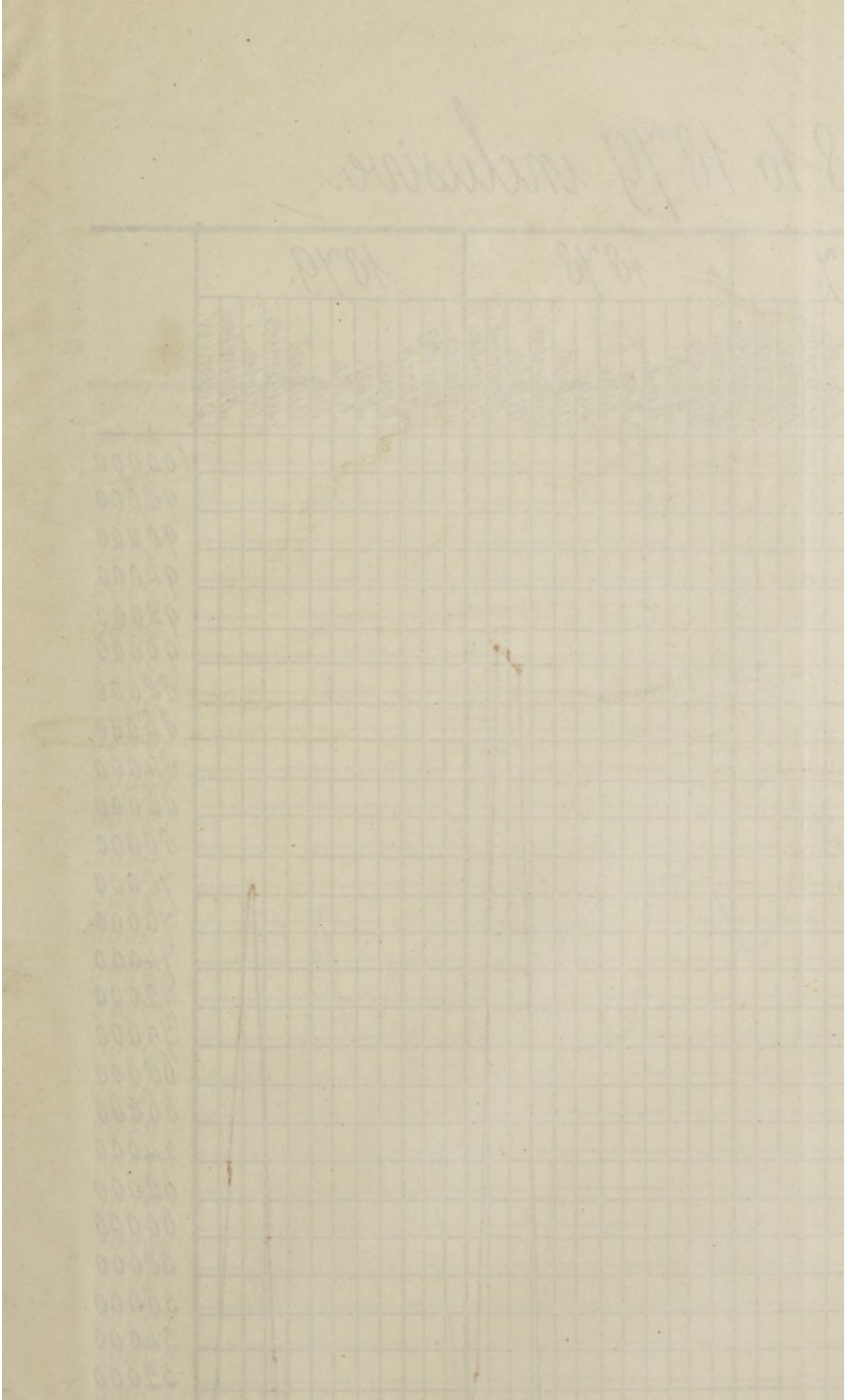
145. By reference to Annual Form No. IX appended to this Report, it will be seen that the highest mortality was registered in the districts of Gurgaon, Delhi, Rohtak, Rawalpindi, Karnál, Hissar and Umballa. The annual death rate from fever in these seven districts was 70, 58, 57, 50, 43, 29 and 28 respectively. In Jullundur District the rate was also as high as 29, but it was considerably below the usual average. In the districts of Jhelum, Sirsa, Ludhiána, Hoshiárpur, Amritsar, Gurdáspur, Lahore and Gujránwála it varied between 26 and 22.

Districts in which the mortality from fever was very high.

146. As an index to the very sudden and enormous increase in the fever mortality in the districts first above mentioned, I subjoin a statement showing the number of deaths registered under "Fevers" during the monsoon months and those following to the end of the year under report.

Statement showing the deaths registered under fevers during the monsoon months and those following to the end of the year under report in the 7 districts above mentioned.

Districts.	Population census 1868	July.	August.	September.	October.	November.	December	Annual death rate per mille of population for October.
Gurgaon	696,646	808	4,583	8,046	13,086	9,683	4,849	225
Delhi	608,850	788	2,608	5,381	7,769	6,491	3,945	153
Rohtak	536,959	561	2,023	4,956	8,283	5,958	2,764	185
Rawalpindi	699,647	1,650	2,037	4,457	4,920	4,284	3,161	84
Karnál	610,927	701	2,199	3,506	5,169	3,070	2,948	101
Hissar	484,681	343	756	2,458	3,523	1,540	835	69
Umballa	1,008,860	918	1,856	3,148	4,923	4,863	3,131	58
Total for 7 Districts ...	4,646,570	5,769	16,062	31,952	47,673	35,889	21,633	123
Total of remaining 25 districts in the Province.	12,841,555	13,564	14,843	21,640	30,500	27,944	23,402	29



A.

Chart showing the monthly distribution of deaths from fevers in the Panjab during the years 1868 to 1879 inclusive.

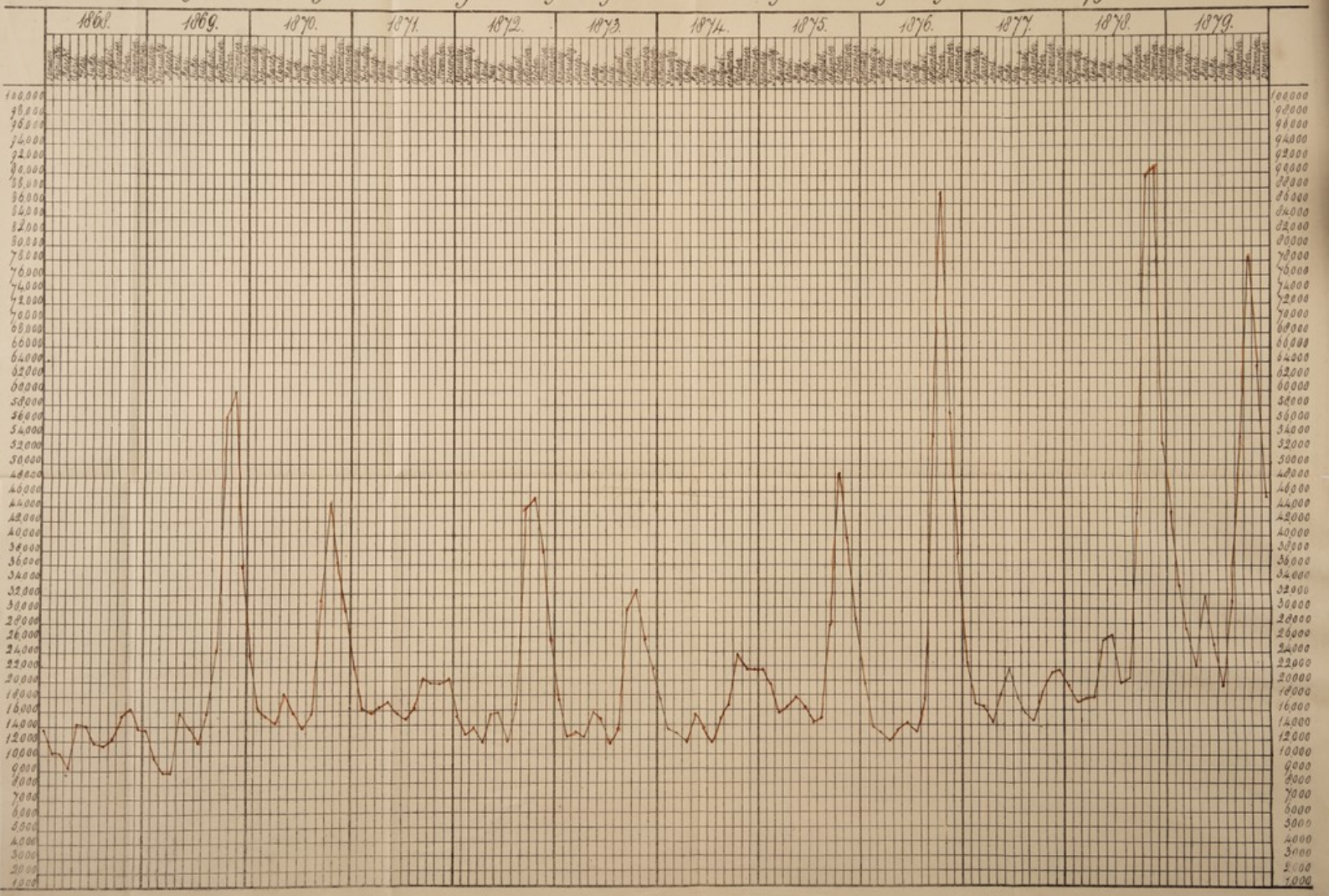
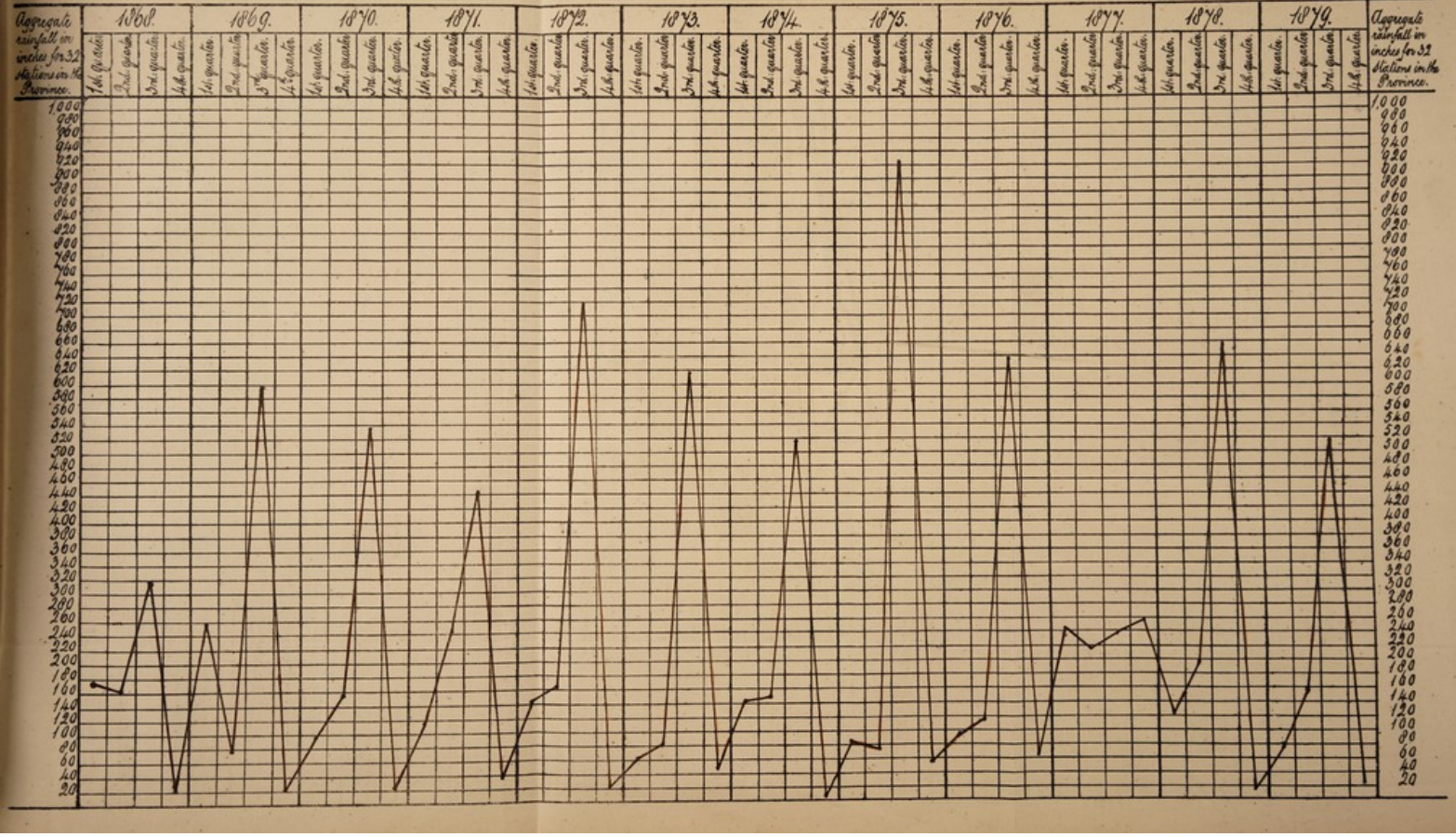
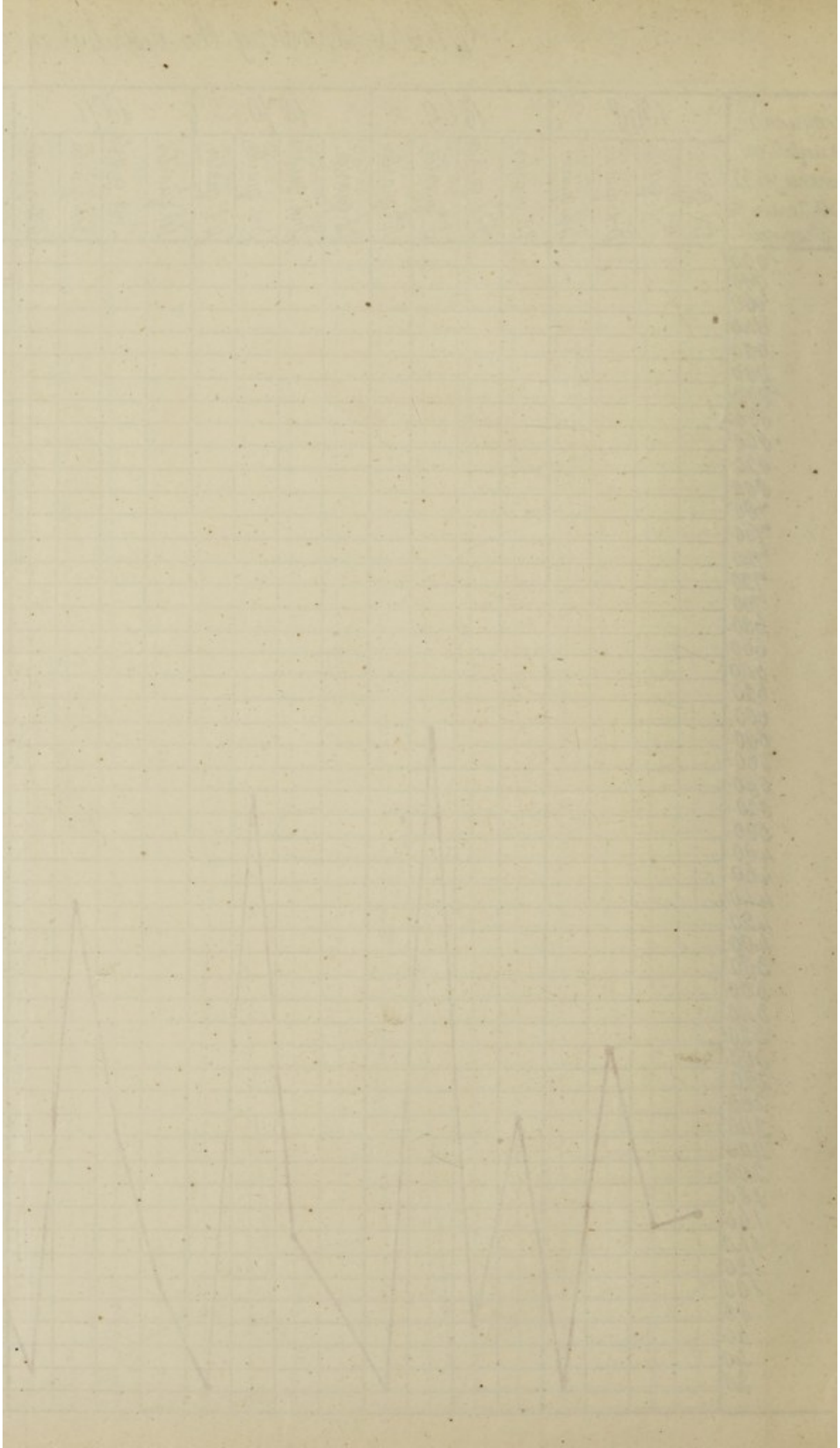


Chart showing the distribution of Rainfall by quarters in the Panjab during the years 1868 to 1879 inclusive.





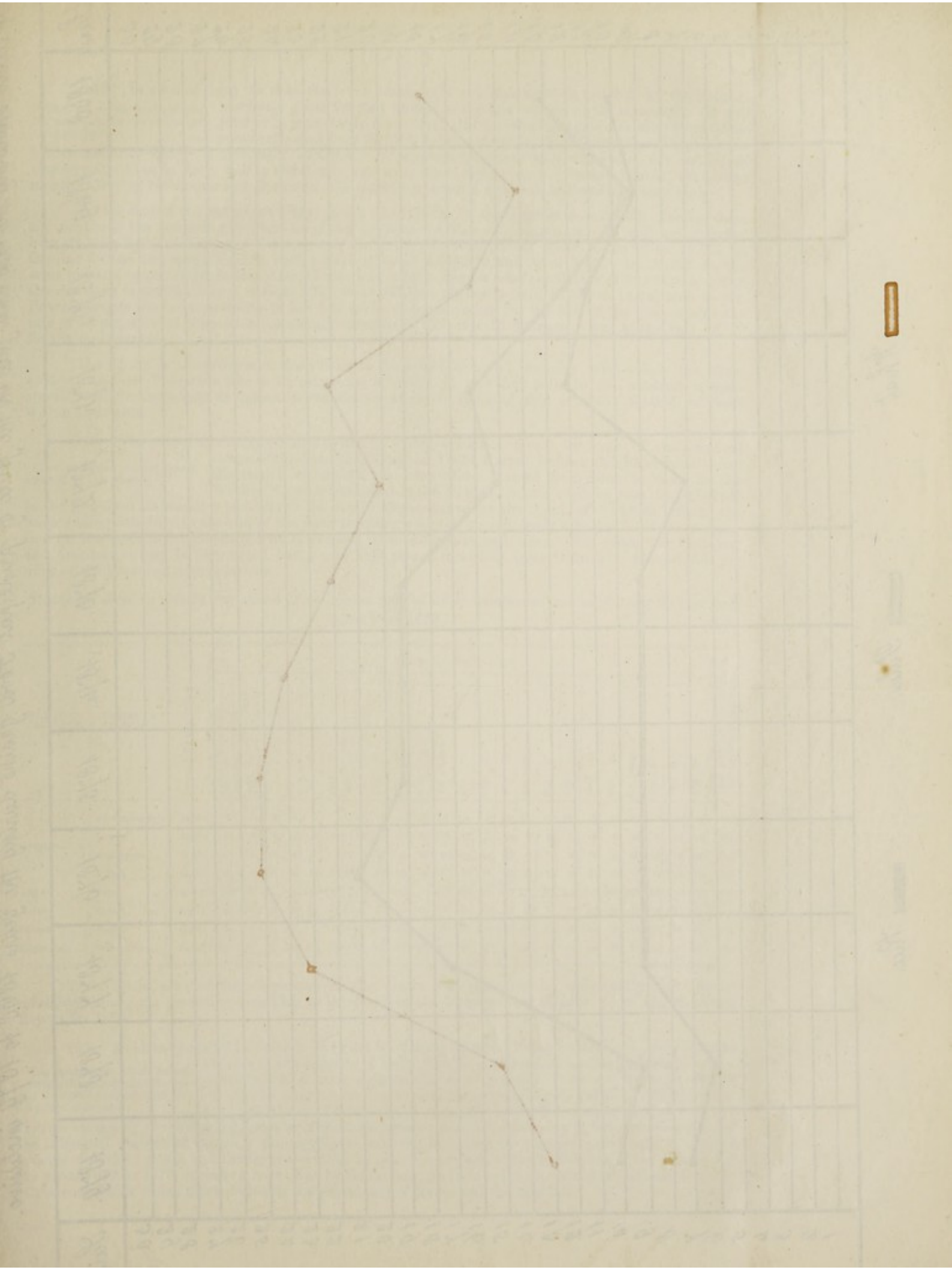
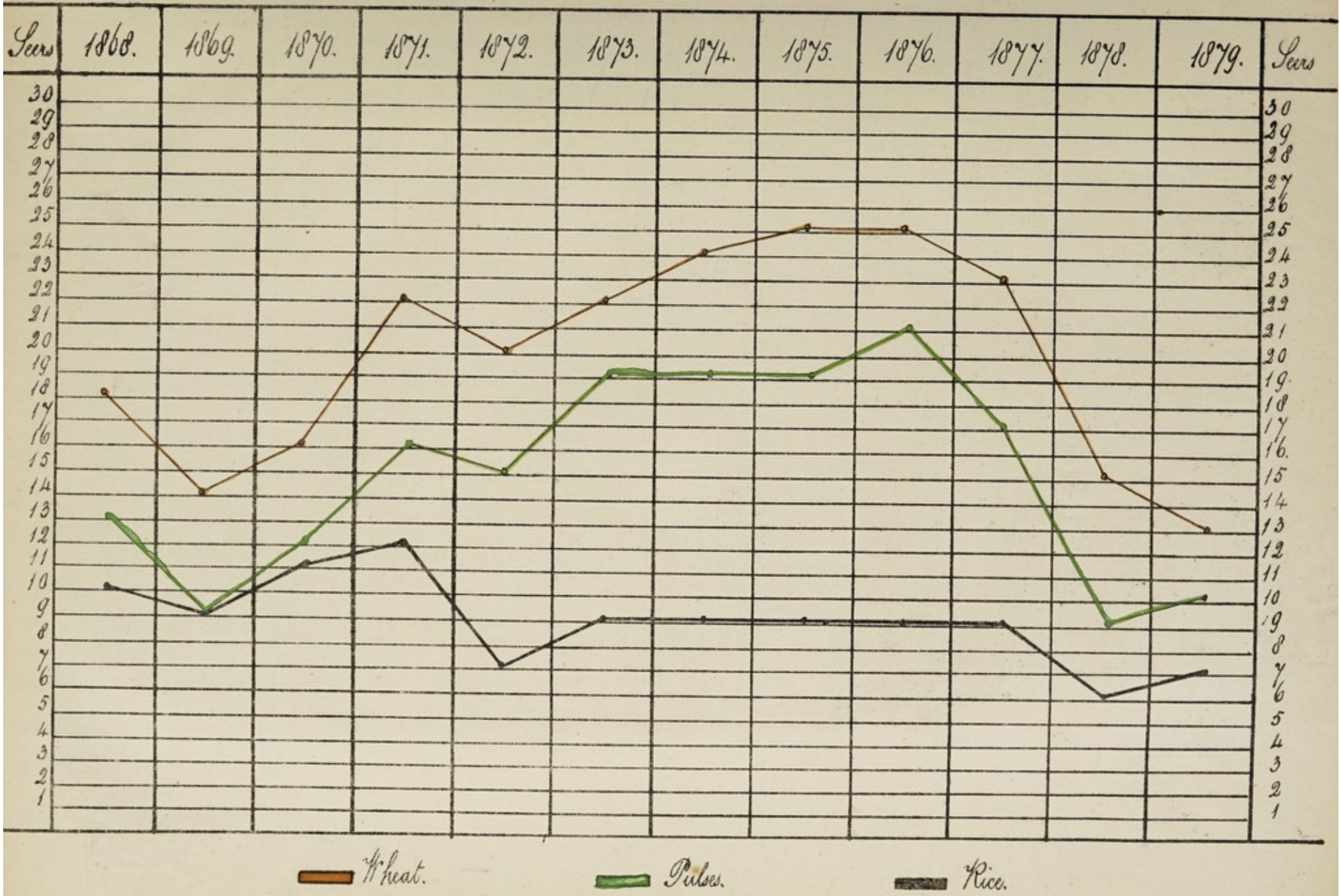


Chart showing the rise and fall in the price of principal Food grains during the years 1868 to 1879 inclusive.



147. In each of these districts the fever reached its epidemic acme in October, at the rates of mortality given for that month in the last column of the statement. It will further be seen that in these seven districts the aggregate mortality from fevers rose at a bound from 5,769 in July to 16,062 in the following month, and so on to October, after which it uniformly declined. In September the mortality was about five and a half times greater than in July, and in October it was more than eight times greater than in that same month. During November and December, the mortality steadily declined, but was still very high.

The above statement shows the periods in the rise and fall of fever mortality.

At the foot of the statement I have given the figures of the aggregate mortality during these six months in the remaining 25 districts of the province by way of comparison. It will be observed how striking is the difference of increase and rate in the two cases; from 5,769 in July to 47,673 in October for the first seven districts with a population of 4,646,570, and from 13,564 to 30,500 for the same months, respectively, in the other 25 districts, which have a total population of 12,841,555, whilst the rise itself is not at a bound as from 5,769 to 16,062, but gradually from 13,564 to 14,843 and so on. In other words the fever mortality in the first seven districts during the last half of the year was at the rate of 68 per mille of population per annum, whereas in the other 25 districts, it was at the rate of 20 for the same period.

The figures in the above statement indicate the suddenness and intensity with which the fever epidemic in these 7 districts rose to its maximum of mortality, and they point to the existence of some special local circumstances or influences which act as causes favoring this excessive fatality of fever within their areas.

148. The extent of the havoc committed by these epidemic fevers in some of the principal towns of the districts of Gurgaon, Delhi, Karnál, Rohtak and Rawalpindi—and the record of which has been duly entered from time to time in the Weekly Returns published in the Punjab Gazette—will be seen by reference to the subjoined statement which shows the deaths registered under the head of "Fevers" from the week ending 5th July to the end of the year, together with the annual death rate per mille of population for the week in which the mortality reached its maximum in each town. The towns of Pesháwar and Amritsar, it may be here noted, had a very high rate of mortality from fevers, *viz.*, 43 and 38 per mille of their respective populations.

The principal towns most affected by the disease.

Statement showing Deaths registered from Fevers in the undermentioned towns during the last half of the year 1879.

NAMES OF DISTRICTS	NAMES OF TOWNS	Population census 1875-76	WEEK ENDING 5th July	12th do	19th do	26th do	2nd August	9th do	16th do	23rd do	30th do	6th September	13th do	20th do	27th do	4th October	11th do	18th do	25th do	1st November	8th do	15th do	22nd do	29th do	6th December	13th do	20th do	27th do	Annual Death rate per 1,000 for the week in which the mortality reached its maximum.
Gurgaon	Farukhnagar	10,594	..	2	..	3	4	4	7	9	13	15	26	45	97	107	155	142	121	118	128	100	74	82	67	49	39	40	697
	Rewári ...	25,190	1	4	6	6	6	14	16	10	25	29	45	47	73	136	158	120	98	85	80	71	66	60	45	36	20	17	281
	Ferozepore ...	10,530	1	...	2	4	8	16	11	8	12	17	31	41	54	63	82	53	39	6	32	38	26	26	23	15	13	12	311
	Palwal ..	13,553	1	4	4	8	10	23	19	30	25	14	14	29	31	44	77	61	33	31	26	25	27	18	15	13	14	12	234
Delhi ..	Delhi ...	115,992	41	30	37	71	114	135	138	128	..	..	279	320	..	392	326	382	326	227	250	272	217	268	220	199	154	170	176
Karnál ..	Karnál ...	24,015	5	6	6	8	12	19	31	64	85	86	62	60	79	62	40	34	29	33	54	23	27	21	29	20	21	11	186
Rohtak ...	Jhajjar ...	12,456	1	3	..	4	1	4	1	9	10	10	17	22	43	88	107	106	115	91	80	52	54	36	35	29	19	13	480
Rawalpindi ..	Rawalpindi ..	20,802	16	22	17	21	27	24	25	21	30	53	52	51	49	66	48	52	44	42	53	41	44	29	24	37	31	28	165

These towns, selected for comparison in the above statement, had an enormously high rate of mortality during the preceding year also, as is shown in the table printed at page 6 of the Sanitary Report for 1878.

149. As already stated in Section V (Vital Statistics) of this Report, the Civil and Medical Officers of the districts of Delhi, Gurgaon, Karnál, Rohtak and Rawalpindi,—districts, which have suffered the most severely from the epidemic fevers during the year under report and that preceding it,—attribute this terribly fatal prevalence of fevers to the unusually heavy fall of rain, coupled with the distress caused by the prolonged scarcity of these two years; and this testimony is fully corroborated by the subjoined statement showing the aggregate rain-fall in inches by quarters, prices current of chief articles of food by years, and the fever mortality by quarters for each of the 32 districts of the Punjab for the years 1877 to 1879, inclusive, as well as by the account given in previous successive Sanitary Reports of the connection which exists between the prevalence of fevers and the rain-fall.

The connection which exists between the prevalence of fevers and the rain-fall illustrated by subjoined statement.

Statement showing the aggregate rain-fall by quarters, prices current of the chief articles of food the years 1877 *to*

Number.	Names of Districts.	Aggregate rain-fall in inches.														Average Wheat.		
		1st Quarter.			2nd Quarter.			3rd Quarter.			4th Quarter.			Total for the year.					
		1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879
1	Delhi	3·7	2·1	0·9	5·2	2·0	8·2	1·2	33·0	26·7	8·1	...	1·2	18·2	37·1	37·0	20	14	15
2	Gurgaon	4·0	2·4	0·7	6·6	1·3	1·6	3·3	24·4	20·4	5·9	...	1·8	19·8	28·1	24·5	20	14	14
3	Karnál	6·8	3·8	1·5	10·3	7·0	3·2	4·3	14·9	18·2	5·6	0·9	0·3	27·0	26·6	23·2	20	16	15
4	Hissar	3·9	1·2	0·4	7·5	4·3	1·1	2·9	14·9	9·1	2·1	0·4	2·0	16·4	20·8	12·6	20	13	13
5	Rohtak	2·3	1·4	1·7	5·6	3·9	3·3	3·0	15·2	15·9	4·4	...	1·9	15·3	20·5	22·8	20	14	14
6	Sirsa	2·1	0·6	0·6	3·6	8·5	1·0	4·3	13·5	9·6	3·9	0·9	0·3	13·9	23·5	11·5	22	13	12
7	Umballa	7·5	6·8	2·5	3·9	5·4	8·1	5·9	25·5	12·6	6·4	1·6	0·7	23·7	39·3	23·9	22	17	15
8	Ludhiána	6·8	2·5	1·8	2·9	6·0	5·0	19·3	23·1	7·2	8·5	0·1	0·9	37·5	31·7	14·9	24	17	15
9	Simla	13·1	6·5	7·5	25·1	16·3	9·7	21·6	37·7	58·8	5·4	0·1	...	65·2	60·6	76·0	15	11	9
10	Jullundur	10·6	3·2	2·1	3·6	6·1	4·7	16·3	35·0	14·2	9·1	...	0·8	39·6	44·3	21·8	24	17	14
11	Hoshiárpur	9·4	5·4	2·0	7·3	6·3	10·5	22·5	36·3	9·8	8·6	0·1	0·9	47·8	48·1	23·2	24	18	14
12	Kàngra	19·5	12·2	11·7	19·7	16·0	17·9	35·7	111·6	130·1	21·4	1·6	2·8	96·3	141·4	162·5	15	13	11
13	Amritsar	10·4	4·1	1·0	6·7	5·3	5·5	6·8	23·2	10·2	8·6	...	1·4	32·5	32·6	18·1	24	17	13
14	Gurdàspur	12·0	5·0	1·8	4·0	6·3	8·6	10·2	10·3	11·8	11·7	...	0·8	37·9	21·6	23·0	23	17	12
15	Siálkot	9·6	4·1	2·2	9·2	5·4	7·5	4·5	20·4	16·6	9·1	0·3	0·7	32·4	30·2	27·0	22	16	14
16	Lahore	6·0	2·2	0·9	2·9	2·2	4·2	3·5	12·4	10·8	4·2	0·2	0·5	16·6	17·0	16·4	24	16	13
17	Gujránwála	8·8	5·0	1·0	2·3	4·8	5·8	3·3	17·3	10·0	9·5	0·8	..	23·9	27·9	16·8	23	16	15
18	Ferozepore	2·2	0·8	0·4	4·0	5·2	1·1	4·6	11·6	8·1	4·4	0·2	0·6	15·2	17·8	10·2	28	18	14
19	Rawalpindi	12·1	5·8	2·7	7·8	12·5	5·8	6·9	14·1	24·2	13·8	0·8	1·4	40·6	33·2	34·1	30	18	13
20	Jhelum	15·1	2·5	2·6	3·8	4·7	7·7	4·5	18·6	18·5	12·8	0·7	0·7	36·2	26·5	29·5	27	18	13
21	Gujrat	10·6	4·5	1·8	4·9	3·8	7·9	4·3	20·6	14·5	11·0	1·2	0·4	30·8	30·1	24·6	25	16	13
22	Shahpur	5·2	10·0	2·1	4·2	4·4	0·9	0·6	14·9	7·6	5·4	...	...	15·4	29·3	10·6	28	17	12
23	Mooltan	1·4	0·7	1·1	1·4	1·1	1·7	9·7	8·1	1·7	1·1	0·4	...	13·6	10·3	4·5	21	13	13
24	Jhang	2·8	1·9	0·9	6·7	2·3	1·4	4·9	9·2	1·9	2·5	...	...	16·9	13·4	4·2	24	14	12
25	Montgomery	12·6	0·4	1·4	2·3	3·4	1·2	3·8	13·9	2·6	2·3	...	...	21·0	17·7	5·2	28	16	13
26	Muzaffargarh	2·0	0·2	1·1	1·9	1·7	1·4	6·5	8·2	...	1·2	...	0·1	11·6	10·1	2·6	21	13	13
27	Dera Ismail Khan ...	4·1	2·0	1·4	3·3	5·4	0·2	0·4	8·9	3·1	3·9	...	...	11·7	16·3	4·7	28	16	12
28	Dera Gházi Khan ...	1·9	0·5	1·9	0·9	2·2	2·0	1·4	5·6	0·9	1·5	...	...	5·7	8·3	4·8	21	13	12
29	Bannu	4·0	3·3	4·0	7·8	7·6	1·8	1·8	4·7	5·6	5·1	...	0·1	18·7	15·6	11·5	40	20	12
30	Peshàwar	6·8	3·8	2·7	6·2	7·2	...	...	10·8	1·1	12·5	...	0·5	25·5	21·8	4·3	26	17	8
31	Hazárá	14·3	14·0	6·2	19·7	13·6	5·2	9·1	19·4	22·1	26·2	1·3	2·2	69·3	48·3	35·7	25	14	10
32	Kohat	7·1	3·6	2·7	6·5	4·3	0·8	2·5	15·9	6·2	19·0	2·4	0·6	35·1	26·2	10·3	32	19	9

by years, and the fever mortality by quarters for each of the 32 *districts of the Punjab during* 1879 *inclusive.*

Price current.						*Aggregate registerred deaths from fevers.*											
Rice.			Pulses.			1st Quarter.			2nd Quarter.			3rd Quarter.			4th Quarter.			Total for the year.		
1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.	1877.	1878.	1879.
9	7	8	21	10	14	1,717	2,169	4,003	2,130	3,481	4,350	1,816	3,801	8,777	2,702	13,278	18,205	8,365	22,729	35,335
9	6	7	20	10	13	1,355	2,658	3,747	1,621	4,297	4,062	1,592	8,569	13,437	2,209	16,252	27,618	6,777	31,776	48,864
10	7	9	18	10	13	1,632	1,555	4,283	1,764	2,515	4,171	1,540	2,563	6,406	1,580	9,859	11,187	6,516	16,492	26,047
11	7	8	24	14	15	751	1,352	1,680	835	1,689	2,751	809	1,901	3,557	1,079	3,950	5,898	3,474	8,892	13,886
10	6	7	22	12	14	1,453	1,860	2,765	1,823	2,239	3,266	1,688	2,555	7,540	2,177	8,686	17,005	7,141	15,340	30,576
11	7	8	23	13	14	463	642	901	471	797	1,107	385	729	1,247	611	1,669	1,952	1,930	3,837	5,207
13	8	10	21	10	14	2,680	1,973	5,039	2,735	2,999	4,080	2,138	3,295	5,922	2,029	10,535	12,917	9,582	18,802	27,958
11	7	7	19	9	12	1,268	1,340	2,743	1,662	2,168	2,059	1,809	3,298	2,995	2,385	11,740	5,184	7,124	18,546	12,981
8	5	4	12	7	8	31	46	57	49	66	70	45	81	155	45	77	110	170	270	392
10	7	8	18	9	11	3,792	2,263	7,396	3,196	3,642	4,434	3,167	8,540	3,959	4,077	34,266	6,741	14,232	48,711	22,530
10	9	9	17	9	11	3,286	2,688	5,023	3,238	3,436	4,063	2,942	4,642	5,133	3,561	14,809	8,472	13,027	25,575	22,691
13	11	11	12	7	9	2,059	2,788	2,798	1,942	2,297	2,887	2,303	2,549	4,779	2,682	3,156	4,180	8,986	10,190	14,644
12	9	9	19	9	13	3,196	2,584	5,758	2,868	3,396	4,716	3,082	4,498	4,333	3,597	13,578	6,037	12,743	24,056	20,844
9	7	7	16	7	11	4,113	3,929	5,947	3,583	4,048	4,353	2,845	3,000	3,648	3,002	7,635	7,751	13,543	18,612	21,699
7	6	6	17	9	12	3,192	3,386	4,047	3,121	4,007	2,942	2,805	2,717	2,725	2,722	6,151	5,207	11,840	16,261	14,921
14	8	9	17	8	10	3,541	3,280	6,117	2,739	3,654	3,872	2,729	4,396	3,148	3,840	12,178	5,659	12,249	23,508	18,796
14	8	9	17	10	10	2,890	2,057	3,679	2,373	2,837	2,330	1,964	2,080	2,153	2,325	6,154	4,017	9,552	13,128	12,179
11	6	7	22	9	12	952	1,259	1,983	925	1,770	1,622	1,317	4,859	1,584	2,416	11,205	2,519	5,610	19,093	7,708
6	6	5	13	9	8	1,692	2,445	9,345	2,236	3,824	5,438	2,212	3,411	8,144	3,165	9,115	12,365	9,305	18,795	35,292
9	7	7	17	10	11	1,041	1,346	3,478	1,257	1,876	2,236	1,307	2,074	2,704	1,804	5,088	4,440	5,409	10,384	12,858
11	8	8	15	9	10	1,602	1,782	2,553	1,796	2,811	2,023	1,813	2,352	2,690	2,068	4,457	4,695	7,279	11,402	11,961
5	6	7	18	10	10	973	1,106	2,256	1,068	1,247	1,291	847	1,152	1,142	1,219	3,220	1,303	4,107	6,725	5,992
8	7	7	16	8	10	2,665	1,807	2,434	1,868	1,478	1,455	1,342	1,491	877	2,175	3,389	1,834	8,050	8,165	6,600
11	7	8	19	9	9	886	619	842	678	481	452	520	424	320	742	876	439	2,826	2,400	2,053
10	7	7	15	8	8	1,624	1,199	1,766	1,164	936	972	796	913	656	1,297	2,762	1,539	4,881	5,810	4,933
9	7	6	13	6	7	1,877	1,217	2,082	1,248	1,160	1,200	1,023	1,167	810	1,557	3,674	1,594	5,705	7,218	5,686
10	6	6	14	9	7	1,328	1,457	2,784	1,343	1,426	1,534	1,992	1,366	967	1,346	4,053	1,711	5,009	8,302	6,996
10	8	7	13	8	9	1,104	718	1,132	870	779	662	592	664	454	614	1,819	649	3,180	3,980	2,897
8	7	4	14	9	6	603	719	2,080	635	627	1,019	1,470	840	695	611	2,350	966	2,319	4,536	4,710
10	7	5	12	7	6	851	1,098	2,142	1,037	2,363	1,608	630	1,785	1,183	860	1,520	2,556	3,378	6,766	7,489
14	6	7	12	7	7	1,145	880	1,771	899	1,589	1,339	766	1,204	1,423	830	5,232	1,923	3,640	8,905	6,456
12	10	6	12	8	7	203	142	838	178	144	285	191	202	267	160	798	368	732	1,286	1,758

Deaths from Cholera also high in these seven districts.

150. It is further to be noted here that the people of the above named districts suffered severly from a visitation of epidemic cholera during the months of April, May and June immediately preceding the outbreak of the fever epidemic of the year under report, as will be seen by reference to the statement on page 64 under the head of cholera.

The circumstances that favour the development of the disease in the seven districts and principal towns above noted.

151. I have said in a previous para. (145) that the high figures and sudden rise to the maximum of mortality in the seven districts above specified, point to the existence of some special local conditions or circumstances which favour the development in them of the excessive, and to some extent exceptional, prevalence of fevers of a very deadly kind. It is to be regretted that we have no means, of distinguishing the different kinds or types of the disease classed under the generic term "Fevers." But it is presumable from the known existence of scarcity and general distress amongst the poorer classes for a protracted period, in the districts above mentioned especially, that a considerable proportion of the mortality was due to "famine fever". Making due allowance however for these exceptional circumstances, there still remains the fact, that considerably more than half the entire mortality of the province year by year is due to diseases, classed under the-head, "fevers." The returns for the year under report show, that the distribution of this mortality is not equal all over the province, as above described, and thus indicate the operation of special causes in particular localities, as was found to be the case in Jullundur in 1878. In the case of the districts above noted, which show an excessive fever mortality for the year under review, there are certain local conditions which require to be mentioned as being calculated to favor the excessive growth of diseases of this class. One of these conditions is undoubtedly the defective drainage of the areas covered by the several districts, and more especially so in the case of those districts which are within the area irrigated by the Western Jumna Canal and in which the soil is either more or less water-logged, or else has the spring level close below the surface. In these last districts the evil has long been recognized, and the works now in progress on the new alignment of the canal have been undertaken with the object of remedying it. Another of these conditions is the very insanitary state of the towns and villages themselves; conditions which combined with a naturally unfavorable character of the soil and site very materially aggravate the nature of the evils thus produced and intensify their activity in the production of this class of diseases. Some idea of the very discreditable and highly unwholesome state of affairs, which is their ordinary and constant condition, and which it appears has been no way improved since I made my inspection report on several of the same towns (such as Shahabad, Kárnal, Delhi, Ballabgarh, Gurgaon, Rewari, Palwal, Farakhnaggar, Jhajjar, Rohtak, Gohana, Panipat, &c.,) in the cold season of 1877-78, will be gathered by reference to Section X, personal proceedings, of this report.

The very unsatisfactory state of these towns in respect to their sanitation, as shown in these reports, is of itself sufficient explanation of the high mortality they habitually suffer; see the last column of Annual Form No. (VIA.) appended to this report, which gives the mean ratio of mortality for the preceding five years. It is no matter of wonder therefore that towns so very unfavorably circumstanced in point maintaining an average health standard in ordinary times, should suffer to an extraordinary degree in exceptional times, of scarcity and epidemic activity.

The lesson taught by the insanitary condition of these towns

152. The lesson taught by the terrible experience of these towns (short of the prime remedy by effective provision for the free drainage of the whole area of the country) is the absolute necessity of maintaining the highest attainable standard of sanitation not only in the public thoroughfares and surroundings of the towns as a whole, but also in the arrangements for the conservancy and domestic hygiene of each one of the separate houses which are clustered together in its area.

The points which require more particular attention of the Municipal Committees remarked upon.

153. Taking the province as a whole, there has been no doubt a very marked improvement effected in the sanitary condition of most of its principal towns, through the efforts and expenditure of the several Municipalities from year to year during the last decade. But they have got a great deal to do, in very many of the minor Municipalites especially, before the towns of this province can be considered in anything like a satisfactory state of sanitation. Too much stress cannot be laid on this most important matter, nor can Municipalities be too much pressed to devote a more earnest attention to the duties required of them in this respect. The points requiring more particular attention on the part of Municipal Committees every where, and the earliest adoption by them of remedial measures, are the improvement of town sewerage and street conservancy, for it is owing to the neglect or imperfect provision for these, that the air and water and soil of the dwelling houses is poisoned and rendered unfit for the existence in a state of health of the inhabitants.

Streets and thoroughfares in almost all of the small municipal towns require remodelling on the approved system.

154. The public streets and thoroughfares in almost every one of the lesser Municipal towns require thorough renovation and remodelling on the system already adopted in several towns with very satisfactory results. It is that of laying down their streets with a convex roadway, sloping gently to an open surface gutter at each side (as has been described in the Sanitary Report for last year), instead of the old fashioned concave roadway with its central line of gutter and cross streaks of sewage flowing to it from the houses on either side. By the new plan, the sewage issuing from the houses is at once caught direct by the side gutter of the street and removed daily by the flushing and sweeping to

which these gutters are subjected, whilst the roadway is left dry and in a state to be easily kept clean by sweeping. By the old system, the street roadway soon becomes a mere wide shallow sewer, always in a foul and grimy state and constantly damaged and indented by the traffic of men and cattle and carts: thus not only tainting the atmosphere with unwholesome exhalations, but polluting the soil by the soakage and percolation to lower depths of sewage matters.

The necessity and advantages of good clean streets in the Municipal towns.

155. The necessity of good clean streets in our Municipal towns is a very urgent one, and it is of the greatest importance that the several Municipal Committees should take the subject under their immediate consideration with a view to the adoption of measures for their being put into a proper state on a thorough, comprehensive, and uniform system; and not in the piecemeal and haphazard fashion, which has in too many instances been heretofore the practice. The money expended in the repairs of streets in this piecemeal fashion is only wasted and does no good towards the improvement of the sanitary condition of the towns as it only removes the evil from one spot to another within its area. To effect any good result it is absolutely necessary that the work be done thoroughly on a uniform system of proper gradients for the whole town area, so as to conduct its sewage at once to the out-fall drain and away from the town precincts. Such a system once carried to completion will secure for the town clean and wholesome thoroughfares, a purer breathing air than that the people, under the existing circumstances, can possibly obtain, and above all, will protect their well water from a very abundant and constant source of the most dangerous kind of pollution; and further it will very much lessen the labours of the scavenging establishment, and facilitate the performance of their duties in a more perfect and satisfactory manner than has yet been found possible under the unfavorable conditions above described.

Wholesome air and water absolutely requisite for maintenance of sound health.

156. Wholesome air and wholesome water are absolutely necessary requisites for the maintenance of sound health, and they are to be secured in our Municipal towns (I mean such of them as cannot provide for water-supply and sewerage by pipes and drains on the European system) by a proper attention to their sanitary requirements. One of the most important of these, is the maintenance of the streets in a proper and wholesome state of repair and cleanliness.

The necessity of prohibiting the building of shop counters over gutters running with sewage.

157. A very important point connected with this subject of street sanitation, and one requiring immediate and most serious attention, is the almost universal custom of building out shop counters immediately over open gutters running with sewage. Measures are necessary for the remedy of this evil and the strict prohibition of the practice in the future. The practice is bad enough under any circumstances; but in the case of articles of food (which are often consumed straight as taken from the counter) exposed for hours, or may be for days, upon these counters to the effluvia rising from the drains underneath, and to the tainting effected by swarms of flies passing to and fro from one to the other, as well as to the contamination produced by the admixture of street dust and wind drifts, the practice is one which is highly dangerous to health, and must be a very much more frequent cause of the production of disease than is at all generally recognized.

The conservancy establishments paid from Municipal funds require proper supervision and organization.

158. A part from these very serious defects, the remedy of which is the duty of Municipal Committees, there is another which also comes under their supervision and control. It is the more or less generally faulty organization and working of the conservancy establishment appointed and maintained by them at the expense of the Municipality. In many of the Municipal towns a liberal grant is made from the Municipal Fund for the maintenance of their several conservancy establishments, but in many (the lesser Municipalities especially) the sums allowed for this branch of their Sanitary Budgets are insufficient for the actual requirements. In all, however, with a very few exceptions, the money thus spent is to a greater or less extent wasted, owing to the absence of proper supervision and organization. Municipal Committees should bear in mind that their duties in this matter do not end with the mere grant of a certain sum out of the public fund for a specific purpose, but include also their supervision and control to ensure the proper performance of the work for which the money is paid, and thus to secure an adequate return for the outlay. Owing to the habitual neglect by Municipal Committees of this very important duty, the work of scavenging in most towns is very imperfectly performed. Comparatively very few Municipalities have as yet taken any steps to turn to profitable advantage the sweepings of their streets and other town refuse by storage and sale as manure. The plea put forward by many is the objection on the part of cultivators to use such manure owing to its mixture with latrine ordure. But this is an idle excuse, for what is done by some Municipalities can surely be done by the others, if they choose to make the effort and sacrifice personal motives to the public advantage. In those towns where the mass of street sweepings, &c., is not sold as manure or kiln fuel for the benefit of the Municipality, it is certainly so disposed of by the sweepers to their personal advantage, and with no objection to its use on the part of the cultivators. In these negligent Municipalities, in fact, it is the collection of this stuff for sale to their own profit which is the chief aim of the sweepers, the prime duty for the performance of which they are paid by the Municipality is with them a matter of secondary consideration; and as they are not properly supervised or controlled, the Municipality suffers. In other words the Municipality pays the sweepers to take away from the town the stuff they can sell to their own profit, but they fail to exact from them in return the duty of keeping the town clean. It is one thing to take away garbage and ordure and litter for sale, and another thing to keep the places whence they are removed clean.

159. So far I have referred to the main defects of public sanitation in our Municipal towns, defects which are easily to be remedied, and indicated the kind of action necessary to remove them. But there is another class of evils which is beyond the control of Municipal Committees, and unfortunately it is of a character which operates very widely and powerfully to nullify the good effects of the sanitary improvements already brought about at considerable labour and expense by even the most advanced of our Municipalities.

The insanitary condition of private dwellings and the universal neglect by the occupants of the most simple sanitary rules.

I allude here to the evils resulting from the almost absolute and universal neglect of the most simple measures of sanitation in the private dwellings of our urban (to say nothing here of the rural) population, even in the houses of the wealthy and otherwise well informed. The extent to which the observance of simple cleanliness in the arrangements of the private dwellings of our towns and villages is habitually neglected is most astonishing, and it is above all others the greatest difficulty we have to contend with in our efforts to improve the sanitary condition of our population centres.

There is not only a vicious system of non-ventilation and overcrowding found everywhere, but there is a stubborn neglect to provide for the wholesomeness of the dwelling as a human habitation. The habitually foul state of the court yards, and the stalling of cattle under the same roof and often in the same room with the owners, are sufficiently serious evils in this respect, but the greatest of all arises from the faulty privy arrangements. In many towns the privy is generally built on the roof of the house, and in this position produces the least amount of inconvenience, and when properly tended, is free from objection. But more frequently it occupies some corner on the ground floor, either in the form of a cess pit, or a sink opening by a trap door on to the street, or else it is a mere recess, the floor of which receives the excreta. In the former cases the privies are cleaned out at longer or shorter intervals. In the latter the ordure is, as a rule, removed daily, but the floor which is always the unprotected earth constantly remains sodden and saturated with the excreta. In such case the effluvia pervade the house. In many houses the privy is formed by walling off a corner of the court-yard, and using the bare ground as in the last case described, and here too the place being roofless there is the further evil of the ordure being washed by rains into the court.

The fault in all the privies is the absence of utensils for the reception and complete and easy removal of the excreta. Were these (glazed pottery is inexpensive and easily procured) utensils provided the floor would be protected from pollution and the sweepers would have no trouble in keeping the places in a wholesome state of cleanliness.

I have made these remarks in order to engage the attention of Municipal Committees to the points which require more special consideration in whatever efforts are made with the view to improve the sanitary condition of their towns. The subject has been too long neglected by the public, and unless something is done to remedy the existing unsatisfactory condition of the private dwellings in our towns, it is hopeless to look for that improvement in the public health which the other sanitary works executed would lead one to expect.

160. Surgeon Major Adam Taylor's report, on the insanitary state of certain villages on the Western Jumna Canal and on the position of the new alignment of the canal, together with a map illustrating its course and the position of the several villages situated near it, is given as Appendix C. to this report.

Surgeon Major A. Taylor's reports on the insanitary state of certain villages on the W. J. Canal given as Appendix C.

D. BOWEL COMPLAINTS.

161. Under this head a total of 29,612 deaths were registered during the year under report against 32,071 in the preceding year. Subjoined is given a statement showing by months the prevalence of Bowel Complaints during the two years 1878 and 1879.

Statement showing deaths from Bowel complaints by months during 1878 and 1879.

Names of months.	1878.	1879.
January	1,363	2,184
February	1,013	1,528
March	1,174	1,367
April	2,311	1,761
May	4,160	2,697
June	2,958	2,099
July	1,774	1,860
August	2,282	2,675
September	3,256	3,428
October	4,394	3,927
November	4,236	3,668
December	3,150	2,418

162. The highest number of deaths from this class of diseases occurred, as usual in the months of October and November. The districts most affected will be seen from the statement appended below, showing the annual death rate per 1,000 of population in the several districts of the province for 1878 and 1879, together with the ratio for the preceding five years.

The months in which the highest number of deaths occurred and the districts most affected.

Statement showing death-rates per 1,000 *of population for* 1878 *and* 1879, *together with the mean death rate for the preceding* 5 *years ending in* 1877.

Number.	Districts.	Death-rate for 1879.	Death-rate for 1878.	Mean death-rate for preceding 5 years.	Number.	Districts.	Death-rate for 1879.	Death-rate for 1878.	Mean death-rate for preceding 5 years.
1	Delhi ..	3·65	3·41	2·04	18	Ferozepore ...	0·85	0·94	0·91
2	Gurgaon ...	4·27	5·49	2·48	19	Rawalpindi ...	2·56	1·31	0·65
3	Karnál ...	2·36	2·47	1·31	20	Jhelum ..	2·32	1·55	1·24
4	Hissar ...	1·48	1·52	0·69	21	Gujrat ..	0·87	1·26	0·52
5	Rohtak ...	1·69	2·27	0·45	22	Shahpur ...	1·34	1·65	1·40
6	Sirsa ...	1·68	1·79	0·94	23	Mooltan ...	0·73	1·04	0·98
7	Umballa ...	3·15	2·75	1·43	24	Jhang ...	0·42	0·57	0·53
8	Ludhiána ...	1·28	2·61	1·30	25	Montgomery	0·55	0·45	0·49
9	Simla ...	4·76	3·66	2·01	26	Muzaffargarh ...	0·28	0·26	0·21
10	Jullundur ...	0·58	1·19	1·13	27	Dera Ismail Khan ...	0·50	0·93	0·43
11	Hoshiárpur ...	2·27	3·13	2·95	28	Dera Gházi Khan ...	0·59	0·79	0·44
12	Kángra ...	2·26	1·89	2·61	29	Bannu ...	1·31	1·25	0·93
13	Amritsar ...	2·22	2·23	1·27	30	Pesháwar ...	1·11	1·55	0·45
14	Gurdáspur ...	1·77	1·47	1·84	31	Hazárá ...	0·70	2·04	0·68
15	Siálkot ...	0·81	1·07	1·08	32	Kohát ...	0·89	0·36	0·37
16	Lahore ...	1·23	1·12	0·89					
17	Gujránwála ...	0·95	0·98	0·76		Ratio for Province ...	1·69	1·83	1·24

163. The highest number of deaths from Bowel Complaints occurred in the Simla district, the ratio reaching as high as 4·76 against 3·66 in the preceding year, a rate only exceeded in that year by Gurgaon with a ratio of 5·49. This year Gurgaon gives a ratio of 4·27 and comes next to Simla in point of prevalence of mortality from this class of diseases. Next to these districts in the order of sequence are Delhi, Karnál, Rawalpindi, Jhelum, Hoshiárpur, Kàngra and Amritsar.

The districts of Simla and Gurgaon show a very high death-rate from this disease.

164. The following towns suffered very severely as will be seen from the death-rates given opposite each.

The towns which suffered most.

Narot	34·99	Dharmsála	11·88
Palwal	32·76	Haripur	11·61
Farukhnagar	32·09	Darman	11·20
Ballabgarh	20·23	Jhajjar	10·60
Firozpur (in Gurgaon District) ..	18·90	Nandpur	10·46
Terá Sujanpur	16·21	Jawálamukhi	10·90

E.—INJURIES.

165. The total number of deaths under the head of Injuries was 5,306 against 5,783 in the preceding year. They were distributed under the following heads, namely, suicide 307, wounding 351, accidents 3,693, snakebites, hydrophobia and killed by wild beasts collectively 955.

Deaths from injuries detailed.

166. The deaths from the different modes of committing suicide during 1879, are compared with 1878 in the annexed table :—

Suicide.

	1878.	1879.		1878.	1879.
Drowning	74	131	Gun shot wound	2	3
Hanging	124	87	Falling from heights	6	7
Poisoning with opium ...	28	12	Setting fire to house	0	1
Do. with arsenic ...	17	13	Cause not stated	15	49
Cutting the throat	2	1			
Stabbing	0	3	Total ...	268	307

167. Of the 131 suicides from drowning, no less than 71 of that number occurred in the Gurgaon district alone, *viz.*, 14 among males and 57 among females. The marked excess of suicides in this district, compared with the other districts of the province, and the excess of female suicides as compared with the males, have been frequently noted in the annual Sanitary Reports and the extraordinary circumstance calls for investigation in order to ascertain what are the circumstances and causes of this very noticeable peculiarity. Perhaps the Deputy Commissioner might be able to given some information on the subject. Next to Gurgaon, the districts of Hoshiárpur and Kángra showed the highest number of deaths from this cause *viz.*, 30 and 33 respectively. This distinction also has been alluded to in previous reports and is noteworthy.

The high deaths from suicide in the Gurgaon district calls for investigation.

Accidents.

168. Accidents caused 3,693 deaths in 1879 as compared with 4,392 in the preceding year. The table in the margin shows concisely the number of deaths caused by different forms of accidents among males and females.

	Males.	Females.
Drowning	1,106	939
Crushed under and falling from roofs, trees and walls	715	305
By lightning	14	2
Burns	214	197
Kicks from horses	34	14
Cause not stated	25	7
Other causes	97	24
Total ..	2,205	1,488

Deaths from snakebites continue to be most common in Gujranwála and Lahore.

169. From snakebites, there were 818 deaths against 752 and 832 respectively, in the two preceding years. The deaths from this cause continue to be most common in the districts of Gujránwála and Lahore.

Hydrophobia.

170. From Hydrophobia there were only 69 deaths against 85 in the preceding year. This is a considerable reduction from the figures of the preceding 5 years ending 1877 as will be seen from the subjoined statement.

Deaths registered from Hydrophobia:—

Years.	Deaths.	Years.	Deaths.
1873	... 129	1876	... 161
1874	... 173	1877	... 157
1875	... 162		

Of the above 69 deaths, the highest numbers, namely, 9 and 6 occurred in the districts of Amritsar aud Ludhiána respectively.

Deaths registered as caused by wild beasts.

171. The deaths registered as caused by wild animals were 68 as follows:—By jackals 15 by wolves 11, tigers 5, (these last all in the Rawalpindi District) bears 2, and single deaths by wild boars, leopards and alligators. From the stings of scorpions 3 deaths were registered; and of 29 deaths, the causes are not stated.

Deaths from all other causes.

172. The total number of deaths registered from "all other causes", that is to say other than cholera, small-pox, fevers, bowel complaints and injuries was 89,732 against 109,939 in the preceding year. This number includes 26,552 deaths registered from various forms of disease of the chest. The mortality from these diseases is given by months in the subjoined statement.

January	... 2,171	July	... 1,522
February	... 3,122	August	... 1,537
March	... 2,920	September	... 1,615
April	... 2,312	October	... 1,565
May	... 2,743	November	... 2,086
June	... 1,894	December	... 3,065

It will be seen that the highest mortality occurs in the cold weather months, from November to March. The month of May, however, shows also a higher rate of mortality than the succeeding months to November.

SECTION VII.

The Vaccination Report for 1879 will be prepared and submitted direct to Government by Surgeon Major J. Bennett who was officiating as Superintendent General of Vaccination up to 31st March 1880, after which date, under the orders of Government of India Notification No. 150 of 15th March 1880, the Vaccination Department was amalgamated with the Sanitary Commissioner's Office.

SECTION VIII.

No Remarks.

SECTION IX—SANITARY WORKS—CIVIL.

Sanitary Works of importance in progress during 1879.

173. The following Sanitary Works of importance in progress in the province during 1879 are extracted from a memorandum furnished to this office by the Secretary to Government, Punjab Public Works Department.

I. Delhi water works.
II. Simla „ „
III. Lahore „ „
IV. „ out fall-Sewer.
V. Amritsar city drainage.

Details of each are given below :—

I.—DELHI WATER WORKS.

The object of these works, which have been undertaken by the Municipality, is the supply of potable water to the inhabitants of Delhi city numbering by the census of 1875-76, 115,992 souls. The Municipality desire to provide a water supply at the rate of 16 gallons per head of population, but it has been pointed out that this errs on the side of liberality, and that the daily supply may, at first, be well limited to 10 gallons per head, and further that the suburbs of the city containing 44,561 souls by the census of 1875-76 may, with advantage, be included in the great boon which it is proposed to confer on the residents in the city. After numerous trials in various localities, it has been determined to obtain the supply from wells sunk above the city in an alluvial island on the Western bank of the river Jumna, the water to be raised by pumping into a high service reservoir, thence to be distributed through the city and suburbs by gravitation. Samples of the water obtained from the site finally fixed upon have been analysed by the Chemical Examiner to Government and reported by him to be "of very good quality, containing moderate saline contents, and shewing no evidence of sewage pollution." The details of the revised project are now being completed by an Engineer lent by the Punjab Government to the Municipality.

II.—SIMLA WATER WORKS.

The water works at Simla are designed for the supply of 100,000 gallons, of water daily or about 8½ gallons per head, on an average population of 12,000, which is the mean according to recent census between the maximum summer population and the minimum population in winter. This provision will be supplemented by the existing sources of supply in, and about, the station, but which in the hot months are quite inadequate of themselves to meet the requirements of the people. This scheme comprises the collection of the water from the perennial springs on the South side of the Mahasu range, about 14 miles from Simla, which after filtration is carried through iron pipes to two covered reservoirs, one at the Sanjouli Bazár on the Simla side of the tunnel on the Mahasu road, the other near the Simla Church. This latter is of sufficient capacity to hold 12½ days supply. From these reservoirs the water will be distributed in pipes over the main roads in Simla. It has been ascertained by careful guaging, that the water supply from the proposed sources in the Mahasu range does not fail even in the driest months, although it then falls short of the full daily supply, and hence the necessity for storage.

The condition of the water works at the close of 1879 was as follows:—

Head Works.—The construction of tanks, filter beds, valve wells, weirs, &c., at streams 1, 2 and 3 well advanced.

Sanjouli Reservoir.—Excavation of the reservoir completed, with the exception of the dressing of the sides and floor. A portion of the 1½ feet concrete flooring laid down in South-east corner. 30,000 cubic feet of building stones collected and 31,000 cubic feet of stone ballast broken for concrete.

Church Reservoir.—Excavation all but finished, and 1½ feet concrete flooring completed over ⅗ths of the whole area. The East main wall, side main walls for a length of about 80 feet, and three cross walls carried to a height of 11½ feet above floor level. The south main wall carried to a height of 4 feet and cross walls, numbers 4 and 5, in progress. The concrete backing of the main walls laid to 10 feet above floor level.

Pipe Work.—Of the main line piping on the road, 2½ miles remained to be laid. In Simla itself, the following lines were nearly completed—

"Choura Maidan" Line.
"Elysium" „
"Kaithu" „
"Chota Simla" „
"Katcheri" „
"Boileauganj" „

All the Stand Posts but one had been erected, and many of the aircocks fixed.

III.—LAHORE WATER WORKS.

The design of these works is to provide an adequate supply of wholesome water for household purposes to the inhabitants of the city and suburbs. The population according to census of 1875-76 was, urban 92,000, suburban 36,000 or roughly 130,000 souls. In the scheme for the water works, a supply of 10 gallons per head of population has been considered ample, and the project is capable of extension hereafter. The total supply at present arranged for is 1,500,00 gallons per diem. The water is obtained from wells sunk at a spot to the North of, and ¾ths of a mile distant from, the city near the river Ravi. The site was determined after the most careful investigation and examination by competent authorities. The water will be raised by pumping engines, and delivered into a reservoir placed on the highest point of the city and commanding every part of it and the suburbs. From this reservoir the water will be carried and distributed in iron pipes.

The condition of the work at the close of the year 1879 may be briefly described as follows :--

I. *Supply wells and junction pipes.*—Four wells built and nearly sunk to the required depth below water level. The fifth well built to 21½ and sunk to a depth of 14 feet in water. The mansonry of pump well sunk to a depth of 17 feet below water level, and the trenches for laying the connecting piping well advanced.

II. *Engine and Boiler house and Smoke Stalk.*—Foundation of the Engine beds completed and four for the foundation of the chimney stalk in progress.

III. *Reservoir in city.*—The excavation and puddle work of the reservoir completed, the concrete work well advanced.

IV. *Pipe Work.*—4,100 running feet of service pipes of 6″ diameter have been laid from the Bhati gate of the city to the lower mall road in Anarkallí. From the Lohari gate of the city along the Anarkallí Bázár to Edulji's shop 2,282 running feet of service pipes of 10″ diameter have been laid in, and 6″ pipes continued thence to the main road to Charing Cross.

IV.—OUT-FALL SEWER, LAHORE.

This very important work of the complete scheme for the sewerage of Lahore city which it is in contemplation to take up when the resources of the Municipality will admit of it, has been completed, and in use since the end of August 1879. By this sewer the sewage of the city is carried in an underground channel to a point on the river Ravi some four miles distant from the city and is there discharged.

V.—AMRITSAR CITY DRAINAGE.

This scheme for a combined drainage and sewerage is entirely in the hands of the Amritsar Municipality, and may be briefly described as a project for carrying the sewage, &c. of the city into a precipitating tank some distance from the walls, from whence it will be raised and used for sewage irrigation. The condition of the works at the close of 1879, as reported by the Secretary of the Municipal Committee, was as follows :—

Main escape channel.—The channel about one-half completed. Two out of four bridges across it finished.

Main Masonry drain round city.—The total length of the proposed drain is 10,000 feet, of which 2,720 running feet had been completed, and 5,540 running feet were in hand.

Roadway round East side of city.—4,400 running feet of this roadway were dressed and 800 running feet metalled.

Regulator.—Work on the regulator was in progress and 1,000 square feet of the bed were raised and dressed, and the arrangements for flushing the main drains from the Hasli Canal were well in hand.

Statement showing Income and Expenditure of all Municipal towns.

174. I append herewith the statement showing by districts the income and expenditure in the Municipal towns of the Province for 1879 :—

INCOME AND EXPENDITURE OF THE MUNICIPALITIES IN EACH DISTRICT OF THE PUNJAB, DURING THE YEAR 1879.

Table showing the Income and Expenditure of the Municipalities

No.	Name of Districts.	Balance from previous year.	Actual income for the year.	Total.	Expenditure on Sanitary						
					Conservancy Establishment.	Paving.	Roads and Bridges.	Drainage and sewerage.	Water-supply including clearing and repairing of wells, tanks, &c.	Widening of streets	Constructions of latrines.
1	Delhi	5,029	2,41,321	2,46,350	26,836	289	11,114	7,954	10,071	...	737
2	Gurgaon	16,917	60,581	77,498	6,206	1,327	1,219	453	1,355	...	1,001
3	Karnál	6,880	49,171	55,551	6,559	...	1,238	68	236	...	...
4	Hissar	32,892	53,537	86,429	12,538	219	2,694	500	2,085	...	50
5	Rohtak	12,557	31,205	43,762	4,689	...	3,016	...	674	...	136
6	Sirsa	25,845	54,396	80,241	3,312	...	2,468	694	1,649	...	246
7	Umballa	23,028	59,473	82,501	11,259	2,408	6,152	819	1,323	...	418
8	Ludhiána	44,854	80,083	1,24,937	12,436	2,383	4,188	986	611	...	3,960
9	Simla	34,583	1,56,634	1,91,217	20,452	...	38,127	60,325	...	...	2,002
10	Jullundur	14,021	60,432	74,453	11,644	3,153	2,392	1,070	2,221	...	207
11	Hoshiárpur	13,959	54,013	67,972	8,952	1,943	1,054	11	607	21	...
12	Kángra	6,210	15,158	21,368	1,480	965	603	21	505	..	150
13	Amritsar	1,78,852	2,19,130	3,97,982	36,196	...	20,288	51,325	3,821	...	...
14	Gurdáspur	13,007	52,834	65,841	6,865	3,584	...	745	966	...	...
15	Siálkot	5,200	43,316	48,516	4,125	1,865	7,335	239	...	...	...
16	Lahore	72,447	2,16,491	2,88,938	66,698	368	24,137	6,187	2,197	...	431
17	Gujránwála	19,208	51,768	70,976	6,541	1,583	777	1,455	289	...	...
18	Ferozepore...	18,204	49,486	67,690	4,949	...	6,139	317	2,050	...	10
19	Rawalpindi	26,426	83,344	1,09,770	12,474	667	7,056	1,472	2,267	...	20
20	Jhelum	19,877	73,461	93,338	7,273	2,519	4,816	1,328	916	...	44
21	Gujrat	3,133	19,115	22,248	4,342	199	27	88	11	...	...
22	Shahpur	17,816	40,954	58,770	4,563	1,405	690	610	515	...	...
23	Mooltan	76,377	91,729	1,68,106	14,306	8,302	23,443	745	1,226	...	...
24	Jhang	4,098	35,380	39,478	5,050	50	290	50	35	..	120
25	Montgomery	3,910	16,225	20,135	1,964	...	2	...	29	...	...
26	Muzaffargarh	5,504	17,620	23,124	2,428	540	...	59	336	...	103
27	Dera Ismail Khan	17,151	49,500	66,651	8,940	7,000	2,476	2,031	379	...	15
28	Dera Gházi Khan	12,880	44,676	57,556	7,489	1,863	1,761	862	291	...	90
29	Bannu	2,891	36,030	38,921	5,557	1,388	759	55	84	...	80
30	Peshawar	7,947	1,63,522	1,71,469	19,573	...	3,897	14,728	3,382	...	...
31	Hazára	1,800	14,293	16,093	1,897	...	264	129	183	135	...
32	Kohát	6,664	29,177	35,841	1,987	...	273	2,144	...	...	...
	Total ...	7,49,667	22,64,055	30,13,722	3,49,580	44,020	1,78,695	1,57,470	42,314	156	9,820

in each District of the Punjab during the year 1879.

Works.		Expenditure on other heads.							Remarks.
Repairs of latrines.	Total Sanitary charges.	Vaccination.	Dispensaries.	Police.	Schools.	Miscellaneous.	Total expended.	Balance unexpended.	
74	57,075	659	14,904	65,864	6,525	85,541	2,30,568	15,782	
162	11,723	...	7,722	11,005	4,408	12,048	46,906	30,592	
25	8,126	...	1,998	15,362	4,231	11,937	41,654	13,897	
278	18,364	..	5,035	15,444	2,656	5,683	47,182	39,247	
127	8,642	...	2,003	7,968	3,256	7,793	29,662	14,100	
143	8,512	...	2,923	5,518	3,506	19,323	39,782	40,459	
1,139	23,518	518	4,290	13,430	2,646	12 933	57,335	25,166	For Financial year ending 31st March 1879.
478	25,042	20	4,687	12,278	5,983	14,460	62,470	62,467	
...	1,20,906	...	747	6,618	386	33,491	1,62,148	29,069	
698	21,385	...	5,614	15,492	4,892	12,736	60,119	14,334	
368	12,956	130	3,355	10,489	2,463	16,741	46,134	21,838	
...	3,724	111	2,988	2,924	1,582	3,468	14,797	6,571	
528	1,12,158	294	27,020	40,017	6,505	61,020	2,47,014	1,50,968	
...	12,160	...	5,655	9,778	7,693	13,385	48,671	17,170	
206	13,770	120	3,919	9,691	4,495	11,009	43,004	5,512	
541	1,00,559	525	9,877	41,141	7,290	63,191	2,22,583	66,355	
6	10,651	...	3,663	10,040	4,946	14,656	43,956	27,020	
...	13,465	...	4,493	7,514	3,494	12,355	41,321	26,369	
1,641	25,597	...	9,228	12,549	3,477	22,440	73,291	36,479	
120	17,016	94	6,356	10,307	2,059	16,578	52,410	40,928	
10	4,677	...	1,592	6,130	903	4,014	17,316	4,932	
28	7,811	...	3,615	9,518	3,758	5,823	30,525	28,245	
200	48,222	...	7,291	18,993	8,941	22,038	1,05,485	62,621	
50	5,645	...	5,058	5,938	3,682	7,954	28,277	11,201	
57	2,052	...	4,318	1,903	2,731	3,764	14,768	5,367	
10	3,476	...	1,785	3,851	1,803	5,448	16,363	6,761	
220	21,061	...	7,269	7,104	3,072	18,873	57,379	9,272	
648	13,004	...	2,351	6,139	2,100	17,881	41,475	16,081	
79	8,002	29	1,693	6,651	1,977	10,619	28,971	9,950	
238	43,818	475	7,342	31,552	1,972	84,198	1,69,357	2,112	
32	2,640	...	25	3,787	302	4,590	11,344	4,749	
83	4,487	...	330	3,297	289	5,753	14,156	21,685	
8,189	7,90,244	2,975	1,69,146	4,28,292	1,14,023	6,41,743	21,46,423	8,67,299	

Sanitary progress in the Municipal towns of the Province by Districts.

175. The following is a brief history of the sanitary progress made during 1879 in the Municipal towns of the Province, epitomized from the reports received from the Deputy Commissioners :—

DELHI DISTRICT.

The Deputy Commissioner gives no details of the works executed in his district, but the income and expenditure return for Municipal towns appended to his report shows that in the Delhi Municipality, out of a total income of Rs. 2,22,161 during 1879, Rs. 10,142 was spent on "roads and bridges" Rs. 7,953 on "Drainage or Sewerage," Rs. 9,995 on "Water-supply including clearing and repair of wells, tanks, &c.," Rs. 681 on construction of latrines. The conservancy establishment cost Rs. 24,150.

GURGAON DISTRICT.

The following improvements have been executed in the municipal towns of this district during the year 1879.

Rewari.—Surface drains have been repaired and several small culverts constructed for more effectually carrying off the rain water. One covered latrine has been finished and is in operation, and arrangements have been made for erecting 4 others on the same plan for women, and 5 of a different pattern for men. Two sloping streets have been paved with flags, and the main bazár of the town is now being remetalled. A dead house has been added to the Dispensary, and enclosures have been made for storing the town refuse. Two new slaughter houses and 50 urinals in different parts of the town are under construction. The new female wards lately added to the Dispensary are now in use. All the wells were thoroughly cleaned before the rains set in, and a new one for the use of the school has been sanctioned. Some deep drains along the bazárs, leading to the Jeypur and Delhi gates, have been fenced in.

Palwal.—Excavations around the town where water formerly lodged have been filled up. Two thatched latrines in which the dry earth system will be introduced, are in course of construction.

Farukhnagar.—One covered latrine is under construction and hollow places in the town have been levelled.

Firozpur.—One new kacha latrine is being made. All the latrines of this town require to be roofed, but the ordinary income is only just sufficient to meet current expenses.

Sohna.—Four open latrines for women have been erected, and the drains which carry off the overflow of the sulphur springs, have been improved.

Nuh.—One covered latrine is being erected and some slight improvements in the drainage of the bazár have been effected.

Hodal.—A large stagnant pool, close to the town has been filled up, and a covered latrine is in course of construction.

KARNAL DISTRICT.

The list of sanitary works, says the Deputy Commissioner, is for the present year a blank. The Municipal Funds, as the income stood at the beginning of the year, were altogether inadequate to effect any improvements. A certain amount, however, has been spent in improving roads and bridges and the water-supply in the 3 principal towns of the district, as will be seen on reference to the Statement of Municipal Income and Expenditure.

HISSAR DISTRICT.

Water supply.—At Hissar all the drinking wells were repaired and cleaned out. At Hansi also the drinking wells (8 in number) were as usual cleaned out. At Bhiwani the number of wells cleaned out was 31. The Artesian well which was commenced here some years ago, and cost including all incidental charges Rs. 17,251 proved a total failure, and the work was abandoned as there was no prospect of obtaining any water.

Latrines at Bhiwani, Hansi and Rattia were as usual repaired. A new latrine was built at Hansi.

Drainage.—At Hansi the drains were repaired at a cost of Rs. 180, at Bhiwani Rs. 200, at Hissar Rs. 70, and at Fatahabad Rs. 50.

Streets.—The paved streets of the towns have been carefully attended to and repaired during the past year. At Hissar the cost was Rs. 783, at Hansi Rs. 487, at Bhiwani Rs. 1,224, at Fatahabad Rs. 200, and at Rattia Rs. 10.

A very extensive excavation near the Dák Bungalow at Hissar where rain water used to collect and stagnate has been filled up. This work was completed at a cost of Rs. 200, and is a great improvement to that locality.

On the representation of the Police from time to time, says the Deputy Commissioner, the sites of several villages have been improved through the agency of lambardárs (headmen of villages) by the removal of dung heaps, litter and other refuse to a proper distance from the dwellings. On this point however, a very great deal remains to be done, the chief difficulty in improving the sanitary condition of villages being the want of funds, without which little real progress can be made.

ROHTAK DISTRICT.

No new works have been executed beyond filling up hollows in the towns of Gohána and Beri and levelling filth holes around the fort at Rohtak, a large sum also has been spent in these towns on the construction or repairs of roads and bridges. In Kharkhowda, Rs. 169 were expended on improving the water-supply of the town and Rs. 136 on the construction of latrines.

SIRSA DISTRICT.

The drains of the town generally were repaired. A scheme for the drainage of the town, involving the construction of a drain carried to the Ghaggar some 4 miles away, is under consideration. Rs. 364 was expended in repairing 5 wells in the town and in rebuilding a wall on the east side of the Bahadura tank. Orders were issued for the filling up of all pits and hollows in the court-yards of the various houses and good progress has been made in carrying out these orders. The latrine outside the Sohuwála gate of the town is being roofed.

Fázilka.—A drain was constructed to carry off the water which used to stand near the well, known as the "Chauk Ká Kúa." The masonry tank at the Baháwalpur gate has been deepened and the other tank near it cleaned out. A well in Mehtabgunj has been repaired and a well is being made in the Okára road. Pits and hollows on the sites of private houses have been filled up, and one or two low lying lanes have been raised.

Ellenabad.—The ghat of the tank has been repaired.

In Sirsa, improvements to roads and bridges cost Rs. 1,092, and in Fazilka Rs. 464.

UMBALLA DISTRICT.

Two latrines at Jagadhri and two at Kharrar were built. Improvements to pavements and roads made at Umballa, Jagadhri, Rupar and Kharrar.

LUDHIANA DISTRICT.

Drainage.

The drainage of the town of Ludhiána has been notoriously in so defective a state, that a comprehensive and complete scheme of new drainage has been initiated under the auspices of Mr. Hammer, Civil and retired Engineer, who completed at the end of the year a scheme of new drainage which has been submitted for Government sanction.

Improvement of village sites.

The only improvement which is being introduced is the insisting on the removal of all rubbish and manure heaps, to a place appointed 200 yards from the border of the village sites.

Conservancy.

A great change has been made in the system of conservancy in the town of Ludhiána. Moveable latrines have been introduced, and all refuse is now stored in large enclosures outside the town, and its sale is expected eventually to prove a source of considerable profit to Municipal income.

SIMLA DISTRICT.

Simla District.

A brief description of the progress made in the water works of the sanitarium has already been given. With regard to other sanitary improvements may be noticed the clearing away of a considerable portion of the upper Bazár and the reconstruction of the remainder. This work is now almost completed. Lateral streets are being cut at intervals through the Bazár as opportunity offers, to act both as air shafts and as a precaution against the spread of fire. A set of cooly quarters has been erected in an un-objectionable locality, so as to relieve the present over-crowding in the Bazár near the Theatre. Old buildings are being gradually demolished to make room for better ventilated habitations. Over-crowding in certain localities is being stopped by degrees; and no new buildings or reconstructions are sanctioned without the approval of the Medical Officers who are members of the Committee.

No drainage work of any importance has been undertaken during the year. The ordinary drains of the Bazár and of the station generally have been repaired and kept in good order. The Municipal Committee, says the Deputy Commissioner, are fully alive to the fact that a comprehensive drainage system on modern principles is one of the most pressing wants of Simla at the present moment; and this they intend supplying as soon as the water works project shall have been completed in November next

JULLUNDUR DISTRICT.

Drainage.—Internal drainage works of Jullundur Station were so far commenced, that levels were taken and plans were prepared. These were approved by the Municipal Committee, and in the year ahead of us it is hoped that most of the surface drains will be flushable by water and that the use of sinks or "chobachás" will terminate. Rs. 500 were spent in clearing out a channel to the South of the town of Jullundur, but this has reference to external drainage and the conveying away of stagnant flood water. At Nakodar Rs. 180 were spent in repairs to the large drainage channel constructed in 1876.

Water-supply.—There is little to record under this head. At several places drinking wells and cattle tanks have been restored and at Jullundur the large pucca tank named "Divitál" has been restored at a cost of Rs. 6,000. Of this, the sum of Rs. 2,000 was a grant from Municipal Funds.

Latrines.—Two small pucca latrines were constructed in the town of Jullundur for the use of the public in Mohalla Sittan. Twenty more portable latrines were erected outside the town on culturable fallow land. Portable latrines have also been started at Nakodar. The people having taken very readily to these sorts of latrines.

The most important improvement in conservancy at Jullundur Station has been the carrying out of measures for inspection of interiors of houses, resulting in much better in-door cleaning than has ever been known to exist before. On the out-skirts of the town of Jullundur around and about the public offices, a garden and pleasure ground has been constructed, where before was unsightly waste.

No details have been furnished by the District Officer of the pavements laid down, but the Municipal Income and Expenditure statment shows that Rs. 3,513 were expended on the pavement of, and repairs to, streets of the Municipal towns of which Jullundur had spent 1,475 and Nakodar 696. Improvements to roads and bridges cost Rs. 1,742 in Jullundur, 549 in Nakodar and 101 in Phillour.

HOSHIARPUR DISTRICT.

The Municipal Committee of Hoshiárpur spent about Rs. 1,688 on pavements to the streets and Bazárs of their town, Rs. 949 on roads and bridges, and Rs. 350 on repairs to latrines. There was an expenditure of Rs. 200 on "paving" in the town of Una. No Sanitary works have been executed in the other Municipal towns of the District.

KANGRA DISTRICT.

The Municipalities in this district (6 in number) are extremely poor. The Deputy Commissioner has furnished no details of the sanitary works executed during the year under review, but the Municipal Income and Expenditure table shows that Kangra spent Rs. 950 on "paving," Dharmsala Rs. 185 on water-supply and 150 on construction of latrines, and Sujánpur Rs. 320 on water-supply.

AMRITSAR DISTRICT.

Amritsar.—This is the richest Municipality in the Province and has a paid Secretary. It had an income of Rs. 3,79,874 in the year under review including a balance of Rs. 1,71,333 from the previous year. Of this it spent Rs. 34,463 on conservancy, Rs. 51,325 on drainage and sewerage, Rs. 18,185 on roads and bridges, Rs. 3,821 on water-supply and Rs. 508 on repairs to latrines.

The Secretary of the Committee states in his report that the drainage project for carrying off the sewage that at present falls into the city ditch on the East, was sanctioned and commenced during the year. The improvements that will be effected by the completion of this work cannot be estimated.

For the past ten years the sewage from the houses of the most thickly populated part of the city was emptied into a swamp or well in a low-lying garden, the Akálían Bagh, and there festered and poisoned the atmosphere with noxious gases. During the year a pucca masonry aqueduct of 47 arches was constructed across the garden and through this the sewage is conveyed to the sewer that empties itself at the Bhágtanwála gate.

Another drainage and sanitary improvement which deserves special mention was commenced during the year. The conversion of the Ahluwáliá Dháb into a Park. This Dháb in years past was an immense cess-pool, and being situated near the principal trade mart in the city and the public buildings, the extent of the nuisance may be imagined; it was constantly present to the senses of those who had public or private business in that part of the city. The Committee up to the year 1875 had spent large sums of money in raising the level by earth, but this did not completely remove the evil, open kacha drains still remained through which sewage was constantly passing and being absorbed into the earth. These kacha drains are now being replaced by good pucca saucer drains that will empty into the outside main drain and be carried far beyond the city wall. Roads are being made and old houses removed. The lateral spaces between the roads will be planted with grass and trees, and the garden that was formerly used as a latrine by the populace has been purchased and thinned out to become a resort for pleasure seekers during the hot evenings of summer.

A chemical analysis of the well water of the city was made during the year by Mr. David Waldie of Calcutta; a copy of the result is appended.

Analysis of 12 Samples of Waters from Amritsar, from the Secretary of the Municipal Committee.

Number of Sample.	Total solids dried at 22° total in Gallon.	Total mineral solids in 1 Gallon.	Chloride of Sodium in 1 Gallon.	Hardness (Clark's Scale, per Gallon).		Total free and albumenied ammonia in 1,000,000, parts Wanklyn's process.	Nitrites—quantity indicated.	Nitrates quantity.	Oxygen Consumed by 1,000,000 parts Tidy's process.		Remarks.
				Total.	*Permanent.*				1 *hour.*	3 *hours.*	
I	23·5	17·6	1·75	10·9	5·2	·056	...	Considerable	·022	·037	
II	48·4	40·0	7·42	13·6	3·6	·240	Distinct	Large	·350	·404	
III	30·2	28·0	3·80	10·4	5·7	·100	Very small	Very little	·045	·051	
IV	31·6	26·6	1·05	15·7	3·3	·140	Much	Very large	·243	·352	
V	45·6	40·6	10·41	16·0	7·5	·060	Small	Considerable	...	·033	
VI	56·8	45·6	12·28	11·1	7·0	·060	Small	Considerable	·047	·055	
VII	36·4	36·4	4·79	10·4	4·5	·052	Very Small	Considerable	...	·021	
VIII	40·0	35·8	9·53	14·7	7·6	·056	Much	Considerable	·030	·053	
IX	28·0	24·6	6·66	12·2	6·3	·048	Distinct	Large	...	·056	
X	50·4	43·4	12·87	13·5	8·9	·128	Distinct	Very large	·018	·019	
XI	45·6	41·4	9·76	14·1	7·4	·032	Distinct	Very large	·031	·034	
XII	48·4	36·4	7·72	14·8	8·9	·048	Distinct	Very large	·089	·109	

(*Sd.*) DAVID WALDIE, F. C. S.
KASIPUR, CALCUTTA 28*th April*, 1879.

The principal subjects to which the Sanitary Commissioner drew attention at his visit in November 1878 were:—(*a*) The Eastern drainage project, (*b*) the Akálian Bagh. These have been reported on above. (*c*) Dust bins. An improved kind has been introduced. (*d*) Vessels for latrines and dispensary. A potter was brought from Mooltan and a supply of good glazed wares was manufactured by him. (*e*) Water analysis. This has been obtained.

In the towns of Jandiála and Tarn Táran improvements in drainage and communications have been effected after the system in force in Amritsar. Slaughter yards and public latrines have been provided.

GURDASPUR DISTIRCT.

Gurdáspur.—Repairs done to pavings and drains.

Dínanaggar.—Paving of Bairuni street; repairs to drains, streets and well.

Batála.—A new slaughter-house was built and the old one which was considered objectionable removed. This as well as the following minor sanitary improvements were effected in accordance with the suggestions made by the Sanitary Commissioner on his inspection of the town in 1878.

Circular drain to allow free passage of water constructed. Many wells were cleaned and parapets of 8 wells raised; streets of Kot Kuljus and Teligate were paved and repairs done to others.

Pathánkot.—Paving of Habil Shah's street. Repairs to streets and drains.

Dera Nanak.—Repairs to streets and drains.

Fatahgarh.—Building side drains.

Sukhu Chak.—Paving streets.

Sujánpur.—Repairs to Baoli.

SIALKOT DISTRICT.

Siálkot Town.—Cleaning out a large drain near the Lock hospital. Making a new drain in Bazár Hakim. Cleaning a drain near Bohar Gujar Singh;—making a new drain in Bazár Tiba Kakuzian. Repairs to two wells were in progress. The road through Tiba Kakuzian was remetalled, so were the roads through Hakim Burah Bazár and the grass Mundi Bazár. Pavements in several streets in the Siálkot town were repaired and put in order. These works cost Rs. 9,200, the outlay has been very large in comparison with previous years. No sanitary works beyond keeping up the usual conservancy establishment, have been carried on in the other Municipal towns.

LAHORE DISTRICT.

Lahore Municipality.—The following sanitary improvements were effected :—

Bridge on Temple road ; cistern at Bans Mundi drain, earth work and Kothas (huts) at storage sites, drain at Bans Mundi, drain near slaughter house, improving Abkari gate latrine. New latrine outside Sultan Serai, garden wall between Lohari and Shahalmi gates. Repairs were done to the city main sewers, to the paving between Lahori and Hira Mundis, to city drains and cross channels, and to the roads between Kotwali and Taksali gates. Repairs were also done to 16 different roads in the station and wire-fencing round Museum garden, slaughter-houses, bathing ghats and latrines. The Deputy Commissioner furnishes a long list of the improvements effected in the minor towns of the district, which shows that attention has been paid to the subject of sanitation, and that they have spent a very fair portion of their small income in this direction.

Major Harcourt, the Deputy Commissioner has evinced a lively interest in the matter of sanitation. I append to this Report (See Appendices. A. and B.,) his letters giving an account of the working of the conservancy system in the city and suburbs of Lahore during the year under review, as also his views on conservancy system in villages. Major Harcourt, like several other District Officers, advocates legislation for village sanitation. Whatever may be the difficulties that a District Officer has to meet with in dealing with the people in their present state of ignorance, and they are no doubt very great, I do not think, the time has yet come for enforcing sanitation in villages by law, but agree in the remarks recorded by His Honor the Lieutenant-Governor in the review of the Sanitary Report for 1878, *viz.*, " at least it is not impracticable that District Officers should take measures to secure the streets of villages being kept clean and to prevent the practice, only too common, of depositing the carcases of animals in close proximity to village walls."

GUJRANWALA DISTRICT.

Gujránwála.—Rs. 1,042 were laid out in paving streets, and Rs. 688 in improving the important city roads, besides the necessary repairs to pavements and drains, &c. But much attention was paid during the year towards improving the conservancy arrangements of the town by increasing the conservancy staff and by expending money to the extent of Rs. 1,565 in purchasing conservancy and rubbish carts, &c., from Allahabad. Under the former arrangements the filth and night soil were removed on donkeys which system was found objectionable in practice. Under the new arrangements, sites are fixed within the town for the deposit of city refuse and night soil which is again removed in the conservancy carts and deposited in the extra mural dung hills fixed outside the town limits. The introduction of urinals here and there in the town may also be regarded as an improvement.

In the minor Municipal towns no new sanitary works were executed beyond the necessary repairs to bridges and drains, &c.

Wazirabad.—Two important sanitary works are in progress in Wazirabad as regards drainage and conservancy. The one is the construction of a drain about 2,000 feet in length leading into the stream known as the Palku Nallah, and estimated to cost Rs. 9,580. This work has been in progress since 1871 and when completed will greatly benefit the town. The other is the remetalling of the main bazár at a cost of Rs. 3,260. The old pavement was much broken into holes which interrupted drainage. Another important measure of sanitary improvement also is being carried, *viz.* the removal of the Hindu burial ground from the bank of the Pulku stream.

FEROZEPORE DISTRICT.

No details of the sanitary works executed in the municipal towns of this district are given in the District Officer's report, but the Income and Expenditure return shows, that Rs. 1,233 were spent on improving water-supply in the small town of Zíra, Rs. 614 in Ferozepore, and Rs. 203 in Dharmkot. There was an expenditure of Rs. 6,023, on " Roads and bridges" in Ferozepore, and Rs. 116 in Muktsar.

RAWALPINDI DISTRICT.

The main sewer of the city of Rawalpindi was furnished with a pucca pavement for a distance of 250 yards at a cost of Rs. 2,296. It is intended to make the drain pucca to its out-fall into the Leh. This extra work has been estimated to cost another Rs. 3,112. It is hoped that the work will be advanced towards completion, by the end of the official year. Wells were cleaned during the year, 15 were repaired and their parapets were raised and copings supplied. One new well was constructed, some measures were taken to improve village sites. Villagers were instructed to deposit their cowshed refuse at a distance of 200 yards from the inhabited part, rather in a Kotha (hut) if available, or within a mud or hedge enclosure as convenient, to be ultimately used as manure for their fields. Two slaughter-houses were constructed outside the city, but sufficiently near the residence of the Assistant Surgeon to admit of his inspecting the cattle before slaughter.

The various proposals made from time to time for improving the water-supply of the Rawalpind city, were discused at a general meeting of the Committee on 7th August 1879, and set aside as eithe, impracticable or too expensive; at last an alternative plan proposed by Dr. Henderson, Civil Surgeon of obtaining water from wells to be constructed outside the city was approved by the committee with the sanction of the Commissioner, and it was proposed that 3 or 4 experimental wells at selected sites outside the city, at a distance of from one to two hundered yards from the nearest house be constructed, and the water, being raised by means of persian wheels with chain and metal buckets, be delivered through a gas pipe into a cistern, and thence drawn by means of taps. The Executive Engineer was requested to furnish a plan and estimate for the construction of these experimental wells, but he has not yet complied with it. His particular attention has, however, been drawn to the matter, now, and as soon as the requisite plan and estimate are received, the work will be taken in hand and, should the experiment succeed, more wells will be constructed.

The Maharajah's Serai, as it is called, was thoroughly repaired during the year; ventilators were provided to the latrine.

JHELUM DISTRICT.

Jhelum.—Rs. 2,903 were spent during the year on "roads and bridges," Rs. 1,278 in "drainage and sewerage," Rs. 818 on "paving," Rs. 127 on "water-supply," and Rs. 105 on "construction and repairs of latrines." In Pind Dádan Khan, Rs. 1,341 on "paving" Rs. 774 on "water-supply" Rs. 1,643 on "roads and bridges." In Tallagang Rs. 260 on paving, Rs. 270 on "road and bridges." In Chakwál Rs. 100 on paving.

GUJRAT DISTRICT.

No new works were constructed in any of the municipalities of this district during the year under report, but repairs were effected to certain drains and pavements in Gujrat.

SHAHPUR DISTRICT.

The Municipal towns in this district seem to have devoted a fair share of their income on minor sanitary works. A new drain was constructed in the town of Bhera and another at Khusháb.

Pucca stairs were added to the fourth side of the tank at Girot. Tanks and wells were repaired in the towns of Bherah, Sahiwal and Khusháb for the purpose of storing clear water. A bridge is being constructed in Khusháb. As regards paving streets, Rs. 853 was laid out in Khusháb on original works while a sum of Rs. 552 was spent in repairs of pavements in different towns.

MOOLTAN DISTRICT.

The Municipality of Mooltan paid very great attention to the sanitary improvement, of their town the total sanitary charges during the year amounted to no less than Rs. 42,819 out of a total income of Rs. 74,829 or 1,30,759 including balance from the previous year. Three of the largest lanes and 15 others, all of which are densely crowded with houses on either side were paved during the year, at a cost of Rs. 14,044, and estimates for the pavements of 22 other smaller lanes amounting to Rs. 8,165 have been sanctioned, and work has been commenced; so that by the close of the financial year a large section of the city lanes will have been paved with side drains which will doubtless be conducive of greater cleanliness. The nuisance of standing pools of water in the Kacha lanes will thus have been removed, all the side drains being connected with the large storm water drains. Almost all the wells in the city are cleaned out annually, all the latrines were repaired.

Some drains in the Jalálpur, Talamba and Dunyapur towns were repaired. In Talamba a well was repaired. In Kahror three wells were provided with cisterns and repaired at a cost of Rs. 424. In Dunyapur one well was re-dug and repaired at a cost of Rs. 250, and one was provided with a drain and cistern. In the Kahror and Jalálpur Municipalities, the Bazárs were repaired at a cost of Rs. 949, and in Shujabad and Talamba pavement was repaired at a cost of Rs. 122.

JHANG AND MONTGOMERY DISTRICTS.

No new works of a special Sanitary character were commenced in the Municipal towns of these districts.

MUZAFFARGARH DISTRICT.

Two new latrines were constructed in the municipality of Jatoi. In Muzaffargarh the floors of two latrines out side the city were dug up and new earth filled in as suggested by the Sanitary Commissioner last year. In Shahr Sultán the walls of one latrine were repaired. Some portions of the markets of Alípur, Shahr Sultán, Jatoi, Sitpur and Muzaffargarh were paved. In each street of

the town of Muzaffargarh *nands* have been placed in which the people throw their house sewage. The Deputy Commissioner states in his report, that attention is paid to drainage and when visiting towns and villages he is in the habit of continually ordering small drains to be constructed to take away surplus water. During his tours, he says, "he takes every opportunity of impressing on the people the disadvantages of overcrowding and the importance of straight and wide streets."

DERA ISMAIL KHAN DISTRICT.

The Municipalities in this district are alive to the importance of sanitary works. The Dera Ismail Khan Municipality besides the usual expenditure on conservancy, spent Rs. 5,000 on paving, Rs. 2,092 on roads and bridges, Rs. 2,031 on drainage or sewerage and Rs. 186 on water-supply. Kuláchi town spent Rs. 1,000 on paving, Rs. 384 on roads and bridges and Rs. 220 on repairs to latrines. In Leiah town there was an expenditure of Rs. 1,000 on paving and Rs. 193 on water-supply.

DERA GHAZI KHAN DISTRICT.

The sanitary works executed were some drains and repairs to bridges. Existing drains and wells were also cleaned and repaired. There was also some expenditure on "paving" and construction and repairs of latrines in the towns of Dera Gházi Khan, Rájanpur, Dájal and Jámpur.

BANNU DISTRICT.

In the Municipality of Edwardes-abad, two roads have been paved with brick, one leading from the Tahsíl to the Hawvid road, the other in the market place from the Sadr Bazár to join the Miran road. A drain has been made from the Tahsíl to Hawvid road. In the Kalabagh Municipality, a latrine for females was erected.

PESHAWAR DISTRICT.

Drainage.—Saucer drains in

1. Kissa Khanni Bazár.
2. In Muchhi Hatta.
3. In Gunj Bazár.
4. In Damma Gully.
5. In Dhuki Nawa.
6. In Bajouri Bazár.

Of the petty sanitary works executed in Pesháwar Town and in progress those noted in the margin are of some importance.

Saucer drains alone are made, except where it is found that they cannot answer and here a covered drain is avoided as much as possible. For the many surface openings in covered drains, grated windows have been arranged for, both on the score of better conservancy and economy.

Water-supply.—The Bárá water-works have not yet been finished. Until they are, it really is impossible to improve the city water-supply to any extent; as it is, however, the Pesháwar Municipal Committee has lately sanctioned and undertaken the re-construction, as an experiment, of part of the city canal. Work has begun at the Kabul gate entrance of the canal and has been carried on for about 120 yards; the main features of the work being that provision has been made on either side for channels to receive dirty water from streets and places adjoining them, thus leaving unsoiled the centre channel water, which is received from the Bárá stream, for public uses of drinking and ablution. Up to the present, this work promises to satisfy every expectation, but still to be fully useful, some filtering tanks must be made at the Kabul gate, and these will be taken in hand so soon as funds permit. The Committee has made a very good well in the Kunjpura Bazar. The water of this is said to be of good quality and the Committee has it in mind to construct wells at other suitable places.

Great attention is paid to the conservancy of the town. The patent filth carts brought into use last year are found to work well and care is taken they are periodically repainted.

Another bit of ground was bought for filth pits.

The four sets of latrines at the different gates of the town have been planted round with trees where possible. The orthodox rib used by sweepers in these places has given way to the implement suggested by the Sanitary Commissioner in his inspection report dated November 1878.

Nothing, says the Deputy Commissioner, has been done strictly speaking with regard to improvements of village sites, but a small expenditure has been incurred in levelling and cleaning up broken and unseemly ground, in filling up cess pools and in draining them.

HAZARA DISTRICT.

The District Officer has given no particulars of the minor sanitary works executed in the Municipal towns of this district.

KOHAT DISTRICT.

Kohát town.—The drainage of the Hindu ward has been completed during the year. The Deputy Commissioner has budgetted for Rs. 15,000 for the next year and proposes to submit a complete conservancy and sewerage scheme for the sanction of Government.

SECTION X.—GENERAL REMARKS AND PERSONAL PROCEEDINGS.

176. During my absence on 3 months' privilege leave from 27th April to 27th July 1879, Dr. J Fairweather, Civil Surgeon of Delhi was appointed to officiate as Sanitary Commissioner of the Punjab. In September 1879, I was again sent on special political duty to Afghanistan, under the orders of the Foreign Department of the Government of India, and was succeeded by Surgeon-Major Adam Taylor, Civil Surgeon Pesháwar, who held the appointment from the 24th September 1879 to 31st March 1880; after which date I again resumed charge. Surgeon-Major A Taylor has drawn up the cholera report for the year 1879, which I have attached under Section VI, "Chief diseases of the year;" separate copies of it having been already forwarded to Government.

Officers in charge of the office of Sanitary Commissioner during 1879.

The Sanitary inspection of towns and villages in this province during the camp season, also, was entirely performed by this officer, and a summary of the several places inspected by him is herewith annexed.

RAWALPINDI.

Inspected on the 9th and 11th October 1879.

A stable yard belonging to a horse keeper required cleaning, the earth in several places being saturated by the stalling of the horses. Several houses also were close, and ill-ventilated. The saucer-shaped gutters, made of cheap, but well burnt bricks, set in Portland cement, are believed to be the best adapted for the purpose of carrying away the filth from theprivies and yards, and are recommended in preference to any other for the system which is to be introduced into the bazár. Five lanes are already furnished with them, and the rest of the bazár will have them as quickly as they can be built; those places being selected for priority, which are most in need of them, either from their being destitute of anything, but *kucha* drains, or in which the old *pucka* ones are out of repair. Dr. Henderson, the Civil Surgeon, had constructed by way of experiment, and with a view of avoiding the stench inseparable from open sewers, a drain of the same description as these last, covered by a layer of bricks, which, on being opened, was found to contain a layer of mud about 3 inches in depth, which had been deposited in the course of a fortnight. This drain is inferior to the open sort, being unventilated and liable to become blocked by deposit; besides, the stench at the periodical openings every month, and the nuisance of cleaning out a month's accumulation, would be greater and far more dangerous, than the smell given off by the open sewers, which are always kept clean and properly flushed.

Chief Sanitary defects and suggestions.

The houses of the baboos employed as clerks in the various Government Offices, are close and unventilated. They all had an unpaved court-yard, in which, at one corner, was a latrine without any plan or contrivance for keeping it clean, and as it was morning before the carts had come round, they were found in a state best left to the imagination. In close proximity to these, was generally a well in a neglected state with a lot of putrid water stagnating round it; and as the same courtyard, but a few feet square, contained both well and latrine, the vicinity must certainly be dangerous to the purity of the water in the former. Measures are, however, being taken to remedy the evil. The privies are all to be furnished with pans and dry-earth, under penalty of their abolition if neglected. The ground round the wells is to be kept in order, and the drainage from the yard is to be taken in the new *pucka* gutters, running along the sides of the streets. In McKeson's Street, the drain which runs under Jowahir Lall's house will be necessarily closed, and taken round outside the building, there being ample room for it on the road. In Davies' Street, the drains run on both sides of the way, and are covered in by extension of the shop fronts; this being done some years ago with the permission, if not by the direction, of a former Cantonment Magistrate. The platforms on which the shopkeepers sit, and which serve for counters are directly over the sewer, and the exhalations from it, passing through the openings left at the sides and in the front of the brickwork, must poison alike, the salesman and customers, and impregnate the goods. This state of things exist all through the main streets of the bazár, and in the butchers, and provision markets. The evil consequences thereof were prominently brought to one's notice by the myriads of flies swarming over the drains and settling on the meat and sweets, &c., and must necessarily cause a direct defilement of food to a highly dangerous extent.

The bakers' shops are of the usual description. The bread which is sold to Europeans is not exposed in the shop front, and is consequently saved from the flies and dust, but the interior of the bakery is close, unventilated, and perfectly dark. It is here that the dough is mixed, kneeded, and divided into loaves, after which, no doubt, they are placed on the owner's bed, which has a grimy piece of matting over it. Dean, Brownlow, and Lytton Streets, with others, presented, in slightly different degrees, the same characteristics.

The back slums of the bazár, in which there are but dwelling houses, presented the same appearance as the Baboos' Mohulla, except that the houses were smaller and less pretentious; there being no wells in the courtyards. There are 554 registered privies belonging to private houses, and, with one or two exceptions, all in the same dirty state. It is not possible or advisable to do away with these privies, as the distance from the public places is great; and they can be kept in order, under the dry-earth system, by the sweepers, who are paid by the owners of each house which they attend. There are only two latrines, one, with 30 seats for males and 18 for females to the north-east and the other, with 48 for males and 18 for females to the north-west of the bazár; there were also some to the south, but the place was so crowded with houses that there was no room for them, and they had to be removed as a nuisance. The latrines are on the trench system, moveable screens on wheels being placed over the trenches, which were covered in when used up, and the screens moved on to fresh ones dug as required. They were in fair working order, but the frame work of the screens was in some cases out of repair. It is suggested that permanent latrines on the dry-earth system would be better if properly managed, especially when space is so limited, as here; and the poudrette would be saleable as valuable manure; that if the dry-earth system can be introduced into the privies, there can be no objection to the whole stuff being collected into walled enclosures and stored there till sold for manure. The poudrette from the latrines would not be offensive, and if proper situation be selected for the godowns, they would be of less nuisance than the heaps of refuse and irregular filth now used. The Cantonment Magistrate suggests that there should be a larger conservancy establishment, both of men and carts, for the bazár. The Sanitary Commissioner is likewise of the same opinion, and believes the carts to be certainly objectionable, as they must scatter their contents about, as they go, being full of holes. Proper conservancy carts are much needed in an adequate number.

With regard to the crowding of the bazár, Dr. Henderson's plan of increasing the space by not permitting houses which fall into disrepair to be re-occupied or repaired, is approved of by his Excellency the Commander-in-Chief; but unless the sites are cleared and kept clean, the abandoned ruins will become nuisances as receptacles of filth, and unless the bazár be allowed to spread laterally, for which there is no space, the rest of it will become utterly jammed and quite inadequate to give accommodation to the ejected tenants. It is stated that unless the Government is prepared to assist the Cantonment Committee, by a very large grant to enable them to block and fill up the drain in the principal streets, and to build another round and outside the shops in the bazár, the state of the case will only admit of the palliative process of keeping the drains as clean and inoffensive, as a proper conservancy establishment, under strict supervision, can make them. It is suggested that the bakeries should also be inspected at short intervals, and their kitchens kept clean and well ventilated. Unless a proper meat, fish, vegetable, and sweetmeat market is established, the Sanitary Commissioner does not see how the provisions can be kept untainted by flies or dust, the glass sashes of European shops being beyond the reach of natives. Thus the evils, arising from the primary constructions of all bazárs, have been perpetuated and multiplied by crowding into a limited space, under no or very insufficient hygienic rules, a careless, dirty, intensely ignorant and poor population, the result of which is squalor, filth and disease.

The people of Mahrir ascribed the unhealthiness of their village to swamps formed by the drainage being upheld by the Railway embankment. There is a large swamp, or rather an irregularly shaped pond above the village, and some smaller, nearly dry pools below it. These swamps are objectionable and unsightly. The village is now under the charge of the Cantonment Police.

The Leh river was low and sluggish. Its bed was occupied by bathers and *dhobies*; besides several people were seen filling their water utensils among and below the watermen. If the *dhobies* be allowed to contaminate the water by washing in it clothes, empoisoned by having been worn by patients suffering from cholera, fever, and various other diseases, the danger of an outbreak of epidemic sickness is imminent. It is suggested that no washing ought to be permitted in the river on any pretext, until it has well passed the town.

Springs of fresh water may be seen in various places oozing from the banks of the river Leh, and it is by tapping these at a spot a short distance from the city, that it is proposed as one of the remedial measures for the present evil, to procure the supply which is to be artificially brought into the town; and as the quantity is sufficient, the quality pure, and the supply inexhaustible, no objection is raised to it. Dr. Henderson has another project of digging wells near the city, but the Sanitary Commissioner thinks that the former idea is the better one, for one reason alone, and that is, that the springs being furnished from reservoirs distant in the hills, are quite out of danger of contamination; and though the same reservoirs supply probably the whole area, the nearer the city the wells are placed, the greater is the chance of their being polluted by drainage, especially, if the spring water passes nearer under the city before it gets to the situation of the wells. Something, therefore, should be done at once, as the earth of the town is impregnated with sewage, and the water perforce contains the salts of the fluids, urine, &c., poured into it day and night. It is a wonder that every well is not so saturated with saline matter as to be unusable from its hardness.

The money expended on supplying filters would be wasted, especially as they are not able to purify brackish water. It is suggested, therefore, that some project be set on foot of bringing in pure water, wheresoever it might be obtained, by means of aqueducts or pipes, and that it be carried out as soon as possible. There, however, would be no harm in making one filter after Dr. Bellew's plan, at a cost of about Rs. 200 as an experiment, especially if there be great necessary delay in working any

scheme of bringing the water supply from outside; but on the distinct understanding that the construction of the filter is not to delay for a day, the carrying out of any sanctioned plan of water supply from outside. The gutters round the platforms of the town wells, were in some instances choked with mud. It is suggested that they should be cleaned and washed daily.

One Serái. belonging to the Maharajah of Kashmir, was visited, the privy in it was a closed room with no appliances whatever for removing the *excreta*, or protecting the soil.

Health.

In the bazár there had been a considerable amount of slight fever, which was declared to have attacked about half the population, but did not last for more than 3 or 4 days. Fifty children were examined, out of which five were found to have had enlarged spleen, but in none was the disease of any great degree. The bazár was infinitely the healthiest place of all; the Regimental bazár came next, and the villages by far the worst. In these latter, almost every child was found to have an enlarged spleen; and the accounts were, that the fever, evidently ordinary intermittent or remittent, had been prevalent to a great extent and very severe, save in one village named Mahur.

About the barracks, lines, bazárs, &c., of the 10th Hissars and D 4 R. A., the men's surroundings were found in a very unhealthy condition. People were found suffering to an intense degree, from the effects of the so called miasmatic fever. The Sanitary Commissioner states, that he has never seen, during the whole term of his service in India, any body of men with the stamp of malarial cachexia, so unmistakeably impressed upon them; the pale chloritic complexion, white lips and eyelids, feeble bearing, listless and languid expressions, bore evidence to the extent to which they had been prostrated.

In the village of Mahrir, there had been a great deal of sickness during the last two or three months, and about 14 or 16 deaths. There was a great prevalence of spleen disease; about 80 per cent. of the children being affected.

In the village of Khannah, the amount of fever and spleen disease was exceptionably high, but no deaths occurred.

In the town of Rawalpindi there had been cholera, and typhoid fever is raging at the present moment. This outbreak is owing to the unhealthiness of the Leh water, which is used by *dhobies* for washing.

There had been a great deal of intermittent fever during the past few weeks, and enlarged spleens were very common, so much so, that the Sanitary Commissioner examined ten children before he found one without ague-cake. Dr. Henderson states, that typhoid fever was prevailing, but very slightly among the well-to-do classes. The inhabitants state, that the above sickness was chiefly owing to the excessive crops of maize and millet, as the fever had much diminished since they had been cut down.

Fever was very prevalent and enormously fatal throughout the whole of the district.

Registration of vital statistics.

Satisfactory.

JHELUM

Inspected on the 3rd November 1879.

Chief sanitary defects and suggestions.

Outside the corner of the jail garden, a latrine, which had been built for the police, although not much used, had not been cleaned for weeks, and was found in a disgusting state. It was ordered to be knocked down and levelled.

The latrines of the city were found in a very bad state, being built of *kucha* materials. Orders however, were given to the conservancy Darogah, to furnish proper pans, and have them used with dry-earth. Outside the *Mohulla Jadid*, a large *pucka* latrine was found in an offensive state, being furnished with urinal pans, but none for the solid matter, which was accumulated in a heap under the seat. The latrine is on a bad plan, and it is therefore recommended to have a *kucha* one in the mean time as it can be dispensed with. The dry-earth system should be strictly enforced and proper *gumlahs* in sufficient number provided.

All the filth from the city is thrown into a broken piece of ground called "the chupper" where it is burnt. The place is very offensive, and the plan objectionable. If an establishment can be managed and as a large one is not required, the expense would not be great. It is therefore suggested, that the filth be either buried in trenches of the proper width and breadth (*viz.* 1 foot), or stored into godowns provided with a mud wall for use as manure. Captain Hutchinson states, that the people cannot be induced to remove it, even as a gift, to their fields and gardens; but nevertheless the experiment should be tried. The privies in the town are all on the tops of the houses or in the courtyards; and it is suggested that they should be furnished with gumlahs and dry-earth, on pain of their being disallowed, if neglected. In the different drains, man-holes exist, closed by wooden shutters. The Sanitary Commissioner states, that more are required, and that they should be furnished with lattice covers of thick wood, so that the air may keep inside the drains and ventilate them.

The well in the Mundi should have its mouth protected by a two-feet wall, with props and pullies. The groove at the end of the platform also wants some slight repair.

The Municipality is strongly recommended to take into consideration the idea of storing and utilizing the manure from the city, and is advised to purchase a proper number of oenservancy and Crawley carts, to carry away the filth which has been burned and buried.

The fort, a small quadrilateral building, was found in a very filthy state. It is utterly unprovided with drains, excepting a small *pucka* one, which takes the surface water from a portion of the area, and allows it to run out into the ground opposite the gate. This drain was in a very offensive state, being filled with putrid stinking water, and the pool which had been formed by its flow outside the gate, was a large slough made by the churning up of this water with mud, by the carts and animals that were constantly moving along in the central part of the military camp. The fort well was very much used. It was directed to be discontinued, until a proper platform with a receptacle for the waste water, which used to accumulate in the drains, could be furnished. Inside and to the left of the gate, a space was much defiled by the natives, who used the spot as a place for throwing down their cooking water. The drainage from this had flowed through a small opening in the wall, making a black stinking puddle outside. The Sanitary Commissioner directed that no cooking should be allowed, and that no water should be thrown about, and that the pool should be dried and covered with earth. The well out-side the fort contains water perfectly thick with mud and utterly unfit for use. Natives in large numbers were drawing from it during the Sanitary Commissioner's visit. It must be closed, and every endeavour made to repair the fort well as soon as possible, as the water from it is very good and sweet and, moreover, the sanitary condition of the well, being under the eye of the guard, can be secured; whereas, in the outside well, whose bottom is only 8 or 10 inches below the surface of the water, mud, &c., is constantly being stored up by the buckets of the drawers. A good supply of water may be obtained by deepening the well a few feet.

A latrine, made of unburnt bricks, under the railway near the cantonment side, was found in a very filthy and most dangerously offensive condition. The compartments had no earth in them, nor any pans, but a pot for the urine. The floors were saturated with liquid and covered with solid excrement, with no attempt whatever at covering it with earth. One compartment was filled up with solid fœcal matter to the very top, this being the only attempt at collecting the ordure.

Health. Not Satisfactory.

Vaccination. Fairly popular.

LUDHIANA.

Inspected on the 14*th*, 15*th and* 16*th November* 1879.

Chief sanitary defects and suggestions.

There is always a great flow of dirty water down the main out-fall sewer of the city, which runs into a large swamp in the vicinity of the town, and which is sufficient to pollute the water and render it dangerous. The swamp is a great source of disease to the inhabitants of the town, and the residents of the Civil Station, which overhangs the marshy plain, and which is yearly covered by the flood-water of the Sutlej. During the season when the river is full, nothing offensive is smelt, but directly it goes down, the stench from the sewage matter becomes excessively strong and brings about a great deal of sickness.

The drainage of the town is in a very bad state, there being no attempts made to remedy the arising evils.

The system of paying the Zamindárs for carrying away the filth is wasteful and to a certain extent unsatisfactory and uncertain. It is strongly recommended that the plan now in practice at Amritsar be introduced.

Garbage boxes of Delhi pattern should be provided for streets, dwellings, quarters and latrines

In all the bazárs, only one street was found to have been much encroached on by the shopkeepers, who had their counters directly over open drains, a potent way of poisoning their customers and the surest way of propagating various diseases.

The public latrines which are all on a new plan, were very dirty, especially the bars on which the feet are rested. They should be cleaned daily, either in the morning or evening. It is suggested, owing to scarcity of ground which renders the trench system impracticable, that pans be furnished; filth boxes and sewage carts should also be provided of which, if there are enough, one should always be on the spot, for the immediate reception of the filth. The stench from the deposit of the filth, which was scraped up and thrown into holes, where it lay insufficiently covered with earth, was very great. To remedy this, all the refuse should be taken to the manure godowns, and sufficient dry earth used in the latrines. Many private latrines were filthy and neglected. A register should, therefore, be kept of all private latrines, which should be looked at occasionally and cleanliness enforced. *Gumlahs* should be furnished to all. It is chiefly to the privies that the soil contamination and deterioration of the water is due, and nothing can be more disgusting or dangerous than these places with their floors reeking, with a stinking paste of excrement, urine and mud.

The platforms of the slaughter-houses should be paved with slate, which should also be used for the counters of the shops ; a great improvement in the condition of all would thereby be effected. The mud counters covered with dirty mats or filthy planks of wood, are anything but likely to preserve the meat. The Sanitary Commissioner recommends that iron buckets be sunk into the ground to receive the blood, &c., which can be removed daily, and thrown on the manure in the godowns, and well covered with earth. The blood from the goat and sheep slaughter-house is taken from the reservoirs, and thrown on a field close by, but it is not covered with earth or kept clean, and in hot close weather it must be a pestilential nuisance. Care should therefore be taken to cover up the blood immediately after it is deposited in the fields.

The wells in the town, as well as the cisterns and gutters, were foul. The platforms were broken and in ruins, and the ground was in nearly every case trodden into pools of black sludge round them. The tubes seemed to be sound, but most of them were very old and should be looked to, as in a town like Ludhiána, with no proper or adequate drainage, if the shafts be imperfect, subsoil drainage is certain to find its way into them. It is suggested that all the good wells in the town of Ludhiána be furnished with platform sloping away from their mouths to a gutter at the circumference, which should lead into a cistern to be emptied daily. A rim round the mouth should be built high enough to prevent drippings, from the feet of the drawers running back into the wells. Props and pullies should also be furnished in sufficient numbers for the strings and ropes of the drawers who frequent each particular well.

The latrine arrangements in the public seráis were found to be most faulty. The privies were in the highest state of filth and neglect, without pans, dry-earth, or any attempt at keeping them clean. In two of them, namely, Kanhya Lal's and Balhara seráis was a *kucha* drain leading into a hole in the ground outside, which was full of the most highly condensed liquid putridity.

In Kanhya Lal's, was found a large muck heap, the accumulation of years ; and in another, Nawab Ali Mohammed Khan's, a hollow in the ground was the receptacle of all the dung sweepings, and ordure of the latrines. These should be inspected daily, and the cleanliness and conservancy should be carefully attended to.

It is said that a plan for the proper draining of the city and Buda Nullah, in connection with a water-supply from the Sirhind Canal, is being drawn up and discussed.

The Deputy Commissioner is very anxious to have the Civil Station moved about a mile further back from the Buda Nallah, to a higher and drier situation, where pure well water is obtainable, and the air uncontaminated with the exhalations from the marsh in the Khadir of the Sutlej, or miasma from the land saturated with the water of the slow stream of the Buda Nallah, and the annual flooding of the river, and poisoned by the influx of the city sewage.

Health. Ludhiána is comparatively healthy, though malarial fever has been rather rife. Nearly half of the children were found to have spleen disease.

Registration of vital statistics. Correctly and properly kept.

UMBALLA.

Inspected on the 16*th*, 17*th and* 18*th November* 1879.

Chief sanitary defects and suggestions. Some of the wells which contain water have but a few inches of it, and that at a distance of 50 or 60 feet from the surface. The labor of drawing up water by half buckets full is very great. The wells seen by the Sanitary Commissioner had a crowd of men and women round them ; their bottoms were only half covered with water, sand appearing in half the area. Attempts have been made to increase the supply of water in these wells by deepening them, but the labour is of no avail, as the water-bearing *stratum* is a very thin one, and if this is pierced through, the water from it disappears altogether.

It is suggested that all the street sweepings and the latrine poudrette, together with the blood and garbage of the slaughter-houses be collected into godowns, as is done at Amritsar, and sold. In a town like Umballa, which is the centre of a large area of market gardens, which furnish vegetables, not only to the Station and Military Cantonment, but also to Simla, Kasauli, and other adjacent hill stations, manure must be most valuable, and its sale would without doubt bring a considerable addition to the income of the Municipality.

The wells at the sides of the large *pucka* tank of Naurang Rai are much indented on for water by the Hindús ; but there are only a few inches of fluid in them. The water of the tank was turbid and covered with a green scum. It is largely used by the people, the supply from the wells being very short.

The Sukul Kund pond is a large irregular shaped pit, dug out by the brick-makers, whose kilns are on the edge of it. The portion of the excavation kept separate from the main part by a bank of earth, where hemp, &c., is soaked, must be a great nuisance, while the water of both portions must be polluted by the rain water draining from the kilns, the fuel of which consists of the sweepings of the town.

No preparations whatever are being made to enclose the Hindú cremation ground.

In the Abkari, it was found that the lees escaped by a hole in the wall, and formed a black stagnant puddle of some feet in circumference. A *pucka* drain and cistern is necessary, instead of the *kucha* ones which are at present very dirty.

Health. — Fair, fever diminishing rapidly.

Registration of vital statistics. — Well and carefully kept, though deaths number 1,101 and births only 697.

Vaccination. — Successfully carried on.

SHAHABAD TOWN.—(UMBALLA DISTRICT.)

Inspected on the 18*th November* 1879.

Chief sanitary defects and suggestions. — The only means for the removal of the liquid sewage was by 4 *pakhals*, which were carried by buffalo calves. Many of the street drains, which were in the centre of the roadways, were choked with dirt and mud, and required to be thoroughly cleaned. The sewage from the houses ran in black stinking puddles into them. They were broken and irregular and served only for the accumulation of various and numerous pools, collections of fluid, offensive to the highest degree. The latrine is not improved since Dr. Bellew saw it. It was found to be in a very dirty and offensive state. Almost all the houses have in their court-yards private latrines, which were in an extremely filthy and neglected state. The owners are recommended to use pans and dry-earth, but their excuse is, if they did, the sweepers would not clean them. All the wells are in a ruined state, the earth round them being sloppy, black and stinking. One, in the centre of a Muhammadan burial ground, outside the town, from which a person was drawing water at the time of inspection, was in a very bad state; its water was actually putrid and gave out sulphuretted hydrogen to a nausiating degree. The well should certainly be closed. The ponds round the town are in a filthy state; some that are drying up are highly dangerous.

Health. — Intermittent and remittent fever raging and of a fatal type.

Registration of vital statistics. — Fairly kept, although the deaths number more than the births.

Vaccination. — Satisfactory.

JAGADHRI TOWN.—(UMBALLA DISTRICT.)

Inspected on the 21*st November* 1879.

Chief sanitary defects and suggestions. — Round the town there are a great number of shallow pools into which the city sewers run, and in which hemp is usually soaked. The water is befouled by the heaps of manure piled up along their edges, from which rain water must wash a quantity of filth into them, and from the latrines which are very close at hand. The two or three *pucka* tanks which are used for washing and bathing purposes, though protected from sewage defilements and hemp soaking, were found in a bad state, the water being green, thick and stagnant. They are all filled by surface drainage. In the bazár, the brick pavements of the streets are all broken up and irregular.

In the by-streets the drains are very dirty being accumulated with filth. The *kutcha* drains are cleaned, but the filth is piled up on their sides without being removed. The latrines are seated with "*pucka chulas*," are unroofed, have no post or pans, or any dry-earth arrangements. These, though hardly ever used, are very dirty and hardly ever cleaned, the gardens, fields and ditches near the town being resorted to by the people in preference. There is no conservancy system. The filth, sweepings, &c., are carried out by the sweepers or Zamindárs, and piled up in irregular heaps all round the town, where it lies for sometime before it is used, and is worth to the sweepers about 4 or 6 annas a load, if purchased by the cultivators. The Members of the Municipality were asked to collect it into godowns and sell it for themselves, but the expense of the establishment and the fear of interfering with existing rights, seemed to prevent any attempt at such a proceeding. The houses are close, unventilated, and dirty, with slushy uncared-for latrines in their court-yards, and cattle occasionally in the dwellings.

Health. — Fever raging, and spleen disease very common. Small-pox also is said to be prevailing.

Registration of vital statistics. — There was a great confusion regarding the numbers in the register of deaths, as the certificate cheques did not always correspond with the entries in the register. The birth registers and cheques were all right.

Vaccination. — Successfully carried out.

RADHAUR TOWN.—(UMBALLA DISTRICT.)

Inspected on the 23*rd November* 1879.

Chief sanitary defects and suggestions.

The houses are usually small, close, ill-ventilated and dirty, with cattle in the dwelling rooms, and the earthen floors soaked with urine and liquid filth. There are no public latrines or any system of conservancy whatever. The sweepers collect the refuse and pile it up just where they find it most convenient.

Health.

Fever which proved fatal was raging, but was disappearing during the Sanitary Commissioner's visit.

Registration of vital statistics.

Well kept.

Vaccination.

Fairly popular.

KARNAL.

Inspected on the 25*th and* 26*th November* 1879.

Chief sanitary defects and suggestions.

The central gutters which are paved with brick, are very much broken and very irregular, allowing the formation of pits and puddles in which the sewage lies stagnant and putrid. Owing to their being a good deal more fluid in the drains than is usual in towns in the province, the streets and *koochas* are usually filthy. The liquid from the houses running across the roadway to the central sewer, gets stirred up, and splashed about by the passing traffic. The water which runs down the *Gundanalla* ditch, the main channel of escape for sewage from the town, was found to increase as it got gradually away from the city, being about 2 or 3 feet deep, where it terminated in a pond some 10 or 12 feet across. From this pond the liquid was baled out into a water-course of a somewhat higher level, along which it flowed for some distance, until it met the bank of the Rajbaha into which it was again baled. When the Rajbaha is full, the sewage mixes with the irrigation water and is spread diluted over the fields; but when the Rajbaha is low, it runs back and so into the canal itself, polluting its water to an extent which must be dangerous, especially at the time of this occurrence, when there is but a scanty supply of canal water for its dilution. The Sanitary Commissioner recommends that strict orders be given not to empty the cesspools into the Rajbaha, except at such times when the canal water is flowing through the fields, and when the admixture of sewage will only occur in water presently to be expended in irrigation, and where its presence will be rather an advantage than a danger or a nuisance. The only fault found with the manure heaps is, that the ordure is not covered by earth or any other envelope. It would be better if the Municipal Committee were to monopolize the manure, and make their own arrangements for the collection, storing, and disposal of the filth; but it has been found very difficult to do so, without going to an expense, that is beyond the means of the town, and infringing what the people imagine to be their own rights. The Deputy Commissioner states, that the best place for the removal of the manure is to the west of the Sadr Bazár. The slaughter-yard is in a very bad state. It should certainly be condemned, and another built. Most of the animals are slaughtered on the bare ground, where holes and trenches are dug for the blood; the whole place being filthy and offensive to the highest degree.

There are six latrines; one *pucka* one was fairly clean, the ground though in its immediate vicinity was apparently far more frequented by people for relieving themselves than the privies, and was exceedingly filthy. The five mud latrines have thatched roofs, and are in a most neglected state, being broken down and very filthy, some exceedingly so, reflecting great discredit on the members of the Municipal Committee, under whose care they are supposed to be. A new place is to be furnished with iron pans and an iron cistern for the urine. The Sanitary Commissioner recommends its construction experimentally; but the iron should be protected, so as to last a long time, by coal tar, or some such covering from the corrosive action of the urine. Care should be taken that the sweepers use a sufficiency of earth. There are no latrines set apart for special use of females; they all are for indiscriminate use of both sexes. There are a great many private latrines, all filthy and offensive. The Sanitary Commissioner recommends that a register be kept of all privies attached to private houses, and that it be made compulsory on owners to keep them clean, dry, and furnished with proper pans and dry-earth, on penalty of their being disallowed. They should be frequently inspected. The above rule should also apply to the places on the tops of the houses, which were equally filthy. The houses are all close, ill-ventilated, and filthy. There are 16,000 cattle stalled in Karnál, every night at least, and all, or nearly all, are under the same roof as their owners, if not actually in the same rooms. The close pungent air of these dwellings even at the time of the Sanitary Commissioner's inspection after the doors had been open for sometime, made one wonder that all the creatures confined in them during the night did not die of asphyxia. The urine of the cattle partly goes into the sewage continually running out of the city, but by far the greater part must soak into the ground—all the floors being of mud, and very sloppy mud too—with the very poorest attempt at carrying off the drainage. The poudrette from the Jail latrines was buried in large pits, in a piece of waste jungle ground *beyond* the garden, instead of the usual trenches *in* the garden.

Health.

Fever raging. The disease being simple intermittent or remittent fever. A great prevalence of spleen disease.

Registration of vital statistics.

Well and correctly kept.

DELHI.

Inspected on the 8th, 9th, 10th, 11th, 12th and 13th; December 1879.

Chief sanitary defects and suggestions.

There has been no improvement made in the city, the lanes and streets of the mohullah quarters being in the same very filthy and unwholesome condition as they were last year. The scavengering of the city is also on the same irregular and worthless system. The state of the by-streets and courts, between the Farash Khana and Lahore gates, is simply a disgrace to the Municipality, and evinces a neglect of the interests of their fellow citizens, which was not to be expected from the members of the Municipal Committee. The sweepers collect the manure and store it away until it becomes profitable for them to sell it. The Deputy Commissioner has a project for subsidizing these sweepers by the payment to each, of a monthly allowance of a rupee or so, taking from them in return the manure and storing it for the Municipal profit, as by getting the men into the pay of the Municipality, some hold could be got over them, and some penalty in the shape of cutting their pay enforced in cases of neglect of duty, it being found practically impossible to punish them now through the Honorary Magistrates. The experiment is worth trying, but its success is doubted by the Sanitary Commissioner, as the men are most independent and undisciplined, and value their privileges too highly to sell them, except at an exorbitant rate. The urinals described by the Sanitary Commissioner were not appreciated by the people, as the earth of the lanes was streaked everywhere with streams of urine, even in close proximity to the urinals, which did not appear to be extensively used. The latrines outside the city are made of mat screens, and are not furnished with pans or dry earth, and are not often moved. They are consequently dirty and offensive, and the ground on which they are placed is saturated with filth, while there was a considerable deposit of ordure freshly left, all round about the privies, by the people, who preferred to relieve themselves outside, rather than go inside where they would find comfort, cleanliness, and privacy. The mohulla latrines had seats usually made with a couple of flat stones, but the ground was utterly unprotected from the filth, deposited in them, which, in a fluid state, soaked into the soil, or escaped on to the surface of the adjoining street by a hole in the mud wall. It is believed that there must be a thousand of these; more than 500 have been counted.

Similar to these are the private latrines which exist in the court-yards of all the smaller one-floor houses, and which, by the filth, which lies in them, and which is allowed to escape from them on to the roads, are as offensive and pestilential as the others above described. The privies of both sorts should, if possible, be done away with, and in their stead should be supplied, the covered public latrines. They are built on a very good plan, the chief objection to which is, that they are too elaborate and too costly. Two new latrines are being built inside the Mori gate. It is recommended that the arches to them be done away with, a sloping roof of tiles to be supported on brick pillars, the paces between these to be left open, the employment of blocks of stones for the seats instead of bricks and mortar, and the flooring of the compartments and gutters with slabs of stones; the little drain under the seats to be done away with, the floor being drained by its own slope.

Conservancy is the subject which requires most urgently primary attention in Delhi, even before the drainage and water schemes, badly as these, especially the former, are needed. No one can imagine, unless they have seen them, the intensely filthy and offensive conditions of the mohullas; and when it is remembered that for hundreds of years this state of things has existed, from thousands of points the soil of the city has been subjected, without any attempt, even the faintest, to protect it from the soakage of constantly and permanently standing pools of the vilest and most poisonous of liquids, human excreta, in every stage of fermentation and putrefaction, no one can wonder at the contamination of the water in all the city wells, the pollution of the ground on which the city stands, and the air in which it is enveloped, to a pitch deleterious to health and even destructive of life, especially, as is the case in Delhi, of infantile life.

It is suggested that if a market for the manure and sweepings be readily found, such as the godowns used at Amritsar and Lahore, it would be far more convenient for the disposal of the manure than it is at present.

The sanitary condition of the privies of the two-storied houses have been before described. Mr. Devon had a plan in his drainage scheme, of building water closets to the houses to shoot into the sewers, so as to remedy the evils, which the Sanitary Commissioner thinks might answer.

Some of the wells have been sweetened by allowing the canal water to run into them. This plan though of great temporary benefit, is not to be thought of in supercession of the water-work scheme, as the canal is subject to the admixture of great impurities and in time of epidemic diseases, such as cholera, dysentery, and typhoid fever, might prove a means of spreading the germ of these diseases. Indeed, as it is, the stream of the canal is subject to dangerous contamination, for above the city it receives not only the surface drainage of the Pehari, but also the sewage of all the houses in Telewara and the Sadr Bazár, that are on its banks.

The Municipality is bound to see to this, and to provide means of protecting the canal against contamination by sewage, and not only this, but they should stringently prohibit bathing or washing in its water; and prevent, at least as long as it is used, as a most valuable adjunct to their water supply, the disgusting defilement caused by the presence in it of dead bodies of men or animals, as is not unfrequently the case.

The pavement of the slaughter houses should be furnished with slightly raised margins, so that, if any animal is slaughtered near the edge, the blood cannot run off and stain and foul the ground.

Health. Intermittent and remittent fevers raging, and great prevalence of sores called ulcers, which are evidently caused through weakness, and insufficient food.

Inspection of the towns and villages from Delhi to Palwal along the Muttra Road inspected from 14th to 18th December 1879.

Buddeepore.—Fever raging, and great prevalence of spleen disease.

Faridabad.—There was great prevalence of fever which was generally succeeded by dysentery and diarrhœa.

The latrines here are simply square enclosures with mud walls and have no seats or pans.

The slaughter yards are unpaved enclosures just outside the town. They were very offensive and unclean. It is recommended that they be placed in some situation where they will not give offence to the religious feelings of any of the inhabitants.

Ballabgarh—This town has extensive tanks about it in the rainy season, those to the south and west when flooded, block up the roads, and no traffic can be carried on. The Tehsíldár informed the Sanitary Commissioner, that levels had been taken with a view of draining the country, but that no line had been discovered low enough to take off the water.

Fever was raging and there was a great prevalence of spleen disease.

Sirkee (village).—There were some very extensive swamps round the place, the soil being very damp and the spring level on the surface.

Mehrowlee (Delhi district).—This place is in a very bad condition, and the Sanitary Commissioner states, that during his inspection tour, he never saw a village more filthy or neglected. The lanes and *coochas* are the places of deposit of all the ordure and sweepings of the town; in some, one side is quite blocked with heaps of ashes, refuse and garbage. The people ease themselves all over the place, among the houses, in the streets, on the hills, and in the jungle round about; any where in fact except in the two latrines, which, however, are only intended for women, and are evidently never used at all by them. The people are loud and noisy in their complaints against the filthiness of the place. They were however especially vociferous in decrying the filth of their town, the badness of the conservancy arrangements and especially of the idleness and neglect of the sweepers. The Sanitary Commissioner states that he never saw filth in so great profusion or in such a disgusting condition. One place near the *chumars'* quarters was horrible; and just below this was a ravine leading down to a favorite drinking well. The Sanitary Commissioner considers the place a nuisance and a highly dangerous one to boot. There is a large swamp formed close under the village in the rains, but during the Sanitary Commissioner's inspection it was nearly dry. The black mud during the process of evaporation must be a prolific source of disease. The Sanitary Commissioner thinks that this place could be easily drained and its site cultivated.

All the wells are badly kept, the ground round them being a filthy putrid puddle.

There had been a great deal of sickness during the year; the greater number of deaths being caused through fever of an intermittent type. Spleen disease was also prevalent.

GURGAON.

Inspected on the 19th December 1879.

Chief sanitary defects and suggestions. The filth from the latrines was stored in proper godowns, but the people would not use it as manure for their fields. In former years there was a large bund built in front of the Deputy Commissioner's house, which held up the flood-water of the Badshahi Nuddi, and fertilized the land between the station and the village of Jharsa, but in 1875 or 1876 this was broken through by the flood, and as—in the opinion of the civil and medical officers—this flooding was productive of sickness, the breach was never repaired.

Health. The description given by the inhabitants of the fever which had been prevalent was, that it began as quotidían ague; that it was obstinate persistent, returning again and again, and generally accompanied by dysentery and diarrhœa, which was frequently fatal. Several cases were seen by the Sanitary Commissioner, which confirmed this account, and the Assistant Surgeon in a report which he wrote of the epidemic states, that the fever was only malarial or intermittent. One account given by the natives was, that the disease was particularly fatal to pregnant women, carrying them off after producing miscarriage or premature confinement of a dead infant, and that this was so frequent that the returns of births had been greatly reduced by it.

Village Jharsa (Gurgoan District).—This village is about a mile and a half from the civil station of Gurgaon, and is on the drainage line of the so called Badshahi Nuddi which floods the country round in the monsoons. The soil is light, and the spring level in the wells 38 feet below the surface, and the place is in the usual insanitary state common to all villages of the Punjab.

The cause of death was fever, either killing in a short time with coma, or becoming chronic and terminating in fatal diarrhœa or dysentry. Spleen disease was found in 50 per cent. of the children examined, and tertian or quartan fever was prevalent at the time of the Sanitary Commissioner's visit.

REWARI TOWN.—(GURGAON DISTRICT.)

Inspected on the 20th December 1879.

Chief sanitary defects and suggestions.

The insufficient drainage causing accumulation of water both in, and outside the town, and emanations from putrified organic matters contained in the earth under water, was in the opinion of the Sanitary Commissioner, the chief cause which propagated the malarious fevers to the extent of an epidemic in the town.

The godown in which the filth is thrown from the latrines is very badly kept, and the manure is not all inside the walls, but just thrown on the top or sides as the idleness of the sweepers prompt them. The place on the whole reflects great discredit on the Assistant Surgeon, and shews that he neglects the work for which he gets a very fair salary.

Some 50 earthen vessels have been sunk in the earth and furnished with perforated lids to serve as urinals, and it is believed that they are pretty well used; as they are of porous earth, they will soon become very offensive, unless glazed pitchers can be procured. Great care will be required to prevent the arrangement, being the source of more filth and stench than that it was intended to prevent. There has, however, been an attempt made to improve the sanitary condition of the town, the Assistant Surgeon being appointed to superintend the conservancy arrangements and getting an allowance of Rs. 30 a month from the municipality for the work.

Health.

This town like all the others in the Gurgaon district has been exceedingly unhealthy suffering much from the fatal fever which has been epidemic during the last 4 months

Registration of Vital Statistics.

Well kept.

PALWAL TOWN.—(GURGAON DISTRICT.)

Inspected on the 22nd December 1879.

Chief sanitary defects and suggestions.

Measures have been adopted to prevent the drownings in wells, noted by Dr. Bellew, by having their tops guarded by grating. This is not so good a plan as having the mouths surrounded, as is suggested by Dr. Bellew, by a parapet wall, sufficiently high enough to prevent people tumbling over it. If there be a grating, the bhisties and others, when drawing water, put their feet on it, which rendered filthy by treading in the putrid puddle, which is always seen lying about wells, are literally washed into it by the droppings spilt in filling the vessels or mussucks.

A number of deserted houses and ruined huts were found in a very filthy state, on account of being used by the people for relieving nature. It is suggested that if there are no owners to these dwellings, they should be levelled to the ground, but should there be any persons who own them, they should be compelled to keep them clean. The Sanitary Commissioner recommends, that the deposit from the latrines be thrown on to the manure heaps in the godowns, instead of being buried in trenches.

The slaughter yard is simply a piece of ground, containing one or two holes which are dug for the purpose of holding the blood of the cattle which are killed daily; the blood and offal are carried away in *ghurrahs*, and buried close to the manure godowns; where these latter can be disposed of to the cultivators, the refuse of the shambles should be added to them, as being a valuable adjunct to their fertilizing ingredients. A good deal has been done since last report to improve the conservancy of the town; the native doctor of the dispensary who is also a member of the Municipal Committee takes a very great deal of interest and pains in the matter. Most of the defects pointed out by Dr. Bellew, had been removed, at least as far as regards the public ones, and a number of improvements both in the organization and management of the conservancy matters have been carried out.

Health.

Fever has been very prevalent here. It was described as the regular autumnal intermittent, but of a severe and obstinate character killing its victims often after months, and frequently being complicated with diarrhœa or dysentery which brought about the fatal termination.

Pratela village (Gurgaon District.)—There were some tanks and ponds round the place. On the edge of one a scavenger vulture, was seen picking a human skull. The drinking water wells are all on the borders of these tanks; those at a distance being brackish. The place looked gloomy and wretched, and the people ill and depressed. Fever, such as has been described in the places before mentioned, was prevalent.

Dharmkote. | Morlanpore.
Sultanpore. | Kormpore.

Of the several villages in the Gurgaon district inspected by the Sanitary Commissioner during his tour in December 1879, those noted in the margin were of some importance.

The village of *Dhurmkote* is in the middle of a large sandy plain all of which was under wheat cultivation. The Lumbardars stated that the whole place is flooded by the Badshahpore Nuddi in the rains the same drainage that runs past Gurgaon.

Several cases of intermittent fever and chronic dysentery (from which a number of deaths has occurred during the year) were seen by the Sanitary Commissioner.

Village Sultanpore.—There is an accumulation of water in the rains all round the village. The spring level of the wells is 18 feet. The soil is light and sandy. The population about 1,000. 75 per cent. of children had enlarged spleen. There had been no fresh cases of fever for 20 days before the Sanitary Commissioner's visit.

Villages of Molanpore and Kormpore.—Molanpore has a population of about 1,500. The place is one in which salt is made and many of the inhabitants are engaged in its manufacture. There was nothing exceptional in the state of this village.

Kormpore is the ruined remnant of what was evidently once a large important place, it is full of old pretentions ruins, now in a state of utter neglect squalor and decay. The village is on a hollow, evidently caused by a large drainage stream the bottom of which when seen by the Sanitary Commissioner was cultivated with wheat and mustard. Spring level only 4 feet below the surface. The inhabitants of both these villages were freely supplied with medicines from the Sanitary Commissioner's medicine chest. They welcomed his coming into their village very heartily. Intermittent fever, frequently complicated with dysentery and chronic diarrhœa, was very prevalent. Spleen disease was almost universal; in this latter village, there had been evidently great want and scarcity, the appearance of universal poverty was unmistakeable and depression was evident on the faces and in the manner of all.

FARUKHNAGAR TOWN.—(GURGAON DISTRICT.)

Inspected on the 23rd December 1879.

Chief sanitary defects and suggestions.

The city sweepings and filth from the latrines are collected in heaps outside the gates, and are taken by the jagirdar, at a nominal price, for manure. The latrines are exceedingly primitive in their construction, being merely a low wall, not high enough for decency, enclosing a piece of ground on which the women squat; they were all found in a filthy and neglected state. None of the streets in the town are paved or drained, and the city conservancy is at a very low pitch. In fact the sanitary condition of the place is pretty much in the same state as it was when inspected by Dr. Bellew. This town is the one which has suffered most severely of all those 52 borne on the list of municipal towns of the Punjab, from the fever which had been epidemic during the late months. It has taken the place occupied last year by Palwal, and has even a higher death-rate than that of the latter place in 1878. The accounts given by the Tahsildar and others, of the ravages produced by the disease and their effects on the people are as tragic as those given by Defoe of the plague of London. No business was done in the place. Salt trade which is the life and soul of the town, was entirely stopped; this fact was confirmed by accounts given the Sanitary Commissioner by Mr. Bradford, Collector of Customs, at Delhi. Even the ordinary business and work of the day was unperformed; no one was strong enough to grind the wheat used for the daily food of the people, and ground flour; husked rice, and cooked food even had to be procured by rail from Delhi. There was the greatest difficulty in procuring water, while sugar and articles required by the sick rose to a very high price, the former being sold for Rs. 1, a seer. No one could attend on the sick as all were so ill as to need attendance themselves, even the dead could not be removed in the ordinary way, as there were none strong enough to carry out the bodies which were thrown on a cart by twos and threes and so carried off to burial or cremation. The crops of the agriculturists remained standing on the fields uncut, and the seed for the ensuing harvest was unsown till late in the season, but at the time of the Sanitary Commissioner's visit when the heaviest flood of sickness had passed, the Government school which numbered 100 pupils on its list, had actually only 16 scholars present, of these only 3 could be considered as even in fair health; 4 only had died. The Sanitary Commissioner inquired as closely as he could into the nature of the fever, but could elicit nothing that threw any fresh light on the nature of the disease, the description was, that it was fever and ague very obstinate and recurrent, that it almost always killed its victims by dysentery and diarrhœa; that the chronic cases were accompanied by dropsy; that there were some cases in which men were seized suddenly, and some became comatose and died in 48 hours after being taken ill when working in their fields immediately after their return home. The people would not confess to having been under fed nor could any person in the place give a satisfactory opinion as to the cause of the sickness and mortality.

The cremation ground of the Hindus was, as might be imagined, very much over used. The Sanitary Commissioner did not see as the Civil Surgeon of Gurgaon had reported—bodies imperfectly burned, but the immense number of ash heaps made him advise the Municipal Commissioners to have the place ploughed up and cultivated for a season, there being sufficient ground available for burning the bodies that time. There seemed to be a little hesitation as to whether the measure would be popular among the Hindus, but those of the committee who were of that religion agreed as to the advisability of doing as the Sanitary Commissioner told them, and said that there was no real objection on religious grounds to the measure.

JHAJJAR TOWN (ROHTAK DISTRICT).

Inspected on the 26th December 1879.

Chief sanitary defects and suggestions.

Beyond the circular road which surrounds the town, are tanks or rather hollows into which the city is drained and from which there is no outlet. Most of these tanks contained a little water and were usually used for the purpose of soaking hemp in. Nearly all the wells are on the edges of these tanks, and the water in them both is connected by means of percolation from the latter into the former. The tank at *Kalal Mahbara* is now finished and is used for bathing purposes. The Committee was advised to get some live fish and put them in it to prevent the growth of slime and confervæ. The water of the *Devi Serai* tank is green and unwholesome looking from the presence of these two forms of vegetation, which fish would consume. The deposit from the latrines is not used for manure, but some of the trenched ground is cultivated by persons renting it. The Sanitary Commissioner endeavoured to persuade the Committee to have an attempt made to utilize the stuff, but without any avail—the land would not be suitable; there was no irrigation; the mehters would not do what they were ordered. But the main and real reason is apparently that Jat and Hindú cultivators have a strong objection against using human ordure as manure. If the manure could be conveyed to the fields for them the objection would vanish; but the expense prohibits that. In the latrines the dry-earth system is not carried out, and the stench from the places was considerable. The Sanitary Commissioner directed the Committee overseer to see to the matter, as it appeared that the use of earth had been ordered, but the orders had not been carried out. The urinals are now furnished with glazed pots instead of the porous earthen ones that Dr. Bellew condemned. The floorings and gutters should be made of stone slabs instead of lime cement. The greatest fault that the Sanitary Commissioner had to find with the conservancy arrangements was, that all the houses were as usual, provided with a small privy in the corner of the yard, which was invariably in a state of the most disgusting filth and neglect, the drain from it running into the lane, or the liquid soaking into the loose sandy soil. The Sanitary Commissioner recommends that all the privies be registered, furnished with pans and dry-earth by the owners, and kept properly clean on the penalty of their being disallowed if the orders are neglected. It was also explained to the Committee how it was that their wells got salt in them, from the earth being contaminated by the ordure and urine of men and cattle soaking into it.

This is one of the towns which has suffered most severely during the past unhealthy season. The death return shews a rate which has more than decimated the inhabitants, and has exceeded the usual mortality to an enormous extent, being nearly five times that of the years 1870 and 1876, which was on an average 22 per mille and more than three times that of the years 1877 and 1878, the two latter years of which being more by 10 per mille that the average of the seven years preceding them. The disease which has been the cause of this mortality has been described to the Sanitary Commissioner by the Tahsíldárs as intermittent fever killing its victims in variable periods; some 200, the Tahsíldár thinks, died very quickly with *Sirsam* (inflamation of the brain) in August and September when the epidemic commenced; on enquiry it was found that the delirium was not violent or even talkative; but was silent, infact coma—the death taking place in two days. The Sanitary Commissioner suspects it was most likely heat apoplexy attendant on the hot stage of ardent fever; however, the matter is one of mere hearsay and no reliance can be placed on the accounts. By far, the greater number of deaths occurred from chronic fever, either complicated with diarrhœa or dysentery and in some cases with hœmaturia. There were a very great number of miscarriages, abortions, and premature confinements in women who had taken the fever with occasional deaths of the mothers. The cases of fever without delirium are described as being always intermittent, of a quotidian type at first, but now are frequently tertian or quartan. They are attended with spleen disease. A large number of children were examined and enlarged spleen was found in about one-third of the number, not more. Some cases of fever sequelœ were seen, but very few. The causes of the fever are difficult to explain; true it is that the water of all the sweet wells, but one, which is used for drinking purposes, is subject to dangerous contamination from the ponds on borders of which they are sunk; but this has been going on for years, and the Sanitary Commissioner does not see any reason for this contamination being greater in 1879 than in other years. The rain-fall of healthy years often very much exceeded that of the year under observation, and that unless some extraordinary great down-fall at one time may have occurred, so as to deluge the country at one burst, the actual amount of the monsoon rain-fall cannot in the slightest degree account for the out-break of disease in 1879. Again in 1877 and 1878 there was a considerable scarcity, and the Tahsíldár of Jhajjar says that there was distress and sickness caused by this, but the Sanitary Commissioner cannot think that the want which was undoubtedly felt by the poorer classes is enough

to account for the disease, as in the first place, the rich and well-fed had died in quite as great numbers as the poor and half-starved while the scarcity diminished, and that after two years of it at the very time when the sickness commenced, namely in October, and when the mortality was heaviest every body had good food and sufficient.

Health. — Great prevalence of intermittent fever, and about ⅓ of the people suffering from enlarged spleen.

Registration of vital statistics. — Well and carefully kept.

Vaccination. — Not popular. No vaccinator came last year.

ROHTAK DISTRICT.

In the Rohtak District the villages noted in the margin * were inspected by the Sanitary Commissioner from 26th December 1879 to 2nd January 1880, and which are all on the unirrigated high land.

* Sampla. Geegee. Detour. Ganjni. Dhigal.

Sampla, Village,—This is a large village on the Delhi road with a population of 1,324 souls. The spring level was 60 to 70 feet below the surface. The drainage from the village (which was flattish) runs off into tanks which surround it on all sides. There had been 105 deaths (or 79 per mille) from fever during the year. The fever was described as intermittent commencing in the quotidian form and after a time becoming tertian or quartan, killing chiefly by diarrhœa and dysentery, and leaving enlarged spleens which were exceedingly common among the children.

Geegee, village,—A small village with a population of 487 souls. There are three large tanks used for bathing and one good well with water 60 feet from the surface; soil light and mixed. The deaths during the year were 66 or at the rate of 135 per mille per annum. The people declared that fever had been very prevalent and fatal, often quickly so with head symptoms, or more slowly with complication of dysentery and diarrhœa. Spleen disease was prevalent, 50 per cent.; but no ulcers or scurvy.

Detour, Village,—A small Brahmin village with a population of 548, spring level 90 feet deep, soil light. Great complaints of the scarcity during the last two years. Several families had left the place for Najafgarh and Jhajjar or other large towns where they being Brahmins expected to live on charity.

Ganjni, village,—About 100 houses, population (not known); here also the mortality had been very heavy from fever accompanied with diarrhœa, dysentery and pneumonia.

Dhigal, village,—This was a Jat village of 4,666 inhabitants far from any canal irrigation or any thing like swamp or *jhil.* Spring level deep, soil light; Scarcity had been much felt. Fever had been very prevalent.

ROHTAK.

Inspected on the 29th and 30th December 1879.

Chief sanitary defects and suggestions. — It was observed that most of the shop-keepers had wooden platforms over the drain of the street and it was found that they paid one anna per month for the privilege of doing so. The Sanitary Commissioner advises the discontinuance of the custom, as it not only exposes the articles, often sweetmeats and fruit, which undergo no further cooking, to dangerous infection from the drains by flies and evaporation, but also gives rise to attempts at encroachment, the *bunyahs* substituting by stealth, masonry platforms for the wooden ones. The side streets are filthy and undrained, the great nuisance being from the privies of the houses, which are always situated next to the outer wall of the yard, and have a small drain through the wall into the street, by which all the liquid of the place escapes in a black stinking gutter. The privies themselves were in a superlative degree of neglect and filth, and so offensive as to be dangerous and disgusting nuisances. They should be all registered and the owners obliged to keep them clean and furnish them with pans and dry-earth. Complaints are made about the mohulla sweepers not cleaning the houses or removing the filth until late in the day. The Sanitary Commissioner thinks the fault lies with the house owners more than with the sweepers. Some of the privy drains which run into sinks (choubochas) are very badly kept and rarely cleaned. An attempt is to be made to store away all the refuse of the city and latrines, and to sell it by means of a contractor, for manure; at present not a farthing is realized from it. The latrines were without roofs, and one of the places for women, by the *Moondhalla gate*, was in a very neglected state, the seats being broken down, and no pans or dry earth furnished, while it seemed to be very much frequented, and consequently in a very disgusting state. The latrines should all be taken in hand, roofed, and furnished with seats, pans, &c., the deposit being collected and sold for manure with the rest of the city sweepings. The Sanitary Commissioner believes the gardeners would readily give a full price for it.

The Sanitary Commissioner states, that he was told that it is a practice among the butchers to take the sheep, which they keep for slaughter and for sale at Delhi, &c., to the grounds frequented by the people in the early morning, that they might feed on the ordure deposited there. This disgusting practice, which was admitted to be a fact, should be strenuously prohibited, and even rigorously punished, if possible.

The spring level of several wells were taken, 60 feet was found to be the average depth below the surface. The Canal has been brought in by a distribution channel from *Somburpore* for irrigation of the station and land about, and the accounts are, that the water has risen slightly in the wells since. This should be carefully watched. Some marked improvements in the sanitary condition of the town. has been effected by the Deputy Commissioner.

Health. Th fever was described as intermittent and remittent, fatal from diarrhœa or dysentery. The poor and rich alike suffered. 25 per cent. of the children had enlarged spleen.

Vaccination. No operations performed this season. The members of the Municipal Committee themselves confess that vaccination is decidedly at a discount at Rohtak.

On the journey from Rohtak to Gohana on 3rd January, 1880, the Sanitary Commissioner inspected the villages of *Jhanja, Rukhee, Gillore Kalan* and *Mehira* which were adjacent to the road.

Jhanja village.—Was found to be exceptionally filthy, no attention being paid to cleanliness. There has been so much sickness that the crops have only been half cut. The disease has been fever with diarrhœa; spleen disease rife. 75 per cent. of the children having it. There has been no want of food, though a certain amount of tightness as regards money has been felt in the village.

Rukhee village.—The peculiarity of the village is, that when one looks at it from above, the houses seem to be all apparently in one block, with but two or three houses for the whole village, they being all in continuous masses of 20 or 30 dwellings, and no ventilation whatever being possible. The spring level is about 45 feet. The mortality from fever has not been very great, 40 per cent. of the population, however, have enlarged spleen.

Gillore Kallan.—Population about 1,000, spring level 37 feet. There has been no unusual amount of fever or mortality, no scarcity, ulcers or scurvy.

Mohira village.— Is on the canal; nearly all its land is under flood irrigation which runs up to the very walls of the place. No unusual prevalence of fever.

GOHANA TOWN (DISTRICT ROHTAK).

Inspected on the 4th January 1880.

Chief sanitary defects and suggestions. The conservancy of the town is in charge of a Jamadár; there have been 16 sweepers employed since the cholera broke out in May, but they are to be discontinued, and the whole of the sweeping and clearing will be performed by 8 men, as four are employed on the latrines. The Sanitary Commissioner does not think that the work can possibly be managed with so few men, he therefore recommends that the full number 12 be kept on.

The city sweepings and filth are just thrown down in heaps outside the town to be taken away or not, as may happen. In one place which the Sanitary Commissioner saw, it was buried in a pit. No attempt is made to store it away or sell it, as manure, and is therefore lost, both to the cultivators and the municipality as a rule. The Sanitary Commissioner recommends that suitable dry spots be selected, 200 yards or more from the city, in which all the refuse of the place can be stored for sale, and he is sure that not only will great good be effected in the way of enriching the land and increasing the yield, but conservancy will also be advanced, and a certain amount added to the funds of the municipality.

The latrines are in a disgusting state, especially one for women to the north, the other, no doubt being cleaned before hand in expectation of the Sanitary Commissioner's visit. One of these has its drain, into which the urine is passed, running out into the ground outside; the other is furnished with cess-pits, which are emptied by the sweepers, who throw the fluid out on to the ground at the edge of the circular road, which runs by the wall of the privy. Only one of the female latrines has a sweeperess, the other being served by a man. It is recommended that the latter be replaced by a woman.

The private latrines were very filthy. They poison alike, the earth, water and air of the place, especially in a situation where the spring level is as high as at Gohana, and are dangerous; and the gutter of black putrid sludge running from them into the lane is disgusting both to the sight and smell. The Sanitary Commissioner recommends the municipality and Tehsíldár, to see if the evil caused by the neglect to keep the place clean could not be removed. They should only be allowed, if kept clean and furnished with vessels in which dry earth can be used; if neglected, the owners should be prosecuted under the existing conservancy bye-laws in force in municipal towns.

Health, Fever has been unusually severe and fatal. 80 per cent. of the children examined had enlarged spleen.

After leaving Gohana the Sanitary Commissioner went along the Rohtak branch of the Western Jumna Canal to Joshi on the 5th and 6th January 1880. The relation which this bears to the drainage of the country is as follows :—

A portion of the "Nye" nuddie (on the drainage line) runs down to the west of the canal, after crossing the branch near *Titre* to Gohana, where it widens into a large *Jhíl* being blocked by the canal banks below the town.

The "Nye" is joined by a minor drainage above the town which comes from the country east of the canal (*vide* return 16 of the Sanitary Survey of the country irrigated by the Western Jumna Canal No. VI of Selections from the records of the Government of the Punjab for 1870). From Gohana the Nye drainage runs pretty parallel to the west of the Rohtak canal which finally tails into it at *Surgpoora* on the Hansi Road, and the drainage then runs on to *Bheree* and *Assimghur*, whence it goes west to *Souraitee*. Now in the new alignment of the canal the whole of the Rohtak branch will be abandoned from *Joshi* to *Uhur*, and replaced by two distributing channels, one given off some 5 or 6 miles below *Rer*, which will run by *Laharee* and *Bundunee* to *Khur*, where it will fall into the old canal, whence it will be continued to the point where it touches the basin of the Gohana jhil, the bed of the canal at Gohana being abandoned to leave an opening for the drainage crossing from the eastern side. The second distributory channel will leave the Delhi canal at *Khobne* passing by *Surugta Nait* and *Barouta* to the south of *Nuggar* to the Rohtak branch below Gohana, and then runs in the old canal to *Surjpoora*, so that the *Wyeer* and *Pooghtutta* drainage lines (see returns 14 and 16 of the above mentioned report) will be freed and uninterfered with. The new canal crosses the Nye drainage over a syphon at the village of *Nutar*.*

The Sanitary Commissioner examined the village of *Korana*, which is situated in the direct line of the "Nye" stream to the west of the Rohtak canal, half way between Gohana and *Joshi*.

The spring level was only 6 feet below the surface in this village, which was surrounded by small stagnant stinking pools, the ground quite water-logged, very filthy and damp.

The lumbardárs say, fever has been very prevalent and fatal, that the ordinary symptoms are shivering to commence with, then strong fever for 4 or 5 days, then diarrhœa or pain in the chest, and sometimes jaundice, frequently terminating fatally in 10 days or so. That it had gradually changed as the season advanced into tertian or quartan ague which is now very prevalent, that some powders (cinchona febrifuge) were sent them which did a great deal of good.

PANIPAT.

Inspected on the 7th January 1880.

Chief sanitary defects and suggestions.

The greatest evil and one which is at the root of all the nuisance and the cause of the insanitary condition of the place is, that in almost every house is the usual private latrine, unfurnished with any receptacle for the deposit which soaks into the ground, whence it is passed or run off through a hole in the wall into the adjoining street, which it befouls as far as its stream lasts. The state of these privies is quite enough to convince any one, that they are nuisances of the most dangerous and offensive nature. The Municipal Committee all professed themselves convinced of this fact, and stated that they were anxious to do away with the evil. They declared that nothing could be easier than to insist that all privies should be furnished with pans and dry earth, and that forthwith a register of them should be made with a view of compelling the owners to keep them clean and in order, under penalty of being prosecuted under the nuisance law. The Sanitary Commissioner recommends that the Municipality should monopolize all the filth, sweepings, &c., even if they have to make a considerable increase in their conservancy establishment. The public latrines for men were mere cells and in a ruinous condition, being furnished with wooden seats, but no pans or dry-earth. These places should be all properly furnished for the dry-earth system in connection with the manure godown.

The slaughter-yard has only a small brick platform and a gutter which runs into a cistern. This latter is not large enough, and the consequence is, that the whole ground of the yard is saturated with blood and offal. After the dogs have eaten as much of the filth of the yard, &c., as they are able, the remainder is supposed to be buried, but is thrown really into the bed of the *Gundá Nullah* ditch, which has been dry for the last 3 years.

Most of the wells are brackish. Some wanted the protection of a small parapet wall, as the water was running back into them from the feet of the drawers, which were foul from trampling in the black muck round about. The Sanitary Commissioner described to the Committee the shape of the platform system that he thought best for public wells, and they professed to agree with him in the advisability of adopting it.

As no *pakhals* have been bought to remove the liquid filth, which collects in the sewers, the Committee expressed themselves anxious to make some arrangement for this purpose, and proposed buying 2 or 3 Crawley carts as an experiment.

Health. Fair.

Registration of vital statistics. Well kept.

* *Note by Sanitary Comr.*—For further particulars on this subject see Appendix C of this report.

On the 8th of January, the Sanitary Commissioner in company with the Náib-Tahsíldár of Pánipat made a circuit in the Khadir of Jumna river east of Pánipat visiting villages as follows:—

1. *Raja Kharee* 6 miles from the river bed, population 668; village very dirty; wells surrounded by sludge and filth; water 12 feet distant from the surface. No scarcity. The Lambardárs declared fever had been very prevalent and fatal, that it was intermittent at first but afterwards became tertian and quartan, that it was accompanied and rendered fatal by diarrhœa and dysentery; spleen disease very prevalent; 80 per cent. of those examined having enlargement of that organ.

2. *Bábel*, 3 miles from the river, population 1,453. This village is on the Bauli escape canal which is now generally dry; in the rains the river water flows back up the channel and floods the place. It was said that 317 houses had been washed down by the inundation. This evil, which really exists, is to be remedied by taking the escape some distance down the Khadir and allowing it to join the river at a point low enough to prevent the reflux of the flood water. Village exceedingly dirty and no ventilation. The wells were in the filthiest condition imaginable. The manure sweepings and filth were piled in heaps close to the gates. Only the very poorest suffered from scarcity, the people looked well and in good spirits, but fever of the character noted above had been very severe and fatal.

3. *Dhausowlie*, about ½ a mile from the river; population 1,200. The Bauli drain is about ½ a mile off. The people complained of flooding from the reflux of the river water up its channel. No complaints of scarcity. There had been much fever of a fatal character.

4. *Korar*, ½ a mile from river, population 1,404. The water in the wells 20 feet below surface. The people looked ill and depressed and complained much of fever.

5. *Chota Chhajpur*, 4 miles from river, population 468. Spring level 20 feet deep. The people said they had suffered greatly from want. Fever had been very prevalent from complication of diarrhœa and dysentery, it began as quotidian and ended as tertian and quartan. 15 out of 20 children had enlarged spleen.

6. *Ninori*, 6 miles from river, population 618. Spring level 15 feet, no scarcity complained of. A good deal of fever of the usual type.

7. *Ogru Kheri*, 9 miles from river and close to Pánipat. The Lambardárs stated that there had been no want and not much fever; no ulcers or scurvy. The children examined evidenced 50 per cent of spleen disease.

This examination was undertaken by the Sanitary Commissioner to see if the villages on the *Khadir* had been as he was told exceptionally severely visited by the fever of the year. The facts above given show that there was no excessive sickness or mortality, comparatively speaking, from the fever which has been epidemic in the Punjab and North-West.

AMRITSAR.

Inspected on the 18th January 1880.

Chief sanitary defects and suggestions.

The drains inside the courts of the private houses were in a very filthy state; tortuous channels in the earth being full of black sludge. The places are a source of dangerons pollution to the soil, air and water of the town, and as long as they exist, the sanitary condition of the city cannot be said to be perfect or even good. The owners say they are too poor to make drains themselves, and the Municipality could not afford to do it all; but it is to be hoped that by constant supervision and endeavour to make the people attend to the hygienic condition of their own dwellings, gradual improvement will be effected. The wells have not been cleaned out since 1876, but it is intended to do them all this year. The Sanitary Commissioner thinks that a plan, by which a certain number could be cleaned yearly, would be better than that of doing them all at the same time. They must require attending too oftener than once in four years. The stone pavement of the slaughter-house should, if possible, be extended so as to cover entirely that portion of the yard now laid down with brick, as the irregular and uneven surface of the latter gives hollows in which blood and offal collect. The trenches, into which the deposit from the latrines, &c., is thrown should be closed and the ground ploughed and cultivated. In future the Sanitary Commissioner recommends that all the latrine refuse be buried in narrow trenches one foot deep and one foot apart, in the garden, and that the land be cultivated 3 months after the trenches are filled in. There is an unsigthly hollow in the plain outside the jail to the west of the gate, evidently excavated for building purposes. This should be filled in or trimmed up into a regular shaped tank, and cultivated with *singharas*, (Trapa bispinosa) as when full of stagnant water it must be unhealthy.

Registration of vital statistics.

Well and correctly kept.

JHANG.

Inspected 6th February 1880.

The town is somewhat flat surrounded by sand hillocks, which appear to be simply collections of drifted dust. Cultivation with irrigation from wells by persian wheels, is carried on up to the walls of the houses. There is no wall round for defence or collection of octroi. The river Chenáb runs about

3 miles to the north-east, but there is a branch which flows in the rains within a mile. The spring level is high in consequence of the proximity of the river being only about 15 feet below the surface. There is one large street running through the place from east to west: it is broad and open, paved with *kunkar*, and having on each side *pucka* drains of a rectangular shape, which empty themselves into a large outfall sewer at the city gate; this runs about 200 yards and then terminates in a ditch which carries off the water towards the river; the sewer is rectangular and there was a thin stratum of fluid here and there in the flat bottom, but no flow. It is evidently only useful for the flow of storm water. There is an objection against the side drains, which is, that they would wash away and undermine the walls of each side of the roadway, especially where the houses are simply made of *kucha* earth. There are 5 *pucka* latrines for females, these are merely square pieces of ground with mud walls and a doorway fended by a screen; no pans, receptacles, coverings, or divisions; they were quite clean and did not appear to be used to any great extent; a small collection of dried up filth was buried in a hole in their rear. There are 2 large privies for men, one having 70, the other 74 cells; they are furnished with dry-earth but no pans. These seemed to be pretty well frequented, the deposit was buried in pits behind the latrine and removed by the contractor about once a week for manure. The whole of the city refuse is used for the fields, with the exception of the straw and dry litter (not horse dung) which is employed by the potters for burning their vessels.

There has been some scarcity in the place, but nothing like starvation or famine. Wheat was selling at 8 sérs in November and December 1878, and January 1879.

Vaccination. The people expressed themselves in favor of vaccination.

MAGHIANA TOWN (JHANG DISTRICT).

Inspected on the 7th February 1880.

Chief sanitary defects and suggestions. There are 5 hollows inside or in the immediate vicinity of the city, which are of various sizes, having been excavated for building purposes. They should, if possible, be filled up, as they must become the receptacles of stagnant water in the wet season. The Sanitary Commissioner is of opinion, that the sewage of the town should be further removed by egg-shaped *pucka* sewers, and, if possible, used to irrigate the fields; this being most valuable as a stimulating manure. He also thinks that pans should certainly be furnished for the latrines, as they are well used. The place, where the sheep and goats are killed, is an open irregular piece of ground, which was very dirty and offensive; adjoining it was a shed in which animals had been killed, and as the blood and offal was still there half dried and decomposed, the place was in a very offensive state. The Sanitary Commissioner thinks that a regular slaughter-house with a stone platform for the animals, and trenches with cisterns for the blood and offal, should be constructed. There is a very fine octagonal tank called the *Jundiwallah*, having been built 18 years ago. It will not hold water and is consequently useless and unsightly. An effort should be made to puddle the bottom and render it capable of being kept full, as it would add greatly to the beauty of the station.

Health. Fair.

Registration of vital statistics. Well kept.

DERA ISMAIL KHAN.

Inspected on the 9th February 1880.

Chief sanitary defects and suggestions. It will be necessary to take care that the facilities for flood irrigation are not abused; the soil has a tendency to throw out a saline efflorescence, and should this increase, or should there be any signs of the land becoming water-logged, or should the spring level in the wells rise much, measures should be taken to divert the water supply to the fields from the stream of the Seoni. It is also necessary to see that the banks of the canal do not block the surface drainage of the country.

In the new part of the town many large and deep holes had been excavated for building material. This practice which is against Municipal bye-laws, should be strictly prohibited, and the offenders against the law compelled to fill up the holes they have made besides being fined. The Deputy Commissioner has now matured a plan of rebuilding the town drains, supplementing the old ones by saucer channels, which will be a great improvement, especially if the out-fall drain be made egg-shaped. It is proposed to extend this system over the whole city, a certain portion of the bazár being already furnished with the new drains. If it be possible, the drains would be greatly improved, if they were coated with Portland cement, the cost of which would be according to the amount of sand mixed with it. Many of the wells are shaded by trees, in which birds roost and defile the water by their droppings; leaves also fall in and decompose. This can easily be remedied by putting a wooden pent roof over their mouths. In some of the wells, especially the smaller ones, platforms wanted raising to a height of 2 feet, to prevent the water dropping back into the wells from the soiled feet of the drawers; pullies for the ropes attached to the drawing buckets are also necessary, and it would be as well if the platforms round the mouths of the wells were on a regular plan with a gutter round the edge running into a cistern, from which the water could be run off in the surface drains at the hour appointed for flushing. The

Sanitary Commissioner recommends that the Amritsar plan of storing away the manure, &c., be adopted in the town of Dera Ismail Khan. All the houses were furnished with private latrines in the corners of their yards, which were found in a very disgusting and filthy state, the earth forming their floors being saturated with ordure. They should be put under the supervision of a jamadár who should report all cases in which the owners permit them to be neglected. They should be furnished with pans and dry earth, as in times of epidemic diseases they may become sources of considerable danger. The Sanitary Commissioner recommends that in the public latrines earthen pans should be substituted for the basket, and that both this and the utensil for urine should be glazed. The slaughter-yard for goats and sheep is situated inside the city wall and consists merely of a large compound with holes in the ground. Another yard some distance from the town was pointed out to the Sanitary Commissioner as the place for butchering cattle, the ground being smeared with dry blood and filth. A regular walled enclosure is absolutely necessary. A platform should be built of brick or cement of sufficient size to meet all the requirements of ordinary and extraordinary occasions, with a gutter running down its centre towards a cistern, sufficient incline being given to faciliate the flow of the blood, &c. The cistern should be emptied daily, and the platform washed, the blood being carried to the filth godown for the sake of convenience.

Health. — Fair.

Registration of vital statistics. — Well kept.

Vaccination. — Well and thoroughly carried out.

BANNU.

Inspected on the 12*th and* 13*th February* 1880.

Chief sanitary defects and suggestions. — The Sanitary Commissioner recommends, that instead of having the sweepings thrown in irregular heaps close to the latrines, godowns should be made on these spots, by raising mudden walls round them to a height of 5 or 6 feet. The sale of the manure would be more profitable if it were sold to the cultivators and others on payment of a certain sum for 100 donkey loads or per cart load. Pans should be compulsorily used in the privies, which are, in their present state, a nuisance and dangerous to the health of the town. The slaughter-houses were in a very bad state. They had no platforms, trenches or cisterns but merely a piece of ground partially walled round it. Proper slaughter-yards with *pucka* platforms, trenches, and cisterns, should be constructed in situations which would admit of the removal of the blood and offal to a manure godown at no great distance.

Health. — Fair.

Registration of vital statistics. — Well kept.

BHAKKAR TOWN (DERA ISMAIL KHAN DISTRICT).

Inspected on the 15*th February* 1880.

Chief sanitary defects and suggestions. — The latrines were much neglected, the deposit being scattered all over the ground. They should be furnished with pans, seats and dry earth.

The surroundings of the wells are in the usual filthy state. Some of them require a coping round their mouths with pullies, to enable people to raise the water without drawing it over the edges of the coping. The slaughter-house is a small walled-in yard, the ground of which is caked for some depth with dried blood and garbage. It is very much worse than useless; and were it not for the dryness of the air and soil, it would be poisonous. It would be better if the animals were killed in the open air, than to allow all the blood, offal and garbage, to accumulate in one spot. The part of the town inhabited by the cultivators have many vacant houses which are visited by the people who use them as latrines. If these houses are private property, the owners should see that they are cleaned; if public, the Committee should see that the sweepers clean them daily, and the people should be prevented from defiling them.

Health. — Very good.

Registration of vital statistics. — Correctly kept.

Vaccination. — Fairly popular.

MOOLTAN.

Inspected on the 19*th and* 20*th February* 1880.

Chief sanitary defects and suggestions. — The side gutters in the bazárs were in a very neglected state, being often blocked with dirt and refuse. The plan of covering the drains with wooden platforms is almost universal; as the gutters are hidden by these platforms they are not properly cleaned and serve as receptacles for the garbage and refuse of the place, and as they are used as counters

on which the food, vegetables and fruit are exposed for sale, these articles are subjected to pollution by the noxious and stinking effluvia of the drains, as well as by the flies which swarm about, attracted by the dirt lurking in the sewers, and by the provisions or other things for sale. The Sanitary Commissioner thinks that it would be better to have all the shallow drains on the saucer plan without any angle, and where it is necessary to deepen them, the egg-shaped form would give less occasion for catching solid matters and less surface for the sewage to run over than any other. The small *coochas* were very filthy, and unpaved. They were saturated with the filth which had been washed down by the sewage from the yards and houses. The lanes are ill-ventilated and the houses tottering and on the very verge of falling. A large under-ground drain runs to the Park Gate. In the first portion of its course the incline is backwards; in the second, the water is stagnant and probably the drain level; in the last portion, a thin black line of sewage runs down it to the gate where it escapes into a ditch between the city wall and the circular road, meandering along for some 100 yards, it crosses under the road to the fields, where it is lost. It is recommended that a *pucka* drain be substituted for this open ditch, which is disgusting to the sight and smell. The whole system of drainage in Mooltan requires to be thoroughly taken in hand; in order that it may be carried out well and in prefect unison, it is necessary that a survey of the town be made, and all the different levels accurately taken. A drain should be constructed for the emptying of the pools, which are filled with the storm water of the city, which lies stagnant till it soaks into the soil or is dried by evaporation, which must tend to increase sickness. The latrines are unfurnished with pans or any furniture, the deposit being scraped off the ground on to a basket, and then thrown into a hole in the vicinity, whence it is removed to the filth trenches on bullocks. It is recommended that they be supplied with glazed pans.

The burial grounds for Hindú children were disgracefully kept. They are small enclosures, with a low mud wall and gate, full of graves, which are so shallow that in the sandy soil it is a work of no labor for the dogs and jackals to exhume a body. Every grave was scratched up, and portions of infants' skulls and other bones lying about, shewed that the bodies had been dug up and devoured. These places were alike indecent and dangerous. The *abkaree* compound was untidy and sloppy. Cisterns had been constructed outside the wall for the lees which ran into them through gutters; the other waste water of the distillery however, ran in separate gutters into the field outside, where it made various stagnant festering pools. All the waste water should be conducted into the tanks and removed with the lees, as it is all highly charged with organic impurities. The *Kupwalla* well is subject to the risk of sewage contamination; the water has not yet been analysed. It should be sent up to the Chemical Examiner with that of the other well at the Ahmed Shah mosque; and they should be closed until the report of the analysis be received.

Almost all the houses in the town and suburbs are ill-ventilated and not properly cleansed. Some have no latrines, but most of the inhabitants use either the roofs of their houses, or spare spaces in the buildings, or a portion of the street in front of the gates; others have latrines, which are sparingly cleaned, perhaps only once or twice in the week, situated on the tops of the houses, when the urine and liquid filth is allowed to run some distance along the whole length of the house, to fall into the streets or in front of the doorways or staircases; so that foul effluvia are blown into rooms where the inhabitants sit at work, &c. There are some dwellings where the area is not sufficient and the atmosphere contaminated, as to be injurious to the health of the occupants. Some people also live in the same rooms where they keep their cattle, and from which the filth is not removed for several days.

Health.	Fair.
Registration of vital statistics	Well kept.
Vaccination.	Efficiently performed.

MUZAFFARGARH.

Inspected on the 21*st February* 1880.

Chief sanitary defects and Suggestions.

The drains of the bazàrs should be saucer-shaped, and adopted in preference to the square-shaped ones, as they give less friction and surface to the flow of the water, besides they are destitute of angles by which solid matters are caught and detained. The sewers which are at the circumference of the town, hold all the flood water which is brought down by drains paved with a concave surface. These sewers are 8 in number, and are blocked with dust, bricks, rags and other rubbish; some of them are furnished with iron gratings, others are open. They should all have grated iron doors, which should be locked, and cleaned out periodically by the *mehters*.

Health.	Fair.
Registration of vital statistics.	Well kept.
Vaccination.	Well carried out and fairly popular.

VITAL STATISTICS
OF THE
GENERAL POPULATION, 1879.

ANNUAL FORM NO. I.

BIRTHS REGISTERED in the DISTRICTS of the PUNJAB during the year 1879.

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 1,000 of population.*			Number of males born to every 100 females born.	Excess of births over death per 1,000 of population.	Excess of deaths over births per 1,000 of population.
			Males.	Females.	Total.	Males.	Females.	Total.			
	DELHI DIVISION.										
1	Delhi 6 Munl. towns ...	192,753	3,182	2,960	6,142	16	15	32	107·50	...	42
2	Gurgaon 4 Do. ...	59,867	969	892	1,861	16	15	31	108·63	...	32
3	Karnál 5 Do. ...	74,796	950	785	1,735	13	10	23	121·02	...	37
	HISSAR DIVISION.										
4	Hissar 6 Munl. towns ...	69,241	934	753	1,687	13	11	24	124·04	...	19
5	Rohtak 6 Do. ...	55,263	713	644	1,357	13	12	24	110·71	...	58
6	Sirsa 5 Do. ...	28,097	324	252	576	11	9	20	128·57	...	29
	UMBALLA DIVISION.										
7	Umballa 11 Munl. towns ...	103,811	1,249	1,086	2,335	12	10	22	115·01	...	32
8	Ludhiána 6 Do. ...	77,911	1,068	949	2,017	14	12	26	112·54	...	26
	JULLUNDUR DIVISION.										
9	Jullundur whole district ...	783,020	6,657	5,736	12,393	8	7	16	116·06	...	18
10	Hoshiárpur 10 Munl. towns ...	80,069	853	819	1,672	11	10	21	104·15	...	20
11	Kángra 5 Do. ...	23,752	254	239	493	11	10	21	106·28	...	27
	AMRITSAR DIVISION.										
12	Amritsar 7 Munl. towns ...	169,770	2,539	2,541	5,080	15	15	29	99·92	...	41
13	Gurdáspur 15 Do. ...	87,367	1,018	951	1,969	12	11	22	107·04	...	22
14	Siálkot 9 Do. ...	71,941	908	763	1,671	13	11	23	119·00	...	8
	LAHORE DIVISION.										
15	Lahore 8 Munl. towns ...	171,600	2,231	1,864	4,095	13	11	24	119·69	...	21
16	Gujránwála 10 Do. ...	70,633	965	849	1,814	14	12	26	113·66	...	14
17	Ferozepore 7 Do. ...	31,976	506	453	959	16	14	30	111·70	...	17
	RAWALPINDI DIVN.										
18	Rawalpindi 5 Munl. towns ...	44,440	704	614	1,318	16	14	30	114·66	...	63
19	Jhelum 4 Do. ...	38,049	488	389	877	13	10	23	125·45	...	30
20	Gujrat 4 Do. ...	41,856	724	648	1,372	17	15	33	111·73	...	3
21	Shahpur 6 Do. ...	45,388	913	856	1,769	20	19	39	106·66	2	...
	MOOLTAN DIVISION.										
22	Mooltan 7 Munl. towns ...	69,335	1,361	1,250	2,611	20	18	38	108·89	6	...
23	Jhang 5 Do. ...	38,850	556	507	1,063	14	13	27	109·66	...	2
24	Montgomery 5 Do. ...	21,055	366	317	683	17	15	32	115·46	2	...
25	Muzaffargarh 7 Do. ...	19,586	281	211	492	14	11	25	133·17	...	3
	DERAJAT DIVISION.										
26	D. I. Khan 5 Munl. towns ...	41,064	370	333	703	9	8	17	111·11	...	7
27	D. G. Khan 5 Do. ...	35,253	516	350	866	15	10	24	147·43	...	11
28	Bannu 4 Do. ...	20,925	290	213	503	14	10	24	136·15	...	23
	PESHAWAR DIVISION.										
29	Pesháwar 2 Munl. towns ...	59,447	769	653	1,422	13	11	24	117·76	...	61
30	Hazára 4 Do. ...	13,610	141	108	249	10	8	18	130·55	...	44
31	Kohát 1 Town ...	11,043	35	31	66	3	3	6	112·90	...	31
	Total ...	2,651,768	32,834	29,016	61,850	12	11	23	113·16	...	26

NOTE.—The population of the rural circle of Jullundur is according to the Census of 1868.

DEATHS REGISTERED in the DISTRICTS of the PUNJAB during the year 1879.

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.	*Number of deaths registered.*			No. of males died to every 100 deaths of females.	*Ratio of deaths per 1,000 of population.*			*Mean ratio of deaths per 1,000 during previous 5 years.*		
					Males.	Females.	Total.		Males.	Females.	Total.	Males.	Females.	Total.
	DELHI DIVISION.													
1	Delhi	608,850	*1,258	496	23,121	20,363	43,484	113	71	72	71	33	33	33
2	Gurgaon	696,646	1,938	348	29,717	26,520	56,237	112	80	81	81	31	28	30
3	Karnál	610,927	2,396	264	19,908	16,314	36,222	122	60	58	59	27	24	25
	HISSAR DIVISION.													
4	Hissar	484,681	3,540	137	11,034	9,427	20,461	117	41	43	42	17	16	17
5	Rohtak	536,959	1,811	295	19,088	16,694	35,782	114	65	68	67	24	23	23
6	Sirsa	210,795	3,116	68	4,718	3,779	8,497	125	40	40	40	20	21	20
	UMBALLA DIVISION.													
7	Umballa	1,008,860	2,570	394	24,015	18,417	42,432	130	44	40	42	24	22	23
8	Ludhiána	583,245	1,375	429	11,316	8,452	19,768	134	35	32	34	27	29	28
9	Simla	33,594	18	1,888	686	327	1,013	210	31	28	30	16	19	18
	JULLUNDUR DIVISION													
10	Jullundur	783,020	1,322	596	14,843	12,034	26,877	123	34	34	34	39	45	42
11	Hoshiárpur	938,890	2,180	450	17,938	14,674	32,612	122	35	34	35	33	34	34
12	Kángra	743,758	8,389	87	13,309	10,826	24,135	123	34	31	32	23	21	22
	AMRITSAR DIVISION													
13	Amritsar	832,750	1,573	535	20,224	15,441	35,665	131	43	42	43	33	36	34
14	Gurdáspur	906,126	1,822	496	18,142	13,979	32,121	130	36	34	35	29	29	29
15	Siálkot	994,458	1,958	510	13,066	10,307	23,373	127	24	23	23	26	24	25
	LAHORE DIVISION.													
16	Lahore	775,551	3,648	218	18,335	13,537	31,872	135	43	39	41	32	33	32
17	Gujránwàla	550,576	2,587	207	10,299	8,513	18,812	121	34	35	34	27	29	28
18	Ferozepore	533,416	2,744	204	8,465	5,480	13,945	154	29	23	26	23	22	23
	RAWALPINDI DIVISION.													
19	Rawalpindi	699,647	6,218	114	25,946	20,929	46,875	124	69	65	67	23	22	23
20	Jhelum	500,988	3,910	128	12,018	9,686	21,704	124	45	41	43	22	22	22
21	Gujrat	616,347	1,973	324	10,332	8,676	19,008	119	31	30	31	20	19	20
22	Shahpur	368,796	4,691	78	6,001	4,833	10,834	124	31	28	29	25	24	24
	MOOLTAN DIVISION.													
23	Mooltan	459,765	5,880	80	5,401	3,777	9,178	143	21	18	20	27	25	27
24	Jhang	348,027	5,702	61	2,628	1,839	4,467	143	13	12	13	15	14	15
25	Montgomery	359,437	5,574	64	4,414	3,160	7,574	140	22	20	21	24	25	25
26	Muzaffargarh	295,547	3,136	98	4,249	2,961	7,210	143	26	22	24	23	22	23
	DERAJAT DIVISION.													
27	Dera Ismail Khan ...	394,864	9,296	56	5,031	3,736	8,767	135	24	20	22	20	19	20
28	Dera Gházi Khan ...	309,978	4,377	118	*2,575	1,704	4,279	151	15	12	14	15	14	15
29	Bannu	287,547	3,831	91	3,795	2,706	6,501	140	25	20	23	18	16	17
	PESHAWAR DIVISION.													
30	Pesháwar	500,443	2,504	271	6,866	5,021	11,827	135	25	21	24	15	13	14
31	Hazára	367,218	2,835	122	5,190	3,559	8,749	146	27	20	24	19	15	17
32	Kohát	145,419	2,838	52	1,841	1,091	2,932	169	23	16	20	10	8	9
	Total for the Province ...	17,487,125	107,010	173	374,451	298,762	673,213	125	39	37	38	26	26	25

* Note.—The figures in column 4 have been taken from the Punjab administration report for 1878-79.

ANNUAL FORM No. III.

DEATHS REGISTERED in the DISTRICTS of the PUNJAB during each month of the year 1879.

1	2	3												4	5
Number.	Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total Deaths registered during the year.	Number.
	DELHI DIVISION.														
1	Delhi	2,159	1,699	1,442	1,499	2,600	1,930	1,139	3,416	6,481	8,935	7,593	4,591	43,484	1
2	Gurgaon	1,759	1,557	1,338	1,253	2,721	2,003	1,176	5,386	9,093	14,179	10,454	5,318	56,237	2
3	Karnál	2,698	2,019	1,627	1,729	3,897	2,259	1,180	3,055	4,451	6,062	3,648	3,597	36,222	3
	HISSAR DIVISION.														
4	Hissar	723	717	921	1,963	4,163	1,400	501	898	2,694	3,745	1,725	1,011	20,461	4
5	Rohtak	1,238	1,031	1,114	1,338	3,334	1,443	719	2,262	5,327	8,640	6,310	3,026	35,782	5
6	Sirsa	391	417	619	783	1,412	788	437	416	898	1,100	720	516	8,497	6
	UMBALLA DIVISION.														
7	Umballa	2 786	2,641	2,690	2,512	4,097	2,690	1,786	2,864	4,169	6,170	6,115	3,912	42,432	7
8	Ludhiána	1,777	1,427	1,286	1,213	1,819	1,473	1,090	1,350	2,008	3,118	1,970	1,237	19,768	8
9	Simla	65	62	54	79	74	76	169	127	92	98	73	44	1,013	9
	JULLUNDUR DIVISION.														
10	Jullundur	4,140	2,424	1,806	1,648	2,163	1,939	1,521	1,422	1,936	2,592	2,693	2,593	26,877	10
11	Hoshiárpur	3,035	2,317	1,949	1,998	2,872	2,249	1,874	2,197	3,252	4,400	3,277	3,192	32,612	11
12	Kángra	1,419	1,552	1,592	1,469	1,969	1,393	1,430	3,503	3,499	2,299	2,093	1,917	24,135	12
	AMRITSAR DIVISION.														
13	Amritsar	4,037	2,723	2,741	3,034	4,034	3,004	2,529	2,363	2,532	3,075	3,006	2,587	35,665	13
14	Gurdáspur	2,996	2,806	2,658	2,216	3,220	2,601	1,672	1,682	2,228	3,449	3,650	2,943	32,121	14
15	Siálkot	2,195	2,110	2,056	1,522	2,578	1,830	1,436	1,266	1,770	2,532	2,218	1,860	23,373	15
	LAHORE DIVISION.														
16	Lahore	4,031	3,391	2,867	2,113	3,282	3,000	2,269	1,724	1,639	2,526	2,600	2,430	31,872	16
17	Gujránwála	2,344	1,977	1,606	1,189	1,681	1,408	1,296	1,133	1,190	1,809	1,668	1,511	18,812	17
18	Ferozepore	1,160	1,064	1,146	864	1,422	2,542	1,034	626	945	1,267	978	897	13,945	18
	RAWALPINDI DIVISION.														
19	Rawalpindi	5,517	3,523	3,035	2,771	3,616	3,743	3,209	2,838	5,032	5,364	4,733	3,494	46,875	19
20	Jhelum	1,880	1,580	1,544	1,650	2,405	2,315	1,468	1,595	1,839	2,061	1,944	1,423	21,704	20
21	Gujrat	2,277	1,942	1,544	1,002	1,591	1,413	1,042	1,111	1,686	2,313	1,793	1,294	19,008	21
22	Shahpur	1,555	1,251	1,039	698	899	797	787	798	682	753	762	813	10,834	22
	MOOLTAN DIVISION.														
23	Mooltan	1,275	1,014	976	640	757	549	467	428	483	646	963	980	9,178	23
24	Jhang	606	629	613	359	325	275	357	330	207	183	260	323	4,467	24
25	Montgomery	1,013	877	879	534	549	506	459	345	389	586	731	706	7,574	25
26	Muzaffargarh	963	767	711	652	563	500	494	342	311	503	590	814	7,210	26
	DERAJAT DIVISION.														
27	Dera Ismail Khan	1,083	1,214	903	579	825	553	486	457	414	483	830	940	8,767	27
28	Dera Gházi Khan	595	585	574	338	347	280	221	215	198	260	326	340	4,279	28
29	Bannu	844	907	691	493	465	437	503	423	319	428	450	541	6,501	29
	PESHAWAR DIVISION.														
30	Peshawar	1,426	851	721	589	1,372	1,226	989	590	765	1,161	1,233	904	11,827	30
31	Hazára	987	794	610	590	830	796	615	579	864	811	749	524	8,749	31
32	Kohát	490	299	149	104	150	468	224	214	240	180	214	200	2,932	32
	Total for the Province.	59,464	48,167	43,501	39,421	62,032	47,886	34,579	45,955	67,633	91,728	76,369	56,478	673,213	
	Ratio of Death per 1,000 in each month ...	3·40	2·75	2·49	2·25	3·55	2·74	1·98	2·63	3·87	5·24	4·37	3·23	38·50	

ANNUAL

DEATHS REGISTERED according to age in the DISTRICTS of the

Number.	Districts.	3		4		5		6	
		Under one year.		*One year and under 6.*		*6 and under 12.*		*12 and under 20.*	
		Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
	DELHI DIVISION.								
1	Delhi	2,502	1,999	4,995	4,191	1,301	1,044	943	757
2	Gurgaon	1,573	1,297	5,207	4,097	2,456	1,818	1,751	1,168
3	Karnál	2,127	1,653	4,701	3,680	1,270	994	823	572
	HISSAR DIVISION.								
4	Hissar	552	349	1,639	1,274	904	762	824	565
5	Rohtak	1,159	894	3,136	2,378	1,408	1,096	1,183	832
6	Sirsa	482	396	1,051	952	367	310	312	206
	UMBALLA DIVISION.								
7	Umballa	2,092	1,748	5,650	4,450	1,542	1,211	985	669
8	Ludhiána	1,475	1,261	2,593	1,875	725	602	473	300
9	Simla	75	46	49	32	17	17	29	22
	JULLUNDUR DIVISION.								
10	Jullundur	1,577	1,591	2,706	2,484	917	818	619	489
11	Hoshiárpur	2,410	2,143	2,808	2,656	911	914	693	615
12	Kángra	1,257	1,070	1,194	1,147	704	669	841	713
	AMRITSAR DIVISION.								
13	Amritsar	3,095	3,016	4,686	3,831	1,245	1,002	763	660
14	Gurdáspur	1,914	1,764	3,313	3,044	1,026	856	771	557
15	Siálkot	1,911	1,563	3,041	2,590	773	684	478	399
	LAHORE DIVISION.								
16	Lahore	3,009	2,580	4,384	3,468	1,098	832	814	646
17	Gujránwála	1,679	1,510	2,231	2,076	653	578	319	274
18	Ferozepore	885	724	1,896	1,277	727	445	513	331
	RAWALPINDI DIVISION.								
19	Rawalpindi	2,535	2,281	5,060	4,665	1,824	1,529	1,408	946
20	Jhelum	1,383	1,200	2,644	2,327	986	831	645	414
21	Gujrat	1,199	957	2,647	2,293	678	580	361	320
22	Shahpur	1,225	1,015	1,300	1,149	420	288	182	143
	MOOLTAN DIVISION.								
23	Mooltan	756	655	405	383	209	183	194	140
24	Jhang	357	299	396	331	141	108	73	61
25	Montgomery	717	608	776	564	203	200	159	125
26	Muzaffargarh	380	274	419	343	332	226	186	148
	DERAJAT DIVISION.								
27	Dera Ismail Khan	635	498	584	434	249	192	198	138
28	Dera Gházi Khan	208	134	305	274	219	138	136	84
29	Bannu	351	264	605	520	227	203	167	105
	PESHAWAR DIVISION.								
30	Pesháwar	404	353	1,362	1,203	452	343	317	262
31	Hazárá	171	114	738	641	405	324	327	210
32	Kohát	50	49	173	123	104	53	87	68
	Total for the Province ...	40,145	34,305	72,694	60,752	24,593	19,850	17,574	12,939
	Ratio per 1,000 living ...	4·22	4·30	7·64	7·61	2·59	2·49	1·85	1·62

PUNJAB during the year 1879.

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.
1,623	1,622	1,655	1,623	2,180	1,780	2,415	1,973	5,507	5,374	1
2,859	2,677	2,515	2,924	3,216	2,972	3,632	3,132	6,508	6,435	2
1,527	1,223	1,503	1,341	2,047	1,611	2,139	1,653	3,771	3,587	3
1,295	1,166	1,027	1,154	1,288	1,150	1,274	843	2,231	2,164	4
1,811	1,817	1,558	1,825	2,132	1,942	2,358	1,765	4,343	4,145	5
405	372	363	304	475	324	445	256	818	659	6
1,704	1,229	1,947	1,362	2,523	1,675	2,244	1,604	5,228	4,469	7
748	618	721	602	1,078	734	1,098	709	2,405	1,751	8
99	51	135	39	100	17	67	22	115	81	9
932	750	1,214	918	1,685	1,124	1,805	1,191	3,388	2,669	10
1,237	1,051	1,515	1,127	2,129	1,277	1,890	1,221	4,345	3,670	11
1,428	1,488	1,365	1,054	1,927	1,271	1,296	877	3,297	2,537	12
1,398	1,138	1,584	967	1,874	1,138	1,762	1,031	3,817	2,658	13
1,393	1,073	1,586	1,125	2,294	1,427	1,877	1,135	3,968	2,998	14
719	575	781	667	1,173	823	1,095	677	3,095	2,389	15
1,250	932	1,293	848	1,619	963	1,498	911	3,370	2,357	16
452	398	566	452	859	642	869	620	2,671	1,963	17
699	525	593	418	725	406	853	396	1,574	958	18
2,055	1,671	2,625	1,895	2,682	1,927	2,187	1,528	5,570	4,487	19
805	675	996	704	1,005	741	1,018	680	2,536	2,114	20
597	578	577	551	868	659	818	584	2,587	2,154	21
213	188	278	249	364	278	459	300	1,560	1,223	22
434	301	526	336	799	467	641	351	1,437	961	23
122	105	199	130	282	162	287	155	771	488	24
281	188	293	226	460	293	400	225	1,125	731	25
258	228	453	326	587	406	468	290	1,166	720	26
341	291	493	379	583	466	591	381	1,357	957	27
201	161	288	186	349	193	273	144	596	390	28
314	183	372	251	498	290	402	277	859	613	29
633	437	824	541	844	547	588	408	1,382	927	30
479	364	648	435	690	445	448	246	1,284	780	31
289	123	340	171	281	191	213	119	304	194	32
28,601	24,198	30,833	25,070	39,616	28,341	37,410	25,704	82,985	67,603	
3·01	3·03	3·24	3·14	4·16	3·55	3·93	3·22	8·73	8·47	

DEATHS REGISTERED according to classes in the DISTRICTS of the PUNJAB during the year 1879

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						10,576	29,077	13	3,818	43,484					
2	Gurgaon						14,343	36,449	..	5,445	56,237					
3	Karnál						9,027	22,707	...	4,488	36,222					
	HISSAR DIVISION.															
4	Hissar						3,597	15,042	...	1,822	20,461					
5	Rohtak						4,133	28,646	...	3,003	35,782					
6	Sirsa						2,972	4,515	...	1,010	8,497					
	UMBALLA DIVISION.															
7	Umballa						13,152	23,576	2	5,702	42,432					
8	Ludhiána						7,829	10,066	...	1,873	19,768					
9	Simla						301	493	3	216	1,013					
	JULLUNDUR DIVISION.															
10	Jullundur						12,482	10,640	...	3,755	26,877					
11	Hoshiárpur						11,190	17,118	1	4,303	32,612					
12	Kángra						1,725	18,853	...	3,557	24,135					
	AMRITSAR DIVISION.															
13	Amritsar						17,530	14,876	2	3,257	35,665					
14	Gurdáspur						15,710	12,978	2	3,431	32,121					
15	Siálkot						14,510	6,675	1	2,187	23,373					
	LAHORE DIVISION.	Information not available.										Information not available.				
16	Lahore						20,126	8,830	5	2,911	31,872					
17	Gujránwála						13,121	4,459	1	1,231	18,812					
18	Ferozepore						6,020	6,335	...	1,590	13,945					
	RAWALPINDI DIVISION.															
19	Rawalpindi						42,364	4,343	1	167	46,875					
20	Jhelum						18,918	2,584	7	195	21,704					
21	Gujrat						16,926	1,985	...	97	19,008					
22	Shahpur						8,913	1,713	...	208	10,834					
	MOOLTAN DIVISION.															
23	Mooltan						7,117	1,917	2	142	9,178					
24	Jhang						3,299	1,040	..	128	4,467					
25	Montgomery						5,464	1,798	...	312	7,574					
26	Muzaffargarh						6,136	1,013	...	61	7,210					
	DERAJAT DIVISION.															
27	Dera Ismail Khan						7,657	1,059	...	51	8,767					
28	Dera Gházi Khan						3,385	866	...	28	4,279					
29	Bannu						5,705	753	...	43	6,501					
	PESHAWAR DIVISION.															
30	Pesháwar						10,745	979	...	103	11,827					
31	Hazárá						8,143	577	1	28	8,749					
32	Kohát						2,690	214	...	28	2,932					
	Total for the province ...						325,806	292,176	41	55,190	673,213					

DEATHS REGISTERED from DIFFERENT CAUSES in the DISTRICTS

1	2	3	4	5	6	7		
Number.	A. Districts.	Population according to census of 1868.	Cholera.	Small-pox.	Fevers.	Bowel Complaints.	Injury. Suicide. Males.	Injury. Suicide. Females.
	DELHI DIVISION.							
1	Delhi	434,660	339	7	25,668	1,780	4	10
2	Gurgaon	636,779	727	166	44,427	1,756	22	65
3	Karnál	546,613	1,538	2,197	23,880	1,023	1	5
	HISSAR DIVISION.							
4	Hissar	425,089	3,303	469	12,479	541	1	...
5	Rohtak	509,509	1,958	8	29,205	725	9	10
6	Sirsa	197,988	1,053	617	4,980	324	2	1
	UMBALLA DIVISION.							
7	Umballa	936,992	499	4,811	25,854	2,829	1	1
8	Ludhiána	526,539	233	2,322	11,417	403	3	6
9	Simla	16,154	24	22	193	92	...	1
	JULLUNDUR DIVISION.							
10	Jullundur	708,129	57	973	20,460	288	4	6
11	Hoshiárpur	911,781	79	2,001	22,086	1,961	8	22
12	Kángra	740,896	2,022	241	14,614	1,646	17	16
	AMRITSAR DIVISION.							
13	Amritsar	696,584	344	3,688	15,719	808	4	6
14	Gurdáspur	876,942	19	3,189	21,422	1,554	6	5
15	Siálkot	961,469	37	3,014	14,448	709	2	8
	LAHORE DIVISION.							
16	Lahore	630,317	1,553	4,000	14,759	416	1	2
17	Gujránwála	514,868	405	2,065	11,200	369	6	4
18	Ferozepore	518,248	1,934	1,948	7,202	379	...	3
	RAWALPINDI DIVISION.							
19	Rawalpindi	670,906	2,694	2,562	33,485	1,313	3	...
20	Jhelum	474,272	1,757	2,296	12,191	905	1	1
21	Gujrat	584,932	335	3,083	11,254	491	3	4
22	Shahpur	354,086	172	1,104	5,758	439	...	...
	MOOLTAN DIVISION.							
23	Mooltan	408,887	...	179	5,824	208	2	1
24	Jhang	322,410	159	585	1,848	104	...	...
25	Montgomery	359,437	101	989	4,933	199	2	...
26	Muzaffargarh	295,547	1	845	5,686	82	...	...
	DERAJAT DIVISION.							
27	Dera Ismail Khan	369,579	36	426	6,612	147	2	...
28	Dera Ghází Khan	286,770	...	571	2,557	101	1	...
29	Bannu	284,323	149	410	4,690	360	...	1
	PESHAWAR DIVISION.							
30	Pesháwar	440,049	517	687	4,893	142	1	...
31	Hazára	364,324	778	768	6,439	253	...	1
32	Kohát	129,166	519	40	1,619	51	2	...
	Total of Districts ...	16,134,245	23,347	46,283	427,802	22,398	108	179

Note.—A. Districts in this statement do not include the population

and TOWNS of the PUNJAB during the year 1879.

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.
149	8	171	2,995	30,960	0·78	0·02	59·05	4·09	0·39	6·89	71	25	1
286	12	385	1,980	49,441	1·14	0·26	69·77	2·76	0·60	3·11	78	27	2
120	20	146	3,646	32,430	2·81	4·02	43·69	1·87	0·27	6·67	59	24	3
65	20	86	991	17,874	7·78	1·10	29·36	1·27	0·20	2·33	42	13	4
179	13	211	1,762	33,869	3·84	0·01	57·32	1·42	0·41	3·46	66	22	5
27	14	44	1,053	8,071	5·32	3·12	25·15	1·64	0·22	5·32	41	19	6
139	18	159	4,489	38,641	0·53	5·13	27·59	3·02	0·17	4·79	41	22	7
80	10	99	2,322	16,796	0·44	4·41	21·68	0·76	0·19	4·41	32	25	8
8	...	9	185	525	1·48	1·36	11·95	5·69	0·55	11·45	32	18	9
105	6	121	2,084	23,983	0·08	1·37	28·89	0·41	0·17	2·94	34	40	10
218	30	278	5,062	31,467	0·09	2·19	24·22	2 15	0·30	5·55	34	33	11
305	62	400	5,087	24,010	2·73	0·32	19·73	2·22	0·54	6·87	32	22	12
96	15	121	3,991	24,671	0·49	5·29	22·56	1·16	0·17	5·73	35	29	13
179	28	218	5,122	31,524	0·02	3·64	24·43	1·77	0·25	5·84	36	28	14
123	15	148	3,905	22,261	0·04	3·13	15·03	0·74	0·15	4·06	23	24	15
139	96	238	4,176	25,142	2·46	6·35	23·41	0·66	0·38	6·62	40	31	16
106	96	212	2,865	17,116	0·79	4·01	21·75	0·72	0·41	5·56	33	27	17
48	21	72	1,530	13,065	3·73	3·76	13·90	0·73	0·14	2·95	25	21	18
223	41	267	3,307	43,628	4·01	3·82	49·91	1·96	0·40	4·93	65	22	19
157	40	199	2,849	20,197	3·70	4·84	25·70	1·91	0·42	6·01	42	21	20
119	19	145	2,568	17,876	0·57	5·27	19·24	0·84	0·25	4·39	30	19	21
85	63	148	2,724	10,345	0·48	3·12	16·26	1·24	0·42	7·69	29	23	22
155	39	197	1,075	7,483	...	0·44	14·24	0·51	0·48	2·63	18	24	23
57	40	97	974	3,767	0·49	1·81	5·73	0 32	0·30	3·02	12	14	24
85	56	143	1,209	7,574	0·28	2·75	13·72	0·55	0·40	3·36	21	24	25
68	52	120	476	7,210	0·003	2·86	19·24	0·28	0·41	1·61	24	22	26
59	37	98	851	8,170	0·10	1·15	17·89	0·40	0·26	2·30	22	20	27
29	14	44	313	3,586	...	1·99	8·92	0·35	0·14	1·09	12	13	28
27	17	45	703	6,357	0·52	1·44	16·49	1·27	0·16	2·47	22	16	29
46	4	51	448	6,738	1·17	1·56	11·12	0·32	0·11	1·02	15	10	30
92	10	103	350	8,691	2·13	2·11	17·67	0·69	0·28	0·96	24	17	31
68	6	76	123	2,428	4·02	0·31	12·53	0·39	0·59	0·95	19	8	32
3,642	922	4,851	71,215	595,896	1·45	2·87	26·51	1·39	0·30	4·41	37	24	

and 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 and 79.	Cholera.	Small pox.	Fevers.	Bowel complaints.	Injuries. Suicide. Males.	Females.
	DELHI DISTRICT.							
1	Delhi ...	115,992	14	5	7,572	305	2	1
2	Do. Suburbs ...	44,561	45	....	1,657	74	...	...
3	Sonepat ...	13,637	18	...	438	66	...	...
	GURGAON DISTRICT.							
4	Farukhnagar ...	10,594	...	1	1,499	340	2	1
5	Rewári ...	25,190	20	2	1,425	238	...	1
6	Ferozepore ...	10,530	...	...	774	199	...	...
7	Palwal ...	13,553	6	...	739	444	...	1
	KARNAL DISTRICT.							
8	Karnál ...	24,015	26	106	1,240	228	...	..
9	Kaithal ...	15,799	28	61	329	71	...	...
10	Pánipat ...	24,500	14	5	598	121	1	...
	HISSAR DISTRICT.							
11	Hissar ...	14,162	86	...	296	52	...	...
12	Hánsi ...	12,210	132	...	312	18	...	...
13	Bhiwáni ...	33,220	148	3	799	109	...	...
	ROHTAK DISTRICT.							
14	Rohtak ...	14,994	54	1	341	51	...	...
15	Jhajjar ...	12,456	8	1	1,030	132	...	...
	SIRSA DISTRICT.							
16	Sirsa ...	12,807	35	12	227	31	...	...
	UMBALLA DISTRICT							
17	Umballa ...	26,258	23	78	706	173	...	...
18	Jagádhri ...	12,522	44	156	362	68	...	...
19	Shahabad ...	11 663	8	86	416	70	...	...
20	Sádhaura ...	11,167	14	61	314	11	...	...
21	Rúpar ...	10,261	21	54	306	26	...	...
	LUDHIANA DISTRICT.							
22	Ludhiána ...	40,385	22	51	1,292	265	...	...
23	Jagraon ...	16,321	...	71	272	79	...	...
	JULLUNDUR DISTRICT.							
24	Jullundur ...	35,222	17	9	996	95	...	1
25	Do. Suburbs ...	15,702	2	1	406	22	...	...
26	Kartárpur ...	11,053	11	16	232	10	...	...
27	Ráhon ...	12,914	...	11	436	39	...	...
	HOSHIARPUR DISTRICT.							
28	Hoshiárpur ...	13,138	3	24	217	131	...	...
29	Urmar Tánda ...	13,971	...	3	388	43	...	...
	AMRITSAR DISTRICT							
30	Amritsar ...	136,166	524	745	5,125	1,044	2	1
	GURDASPUR DISTRICT.							
31	Batála ...	26,929	1	65	270	50	...	...
	SIALKOT DISTRICT.							
32	Siálkot ...	32,989	5	144	473	97	1	...
	LAHORE DISTRICT.							
33	Lahore ...	92,035	64	390	3,124	180	1	...
34	Do. Suburbs ...	36,406	34	29	658	326	...	...
35	Kasur ...	16,793	22	97	255	30	...	...
	GUJRANWALA DISTRICT.							
36	Gujránwála ...	20,362	9	63	365	114	...	...
37	Wazirabad ...	15,346	16	9	614	43	...	...
	FEROZEPORE DISTRICT.							
38	Ferozepore ...	15,168	13	55	506	76	...	...
	RAWALPINDI DISTRICT							
39	Rawalpindi ...	20,802	163	52	1,653	464	...	...
	JHELUM DISTRICT.							
40	Jhelum ...	11,319	199	61	409	98	...	...
41	Pind Dádan Khan ...	15,397	6	49	258	159	...	...
	GUJRAT DISTRICT.							
42	Gujrat ...	17,401	24	21	337	10	...	...
43	Jalálpur ...	14,014	21	23	370	34	...	...
	SHAHPUR DISTRICT.							
44	Bhera ...	14,710	6	30	234	55	...	...
	MOOLTAN DISTRICT.							
45	Mooltan ...	29,448	1	25	358	76	1	...
46	Do. Suburbs ...	21,430	1	31	418	50	1	...
	JHANG DISTRICT.							
47	Maghiána ...	13,618	82	20	127	16	...	...
48	Chiniot ...	11,999	1	49	78	27	...	...
	DERA ISMAIL KHAN DISTRICT.							
49	Dera Ismail Khan ...	19,954	2	...	380	47	...	...
	DERA GHAZI KHAN DISTRICT.							
50	Dera Gházi Khan ...	19,133	1	32	331	65	...	...
	PESHAWAR DISTRICT.							
51	Pesháwar ...	58,430	478	335	2,562	410	1	...
	KOHAT DISTRICT.							
52	Kohát ...	11,043	115	46	129	57	...	...
	Total of the Town ...	1,299,686	2,587	3,189	44,653	7,039	12	6
	Total for the Province ...	17,487,125	26,135	49,489	472,939	29,612	121	186

NOTE.—The deaths registered in the Frontier Cantonments and Hill Sanitaria are

DISTRICTS and TOWNS of the PUNJAB, during the year 1879.

8			9	10	11								12
DIES.					RATIO OF DEATHS PER 1,000 OF POPULATION.								
Wounding or Accident.	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.	Mean of previous five years.	Number.
33	2	38	1,940	9,874	0·12	0·04	65·28	2·63	0·33	16 72	85	58	1
1	1	2	290	2,068	1·01	...	37·18	1.66	0·04	6·51	46	42	2
2	...	2	58	582	1·32	...	32·12	4·84	0 15	4·25	43	29	3
9	...	12	279	2,131	...	0·09	141·49	32·09	1·13	26·33	201	43	4
12	...	13	356	2,054	0·79	0·08	56·57	9·45	0·52	14·13	81	45	5
11	...	11	187	1,171	...	...	73·50	18·90	1·04	17·76	111	57	6
9	...	10	241	1,440	0·44	...	54·53	32 76	0·74	17·78	106	73	7
4	...	4	501	2.105	1·08	4·41	51·63	9·49	0·17	20·86	88	50	8
...	...	...	62	551	1·77	3·86	20 82	4·49	...	3·92	35	26	9
9	1	11	387	1,136	0·57	0·20	24·41	4·94	0·45	15·79	46	36	10
1	...	1	203	638	6·07	...	20·90	3·67	0·07	14 33	45	46	11
1	2	3	76	541	10·81	...	25·55	1·47	0·24	6·22	44	38	12
3	...	3	346	1,408	4·45	0·09	24·05	3·28	0·09	10·41	42	36	13
3	...	3	124	574	3·60	0·07	22·74	3·40	0·20	8·27	38	38	14
1	...	1	167	1,339	0·64	0·08	82·69	10·60	0·08	13·41	107	25	15
1	...	1	120	426	2·73	0·94	17·72	2·42	0·08	9·36	33	43	16
8	...	8	315	1,303	0·87	2·97	26·89	6·59	0·30	12·00	49	41	17
2	...	2	211	843	3·51	12·46	28·91	5·43	0·16	16·85	67	29	18
4	1	5	61	646	0·69	7·37	35·68	6·00	0 43	5·23	55	25	19
2	...	2	59	461	1·25	5·46	28·12	0·98	0·18	5·28	41	84	20
8	1	9	122	538	2·05	5·26	29·82	2·53	0·88	11·89	52	30	21
4	6	10	597	2,237	0·54	1·26	31·99	6·56	0 25	14·78	55	52	22
4	2	6	307	735	...	4·35	16·66	4·84	0 37	18 81	45	48	23
4	...	5	327	1,449	0·48	0·25	28·28	2·70	0·14	9·29	41	66	24
3	...	3	75	509	0·13	0·06	25·86	1·40	0·19	4·78	32	63	25
1	...	1	35	305	0·99	1·45	20·99	0·90	0·09	3·17	27	57	26
1	...	1	144	631	...	0·85	31·76	3·02	0·08	11·15	49	28	27
5	...	5	190	570	0·23	1·83	16·52	9·97	0·38	14·46	43	47	28
...	...	...	141	575	...	0·21	27·77	3·08	...	10·09	41	53	29
65	4	72	3,484	10,994	3·85	5·47	37·64	7·67	0 53	25·59	81	57	30
7	...	7	176	569	0·04	2 41	10·03	1·86	0·26	6·54	21	33	31
5	2	8	385	1,112	0·15	4·36	14·34	2·94	0·24	11·67	34	35	32
26	2	29	948	4,735	0·69	4·24	33·94	1·95	0 31	10·30	51	44	33
10	...	10	443	1,500	0·93	0·80	18·07	8·95	0·27	12·17	41	24	34
8	1	9	82	495	1·31	5·78	15·18	1·79	0·53	4·88	29	27	35
7	...	7	351	909	0·44	3·09	17·92	5·60	0·34	17·24	45	40	36
4	...	4	101	787	1·04	0·59	40·01	2·80	0·26	6·58	51	33	37
4	2	6	224	880	0·86	3·63	33·36	5·01	0·39	14·77	58	52	38
11	1	12	659	3,003	7·83	2·50	79·46	22·30	0·58	31·68	144	51	39
4	...	4	123	894	17·58	5·39	36·13	8·66	0·35	10·87	79	28	40
1	...	1	140	613	0·39	3·18	16 76	10·33	0·06	9·09	40	37	41
1	...	1	140	533	1·38	1·21	19·37	0·57	0·06	8·04	31	33	42
3	2	5	146	599	1·50	1·64	26·40	2·43	0·36	10·42	43	36	43
1	...	1	163	489	0·41	2·04	15 91	3·74	0·07	11·08	33	37	44
22	...	23	415	898	0·03	0·85	12·16	2·58	0·78	14·09	30	36	45
8	1	10	287	797	0·05	1·45	19·50	2·33	0·47	13 39	37	47	46
1	...	1	128	374	6·02	1·47	9·32	1·17	0·07	9·40	27	27	47
2	...	2	169	326	0·08	4·08	6·50	2·25	0·17	14·08	27	29	48
3	...	3	140	572	0·10	...	19·04	2·35	0·15	7·02	29	30	49
7	1	8	212	649	0·05	1·67	17·30	3·40	0·42	11·08	34	38	50
27	...	28	1,194	5,007	8·18	5·73	43·85	7·02	0·48	20·43	86	48	51
8	...	8	59	414	10·41	4·16	11·68	5·16	0·72	5·34	37	20	52
381	32	431	18,090	75,989	1·99	2·45	34 36	5·41	0·33	13 92	58	42	
4,044	955	53,06	89,732	673,213	1·49	2·83	27·04	1·69	0·30	5·13	38	25	

own separately in Form No. VI B. but are included in the grand total for the Province.

ANNUAL FORM No. VI B.

DEATHS REGISTERED in the FRONTIER CANTONMENTS and HILL SANITARIA during the year 1879.

Number.	Frontier Cantonment 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	3	1	17	5	...	...	...	...	...	32	58	20	31	11
	Mardán	1,964	7	2	34	2	...	...	1	...	1	36	82	42	14	7
3	Kohát	5,210	8	1	10	21	...	...	...	...	...	50	90	17	1	0·19
4	Edwardes-abad	3,224	16	...	20	17	...	...	1	...	1	90	144	45	13	4
5	Dera Ismail Khan.... ...	5,331	...	...	4	2	...	...	...	...	...	19	25	5	6	1
6	Dera Gházi Khan... ...	2,937	...	...	9	11	...	...	1	...	1	23	44	15	5	2
7	Rájanpur	1,138	...	...	...	...	..	...	...	...	...	...	...	...	...	...
	Hill Sanitaria.															
1	Simla	17,440	84	10	199	68	1	1	10	...	12	115	488	28	80	4
2	Dharamsala	2,862	26	3	30	34	...	...	1	...	1	31	125	44	42	15
3	Dalhousie	2,255	...	...	7	3	..	...	5	...	5	13	28	12	2	1
4	Murree	7,939	57	...	154	12	...	...	2	1	3	18	244	31	14	2
	Total ...	53,194	201	17	484	175	1	1	21	1	24	427	1,328	25	208	4

DEATHS REGISTERED from CHOLERA in the DISTRICTS of the PUNJAB during each month of the year 1879.

1	2	3		4		5												6			7			8	9
Number.	Districts.	Circles of registration.		Villages.														Total.			Ratio of deaths per 1,000 of population.			Mean ratio per 1,000 of previous 5 years.	Number.
		Number in each District.	Number from which deaths from Cholera were reported.	Number in each District.	Number from which deaths from Cholera were reported.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Males.	Females.	Total.	Males.	Females.	Total.		
	DELHI DIVN.																								
1	Delhi	15	12	743	53	...	...	...	78	140	187	3	6	2	...	...	...	244	172	416	0·75	0·61	0·68	0·12	1
2	Gurgaon	16	12	1,239	102	...	...	...	84	384	249	17	19	...	...	...	...	439	314	753	1·18	0·96	1·08	0·21	2
3	Karnál	14	14	868	193	...	...	...	181	1,071	330	13	7	4	...	...	...	935	671	1,606	2·83	2·39	2·62	0·25	3
	HISSAR DIVN.																								
4	Hissar	12	12	715	334	...	...	...	988	2,269	390	25	2	...	...	...	...	2,650	1,624	3,674	7·68	7·45	7·58	0·53	4
5	Rohtak	11	11	498	180	...	...	...	331	1,462	215	12	...	...	...	...	...	1,207	813	2,020	4·13	3·32	3·76	0·94	5
6	Sirsa	13	11	626	146	...	...	...	170	668	216	34	...	...	...	...	...	654	434	1,088	5·59	4·63	5·16	0·27	6
	UMBALLA DIVN.																								
7	Umballa	20	20	2,225	159	...	1	...	164	252	143	12	14	20	3	...	...	423	186	609	0·77	0·49	0·60	0·72	7
8	Ludhiána	9	9	851	58	2	...	...	23	53	120	43	13	...	1	...	...	172	83	255	0·54	0·31	0·44	0·29	8
9	Simla	4	3	238	9	...	...	...	13	13	1	49	28	4	...	...	...	94	14	108	4·25	1·22	3·21	0·95	9
	JULLUNDUR DIVN.																								
10	Jullundur	9	9	1,233	19	...	...	...	37	29	9	6	4	...	...	1	1	61	26	87	0·14	0·07	0·11	0·02	10
11	Hoshiárpur	14	8	2,178	25	...	...	...	20	10	27	11	13	1	...	...	...	49	33	82	0·10	0·07	0·09	0·50	11
12	Kángra	15	15	704	147	...	...	...	98	52	35	156	1,370	323	12	2	...	1,148	900	2,048	2·92	2·57	2·75	0·19	12
	AMRITSAR DIVN.																								
13	Amritsar	10	10	1,078	71	...	1	...	196	216	116	148	134	47	8	...	2	526	342	868	1·13	0·93	1·04	0·31	13
14	Gurdáspur	17	9	2,302	14	1	...	1	11	3	...	...	1	3	...	...	...	15	5	20	0·03	0·01	0·02	0·34	14
15	Siálkot	13	9	2,315	12	3	...	...	11	11	9	...	4	3	...	1	...	32	10	42	0·06	0·02	0·04	0·16	15
	LAHORE DIVN.																								
16	Lahore	20	20	1,672	289	...	1	1	16	350	657	468	151	20	8	...	1	1,026	647	1,673	2·39	1·86	2·16	0·27	16
17	Gujránwála	9	9	1,177	66	...	...	...	2	57	84	185	74	28	...	...	...	242	188	430	0·79	0·77	0·78	0·14	17
18	Ferozepore	15	13	1,276	309	...	...	...	3	394	1,271	262	16	1	...	..	...	1,256	691	1,947	4·28	2·88	3·65	...	18
	RAWALPINDI DIVN.																								
19	Rawalpindi	18	18	1,725	601	...	...	...	50	533	1,157	859	257	52	6	...	...	1,719	1,195	2,914	4·56	3·70	4·16	0·18	19
20	Jhelum	12	12	1,042	293	...	...	...	124	542	760	224	150	140	22	...	...	1,254	708	1,962	4·74	3·00	3·92	0·13	20
21	Gujrat	8	8	1,416	59	1	...	...	...	90	212	27	26	24	...	...	...	203	177	380	0·61	0·62	0·62	0·19	21
22	Shahpur	15	10	632	23	...	...	...	...	8	92	56	16	6	...	..	...	99	79	178	0·50	0·46	0·48	0·27	22
	MOOLTAN DIVN.																								
23	Mooltan	12	1	12,33	2	...	...	...	...	2	...	...	...	...	...	...	...	2	...	2	0·007	...	0·004	0·14	23
24	Jhang	9	8	976	33	...	...	...	...	...	7	144	84	3	4	...	...	145	97	242	0·75	0·63	0·69	0·01	24
25	Montgomery ...	16	13	1,518	37	...	...	...	2	15	20	41	22	1	...	...	...	66	35	101	0·33	0·22	0·28	0001	25
26	Muzaffargarh ...	12	1	534	1	...	...	...	...	...	...	.	...	1	...	...	...	1	...	1	0·006	...	0·003	...	26
	DERAJAT DIVN.																								
27	Dera Ismail Khan ..	19	5	772	12	...	...	...	...	...	...	...	4	9	9	...	16	20	18	38	0·09	0·10	0·10	0·13	27
28	Dera Gházi Khan ..	17	1	422	1	...	...	...	...	...	...	...	1	...	...	...	...	1	...	1	0·005	...	0·003	0·007	28
29	Bannu	13	8	553	22	...	...	...	...	...	1	73	53	3	35	...	...	107	58	165	0·69	0·43	0·57	0·69	29
	PESHAWAR DIVN.																								
30	Peshawar	19	17	730	138	...	...	...	...	382	216	261	51	56	32	3	...	617	385	1,002	2·30	1·65	2·00	0·25	30
31	Hazára	16	14	1,018	228	...	...	...	1	156	238	225	77	78	6	...	...	483	298	781	2·52	1·69	2·13	0·14	31
32	Kohát	11	11	469	107	...	1	...	...	21	323	103	108	85	1	...	...	411	231	642	5·18	3·49	4·41	0·03	32
	Total for the Province...	433	331	34,973	3,753	7	4	2	2,603	9,184	7,085	3,457	2,765	914	147	7	20	15,701	10,434	26,135	1·65	1·31	1·49	0·15	

DEATHS REGISTERED from SMALL POX in the DISTRICTS of the

1	2	3		4		5					
		Circles of registration.		*Villages.*							
Number.	Districts.	Number in each district.	Number from which deaths from Small Pox were reported.	Number in each district.	Number from which deaths from Small Pox were reported.	January.	February.	March.	April.	May.	June.
	DELHI DIVISION.										
1	Delhi	15	4	743	11	3	...	2	1	1	5
2	Gurgaon	16	15	1,239	87	2	8	25	20	48	47
3	Karnál	14	14	868	461	167	302	332	216	572	279
	HISSAR DIVISION.										
4	Hissar	12	12	715	148	44	51	94	110	101	59
5	Rohtak	11	4	498	12	...	3	1	2	1	1
6	Sirsa	13	13	626	215	26	55	112	110	163	98
	UMBALLA DIVISION.										
7	Umballa	20	20	2,225	1,154	221	371	569	621	1,394	881
8	Ludhiána	9	9	851	462	175	292	373	389	572	331
9	Simla	4	4	238	9	1	2	7	6	1	5
	JULLUNDUR DIVISION.										
10	Jullundur	9	9	1,233	294	21	29	59	113	256	239
11	Hoshiárpur	14	14	2,178	684	89	107	127	199	456	453
12	Kángra	15	12	704	124	22	11	18	36	72	44
	AMRITSUR DIVISION.										
13	Amritsar	10	10	1,078	677	280	362	672	755	1,184	757
14	Gurdáspur	17	17	2,302	806	142	189	386	421	896	718
15	Siálkot	13	13	2,315	836	295	363	525	447	755	452
	LAHORE DIVISION.										
16	Lahore	20	20	1,672	841	606	839	916	570	739	514
17	Gujránwála	9	9	1,177	564	554	443	437	251	261	114
18	Ferozepore	15	15	1,276	434	161	311	408	336	341	258
	RAWALPINDI DIVISION.										
19	Rawalpindi	18	18	1,725	735	445	423	468	400	399	258
20	Jhelum	12	12	1,042	520	110	186	254	402	587	437
21	Gujrát	8	8	1,416	740	1,104	854	543	273	228	79
22	Shahpur	15	15	632	196	357	200	111	69	101	68
	MOOLTAN DIVISION.										
23	Mooltan	12	10	1,233	68	101	34	36	13	13	11
24	Jhang	9	9	976	190	119	196	176	75	54	19
25	Montgomery	16	16	1,518	322	185	211	226	101	102	72
26	Muzaffargarh...	12	12	534	185	58	48	89	144	142	119
	DERAJAT DIVISION.										
27	Dera Ismail Khan	19	17	772	97	8	22	29	53	100	49
28	Dera Gházi Khan	17	16	422	117	107	131	133	83	59	41
29	Bannu	13	13	553	78	18	15	35	41	36	46
	PESHAWAR DIVISION.										
30	Pesháwar	19	19	730	171	99	57	70	57	171	225
31	Hazára	16	15	1,013	264	258	133	97	82	91	70
32	Kohát	11	7	469	15	1	2	2	...	5	5
	Total for the Province ...	433	401	34,973	11,517	5,779	6,250	7,332	6,396	9,701	6,754

PUNJAB during each month of the year 1879.

July.	August.	September.	October.	November.	December.	6 Total. Males	6 Total. Females.	6 Total. Total.	7 Number of these deaths among children. Under one year.	7 Number of these deaths among children. One and under 12 years.	8 Total ratio of deaths per 1,000 of population. Males.	8 Females.	8 Total.	9 Mean ratio per 1,000 of previous 5 years.	10 Number.
...	...	...	...	...	...	6	6	12	2	9	0·02	0·02	0·02	0·70	1
12	7	...	...	...	...	96	73	169	15	148	0·26	0·22	0·24	3·89	2
146	212	189	99	38	17	1,393	976	2,369	355	1,900	4·21	3·48	3·88	2·97	3
10	1	...	...	1	1	269	203	472	59	393	1·01	0·93	0·97	1·13	4
...	...	...	1	...	1	4	6	10	1	9	0·01	0·02	0·02	1·01	5
42	18	4	...	...	1	326	303	629	66	514	2·78	3·23	2·98	1·72	6
439	366	203	124	45	12	3,006	2,240	5,246	776	4,055	5·46	4·89	5·20	1·58	7
177	96	16	8	6	9	1,441	1,003	2,444	451	1,913	4·51	3·80	4·19	0·98	8
9	1	...	...	...	...	23	9	32	2	2	1·04	0·78	0·95	0·18	9
138	59	24	10	15	47	498	512	1,010	148	765	1·16	1·45	1·29	0·10	10
282	130	49	42	32	62	1,023	1,005	2,028	478	1,233	2·03	2·31	2·16	0·15	11
26	4	5	2	1	3	152	92	244	13	40	0·39	0·26	0·33	0·11	12
307	71	17	15	6	7	2,457	1,976	4,433	1,035	3,242	5·28	5·37	5·32	1·13	13
331	113	36	12	6	4	1,737	1,517	3,254	599	2,361	3·46	3·75	3.59	0·27	14
205	78	22	6	9	1	1,701	1,457	3,158	802	2,179	3·16	3·20	3·17	0·23	15
183	66	17	16	29	21	2,559	1,957	4,516	1,031	3,281	5·97	5·63	5·82	1·28	16
42	14	7	5	5	4	1,119	1,018	2,137	682	1,352	3·65	4·17	3·88	0·67	17
112	46	10	6	4	10	1,210	793	2,003	348	1,603	4·12	3·31	3·75	0·88	18
119	61	15	6	19	1	1,296	1,318	2,614	599	1,745	3·44	4·08	3 74	0·59	19
228	114	33	13	20	22	1,226	1,180	2,406	490	1,741	4·63	4·99	4·82	0·13	20
30	12	2	2	...	...	1,640	1,487	3,127	736	2,332	4·94	5·23	5·07	0·71	21
39	24	21	21	55	68	597	537	1,134	295	821	3·05	3·10	3·07	0·91	22
8	2	1	4	4	8	115	120	235	45	149	0·45	0·58	0·51	1·20	23
9	3	...	...	1	2	363	291	654	146	471	1·87	1·88	1·88	1·11	24
32	20	6	15	11	8	541	448	989	226	713	2·70	2·81	2·75	2·72	25
88	46	21	12	17	61	484	361	845	96	633	2·98	2·70	2·86	1·00	26
58	31	5	4	25	42	213	213	426	56	319	1·00	1·17	1·08	1·12	27
14	11	4	4	6	10	339	264	603	58	483	1·98	1·90	1·94	0·55	28
39	30	11	26	33	80	213	197	410	57	332	1·38	1·47	1·42	1·60	29
157	101	35	21	15	16	570	454	1,024	103	892	2·13	1·95	2·05	1·10	30
28	5	1	1	2	1	408	361	769	53	633	2·13	2·05	2·09	0·90	31
5	2	2	26	31	6	48	39	87	9	72	0·60	0·59	0·60	0·89	32
3,315	1.744	756	501	436	525	27,073	22,416	49,489	9,832	36,326	2·85	2·81	2·83	1·01	

DEATHS REGISTERED from FEVERS in the DISTRICTS of.

1	2	3		4		5				
		Circles of registration.		*Villages:*						
Number.	Districts.	Number in each District.	No. from which deaths from fever were reported.	No. in each District.	No. from which deaths from fevers were reported.	January.	February.	March.	April.	May.
	DELHI DIVISION.									
1	Delhi	15	15	743	666	1,638	1,308	1,057	1,093	1,905
2	Gurgaon	16	16	1,239	1,142	1,414	1,245	1,088	884	1,850
3	Karnál	14	14	868	826	2,019	1,294	970	996	1,901
	HISSAR DIVISION.									
4	Hissar	12	12	715	622	549	498	633	668	1,347
5	Rohtak	11	11	498	494	1,021	848	896	792	1,509
6	Sirsa	13	13	626	549	262	255	384	367	419
	UMBALLA DIVISION.									
7	Umballa	20	20	2,225	2,001	1,863	1,651	1,525	1,189	1,752
8	Ludhiána	9	9	851	783	1,253	848	642	531	798
9	Simla	4	4	238	61	22	21	12	13	22
	JULLUNDUR DIVISION.									
10	Jullundur	9	9	1,233	1,148	3,781	2,110	1,505	1,260	1,662
11	Hoshiárpur	14	14	2,178	1,948	2,211	1,558	1,254	1,134	1,645
12	Kángra	15	15	704	678	886	985	927	814	1,217
	AMRITSAR DIVISION.									
13	Amritsar	10	10	1,078	988	2,761	1,596	1,40	1,389	1,764
14	Gurdáspur	17	17	2,302	2,016	2,236	2,003	1,708	1,325	1,693
15	Siálkot	13	13	2,315	1,812	1,514	1,382	1,151	753	1,285
	LAHORE DIVISION.									
16	Lahore	20	20	1,672	1,396	2,704	2,028	1,385	1,037	1,530
17	Gujránwála	9	9	1,177	998	1,508	1,266	905	638	897
18	Ferozepore	15	15	1,276	956	825	589	569	396	499
	RAWALPINDI DIVISION.									
19	Rawalpindi	18	18	1,725	1,496	4,565	2,700	2,080	1,740	1,996
20	Jhelum	12	12	1,042	931	1,481	1,138	859	700	839
21	Gujrat	8	8	1,416	1,171	943	842	768	503	803
22	Shahpur	15	15	632	529	840	770	646	415	501
	MOOLTAN DIVISION.									
23	Mooltan	12	12	1,233	818	913	799	722	483	578
24	Jhang	9	9	976	464	338	254	250	163	159
25	Montgomery	16	16	1,518	874	691	565	510	339	327
26	Muzaffargarh	12	12	534	464	847	668	567	484	385
	DERAJAT DIVISION.									
27	Dera Ismail Khan	19	19	772	552	919	1,092	773	463	625
28	Dera Gházi Khan	17	17	422	260	393	361	378	213	242
29	Bannu	13	13	553	364	692	797	541	365	330
	PESHAWAR DIVISION.									
30	Pesháwar	19	19	730	475	1,036	628	478	403	626
31	Hazára	16	16	1,013	721	677	623	471	437	501
32	Kohát	11	11	469	282	446	270	122	79	95
	Total for the province ...	433	433	34,973	28,485	43,248	32,994	27,177	22,066	31,702

the PUNJAB during each Month of the year 1879.

June.	July.	August.	September.	October.	November.	December.	6 *Total.* Males.	Females.	Total.	7 *Total ratio of deaths per 1000 of population.* Males.	Females.	Total.	8 Mean ratio per 1,000 for previous 5 years.	9 Number.
1,352	788	2,608	5,381	7,769	6,491	3,945	18,465	16,870	35,335	56·59	59·71	58·03	19·99	1
1,328	808	4,583	8,046	13,086	9,683	4,849	25,655	23,209	48,864	69·29	71·11	70·14	17·71	2
1,274	701	2,199	3,506	5,169	3,070	2,948	13,976	12,071	26,047	42·25	43·08	42·63	14·52	3
736	343	756	2,458	3,523	1,540	835	7,243	6,643	13,886	27·14	30·49	28·65	10·88	4
965	561	2,023	4,956	8,283	5,958	2,764	16,041	14,535	30,576	54·86	59·43	56·94	17·81	5
321	204	268	775	948	610	394	2,810	2,397	5,207	24·01	25·57	24·70	12·13	6
1,139	918	1,856	3,148	4,923	4,863	3,131	15,410	12,548	27,958	27·99	27·38	27·71	13·43	7
730	582	832	1,581	2,647	1,616	921	7,311	5,670	12,981	22·89	21·48	22·26	16·93	8
35	50	47	58	55	40	15	248	144	392	11·21	12·55	11·67	5·60	9
1,512	1,192	1,127	1,640	2,308	2,309	2,124	12,468	10,062	22,530	29·05	28·44	28·77	32·58	10
1,284	1,109	1,513	2,511	3,554	2,610	2,308	12,259	10,432	22,691	24·30	24·01	24·16	22·57	11
856	768	1,546	2,465	1,703	1,361	1,116	7,938	6,706	14,644	20·17	19·14	19·69	12·84	12
1,563	1,449	1,362	1,522	2,122	2,126	1,789	11,794	9,050	20,844	25·36	24·61	25·03	22·11	13
1,335	962	1,076	1,610	2,632	2,838	2,281	12,130	9,569	21,699	24·20	23·63	23·95	20·46	14
904	819	709	1,197	1,979	1,764	1,464	8,248	6,673	14,921	15·31	14·64	15·00	17·64	15
1,305	1,100	1,002	1,046	1,886	1,990	1,783	10,572	8,224	18,796	24·68	23·68	24·23	21·29	16
795	656	677	820	1,462	1,364	1,191	6,569	5,610	12,179	21·45	22·96	22·12	20·37	17
727	471	402	711	1,080	778	661	4,648	3,060	7,708	15·83	12·76	14·45	16·24	18
1,702	1,650	2,037	4,457	4,920	4,284	3,161	19,290	16,002	35,292	51·21	49·54	50·44	15·05	19
697	619	851	1,234	1,701	1,625	1,114	6,922	5,936	12,858	26·15	25·12	25·66	12·86	20
717	640	745	1,305	2,039	1,610	1,046	6,391	5,570	11,961	19·25	19·58	19·41	13·15	21
375	362	427	353	431	441	431	3,212	2,780	5,992	16·40	16·07	16·25	13·31	22
394	309	266	302	421	689	724	3,913	2,687	6,600	15·48	12·98	14·35	18·70	23
130	104	112	104	85	153	201	1,200	853	2,053	6·20	5·52	5·90	8·63	24
306	264	180	212	444	536	559	2,886	2,047	4,933	14·43	12·84	13·72	15·95	25
331	351	229	230	412	500	682	3,352	2,334	5,686	20·67	17·49	19·24	18·88	26
446	348	318	301	361	639	711	3,998	2,998	6,996	18·79	16·46	17·72	14·65	27
207	168	156	130	172	234	243	1,740	1,157	2,897	10·16	8·34	9·34	11·02	28
324	283	217	195	273	318	375	2,696	2,014	4,710	17·50	15·09	16·38	10·34	29
579	392	282	509	912	993	651	4,226	3,263	7,489	15·79	14·01	14·96	8·72	30
401	279	427	717	756	686	481	3,833	2,623	6,456	20·02	14·92	17·57	12·06	31
111	83	72	112	117	114	137	1,050	708	1,758	13·24	10·71	12·09	6·05	32
24,881	19,333	30,905	53,592	78,173	63,833	45,035	258,494	214,445	472,939	27·18	26·88	27·04	16·94	

DEATHS REGISTERED from BOWEL COMPLAINTS in the

1	2	3		4		5				
		Circles of registration		*Villages.*						
Number.	Districts.	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	13	743	289	144	92	81	74	134
2	Gurgaon	16	16	1,239	418	172	118	67	82	159
3	Karnál	14	14	868	375	138	103	53	78	117
	HISSAR DIVISION.									
4	Hissar	12	11	715	217	34	30	19	44	184
5	Rohtak	11	8	498	77	77	27	35	57	63
6	Sirsa	13	11	626	148	29	11	7	24	30
	UMBALLA DIVISION.									
7	Umballa	20	20	2,225	894	248	163	132	186	186
8	Ludhiána	9	9	851	197	78	49	32	41	75
9	Simla	4	4	238	42	11	7	6	11	15
	JULLUNDUR DIVISION.									
10	Jullundur	9	9	1,233	170	54	41	23	43	35
11	Hoshiárpur	14	14	2,178	803	144	105	92	187	224
12	Kángra	15	15	704	541	74	77	80	112	149
	AMRITSAR DIVISION.									
13	Amritsar	10	10	1,078	260	158	80	100	108	198
14	Gurdáspur	17	17	2,302	466	82	57	75	68	155
15	Siálkot	13	13	2,315	348	49	44	41	59	85
	LAHORE DIVISION.									
16	Lahore	20	20	1,672	354	121	71	85	78	106
17	Gujránwála	9	9	1,177	198	31	26	33	53	61
18	Ferozepore	15	13	1,276	165	34	23	19	31	36
	RAWALPINDI DIVISION.									
19	Rawalpindi	18	17	1,725	241	69	76	68	134	223
20	Jhelum	12	12	1,042	175	53	58	59	81	97
21	Gujrat	8	8	1,416	130	28	41	25	32	114
22	Shahpur	15	15	632	214	68	45	34	45	41
	MOOLTAN DIVISION.									
23	Mooltan	12	8	1,233	67	36	27	37	26	30
24	Jhang	9	9	976	109	12	7	11	10	12
25	Montgomery ... ... — ...	16	15	1,518	126	24	12	25	10	17
26	Muzaffargarh	12	8	534	38	8	9	11	6	4
	DERAJAT DIVISION.									
27	Dera Ismail Khan	19	16	772	77	24	22	18	7	18
28	Dera Gházi Khan	17	8	422	28	30	26	10	10	15
29	Bannu	13	12	553	101	43	27	29	16	42
	PESHAWAR DIVISION.									
30	Peshâwar	19	15	730	58	85	45	45	28	31
31	Hazára	16	13	1,013	73	13	5	11	12	30
32	Kohát	11	8	469	17	13	4	4	8	11
	Total of the Province	433	390	34,973	7,416	2,184	1,528	1,367	1,761	2,697

DISTRICTS of the PUNJAB during each MONTH of the year 1879.

June.	July.	August.	September.	October.	November.	December.	6 *Total.* Males.	6 *Total.* Females.	6 *Total.* Total.	7 *Ratio of deaths per 1000 of population.* Males.	7 *Ratio of deaths per 1000 of population.* Females.	7 *Ratio of deaths per 1000 of population.* Total.	8 Mean Ratio per 1000 for previous five years.	9 Number.
107	103	159	266	349	469	247	1,263	962	2,225	3·87	3·40	3·65	2·22	1
127	135	326	447	585	490	269	1,664	1,313	2,977	4·49	4·02	4·27	3·00	2
78	67	133	143	182	193	158	868	575	1,443	2·62	2·05	2·36	1·58	3
33	25	37	51	84	74	45	418	302	720	1·57	1·39	1·48	0·86	4
101	40	51	100	85	179	93	521	387	908	1·78	1·58	1·69	0·81	5
27	46	32	34	64	27	24	206	149	355	1·76	1·59	1·68	1·17	6
153	133	232	328	539	599	278	2,010	1,167	3,177	3·65	2·55	3·15	1·74	7
56	42	101	76	84	63	50	505	242	747	1·58	0·92	1·28	1·64	8
15	28	20	11	18	11	7	108	52	160	4·88	4·53	4·76	2·23	9
33	19	45	55	47	26	33	262	192	454	0·61	0·54	0·58	1·17	10
131	141	199	261	315	176	160	1,278	857	2,135	2·53	1·97	2·27	3·10	11
110	122	161	276	205	179	135	966	714	1,680	2·45	2·01	2·26	2·50	12
108	134	213	249	208	162	134	1,235	617	1,852	2·65	1·68	2·22	1·52	13
113	68	137	205	287	234	126	1,002	605	1,607	2·00	1·49	1·77	1·92	14
53	51	79	99	112	75	59	527	279	806	0·98	0·61	0·81	1·08	15
63	81	69	62	65	75	76	689	263	952	1·61	0·76	1·23	0·97	16
41	35	43	54	42	54	53	364	162	526	1·19	0·66	0·95	0·81	17
97	54	42	32	31	28	28	295	160	455	1·00	0·67	0·85	0·93	18
211	191	174	209	186	146	102	1,154	635	1,789	3·06	1·97	2·56	0·77	19
107	94	136	176	115	97	89	730	432	1,162	2·76	1·83	2·32	1·24	20
76	46	54	47	33	20	19	340	195	535	1·02	0·68	0·87	0·69	21
27	31	47	32	57	39	28	331	163	494	1·69	0·94	1·34	1·44	22
14	12	14	27	32	44	35	214	120	334	0·85	0·58	0·73	1·02	23
24	7	14	14	6	19	11	91	56	147	0·47	0·36	0·42	0·52	24
13	10	15	14	17	29	13	132	67	199	0·66	0·42	0·55	0·52	25
7	5	6	4	11	3	8	53	29	82	0·33	0·22	0·28	0·24	26
7	12	17	21	18	18	14	124	72	196	0·58	0·39	0·50	0·52	27
10	8	9	6	22	16	15	129	48	177	0·75	0·35	0·57	0·56	28
20	31	39	42	39	28	21	232	145	377	1·50	1·09	1·31	1·00	29
42	48	33	42	46	52	57	395	159	554	1·48	0·68	1·11	0·68	30
31	32	27	29	26	29	13	178	80	258	0·93	0·45	0·70	0·99	31
4	9	11	16	17	14	18	106	23	129	1·34	0·35	0·89	0·38	32
2,009	1,860	2,675	3,428	3,927	3,668	2,418	18,390	11,222	29,612	1·93	1·41	1·69	1·38	

APPENDIX A

Copy of a letter No. 766 dated 3rd December 1879, *from* MAJOR ALFRED HARCOURT, *Deputy Commissioner, Lahore, to*, D. G. BARKLEY, ESQUIRE, M. A. *Commissioner and Superintendent, Lahore Division.*

The question of conservancy in outlying villages has of late received considerable attention at the hands of the Government of India and in proceedings of Government of India No. $\frac{12}{288}$ 44 of 17th September 1879 forwarded to me by Secretary to Government Punjab, with his No. 3660 of 10th October 1879, some stress is laid on District Officers doing what they can to insist on sanitary arrangements being better seen to. I need not refer to past orders and circulars on this important subject, as the fact of such being in existence can be questioned by no one and further allusion to any particular notification on this point would be needless.

2. I have given a good deal of thought to this subject of conservancy in villages which indeed contains not a few difficulties. Take the case as it at present stands. A Deputy Commissioner is well aware of the neglected state of most of the villages in his district, and to a certain extent where the evil has become very pronounced, he can perhaps bring the force of law to bear on the lambardárs, who have been grossly negligent in seeing to the sanitation of their villages. But the Deputy Commissioner does not frequently care to avail himself of the aid the law can give him, and it is but very seldom a Deputy Commissioner ever causes offending lambardárs or other responsible persons to be brought up on a criminal charge. The Deputy Commissioner mainly works through his Tehsildárs, or uses his own personal influence,, which, when brought to bear on the careless and indifferent, may, at any rate for the time, ensure something like a good result.

3. In so far as I can see, there are only two Sections of the Indian Penal Code, which could in any way be made applicable to cases of neglect of sanitation by lambardárs, and my own opinion is, that in the present state of the law, these Sections of the Code could not be used in such a manner that their effect would be very wide-spread or very telling. I refer to Sections 188 and 521—Section 188 Indian Penal Code might perhaps be of the greater utility, but this refers to orders promulgated by a public servant lawfully empowered to promulgate orders. Now it might fairly be urged by offending lambardárs that no orders have ever been issued by Government making lambardárs responsible for cleanliness in their villages, and I myself do not see how a Deputy Commissioner could enforce a penalty in the event of his general orders on this head being disregarded. The duties of lambardárs are defined in the rules formed under Act XXXIII of 1871, and there is nothing in these rules which touches on the sanitation of villages.

4. It is clear that if anything to the purpose is to be effected, action should be taken according to some definite and regular method. The bar to such action being taken is, first, the want of funds on which to work any scheme of village conservancy, and secondly, the want of some responsible person or persons in villages who might be held liable in the event of the ordinary rules of conservancy being neglected. Now, taking up the last question first, it must be at once apparent that any system which would involve cumbrous rules, or rules that could not be easily understood, and could not be readily acted up to, would by its own inherent faults break down. It is therefore a *sine qua non* that for a commencement, the rules for sanitation in villages should be most simple and easy of comprehension to the dullest village intellect.

5. I beg to attach for your perusal a copy of Sanitary instructions issued in the early part of this year. These were forwarded to the Sanitary Commissioner, Dr. Bellew, who expressed to me his high approval of them, and I am inclined to think that these rules might, were more authority vested in Deputy Commissioners to punish the disobedient, work without difficulty, and on the principal that some definite regulations are necessary, with a view to village conservancy being properly carried out, I would suggest as follows.

a.—That Tahsildárs be directed to select a certain number of villages within their Tehsils in which the proposed sanitary arrangements should be tried.

b.—That the lambardárs of these villages be called up in turn, that they have briefly explained to them that matters cannot be allowed to continue on their old footing; and that they will be held responsible for the removal of all filth and sweepings from their villages, for the filling up of all hollows close to the village site, and for the absolute cessation of the practice of persons easing themselves within a limit of 200 yards from the village walls.

c.—The Lambardárs to be directed to select some places as storage sites at least 200 yards from the village, and to be informed that they will be held responsible for all the sweepings being conveyed to these sites.

d.—These sites to be marked in red paint, on the village maps, and an engagement to be taken from all lambardárs that they will abide by the rules that have been explained to them.

6. This experiment I have tried in the case of some villages in this district, and now being on tour I intend seeing for myself what has been effected, and of again urging on the lambardárs the necessity of attending better to the conservancy of their villages. Up to date I fear but little has been attempted in this direction. The lambardárs having agreed to all the Tehsildárs put before them, have returned to their villages wondering what new fancy this has been of the Deputy Commissioner, and there I am afraid the matter has ended. It may be that a desire to improve the state of their villages has grown up in the minds of some few lambardárs, but that this desire is at all general is not to be expected.

7. My instructions to my Tehsildárs were, that reports should be submitted as to the steps taken to provide storage sites in villages, and these reports having been sent in, I find that in very few cases has performance come up to promise. In two or three instances throughout the entire district, I learn, that the lambardárs of certain villages have gone so far as to mark out spots for storage sites, and have assured the

Tehsíldár that they do intend to act up to their agreements, and it may be that others will follow the good example thus set. But meanwhile the existing state of affairs remains and probably will remain for years; independent villages in districts from want of due conservancy arrangements continuing to be *foci* of disease which of course spread out in every direction. In the existing state of the law, however, I do not see what power I have, to either compel the headmen of villages to do anything in the way of conservancy, or to punish them if they disobey my orders. And if I am wrong in my presumption, I am wrong in the company of nearly every District Officer of the Punjab, for I am pretty sure, village conservancy is no better seen to in other districts. Officers would quickly enough take action if they felt they had the legal power to do so, but they know they have not the legal power, and I am convinced that until they are invested with authority to act, matters must continue to remain much as they are this day.

8. The first difficulty, that meets a lambardár who would try to act up to the aforesaid agreement, is the one of expense. He sees filth lying about and tells a zemindár to remove this. The zemindár says very good, and does nothing, and the lambardár having given the order, lets the subject drop. If asked why he did nothing more, he replies he has no power to insist on any particular person removing sewage, and has no funds to pay, even to cart the material away, and this brings me to the question of want of funds touched on in the third para. of this letter.

9. In many villages in this district, there is a system of village taxation in force. With this income, the District authorities have no concern whatever, and it can be expended without the Deputy Commissioner's sanction or control. My own opinion is, that this local cess whether collected as *Dharat* or by any other name, forms a most valuable fund from which to provide the cost of expenditure in conservancy. This cess gives to certain villages an annual income of from Rs. 200 to even Rs. 600, which under present arrangement is almost entirely wasted or misapplied There are many large villages in this district that have got some such local cess, and I think it would be very desirable if such cesses could be declared leviable in every village containing over 500 inhabitants. But taking matters as they stand, and referring only to those villages wherein local cesses are now levied what I would propose is, that the lambardárs of these villages be compelled out of the receipt of the cess to pay for proper conservancy establishment. I would not in any way interfere with the working of the village conservancy scheme, which might be on as rough a scale as possible, so long as the streets were kept clean, were in fair repairs, and the village filth was always removed to certain spots at assigned limits from the town.

10. Another way of raising funds to pay for conservancy also occurs to me. There may be no actual law authorizing a Deputy Commissioner to fine lambardárs for disobedience of orders with reference to conservancy and such like offences, but this exercise of authority is, I dare say not altogether in disuse and probably does not work badly. But all fines on lambardárs would have to be credited to Government. Now, what I would suggest is, that the fines, if inflicted for breach of conservancy rules, or gross carelessness in conservancy arrangements, be credited not to Government, but to a conservancy fund, to be applied to the perfecting of the arrangements that have been neglected by the lambardárs at fault.

11. I put these ideas of mine before you, hoping they may contain the germ of what may hereafter be worked up into a perfected system of village conservancy. Briefly to sum up my views what I would urge is this—

1st.—That District Officers have power given them by law to make Lambardárs of villages responsible for the proper conservancy of their villages. Such rules being drawn out for the guidance of the lambardárs as may be easy of comprehension and without difficulty acted up to.

2nd.—That the lambardárs be bound to pay for sanitation from the village cesses.

3rd.—That the system of village cesses be extended.

4th.—That fines on lambardárs for breaches of village conservancy rules be paid into a fund to be termed the village conservancy fund and be utilized for village conservancy.

12. I have endeavoured to show that I, as a District Officer have endeavoured to the best of my ability to induce lambardárs to see to the conservancy of their villages. The result after a great deal of trouble has been most disheartening, and I am powerfully impressed with the belief that if anything worth naming is ever be done in the direction aimed at, the District Officer must be invested with authority to punish those who still continue deaf to admonition and warning.

Copy of a letter No. 816 *dated* 19*th December* 1879, *from* Major A. Harcourt, *Deputy Commissioner, Lahore, to* D. G. Barkley Esquire, *Commissioner and Superintendent, Lahore Division.*

With reference to your No. 847—2926, of 12th Instant, I beg to make the following remarks. I do not see how it can be inferred (vide your para, 2) that my proposals involve an appropriation of the *Dharat* levied in certain villages. I merely suggest, that the responsible men of the village community be called on to see to village conservancy, and that they can very well afford to pay for some sort of an establishment out of the *Dharat*. In other words, I say the headmen or such persons as may be held responsible for the conservancy of villages, cannot plead they have no funds to work an establishment on, when they have this *Dharat* income to assist them, with the actual details of the administration of this *Dharat* income, I do not propose to interfere at all.

2. You appear to have misunderstood my instructions to Tehsíldárs. It was never my intention that the Tahsíldárs should dispose of the manure and credit the proceeds to the *Mulbah* fund. My order to the Tehsíldárs ran as follows :—

"Arrange with the lambardárs when the manure can be taken away, *i. e.*, from the storage site, and tell the lambardárs that the manure should be disposed of, and the proceeds put into the *Mulbah* fund, or that

each pattidar should have his share of the manure." Surely nothing can be clearer from this, than that the Tahsíldár is simply to give his advice, and that the lambardárs are to credit the proceeds of the sweepings to the *Mulbah*, or that the village owners should share this as they may agree between themselves.

3. You are of opinion that my proposal would involve an interference with private property, as in villages private rights in the manure collected from the premises of the various residents are almost universal. With private rights, I do not desire to interfere at any rate for the present. My view of the case is this, that a mass of pernicious rubbish is thrown out into the lanes, and out-skirts of villages, which is never claimed and never utilized. It lies on the ground, a pestering mass of corruption, and when heavy rain comes, some of this is swept into the ponds, which lie adjacent to nearly every village. This water often lies for a long time on the ground, and is the only water the cattle or the very poorest classes can get. I do not say that people frequent these ponds very much for drinking purposes, but I do say that this filthy stuff percolates through the soil and contaminates all the adjoining wells. Now what I should wish to do as a beginning, is to have all this rubbish removed at least 200 yards from the village site, that in fact no sweepings be permitted to lie about in the public thoroughfares and by the outer walls. Surely it cannot in any way be considered to be interfering with private property to cause the removal, to a safe distance from the hamlet, of what must be a source of disease and ill health.

4. As to legislation, I fear that unless this is brought to bear, we cannot do much. If this important matter can be settled without legislation, then I for one, should strongly object to having legislation. But this subject is not one, that may conveniently be shelved and while fresh experiments are being made. The peril is at our very doors and if legislation is absolutely necessary to secure reform, I do not think that the Government, which has this matter so much at heart, would refuse to give further power to those by whom alone conservancy arrangements can be properly seen to. I suppose very few District Officers, (I hope, however I am wrong in this) have taken more interest in the conservancy of outlying villages than I have, and what has been the result of my effort. From every Tahsíl the same story comes that here and there lambardárs have agreed to have storage sites, but that not in one case yet have these been even marked out.

5. The lambardárs, as you show, and I must allow this is a point, I did not sufficiently consider, cannot of course be made responsible for the conservancy of their villages, and as you say they can only bring moral influence to bear on any co-parcener who leaves filth about, and will not attend to the Sanitary rules laid down. But I think this difficulty which is certainly no slight one, could be met by making all the co-parceners in a village generally responsible for the clean and decent condition of their village, the Government having the power in the case of persistent neglect of orders of imposing a fine on the village community.

6. As I said, I believe that in any gross individual case of neglect of conservancy, probably the collector could avail himself of the criminal law, but what I think is wanted, is something more than this. General powers are required which may be brought to bear against the co-parceners in a village. And I believe that if the collector had such powers and the people saw he was determined to use them, if necessary, we should very soon have a radical change in the conservancy arrangements of villages, and the people would, when once a better system was set a foot, fall into the views of the Government and would eventually appreciate the soundness of the orders which insist on the clearing away of all filth from the inhabited area of the village.

APPENDIX B.

Copy of a letter No 132 *dated* 26th *February* 1880, *from* MAJOR ALFRED HARCOURT, *Deputy Commissioner, Lahore,* to A. BRANDRETH ESQ., *Commissioner and Superintendent, Lahore Division.*

I think the time has now fittingly arrived for me to report to you, for the information of Government, on the conservancy condition of the Lahore Municipality, both because the conservancy arrangements inaugurated in 1878, have now come into fair working order, and because as I am about to give up charge of the District, it seems advisable I should place on record before I go, what has been done during the two years that I have filled the post of President of the Municipal Committee.

2. Your predecessor in his No. 307—1244 of 31st May 1878, forwarding the report of the Sanitary Commissioner on the abominably filthy state of Lahore, pointed out the necessity for immediate action, and requested that he might be informed of the steps the Committee proposed to take towards accomplishing the wishes of Government. One report has already been submitted, vide my No. 596 of 7th October 1878, but it may be more convenient and avoid needless references, if I now take up the subject from the very commencement.

3. The main points that the Sanitary Commissioner commented on, were the abnormally filthy condition of the streets, the conspicuous want of all proper sanitary arrangements, the defective latrines and the defect of system everywhere exhibited in working a proper conservancy scheme.

At the time in question, the supervising establishment was undermanned, and was also underpaid, and inheriting an old system which had been long tolerated, it was necessary for the Committee to strike deep at the root of the evils existing, and to very materially damage interests which had for long been allowed to enjoy privileges which had no foundation in any legal right.

The conservancy of the city and suburbs was at the time referred to, seen to by 57 cart owners, who were called Moafidárs, and their efforts were supplemented by those of other cartmen, who paid for the privilege of removing the filth. But as was quite notorious, these Moafidárs came into the city their sphere of operations being confined to the city when and how they pleased. There were no hours allotted to them within which they might work, and all day long the filth carts were blocking up the thoroughfares and obstructing the roads, and in the event of any occurrence which involved the use of cattle in the fields, the carts did not appear at all, and this was also the rule during a long continuance of wet weather, when for days not a conservancy cart plied within the city.

4. The objects the Committee had in view were.—

1st.—To greatly improve and enlarge the conservancy establishment.

2nd.—To get rid of the Moafidárs with a view to the removal of the filth in a complete and satisfactory manner.

3rd.—To reorganize the latrines and to secure a thoroughly efficient system of conservancy at the least possible cost.

5. The first bar to anything like progress was the Moafidár system, and this subject had first to be taken in hand. It had been proposed by my predecessor to buy out the right of the Moafidárs for Rs. 30,000, but it was eventually determined, that these men had no right at all, and that the Municipality had full power to dispose as it chose of what was its own property. The measure was carried in Committee and the Moafidárs were instructed to sue the Municipality in the Civil Court if they had any claim. They never did sue for the very good reason that they had no claim. But for many months they were not interfered with, and under improved supervision, the delays in removing the city filth were not so great as they had formerly been.

6. Meanwhile, however, the conservancy establishment had been much enlarged, and the city and suburbs were divided into circles under the charge of Darogahs, with their understaff of jamadárs, bhistis and sweepers, all working under a Conservancy Inspector on Rs. 75 a month. At the same time the slaughter-houses were placed under the charge of a European Inspector, who daily made his report to the Secretary on the cleanliness of the buildings and the fitness or otherwise, of the animals brought up for slaughter. Nor were the Committee idle in other points. Keeping in view that sooner or later the Moafidárs would be debarred from working, the Committee invested some Rs. 30,000 in the purchase of filth carts of wood and in one-bullock iron conservancy carts

7. But before our own carts could work, it became necessary to make another arrangement I will now refer to. The main objection to the old system had been that the filth when carted away, was deposited in its raw state on the fields close to the city and to houses in the Civil station. At times during the hot weather, the stench from the fields at the back of the Bank of Bengal and the cemetery as also from the fields abutting on the Railway road from Government House to the Railway station, was disgusting to a degree, the air being contaminated night and day with the foul odours arising from masses of night soil left lying about till it suited the convenience of the agriculturists to plough the same into the ground. It is true that there are Municipal Bye—Laws prohibiting the use of fresh night soil, but it was almost impossible to get convictions, nor with such a vast area to see to, was it possible to ascertain in time where these heaps of refuse were deposited. Now one of the special aims of the new scheme was, to avoid any recurrence of this state of things. The Committee therefore decided to purchase sites near the city and suburbs on which all filth should be stored, covered with earth, and after deodorization be disposed of to purchasers. Considerable delay was experienced in procuring sites. At first six were fixed on, but two of these were so mortgaged and remortgaged, that it was impossible to come to terms with the owners, and finally the Committee only purchased one site, the one at the back of the Bank of Bengal, the other four being all on Nazul plots. One of these is at the old Racket Court at the back of the Cemetery, the second is in a Nazul plot near the Shalimar road, the third is on a piece of open ground near Durand road on the back way to Meean Meer, and the fourth close to the Ferozepore road, about a mile from the village *Ichra.*

All these sites were prepared for the storing of the filth, and mohurrirs were located at each site to check off all entries together with a few baildars to aid in emptying the carts and storing the manure as it came in.

8. Everything being now ready and the carts having been prepared, we began working on the new system. It had been hoped that Contractors would come forward, and the Committee was quite ready to have given the contract on quite nominal terms to any who would make a tender. But we could get no one to take up the contract, and now began the difficulties which resulted at last in a state of affairs which was anything but agreeable to contemplate.

9 Taking over the conservancy arrangements as we had into our own hands, it was necessary to procure cattle and drivers for the bullocks engaged for the filth carts, and also to hire sweepers and donkeys. But a dead set was made against the scheme. The subordinates of the Conservancy Department were probably egged on by the dissatisfied Moafidars with the result that the work of supervision was most carelessly carried out. It was with the greatest difficulty we could secure bullocks and cartmen near Lahore, and when these, after much trouble, were procured, the rates we had to pay were enormous, while sweepers and bhisties having gone off in large numbers to the front, menial servants could hardly be obtained, and when engaged, could only be treated with leniency whatever their faults were. Then again the back lanes and alleys of the city could only be seen to by a service of donkeys and so many of these animals had been bought up for Commissariat requirements and in connection with the Cashmere Famine relief works, that we knew not where to turn for a supply of these useful beasts. It is however quite clear to me, that had the subordinate establishment worked in a proper spirit in time, the system would have done fairly well, but urged on by influences with which we could not contend, the results of their efforts at cleansing the city were trivial to a degree. Day after day reports came in of carts being upset and broken, of lynch pins being stolen, of wheels being damaged, and of carts loitering about unfilled, and of the men employed wasting their time directly they got out of sight of the Darogahs. And when at last the full tale of carts had been made up, and it was finally decided to stop all working by the Moafidárs who, to a certain extent had still been allowed to remove the filth, matters nearly came to a stand still and the filth in the streets began after a time to accumulate in a most unsatisfactory manner.

10. I have now brought down the report to about November 1879. The conservancy establishment then appeared to be doing well on the whole, and I went into camp. But letters reached me from the Secretary to the Municipality, showing that the situation was becoming each day graver and graver, and when I returned in December to Lahore, I, to my dismay, found there was almost a dead lock ; there was the Committee with the cleansing of the city on its hands as one of its first duties, and the whole of the carefully planned arrangements which had given such a world of trouble and anxiety to Mr. Dane, Assistant Commissioner, (our former most able Secretary,) and to myself, seemed to be an utter failure. What complicated matters was, that Mr. Hughes, Assistant Commissioner, (then Secretary) was very unwell, and could not visit the city, as often as was desirable, nor could he attend to his office duties in connection with the Municipality. What we wanted were more carts, more animals, and more sweepers, and a more condensed effort at seeing that those we employed did their duty. Mr. Lawrence, Assistant Commissioner, just then joined the district, and I made over the Secretaryship to him. This Officer worked with a zeal, patience, and ardour for which I can never sufficiently thank him. Ignorant of the country and its ways, he threw himself heartily into the work, and exercising tact and discretion, just where such qualities were absolutely indispensable, he fought a most up-hill game with steady determination. Shortly, and by degrees, the lanes and gullies were brought into order, and though there yet remained much to be done, I entertained every reasonable hope that we shortly should have tided over our troubles, for efforts were being made to secure additional aid in the way of menial servants and cattle, and there seemed at last, a prospect that plans which had hitherto failed in securing all that had been aimed at, would now meet their due reward.

11. At this juncture, probably seeing that it would be hopeless to ever secure the sweepings of the city on their own terms, the old Moafidárs again came forward, and urged that they might be allowed to remove the filth on such conditions as the Committee might impose on them. These men would willingly have paid highly for each cart, if they had been permitted to put the filth in its raw state on their fields, but this could never again be allowed, and the Committee understanding that its first duty consisted in keeping the city clean, the raising of an income from the sweepings being only a secondary consideration, sacrificed the sum that could have been easily obtained, and gave out the contract to those who came forward for one year on certain strict and well defined conditions, which restricted the hours when filth carts could ply and laid down penalties for breach of rules. The new system is now working admirably, and the Committee save close on Rs. 25,000 a year, which sum would have to be paid per annum for the hiring of bullocks alone.

12. The Committee, I hope it will be clearly understood, never desired to have the working of the system in its own hands. It was their desire that contractors should come forward, and it was only on the failure to procure contractors that the duties attendant on conservancy were taken up in direct management.

13. The gain has been a very valuable amount of experience together with the destruction of a bad monopoly, which gave satisfaction to no one but the monopolists themselves, and the Committee has also secured a number of well-built and excellent carts, together with fine storage sites filled with manure which may be estimated to be worth Rs. 15,000 ; a sum that I trust these will fetch when the manure is finally disposed of. We now have the entire conservancy of the suburbs in our own hands. We have a well trained establishment under a careful Inspector, and the conservancy of the city is given to those whose best interest it is to keep the city clean and sweet.

14. The latrines are also being taken in hand, and gradually these will all be rebuilt on a new and I hope, improved pattern. The slaughter houses are properly looked after and supervised, and each member of the conservancy establishment has had his duties marked off and explained to him, so that there can be no excuse for indifferent work or carelessness.

15. I attach for reference, a list of the conservancy establishment now employed, which can be compared with the old list of those employed in February 1878 when I first took charge of the District.

List of Conservancy establishment of the Lahore District for the year 1880.

Number.	Designation.	Salary per-month. Rs.	A.	P.	REMARKS.
	CITY CONSERVANCY.				
1	One Inspector	75	0	0	To be increased to Rs. 100. on 1st April 1880.
2	One Darogah	30	0	0	
3	One Ditto	20	0	0	
4	One Mohurrir	15	0	0	
5	Four Ditto at Rs. 10. each	40	0	0	
6	One Jamadár of Bhistis	6	0	0	
7	72 Bhistis at Rs. 4. each	288	0	0	
8	20 Mate Sweepers at Rs. 4-8. each...	90	0	0	
9	16 Ditto Ditto at Rs. 4. each	64	0	0	
10	177 Sweepers at Rs. 3-8. each	619	8	0	
11	4 Bullocks at Rs. 10. each	40	0	0	
12	8 Pairs of Bullocks at Rs. 16. each...	128	0	0	
13	9 Donkeys at Rs. 4. each	36	0	0	
14	One Chaprasi	5	0	0	
	ANARKALI CONSERVANCY.				
15	One Darogah	50	0	0	
16	One Ditto	40	0	0	
17	24 Beldárs at Rs. 4-8. each	108	0	0	
18	One Mistri	10	0	0	
19	One Jamadár	20	0	0	
20	3 Mate Bhistis at Rs. 5 each	15	0	0	
21	One Jamadár	6	0	0	
22	52 Bhistis at Rs. 4. each	208	0	0	
23	2 Mate Sweepers at Rs. 5.	10	0	0	
24	80 Sweepers at Rs. 4. each	320	0	0	
25	Jhalar	16	8	0	
26	11 Bullocks at Rs. 10. each	110	0	0	
27	39 Pairs of Bullocks at Rs. 16. each	624	0	0	
	SLAUGHTER HOUSE.				
28	One European Inspector	50	0	0	
29	2 Deputy Inspectors at Rs. 10. each...	20	0	0	
30	1 Sweeper	4	0	0	
31	1 Bhisti	4	0	0	
	TOTAL ...	3,072	0	0	

16. Before closing this report, I desire to express my very hearty thanks to Mr. L. Dane, Assistant Commissioner, who for some months was Secretary to the Municipality and to whose exertions and ability the Committee owe very much. I have already rerfered to the excellent services rendered in the cause of conservancy by Mr. W. Lawrence, Assistant Commissioner, who took up the work of Secretary at a very trying hour, and most conclusively showed that he was an officer, who, in a time of unusual anxiety and difficulty, could be thoroughly relied on to devote his best energies to the work given over to his charge.

17. In closing this report, I can only express the hope, that his Honor, the Lieutenant Governor, will feel satisfied that his wishes as to the conservancy of the city have been as fully carried out as circumstances would admit of, and that the interests of the Municipality have not suffered during the term that I have been President of the Municipal Committee.

APPENDIX C.

Necessity of new alignment of canal.

The new alignment of the Western Jumna Canal has been rendered necessary—owing to the faulty construction of the old "Badshahi" canal, which being made on unscientific principles along a line which, roughly speaking, may be considered the drainage of the country—to block up the flow of the surface water, whether the result of rain, or of percolation, or over-flow from the high level canal itself, whenever, as of course, is frequently the case, the drainage lines happen to meet on one side or the other of the banks of the canal, while the principal distributary water-courses which conduct the irrigation for some distance to the country right and left, leaving the canal at right angles, more or less approaching a right angle, are of course transverse to the drainage, which is more or less parallel to it, (the canal) and which is consequently completely blocked and hampered, rendering the ground thoroughly water-logged, and bring ing the spring level to the surface, where it was not actually flooded, causing large tracts of country to lose their fertility by reh deterioration and producing sickness which swelled the mortality returns, and left those who escaped death, sickly and permanently enfeebled.

New canal not yet finished.

3. This new canal, it must be remembered, is now in the course of construction; it is not as yet ready to be opened, and of course, up to the present, the old state of things remains; as until irrigation can be supplied by its channel, the disuse of the old one would entail so much loss both to the Government, by diminution of revenue, and to the cultivators, by stoppage of the supply of water, that any measure which would check irrigation, even temporarily, cannot be entertained.

The direction between Karnál and Moounch.

4. The new line lies between Karnál and Moounch, about four (4) miles to the West of the old one, and runs throughout on higher ground, avoiding the drainage and sewage of Karnál which, as was explained before, will empty itself into the old channel, and thence escape by a cut from Kumbopoora into the Jumna. Two drainage lines run from a common head near Gogripore, below Karnál towards the South-West; the alignment of the new canal is taken down between them, till near the village of Burota, where a syphon passes the Eastern one under and across the canal bed, and allows it to follow its natural course to the *Nye nuddie*. There is also a second syphon a little below this, which passes some local drainage off, in the same direction.

Distributaries.

5. The distributaries have not as yet been dug, but they are so designed as to avoid the mistake made in cutting those of the old canal, of blocking up the new drainage of the country.

Direction between Moounch and Rer.

6. Between Moounch and Rer, the new line runs over some very low land, but it is explained that the drainage to the East of the line will be passed into the old canal, and thence by the escape to the river; whilst that to the Westward will have no impediment against its following its natural course. The line crosses the Bulla supply branch shortly after leaving Moounch.

Housi branch.

7. The Housi branch is crossed by the new canal at Rer. There is a new branch for the Hansi canal from Moounch, which will run to Suffeedon along side the old Bulla supply canal; this latter will be converted into a catchment drain, which will receive all the cross drainage from above, and will carry it off into *Nye nuddie*; a syphon being provided for its transit under the new line at or near the village of *Anta*.

Rohtak canal.

8. The old Rohtak canal and the portion from Rer to Joshi of the Hansi line, will be abandoned or made available for carrying off drainage. The irrigation being taken up by new distributaries commencing at, or about Moounch, and running along the minor watersheds, will so avoid obstructing the drainage in the way that the old water courses did, and the triangular piece of land between Rer, Joshi and Noulta, will be freed from its present water-logged conditions, at least as far as the canal and its primary water courses are concerned.

Drainage Eastwards.

9. Again referring to the drainage to the East of the old canal from Karnál bridge downwards, it will all be received into the old canal in a way similar to that provided for the other side, while a rajbaha starting from Gogripore on the new line crossing the old one just below the Grand Trunk Road bridge, provides for the irrigation of the country East of the old canal as far as Pánipat.

Below Rer to Sirdhana.

10. From Rer the new Delhi branch runs Eastward until it reaches the watershed of the country past Pánipat, Mahrana, Bursham, Naraina, Dhindar, Ahoolana, and recrosses the old canal near Sirdhana. The drainages which were blocked by the old canal at Sitanah, Kokrana, Badawali, Didwaree, &c., will now be allowed to resume their natural courses towards the West, the irrigation being distributed by a channel cut parallel and intermediate to the drainage lines.

Rer escape.

11. The Rer escape will be turned from near Babel, in a southerly or south, easterly direction to opposite Thandar, as at present, the river when in flood backs up the present escape and over-flows a good deal of the country in the Khadir.

Sirdhana to Jooan.

12. From Sirdhana the new line crosses and recrosses the old one several times down to near Jooan whence it assumes an entirely new direction to Chota Khera. The portion of the old line from Sirdhana to Jooan, is on the watershed, as the country there drains East and West from it. The Western line of the Goonah drainage was made some years ago and has, although it was not carried out in its entirety, answered its purpose to a marked extent, some land, formerly swamp, having been recovered for cultivation.

Eastern Jooan drainage.

13. The whole of the Eastern Jooan drainage will be passed by several syphons under the new canal about Barawasni and Rohat into the Gundanulla in the Khadir.

Jooan to Chota Khera drainage line.

14. From Jooan to Chota Khera, the old line blocks by its own banks several important drainage lines holding up the water, and swamping the country; when the channel is abandoned for irrigation purposes, it will be utilized as a main drain, and receiving several drainages, will carry them down to Bowanah whence they will be passed into the Jumna by the present Bowanah escape.

New canal.

15. The new canal here runs at a considerable distance, perhaps 5 or 6 miles to the East of the old one, taking up the higher line, which constitutes in fact the watershed between the edge of a valley of the Jumna, and the hollow in which the old canal was originally dug. The system of natural drainage is somewhat complicated in this portion of the country, and is difficult to explain by writing; it will be seen clearly in the plan accompanying this report. The new distributaries however will be so constructed as to avoid obstructing the drainage, or when the lines necessarily cross, water-way will be provided.

Line from Chota Khera to Delhi.

16. From Chota Khera, down to Delhi the line is practically that of the old canal, the distributary system however will be remodelled and one or two syphons will be provided for passing drainage under the new canal bed.

17. In addition to the advantages afforded by the fresh alignment of the canal along the higher range of land and the consequent avoiding of the block to the drainage caused by the high banks of the old canal, and its distributing water courses, the bed of the channel of the new canal instead of running at a high level, will be dropped well under soil at different falls along its course, thus reducing the percolation and side swamps, so common along the old one, and will prevent the soil of the villages on the banks being so saturated as to have their spring level actually within a few inches of the floor of the houses. The old canal channel has been taken up and enlarged from near Rohilla Khan ke Sarai sufficiently to be used for navigation; it is intended to continue the navigable canal until it becomes continuous with the Agra canal at Okla.

Necessity of keeping canal water pure.

18. The water of the canal is largely used in Delhi for drinking purposes, a great number of wells being supplied with the canal water, in order that their brackish contents might be sweetened by the influx It furnishes the main supply of water consumed for all purposes within the walls of the fort, and it is therefore absolutely necessary that it should be kept as pure as possible, especially as the portion between Delhi and Okla will have but a very slight current. My attention was directed by Colonel Fulton, to the fact that, at the Bhungush bridge, there was a large surface drain emptying itself into the canal, and below this on the West side the whole sewage of the houses along the banks of the canal in the suburbs of Pehari, Pelewara and Sadr Bazar, is emptied into a loop, formed by the abandoned channel of the old canal (which is, however, connected with the water of the new one) and consequently contaminates the water which is brought into Delhi. As long as the necessity for using canal water for domestic or other purposes exist, it is imperative that the water should be kept free from contamination by sewage, or defilement by bathing and washing, a condition which is very far from being arrived at, as any one who has seen the bed of the canal when the water is shut off, must be convinced of, as the fluid which there finds its way into the channel, and there stagnates and putrifies is evidently nothing more or less than liquid sewage.

Necessity of interference of civil authorities and municipality.

19. The canal officers have done their best by prohibiting washing clothes, or carting any filth, dead bodies, &c, into the canal, and that in consequence of an order from the Joint Secretary to Government. But their endeavours to be of any avail, must be strongly backed up by the local authorities; the subject is one which should certainly be taken up vigorously and strenuously by the municipality as bearing most directly and intimately on the health of the city population.

Measures proposed to be adopted to prevent defilement of the water.

20. The sewage and surface drainage, which latter in a populous neighbourhood, must necessarily be loaded with organic impurities, should be carefully diverted to another channel of escape. Care should be taken to prevent what frequently occurs, defilement of the water, by casting in it dead bodies, offal, &c, and it should be necessary to have bathing ghats along it; these should be separated from the channel of the canal, from which fresh water can be admitted by an opening at high water level; the escape of the waste water to be arranged for by drainage in a direction away from the canal; if this be impossible, bathing at that point should be prohibited.

Causes affecting the health of the people on the Western Jumna canal.

21. Going down the canal I inspected the following villages, all of which were along the banks of one or other of the canals, and which were influenced by the conditions above mentioned; as, however, the year has been a most unhealthy one, canal villages and high land (Bhangur) irrigated or unirrigated, have all suffered alike from intense fever of a very fatal type, leaving a large number of the population laboring under the usual well-known sequelæ. I cannot lay any great stress on the results of my inquiries, as affording any special information on the influence of irrigation in general, or the Western Jumna canal in particular, as it is impossible to tell how much of the disease that I saw was due to the miasmatic influences of the canal, or to the exceptional conditions of an universally very unhealthy season; but it must also be recollected that owing to the constant supply of water to their fields by the irrigation of the canal, the canal villages had not suffered from failure of their crops, owing to drought in 1877 and 1878, and had escaped the scarcity and semi-starvation which in the high lands had lowered the health of the people and rendered them, from their weakened and debilitated condition, unable to resist the effects of a fever which climatic occurrences have rendered unusually prevalent and severe.

Moounch.

22. The first place I saw was Moounch. This is a large village of 500 houses and is the place which has been selected as the point where the canal is to divide into its main branches. The inhabitants are Ranghurs (or Muhammad Rajputs) and as far as I could understand had not been in straitened circumstances during the last two years.

There had been a great deal of fever of a fatal type, and out of a total of 40 people, children and adults, that I examined, I found all but 4 had enlarged spleens. There were the usual ponds round the place which were dirty and unkempt with the cattle in the houses, which were unventilated and undrained as usual. There were 113 deaths in 1878 and 197 up to November in the present year, out of a population said to be 3,098.

23. *Aoulta.*—A large Jat village of 1,500 houses of which 50 were empty or in ruins. This village which is about a mile from the canal, had all round it large straggling tanks, in which great quantities of hemp were soaking.

Inspected on the 1st December 1879.

The soil round the village is stiff and clayey. There were 5 wells, the water in all of which was exactly of the same level as that of the ponds around, and with which it was evidently connected. There were great complaints of the prevalence of fever which was stated to begin by quotidian ague, then to turn into tertian or quartan fever, and to kill its victims gradually by exhaustion, accompanying diarrhœa, dysentery, and dropsical swelling. 27 out of 30 had enlarged spleens'. There were 254 deaths registered in 1878, and 251 up to November in the present year, out of a population of 4,975.

24. *Sirdhana*—Jats.—150 houses, half a mile about from the old canal; soil stiff, and strongly impregnated with reh. No scarcity complained of. People do not look ill, but great are the complaints of fever, which commencing as quotidian or remittent, lapses into tertian or quartan, and destroys life by exhaustion, dysentery, diarrhœa, and dropsical swelling; some faint traces of scurvy seen in the gums of a few. There is an extensive old jhil behind the village in which snipe abounded. The only well pointed out to me with water in it of the same level as the jhil and ponds, was surrounded by a large space of filthy swamp, stinking and black; no attempt had been made to clean it, and owing to some feud in the village, as far as I could make out, none would be. In 1878 there were 17 deaths in it, and 22 this year up to November. Population said to be 861.

25. *Aboolana.*—Jat village of about 100 houses formerly there were 200, but owing to sickness and death, the number had dwindled to half. The lambardár stated that last year the mortality was far greater than this year. The village is a mile from the old canal, but nearer the new one; it lies low on stiff soil; has 4 or 5 village ponds round it, and a huge tank or jhil about 400 yards off; has one good and two brackish wells, the water being only a few feet below the surface, in fact on the same level as that of the pools and jhils. There is a ditch round it which is now dry and filthy.

Inspected on the 2nd December 1879.

26. *Muhammadpur Mára.*—A small filthy village on the old canal. The people who look ill—out of heart, and badly nourished, a few having decidedly symptoms of scurvy—stated that last year there had been more sickness than this, and that many had been carried off by fever or its sequelœ. The population of the village is said to be 799, and the deaths, 27 in 1878, and 17 up to November this year.

Inspected on the 3rd December.

27. *Jooab.*—A Jat village of about 560 houses, of which 50 or 60 are empty, and has a population of 3,039. There have been 131 deaths, and 62 births, registered from January to November.

Inspected on the 3rd December 1879.

The fever in this village was not so prevalent and fatal this year, as in 1878. From June to December there were 173 deaths registered, and strangely 75 births. The prevailing disease now is quartan fever, but the history of the sickness, as given by the villagers, was the same as of the other places mentioned; namely commencing by quotidian, it turned to tertian or quartan fever. There had been no ulcers or scurvy; nearly all had enlarged spleens. The usual conditions were found, straggling dirty tanks; wells with water up to the level of these, and of the adjacent canal.

28. *Maitheri.*—a small village of about forty (40) houses, lying low by the banks of the old canal, about 200 yards had suffered this year, the villagers stated, greatly from fever which was very fatal. Nearly all had spleen disease, no scurvy apparent. The soil saturated with water; dirty tanks with hemp soaking in them on all sides. They reported of this village that there had been cases of large ulcers on the legs so bad, as to be fatal. Nine deaths were registered in it during 1878, and 13 up to November 1879. Population said to be 348.

Inspected on the 4th December 1879.

29. *Balgong*—A large Jat village of 400 houses. Here the complaints of last year's fever were loud and deep; twenty houses had been emptied of their owners in consequence. Fever of the usual type, having enlarged spleen, 18 out of 20 examined, having it. The village is close along the banks of the old canal, and surrounded by swamps; it is 4 miles from the alignment, and it is to be hoped that it will be greatly benefitted by the alteration in its relations to the irrigations, as nothing could be worse than its condition now. There were no complaints of scarcity or want. No scurvy or ulcers seen on the persons of the inhabitants.

Inspected on the 4th December 1879.

The population of this village is 4,442. There were 307 deaths in it from June to December 1878. From 1st January up to the end of November of the present year, it had 272 deaths.

30. *Chota Thanah.*—Great mortality last year; the fever is described as of a very obstinate chornic nature, lasting for 10 months or a year, and killing by exhaustion. There were some decided cases of pneumonia, and there was a scorbutic paint apparent in some cases. Here there had been an extensive jhil, which had been removed by filling it up, producing splendid crops on the reclaimed soil, but the people are discontented, because a sickly lot declared that the measure had done their health no good.

Inspected on the 4th December 1879.

There were a number of houses in ruins and empty spaces in the village were pointed out to me as sites of dwellings deserted by the breaking up of the families owning them by sickness and death.

The popultion of Chota Thanah is said to be 1,216. There were 42 deaths registered in 1878, and 55 upto November this year.

Inspected 5th December 1879.

31. *Jataule.*—This is a small dirty village a few yards from the canal and apparently below it. There are about 50 houses in it inhabited chiefly by jats, and it was told me that there had been 50 deaths this year. No ulcers had been known, but some of the inhabitants had slight symptoms of scurvy.

Inspected on the 6th December 1879.

32. *Bowana.*—A large jat village of 400 houses. The lambardárs met me on the banks of the canal from which the village is about half a mile distant.

The wells have a spring level of about 10 feet below the surface, and were all brackish. There had been a great deal of fatal fever, statistics of which are not available.

33. I was very much interested in examining the condition of the villages irrigated by the Western Jumna Canal, as on a former occasion I had spent 6 months in making a Sanitary survey of the whole tract of country receiving that irrigation.

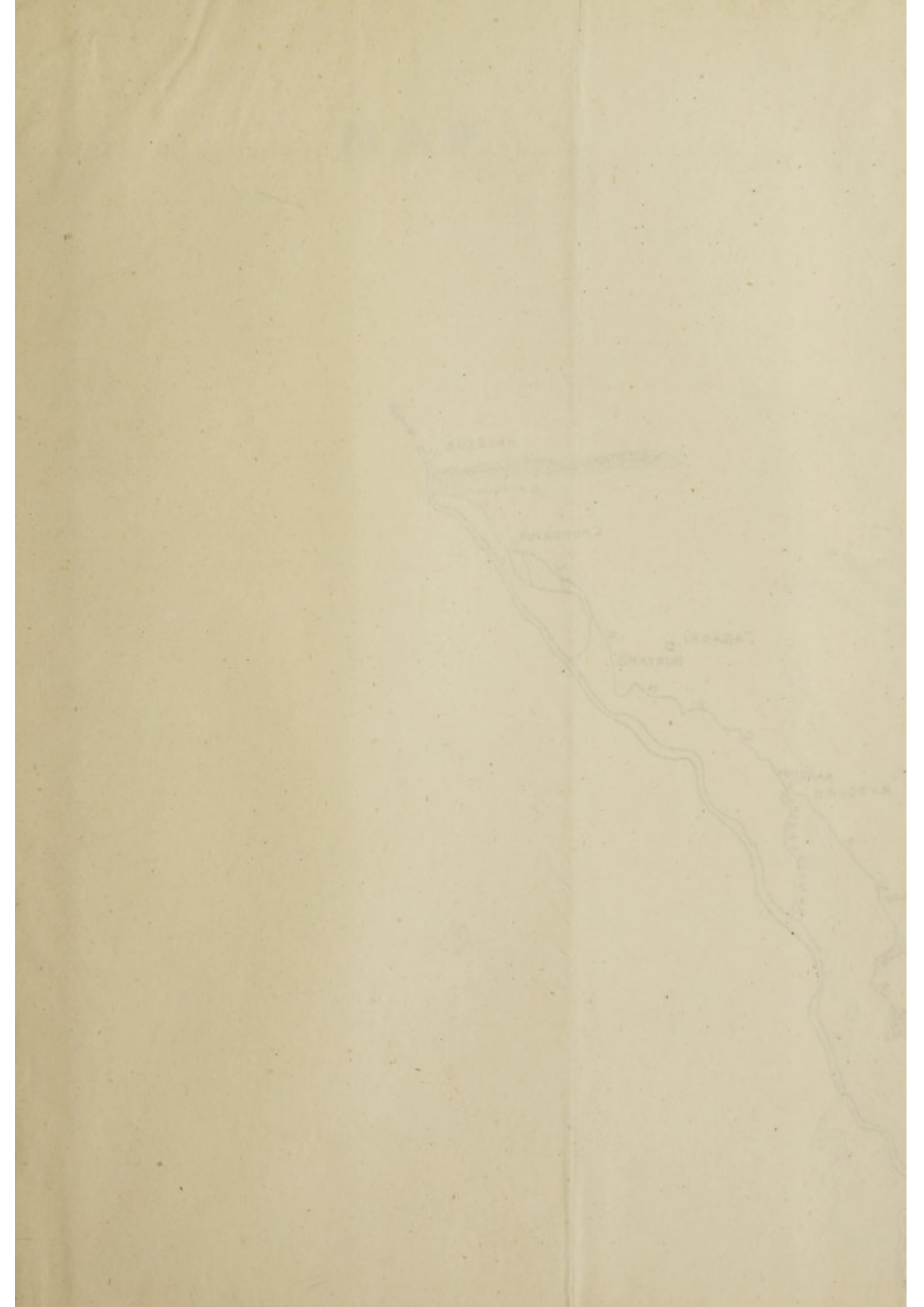
No improvement in the health of the canal villages since 1868.

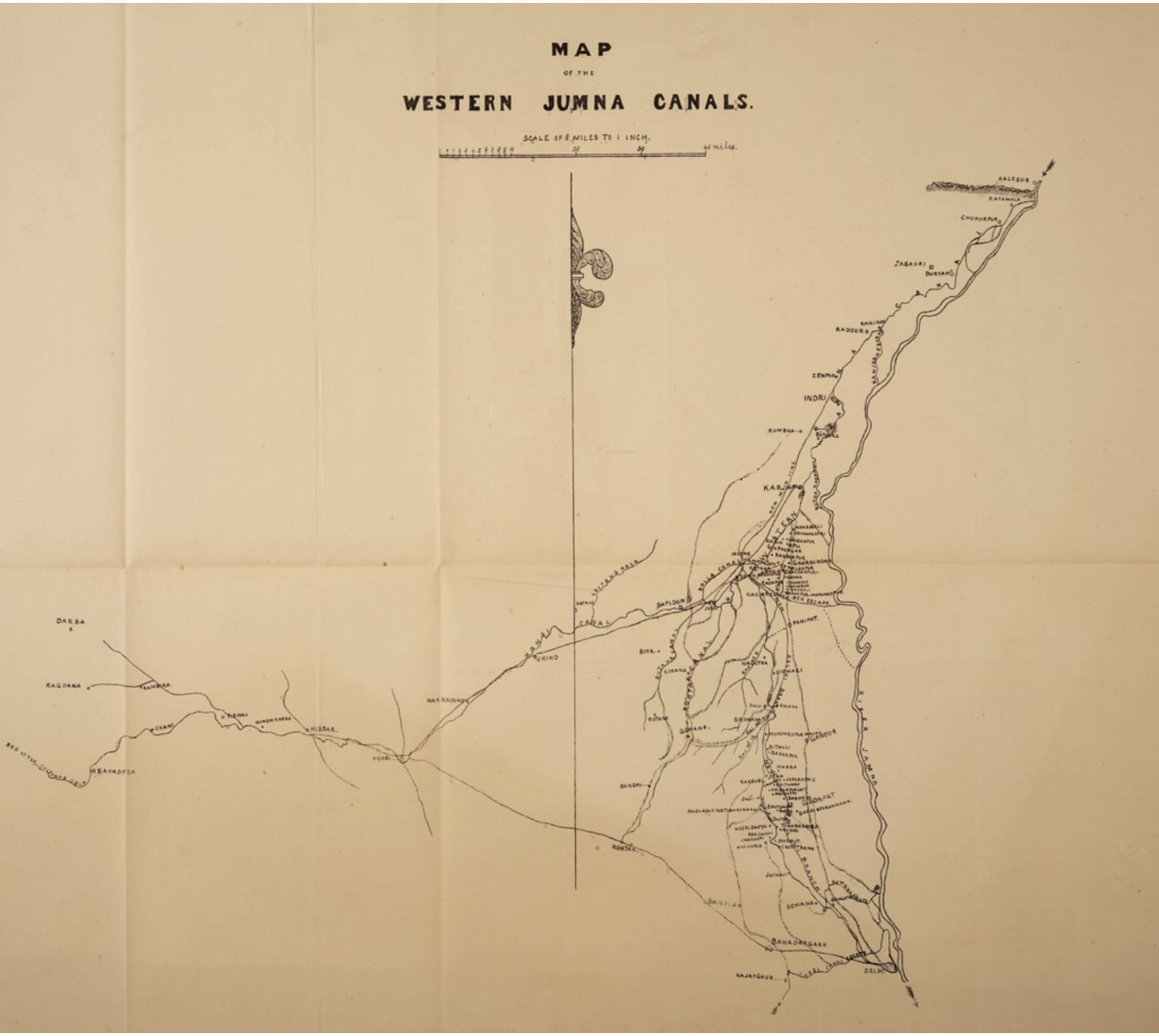
I found that the state of things described in my report of 1868 had, as far as regards the health of the villages which I have now had an opportunity of visiting, by no means improved; on the contrary, the unmistakable evidences of malarial disease shewn by the presence of enlarged spleen, were even more marked now, than then, though probably I may say undoubtedly the universal prevalence of fever of a severe and fatal character all over the Punjab and I believe North-Western Provinces has a great deal to do with the universally high average of sickness and mortality, which has affected the canal villages in company with others in unirrigated districts.

Absence of sloughing ulcers in the canal villages remarked upon.

34. The absence of the sloughing ulcers in the canal villages prevalent in the Lahore, Delhi, and Kárnal Jails, in the population of the district of Delhi, in the Sepoys of the 33rd Regiment at Delhi, and in the Police force there I attribute to the fact that the people had an abundance of food owing to their crops being exempted by irrigation from the consequence of drought, while the very slight traces of scurvy occasionally met with, were no more than I apprehend always exist in a people who are subject to the debilitating effects of a miasmatic atmosphere, and consequent repeated attacks of exhausting fever.

35. The Superintending Engineer, Colonel Fulton, has very kindly, in addition to the assistance he has afforded me by explaining the object of the new alignment of the canal and the various local improvements to be effected thereby, furnished me from his office with the accompanying map shewing the old and new canals with their principal distributaries, and the various main drainages which are in connection with, or influenced by the canal.




MAP
OF THE
WESTERN JUMNA CANALS.
SCALE OF 8 MILES TO 1 INCH.
KALESUR
RAKHAULA
CHOKHANDA
JAGADRI
DURIANG
RADOURA
ZENDA
INDRI
KUMBHA
KARNAL
SAFIDON
PANIPAT
SIRA
GOHANA
SONIPAT
BANGAR
ROHTAK
JHAJJAR
BAHADURGARH
DELHI
NAJAFGHUR
DARBA
KAGDANA
RAMBHA
NARNAUND
HISSAR
HANSI
BHIND
JUMNA

APPENDIX D

LAWRENCE MILITARY ASYLUM AT SANAWAR.

A.—Table showing the SICKNESS and MORTALITY among the CHILDREN of the above ASYLUM during the year 1879.

Months.	Average strength.		Average No. daily sick.		No. daily sick per cent. of strength.		No. of deaths.		Died per 1,000 of strength.		Causes of deaths in Hospital.					
											Measles.		Croup.		Dysentery and diarrhœa.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
January	226	171	5·51	11·83	2·44	6·92	...	...	...	...	...	...	...	...	...	...
February	218	172	7·64	15·60	3·50	9·07	...	...	...	...	...	..	...	...	...	...
March	225	182	15·93	12·90	7·08	7·09	...	1	...	5·49	...	...	...	1	...	...
April	237	186	11·96	10·33	5·04	5·55	...	...	...	...	...	...	...	...	...	...
May	241	182	12·58	11·51	5·22	6·32	...	...	...	...	...	...	...	...	...	...
June	241	182	16·43	10·70	6·82	5·88	...	...	...	...	...	...	...	...	...	...
July	245	186	17·00	8·93	6·94	4·80	...	...	...	..	...	...	...	...	...	...
August	242	183	16·83	12·58	6·95	6·87	...	...	...	...	...	...	...	...	...	...
September	232	174	13·76	10·56	5·93	6·07	...	...	...	...	...	...	...	...	...	...
October	236	166	9·48	4·93	4·02	2·97	...	...	...	...	...	...	...	...	...	...
November	225	169	22·56	15·73	10·03	9·31	...	1	...	5·91	...	1	...	...	...	...
December	220	170	23·80	19·83	10·82	11·65	1	...	4·54	...	...	...	...	...	1	...
For the year ...	232	177	14·45	12·11	6·23	6·84	1	2	4·31	11·30	...	1	...	1	1	...

Distribution of children according to Age on 1st *July* 1879.

SEX.	2 and under 5 years.	5—10.	10—15.	15—20.	Total of all ages.
Boys	10	72	137	26	245
Girls	8	61	96	21	186
Total ...	18	133	233	47	431

B.—TABLE showing the CAUSES of ADMISSIONS into HOSPITAL among the

year

NUMBER IN

Causes of admissions.	*January.*		*February.*		*March.*		*April.*		*May.*		*June.*	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
Small pox	...	...	...	...	...	...	...	...	...	...	...	...
Chicken-pox	...	...	...	...	1	...	2	...	2	...	...	...
Measles...	...	...	...	...	...	...	...	...	...	...	...	...
Enteric fever	...	...	...	...	...	...	...	...	...	...	...	...
Simple continued fever	...	...	...	...	...	...	...	...	...	...	...	...
Intermittent, and remittent fever ...	...	...	...	1	...	...	1	2	...	2	4	...
Malignant cholera	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria	...	...	..	...	..	...	...	...	...	...	..	...
Hooping-cough	...	...	...	...	...	...	...	...	...	...	...	...
Mumps	...	...	1	2	1	...	...	...	1	...	...	1
Muscular rheumatism	...	...	...	...	...	...	...	...	1	...	2	...
Phthisis pulmonalis	...	...	...	...	...	...	...	...	...	...	...	...
Meningitis	...	...	...	...	...	..	...	...	...	...	...	...
Sun-stroke	...	...	...	...	...	...	...	...	...	...	...	...
Epilepsy	...	1	...	1	...	...	...	...	...	...	...	1
Conjunctivitis	1	1	...	...	...	...	...	1	...	...	2	...
Valve disease of heart	...	...	...	...	...	...	...	...	...	...	...	...
Croup	2	1	...	...	1	2	...	1	...	..	1	...
Bronchitis	...	...	1	1	...	...	...	...	...	...	...	...
Pneumonia	...	...	...	...	1	1	...	...	...	...	1	...
Dysentery	...	...	...	1	...	...	2	...	..	1	3	...
Diarrhœa	...	...	...	...	...	...	1	1	6	1	1	...
Ulcer	...	..	...	...	...	1	...	...	...	...	...	...
Tinea favosa	...	...	...	...	...	...	1	...	...	...	...	...
Itch	...	...	...	...	...	...	...	...	...	...	4	...
Wounds and accidents	...	...	1	...	1	...	6	1	6	...	...	...
All other causes	13	9	11	39	46	26	15	7	40	14	25	6
Total	16	12	14	45	51	30	28	13	56	18	43	8

Admitted per cent. of the average

	7·07	7·01	6·42	26·16	22·66	16·48	11·81	6·98	23·23	9·89	17·84	4·39

CHILDREN of the LAWRENCE MILITARY ASYLUM SANAWAR, during the 1879.

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.
...	..	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	..	...	...	...	...	...	5	...	2·15	...	...	...
...	...	...	...	..	...	1	..	21	20	24	16	46	36	19·79	20·35	...	2·77
...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...
...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...
1	3	...	1	...	1	...	1	...	...	...	...	6	11	2·58	6·21	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	..	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...
...	...	...	...	1	1	...	...	...	...	...	...	4	4	1·72	2·26	...	...
...	...	...	...	...	...	...	..	...	...	...	...	3	...	1·29	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	1	...	2	...	2	...	...	...	...	...	9	...	5·08	...	...
...	...	...	...	2	...	...	...	...	...	...	...	5	2	2·15	1·13	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...
..	...	...	...	...	...	...	...	..	...	...	...	4	4	1·72	2·26	..	25·00
1	...	..	...	...	...	...	...	..	...	..	...	2	1	·86	·56	...	...
...	...	...	...	...	...	...	...	...	...	...	...	2	1	·86	·56	..	...
...	1	1	4	...	...	...	...	1	...	1	...	8	7	3·44	3·95	12·50	...
10	6	1	11	2	1	1	...	...	...	...	...	22	20	9·46	11·30	...	...
...	...	...	1	...	...	...	...	...	...	...	...	...	2	...	1·13	...	...
...	2	...	...	...	...	...	...	...	...	...	...	1	2	·43	1·13	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	...	5	1	5	2	3	3	1	...	1	...	36	7	15·44	3·95	...	...
17	4	15	4	6	8	12	5	2	3	9	4	211	129	90·95	72·90	...	...
32	17	22	23	16	15	17	11	25	23	35	20	355	235				

strength in each month.

13·06	9·13	9·09	12·56	6·89	8·62	7·20	6·62	11·11	13·60	15·90	11·76	153	133				

LAWRENCE MEMORIAL ASYLUM AT MURREE.

A.—Table showing the SICKNESS and MORTALITY among the CHILDREN of the above ASYLUM during the year 1879.

Months.	*Average strength.*		*Average number daily sick.*		*Number daily sick per cent. of strength.*		*Number of deaths.*	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
January ...	80	60	...	...	...	...	...	...
February ...	82	61	1·67	1·42	2·04	2·33	...	...
March ...	84	61	0·48	0·25	0·57	0·41	...	...
April ...	91	63	1·20	...	1·32	...	...	...
May ...	90	62	1·64	0·09	1·82	0·14	...	...
June ...	90	62	2·03	0·43	2·25	0·69	...	...
July ...	89	62	1·48	0·16	1·66	0·26	...	...
August ...	82	62	0·54	0·16	0·66	0·26	...	...
September ...	89	63	0·96	0·23	1·08	0·36	...	...
October ...	85	63	1·22	0·09	1·43	0·14	...	...
November ...	89	65	0·46	...	0·52	...	...	...
December ...	89	63	...	...	...	...	...	...
For the year ...	86	62	0·97	0·23	1·13	0·37	...	...

DISTRIBUTION of CHILDREN according to AGE on 1*st July* 1879.

Sex.	2 and under 5 years.	5—10.	10—15.	15—20.	Total of all ages.	
Boys ...	...	38	39	13	90	
Girls ...	...	19	37	6	62	
Total ...	...	57	76	19	152	

B.—TABLE showing the CAUSES of ADMISSIONS into HOSPITAL among the

year

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 fever ...	...	...	...	...	...	...	...	...	...	...	2	...
Malignant cholera	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria	...	...	...	...	...	...	...	...	...	...	...	...
Hooping-cough	...	...	...	...	...	...	...	...	...	...	...	...
Mumps	...	...	...	...	...	...	...	...	...	...	...	...
Acute rheumatism	...	...	...	...	...	...	...	...	...	...	...	...
Phthisis pulmonalis	...	...	...	...	...	...	...	...	...	...	...	...
Meningitis	...	...	...	...	...	...	...	...	...	...	...	...
Sun-stroke	...	...	...	...	...	...	...	...	...	...	...	...
Epilepsy	...	...	...	...	...	...	...	...	...	...	...	...
Conjunctivis	...	...	...	...	...	...	...	...	...	...	...	...
Valve disease of heart	...	...	...	...	...	...	...	...	...	...	...	...
Croup	...	...	...	...	...	...	...	...	...	...	...	...
Bronchitis	...	...	...	...	...	...	...	...	...	...	...	...
Pneumonia	...	...	...	...	...	...	...	...	...	...	...	...
Dysentery	...	...	...	...	...	...	...	...	...	...	...	...
Diarrhœa	...	...	...	...	...	...	...	...	...	...	...	...
Ulcer	...	...	...	...	...	...	...	...	...	...	...	...
Tinea favosa	...	...	...	...	...	...	...	...	...	...	...	...
Itch	...	...	...	2	...	...	...	...	...	...	...	...
Wounds and accidents	...	...	1	...	1	...	...	...	1	...	1	...
All other causes	...	...	1	...	3	...	4	1	5	...	4	5
Total ...	...	...	2	2	4	...	4	1	6	...	7	5

Admitted per cent. of the

	...	...	2·44	32·8	4·76	...	4·39	1·59	6·67	...	7·78	8·06

CHILDREN of the LAWRENCE MEMORIAL ASYLUM at MURREE during the

1879.

EACH MONTH.												*Total admissions during the year.*		*Admitted per cent of stength.*		*Died per cent. of admissions.*	
July.		*August.*		*September.*		*October.*		*November.*		*December.*							
Boys.	Girls.	Boys	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	2	...	2·32	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

APPENDIX E.

POLICE FORCE.

No. I.—TABLE showing the SICKNESS and MORTALITY among the POLICE FORCE serving in the PUNJAB, during the year 1879 *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.	Number of deaths.	Died per 1,000 of strength.	Cause of Deaths in Hospital.																
						Small-pox.	Enteric fever.	Simple continued fever.	Intermittent and remittent fever.	Malignant cholera.	Phthisis pulmonalis.	Scurvy.	Apoplexy.	Heart disease.	Respiratory diseases.	Dysentery.	Diarrhœa.	Hepatitis.	Wounds and accidents.	All other causes.	Died out of hospital.
January ...	19,519	354·59	1·82	77		...	...	...	5	...	1	...	...	...	29	3	4	...	...	3	35
February ...	19,534	336·26	1·72	50		...	...	...	2	...	...	...	...	...	23	1	...	...	...	4	17
March ...	19,623	322·03	1·64	51		...	...	1	7	1	...	...	1	...	13	1	1	...	...	1	25
April ...	19,551	289·62	1·48	27		...	2	...	...	...	...	...	...	...	8	...	...	...	..	1	16
May ...	19,556	292·89	1·50	52		1	1	...	4	4	1	...	...	...	6	...	1	1	1	1	31
June ...	19,576	254·32	1·30	38		2	...	...	2	7	1	...	...	...	4	...	1	...	...	2	19
July ...	19,549	267·99	1·37	40		1	...	...	5	5	...	...	...	...	3	...	2	...	...	3	21
August ...	19,603	396·80	2·02	23		...	...	...	...	4	...	...	...	...	1	...	...	...	...	1	17
September ...	19,569	517·09	2·64	20		...	...	...	3	4	...	...	...	...	1	1	1	...	...	1	9
October ...	19,618	593·26	3·02	43		...	...	...	8	...	...	...	..	1	2	3	3	...	...	4	22
November ...	19,593	477·63	2·44	45		...	...	...	3	...	...	...	...	...	7	4	2	...	1	4	24
December ...	19,649	413·08	2·10	60		...	...	1	2	...	3	...	...	2	23	5	...	..	...	2	22
						4	3	2	41	25	6	...	1	3	120	18	15	1	2	27	2·58
						Died per 1,000 of the average strength.															
For the year 1879	19,578	376·30	1·92	526	26·87	0·20	...	2·35	...	1·28	0·31	...	0·05	0·15	6·13	0·92	0·77	0·05	0·10	1·38	13·18
For the year 1878	19,586	338·11	1·73	362	18·48	...	...	2·04	...	...	0·56	...	0·10	0·05	3·47	1·22	0·97	0·05	0·05	1·07	8·88

Causes of Admission.	Number of admission into Hospital in each month.												Total admission 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	1	5	...	2	2	2	3	...	...	...	...	...	15	0·08	26·67
Enteric fever	1	...	...	4	3	...	...	...	...	...	...	1	9		
Simple continued fever	2	4	8	6	12	8	12	20	41	7	2	3	125	28·20	0·83
Intermittent and remittent fever	213	160	151	219	321	295	445	566	1,061	1,021	657	278	5,387		
Malignant cholera	...	...	1	6	7	9	7	7	5	1	...	...	43	0·22	58·14
Rheumatism	29	24	28	19	17	15	20	23	24	27	29	31	286	1·46	
Primary Syphilis—															
Hard chancre (indurated bubo) ...	5	16	10	20	14	19	21	17	19	26	26	7	201	1·03	...
Soft chancre (suppurating bubo)...	3	4	15	10	4	7	4	10	7	9	10	2	85	0·43	...
Secondary syphilis	6	4	3	8	5	9	5	4	3	2	3	2	54	0·27	
Phthisis pulmonalis	2	4	3	5	3	9	3	4	1	1	2	3	40	0·20	15·00
Scurvy	...	1	1	..	...	...	...	2	...	1	2	2	9	0·04	...
Apoplexy	...	...	1	...	1	...	...	...	...	...	...	...	2	0·01	50·00
Eye diseases	6	4	8	24	21	15	15	17	19	10	8	7	154	0·79	...
Respiratory diseases	172	132	107	45	54	31	13	12	18	24	63	105	776	3·96	15·46
Dysentery	26	12	24	33	29	29	35	39	60	50	65	43	445	2·27	4·04
Diarrhœa	13	6	9	11	26	20	25	24	30	19	10	12	205	1·05	7·32
Tænia	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...
Hepatitis	1	1	...	...	4	1	3	1	1	2	...	...	14	0·07	7·14
Gonorrhœa	3	7	12	15	12	7	23	9	11	7	6	6	117	0·60	...
Guinea-worm	...	2	...	1	2	5	7	6	1	1	1	...	26	0·13	...
Abscess and ulcer	42	40	64	55	55	44	73	66	87	68	52	62	707	3·61	...
Wounds and accidents	5	10	9	10	7	13	16	6	8	4	6	14	108	0·55	1·85
All other causes	93	87	90	88	95	88	94	102	103	121	97	85	1,144	5·84	2·36
	623	523	544	581	694	626	824	936	1,499	1,401	1,039	663	9,953	50·84	
	Admitted per cent. of the average strength in each month.														
For the year 1879...	3·19	2·68	2·77	2·97	3·55	3·20	4·21	4·77	7·66	7·14	5·30	3·37	50·84		
Ditto 1878	2·44	1·77	2·21	2·75	2·70	3·01	3·17	4·58	9·95	9·94	7·02	3·96	53·50		

No. II.—TABLE showing the SICKNESS and MORTALITY among the Police Force

Number.	Districts.	Average strength.	Number of admissions.	Admission per cent. of strength.	Average number of daily sick.	Number daily sick per cent. of strength.	Number of deaths.	Died per 1,000 of strength.
1	Delhi ...	1,168	1,231	105·39	62·95	5·39	42	35·96
2	Gurgaon ...	498	248	49·80	5·86	1·18	22	44·18
3	Karnál ...	617	294	47·65	10·30	1·67	25	40·52
4	Hissar ...	539	294	54·54	9·56	1·77	21	38·96
5	Rohtak ...	450	312	69·33	8·28	1·84	8	17·78
6	Sirsa ...	371	249	67·11	7·06	1·90	4	10·78
7	Umballa ...	1,149	452	39·34	15·20	1·32	33	28·72
8	Ludhiána ...	551	350	63·52	12·86	2·33	23	41·74
9	Simla ...	210	84	40·00	3·70	1·28	6	28·57
10	Jullundur ...	514	281	54·67	7·06	1·37	10	19·45
11	Hoshiárpur ...	503	203	40·36	8·62	1·71	7	13·92
12	Kangra ...	414	187	45·17	5·00	1·21	10	24·15
13	Amritsar ...	929	686	73·84	22·06	2·37	34	36·60
14	Gurdáspur ...	575	223	38·78	5·72	0·99	16	27·83
15	Siálkot ...	544	124	22·79	4·73	0·87	11	20·22
16	Lahore ...	1,363	708	51·94	35·24	2·58	34	24·94
17	Gujránwála ...	489	171	34·97	10·89	2·23	7	14·31
18	Ferozepore ...	561	306	54·54	7·83	1·39	16	28·52
19	Rawalpindi ...	1,042	609	58·44	20·16	1·93	46	44·14
20	Jhelum ...	528	402	76·14	17·12	3·24	24	45·45
21	Gujrat ...	369	172	46·61	5·42	1·47	6	16·26
22	Shahpur ...	479	150	31·31	4·97	1·04	2	4·17
23	Mooltan ...	832	240	28·85	11·37	1·37	14	16·83
24	Jhang ...	504	101	20·04	3·75	0·74	4	7·94
25	Montgomery ...	488	170	34·84	4·28	0·88	7	14·34
26	Muzaffargarh ...	357	255	71·43	9·00	2·52	4	11·20
27	Dera Ismail Khan ...	586	161	27·47	5·83	0·99	13	22·18
28	Dera Gházi Khan ...	486	129	26·54	4·43	0·91	5	10·29
29	Bannu ...	459	170	37·04	4·47	0·97	8	17·43
30	Pesháwar ...	1,065	490	46·09	21·93	2·06	41	38·50
31	Hazára ...	477	219	45·91	10·71	2·24	14	29·35
32	Kohát ...	461	282	61·30	10·21	2·22	9	19·52
	Total ...	19,578	9,953	50·84	376·57	1·92	526	26·87

serving in each District of the Police during the year **1879.**

Causes of deaths in Hospital.																
Small-pox	Enteric fever.	Simple continued fever.	Intermittent and remittent fevers.	Malignant cholera.	Phthisis pulmonalis.	Scurvy.	Apoplexy.	Heart disease.	Respiratory diseases.	Dysentery.	Diarrhœa.	Hepatitis.	Wounds and accidents.	All other causes.	Died out of hospital.	Number.
...	...	...	3	2	...	...	...	...	8	5	3	...	1	4	16	1
...	...	...	...	...	...	...	...	3	1	...	..	...	..	2	16	2
1	...	...	1	...	...	...	...	...	3	...	...	...	1	...	19	3
...	...	...	1	1	1	...	1	...	6	1	...	...	...	...	10	4
...	...	...	3	...	...	...	..	...	...	1	...	...	...	2	2	5
...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	6
1	...	...	1	2	..	...	..	...	7	...	1	...	...	2	19	7
...	...	...	4	...	...	...	..	...	8	...	...	1	...	2	8	8
...	...	...	1	1	...	...	...	...	...	...	3	...	...	...	1	9
1	...	...	1	...	...	...	...	...	4	2	...	...	...	1	1	10
...	...	...	2	...	...	...	...	...	...	...	...	...	...	1	4	11
...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	9	12
...	...	...	3	6	1	...	...	...	15	1	4	...	...	4	...	13
...	...	...	...	...	...	...	...	...	6	...	...	...	...	...	10	14
...	...	...	...	...	...	...	...	...	1	...	...	...	...	..	10	15
...	...	...	5	2	2	...	...	...	19	3	1	...	...	1	1	16
...	..	...	...	...	...	...	..	...	...	...	...	...	...	1	6	17
...	...	...	3	...	1	...	..	...	5	...	...	...	...	...	7	18
...	...	...	3	2	...	...	...	...	10	...	...	...	...	...	31	19
...	...	...	2	2	...	...	..	...	1	1	1	...	...	2	15	20
...	...	...	1	...	...	..	..	..	...	1	...	...	...	1	3	21
...	...	...	...	...	...	..	..	...	2	...	...	...	...	...	...	22
...	...	...	1	...	...	...	...	...	9	...	1	..	...	3	...	23
...	...	...	...	...	...	...	..	..	...	...	...	...	...	...	4	24
...	...	...	..	...	...	...	..	...	...	...	...	...	...	...	7	25
...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	2	26
...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	11	27
...	...	...	1	...	...	...	...	...	...	...	..	...	...	...	4	28
...	...	...	...	3	...	...	...	...	3	...	...	..	...	...	2	29
...	2	...	1	...	1	...	...	...	8	3	1	...	...	...	25	30
1	1	1	2	2	...	...	...	...	...	...	...	...	...	...	7	31
...	...	...	...	2	...	...	...	...	...	...	...	...	...	1	6	32
4	3	2	41	25	6	...	1	3	120	18	15	1	2	27	238	

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REPORT

ON THE

SANITARY ADMINISTRATION

OF THE

PUNJAB

FOR THE YEAR 1879.



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