

Settlement Officer, and desires to specially acknowledge the energy and diligence with which that officer completed the settlement after it was entrusted to him. The report submitted by Mr. Maconachie is interesting in itself, and shows much knowledge of the people and sympathy with them. The Lieutenant-Governor thinks, however, that it is to be regretted that its merits should be lessened by the unnecessary length to which it has run, and by the want of arrangement and revision in parts. On the subject of the great length of Final Settlement Reports a separate communication will be addressed to the Financial Commissioner. The work of Mr. Wood while Settlement Officer was doubtless performed conscientiously, but the task of energetically controlling the settlement operations was apparently beyond his powers. His Honor regrets that an untimely death should have made it impossible for him to acknowledge the services of the Extra Assistant Settlement Officer, Munshi Ajudhia Parshád. The Punjab Government is under special obligations to Colonel Davies, C.S.I., and Lieutenant-Colonel G. G. Young, by whom the settlement operations were principally supervised and directed.

ORDER.—Ordered, that the above review be forwarded to the Government of India in the Department of Revenue and Agriculture, with a recommendation that the settlement be confirmed for 30 years with effect from 1st April 1880.

Also that it be communicated to the Financial Commissioner for information and guidance, and to Mr. Maconachie for information.

No. 823 R.-152-2, dated Calcutta, 9th December 1885.

From—E. C. BUCK, Esq., C. S., Secy. to the Govt. of India, Revenue and Agril. Dept.,
To—The Offg. Secretary to Government, Punjab.

I AM directed by the Government of India to acknowledge the receipt of the Settlement Report of the district of Delhi in the province of the Punjab, a copy of which, together with a copy of the Resolution recorded on the subject by His Honor the Lieutenant-Governor, was transmitted under cover of Mr. Fanshawe's letter No. 1270, dated the 23rd June last.

2. The re-settlement was commenced under Mr. Wood in 1872, and was completed by Mr. Maconachie in 1880. The report was submitted to the Commissioner in manuscript in December of that year, but was not printed till February 1882. The Commissioner's review is dated the 12th December 1882, and that of the Financial Commissioner the 10th October 1884.

3. It is needless to comment on the delay which the above figures indicate. Whether regarded from the point of view of cost to Government, or protracted harassment to the people, it is equally to be regretted, and, as observed in other similar cases, the period that has elapsed since the settlement was completed renders it impossible for the Government of India to exercise its legitimate power of control with any prospect of usefulness.

4. The review submitted by the Financial Commissioner, moreover, is not so exhaustive as to justify the delay which occurred after the report left the Settlement Officer's hands. His Excellency in Council holds that one of the chief objects of a review of a Settlement Officer's proceedings should be to satisfy the Government that the physical, natural, and meteorological conditions of the district justify not only the rates imposed by the Settlement Officer, but also the method of assessment adopted, as well as to show the extent to which it is desirable to apply the theoretical rates to each part of the assessed area. In the present instance these requirements are hardly satisfied. In accordance with the above principles the character of the assessment and the method of collection, which it prescribes should be made to depend upon a close analysis of every separate tract which is subject to varying

conditions; but it appears that only by the Government of the Punjab itself in its final remarks has the report been carefully examined from this point of view. In Sir Charles Aitchison's final review is presented in fact the clearest picture given in the whole series of reports of the agricultural character and position of the district, and His Honor has accordingly placed wholesome restrictions upon the application of the assessment. His Excellency in Council conceives that such analysis of the assessment should have formed part of the duty of the supervising officers of the settlement operations.

5. The final review by His Honor the Lieutenant-Governor of the Punjab shows that while one-half of the district is secure, the other half will always call for careful and considerate treatment in seasons of prolonged and severe drought, and that ever since 1860 the Delhi District has suffered from severe drought or famine. Indeed, its geographical position on the continent of India indicates sufficiently the precarious character of its meteorological conditions. It is in fact one of those districts of which the normal fertility is so great as to attract a large population, without at the same time affording permanent means of resisting those failures of the monsoon which, however occasional, are certain to recur sufficiently often to induce a considerable diminution of the normal outturn. His Honor the Lieutenant-Governor has rightly urged that such a country requires exceptional treatment, and the Government of India cannot insist too earnestly that such treatment should be the result of a deliberate analysis of each tract or, if necessary, of each village within the district, and should not be left to be considered till action is forced on the local officials at the time when the failure may actually occur. The determination of the relief, which may be justified in applying from year to year the fixed assessment by the Settlement Officer, requires an intimate acquaintance with the geographical details of every part of the district however remote from head-quarters which cannot be expected from officers who have to acquire this knowledge for the first time at the crisis when the necessity for taking action arises. The analysis should, in fact, be the gradual outcome of the annual tours of district officials.

6. Under these circumstances, I am to express the satisfaction of the Government of India that His Honor the Lieutenant-Governor has distinctly laid down the same rule

that was applied to the Rohtak District, that the full assessment need only be realized in normal years, and has insisted that all District Officers are held responsible in future for completing and maintaining the village note-books up to date. It is only by a careful and gradual analysis thus effected through the continuous examination and historical record from year to year of the circumstances of every village and estate that a sound basis for the proper administration of the revenue collections can be afforded. In this view the injunctions of His Honor the Lieutenant-Governor in the 15th paragraph of the proceedings of the Local Government are fully approved and confirmed, and I am to communicate the wish of His Excellency in Council that during the course of the next few years an endeavour may be made to effect such a classification of the various tracts as do not fall within the category of secure areas as may enable the District and Divisional Officers to deal promptly and judiciously with them on the occurrence of any failure of season.

7. His Excellency in Council regrets to receive the further confirmation afforded by this report of the evil effects of the badly-aligned drainage of the canal water-courses. The subject is dealt with independently of these papers, and His Excellency in Council is glad to know that such remedies as can be provided are in course of application. The financial results of the settlement are unsatisfactory, and go far to confirm the views to which expression has been given in recent correspondence with the Punjab Government as to the necessity of permanent arrangements for the maintenance of maps, records, and a continuous history of the agricultural condition of a district upon the basis of which a re-settlement can be rapidly framed.

8. The demand has been increased from Rs. 9,22,166 to Rs. 9,69,931, including the owners' rate ; but as the latter is estimated at Rs. 1,22,662, while the average collections of the past four years have fallen short of that amount by about one-third, it is not improbable that the anticipated increase may not be realized. Under the most favourable conditions it will take ten years to recover the cost of settlement operations (Rs. 4,81,000), while if only the average collections of the owners' rate are maintained, as the Punjab Government seems to anticipate, the increase will be about Rs. 8,000 a year, and the cost of operations will not be recovered for sixty years.

9. His Excellency in Council, while agreeing with the Local Government that the report might have been materially curtailed, is glad to notice the approval bestowed by His Honor the Lieutenant-Governor on Mr. Maconachie. It would save some time in bringing settlement operations to a conclusion if all matters not immediately connected with the actual assessment and agricultural condition of a district were relegated to a separate volume, or incorporated in the Provincial Gazetteer, and I am to take the opportunity to note the satisfaction with which His Excellency in Council has read the instructions of His Honor the Lieutenant-Governor on this subject.

10. Finally, His Excellency in Council confirms the assessment for a period of 30 years from 1880 inclusive, except in the case of those villages for which the Local Government proposes, in the 10th paragraph of its review, a settlement for 20 years.

No. 17, dated Lahore, 29th January 1886.

From—R. G. THOMSON, Esquire, Offg. Junior Secretary to Government.

To—The Secretary to the Govt. of India, Revenue and Agricultural Department.

I AM desired to acknowledge receipt of your letter No. 823 of 9th December, 1885 which conveys the orders of the Government of India upon the re-settlement of the Delhi District; and with reference to the 3rd and 4th paragraphs thereof, I am directed to say that the Lieutenant-Governor entirely concurs with the views expressed by the Government of India as to the great importance of reasonable expedition in dealing with the final reports of completed settlements. During the last year or two strenuous efforts have been

1. Delhi.
2. Simla.
3. Muzaffargarh.
4. Jhelum.
5. Jhang.
6. Dera Ismail Khan.
7. Bannu.
8. Waziri Rupi and Síba in Kángra.

made in the Punjab to secure this result and the final reports of the marginally-noted settlements have all been submitted for the orders of the Imperial Government. The only reports now remaining for disposal are those of Karnál, Kohát, Sirsa, Mooltan, Gurgaon, and Ludhiána. Every effort will be made to dispose of these promptly. The first two are pending in this office, and are nearly ready for submission to the Government of India. The last four are pending with the Financial Commissioner, who will be requested to expedite their transmission.

2. I am to take this opportunity to point out that in the last two words of your letter under reply "*five years*" should be read instead of "*twenty years*." I am to request that this error may be rectified.

No. 18, dated Lahore, 29th January 1886.

COPY, with copy of letter replied to, forwarded to Financial Commissioner, Punjab, for information and guidance with reference to his letter No. 1157, dated 10th October 1884.

FINAL REPORT
ON THE
SETTLEMENT OF LAND REVENUE
IN THE
DELHI DISTRICT,

Carried on 1872—77, by Oswald Wood, Esq.,

AND

Completed 1878—80 by R. MACONACHIE, Esq., C. S.

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*Maps to accompany the Settlement
Report.*

- A. Administrative, showing Tahsils, Thanas, Roads, Canals, &c.
 - B. Revenue, showing Assessment.
 - C. Showing Distribution by Tribes and Zaildars' Circles.
 - D. Showing Conditions of Irrigation.
 - E. Showing extent of Irrigation.
-

List of the more important Errata and Corrigenda in the Delhi Settlement Report.

In page 2 at line 5 from the top for Gohán read Gohána.

Do. 7 re bridging the 'Burhiya Naddi,' substitute the following. "During the dozen years or more that the Public Works Department have had charge of the road, no bridge has been built on this spot, but preparations are now (1883) being made to supply this conspicuous want."

Do. 43 at line 13 from the top insert another 'is' between 'is' and 'the.'

Do. 46 at line 4 from the bottom—for 'they'—read 'the people.'

Do. 56 para. 67 and 68 add note:—

"Since the above was written, I have had an opportunity of special examination of the Delhi and Ballabgarh Tahsils, with reference to the question of 'bands,' and now think my advocacy of the restoration and improvement of these irrigation works scarcely strong enough. There are numbers of spots where a valuable protection from drought and famine can be obtained, and I would urge the District Committee not to stop in the systematic prosecution of such works till an account shall have been given of every considerable stream now making its way down the hill sides, its precious fluid either escaping direct into the river, or falling into a noxious jhíl. I am thankful to say that the present Deputy Commissioner, Mr. T. W. Smyth, concurs with me in his sense of the urgency and importance of these works. Some of my remarks on the bands in detail would now be more favourable."

Do. 58 in line 5 from the bottom, add:—

"Though there is good hope now (1883) that they will become such. If sites are well selected some very valuable 'bands' may be made here."

Do. 79 line 25 from the top for 'natural' read 'natural.

Do. 88 line 12 from the top for 'these' read 'there.'

List of Errata.—*Concluded.*

- In page 88 footnote for 'chagan' read 'Chajjan.'
- Do. 95 footnote for 'relatives' read 'relations.'
- Do. 104 line 6 from the top, insert 'in' between 'than' and 'in.'
- Do. 105 line 10 from the bottom for 'duntaun' read 'dantaun.'
- Do. 116 line 12 from the top for 'pitkandhi' read 'pitkaudi.'
- Do. 117 line 16 from the top for 'lamenss' read 'lameness.'
- Do. 169 line 2 from the figured statement for 'entires' read 'entries.'
- Do. 171 line 17 from the top, for 'punishment' read 'to punish.'
- Do. 177 line 12 from the top for 'require' read 'required.'
- Do. 209 line 3 from the top for 'lie' read 'lee.'
- Do. 209 add as footnote on the subject of the 'reh' drainage.

"On this point of likelihood of increase of damage. I find now (1883) I was wrong. The "reh" has increased considerably in some villages, and a separate report will be probably necessary on their revenue condition,"

- Do. 211 line 9 for 'Deva Mandi' read 'Dera Mandi.'
- Do. 241 line 12 for 'Rs. 2,665/- acres' read '2,665 acres.'
- Do. 241 line 14 for 'their' read 'thus.'
- Do. 255 line 25 for 'in proportion to the whole number of each set' read 'the proportion borne by their number to the whole set of patwáris.'
- 261 line 9 for 'of' read 'in.'
- Do. 267 line 32 from the top for 'become' read 'becomes.'
- Do. 267 line 34 for 'as' read 'in.'
- Do. Appendix iv A. page xlv line 5 for 'whether' read 'when.'
- Do. Appendix xi page cxxxii—in remarks on 'Lahrara' fair—for 'over it' read 'over the spot.'

FINAL REPORT
OF THE
DELHI SETTLEMENT.

PART I.—*General account of the District.*

CHAPTER I.

*General aspect of the District with some account
of its drainage, climate and rainfall.*

Para. 1.

Geographi-
cal position.

§ 1. The district of Delhi, as at present constituted, is a long strip of country lying on the right, that is the western side of the Jamná. For administrative purposes it is divided into three Tahsils—Sunipat in the north, Ballabgarh on the south, and Delhi in the centre. The city of Delhi which is conspicuously marked on any map of India, overlooks the river at a point somewhat to the south of the middle of the district with a Geographical position given as Latitude 28°, 30', 40" N. and Longitude 77°, 17', 45" E.

Para. 2.

Length,
Breadth and
Area.

§ 2. The greatest length of the district is in a direct line from Chilkáná in the north to Mohiná in the south, about 76 miles. The average breadth is 18 miles, the broadest place being opposite Delhi itself where it measures nearly 26 miles. The actual area of the district by the last Revenue Survey is 803,098 acres, giving 1,255 square miles.

Para. 3.

Boundaries.

§ 3. The Jamná, having an almost uniform direction slightly to the East of South, forms its eastern boundary throughout the whole length, dividing it from the Bághpat Tahsíl, Meerut district, North West Provinces, which reaches down as far as village Tehrí Daulatpur 11 miles north of Delhi. Below this on the east side of the river lies the Gháziábád Tahsíl of the same district as far as opposite Okhlá 7 miles south of Delhi. Further again to the south down to Makanpur the border village, comes district Buland-

General aspect of the District

[Chapter I.

during a ride across the Bángar would show hundreds of acres whitened or half whitened by the destructive 'reh' or 'shor.' The soil is naturally more fertile and productive than that of the Khádar, being of a firmer consistency. The country is cut up in every direction by water courses. Nearly on the boundary of the Khádar and the Bángar the Great Trunk Road runs almost due north up to the end of the district.

The Dábar lies to the west of the hills and consists of the low ground or basin scooped out by their westward drainage, and the floods of the Sáhíbi Naddí which comes down through Gurgáon from Alwar. In the rainy season the country is under water for many miles round Chháolá and the villages near it: as the rains subside and the cold weather comes on, the greater part of the floods is carried off into the Jamná by the Najafgarh Jhíl Escape—but the Jhíl itself always covers a great many acres with the residuum which lies in a hollow, south of the villages of Báhlolpur Dahrí and Zainpur.

3 Dábar.

Para. 7.

Old bed of the Jamná.

Size of the River.

Its bank & bed.

Its religious estimation.

§ 7. If, as seems probable, the drainage of the hills hollowed out the Najafgarh Jhíl, so too the division of the Khádar and Bángar was doubtless caused by the erratic wandering of the Jamná from its ancient bed. The river enters the district at a height of some 710 feet, and leaves it at about 630 feet above the level of the sea, with a course within the Delhi limits of rather over 90 miles and an average fall of between 10 and 11 inches to the mile. The general direction has been already mentioned as nearly due south. In the floods of the rainy season the river has a considerable breadth swelling in places to several miles with a maximum depth of some 25 feet. In the cold weather its normal depth is said to be four feet only; the stream is only sufficient to supply the three canals which draw from it (the eastern, and the western Jamná, and the Agra Canal) and is then fordable in many* places. The banks of the river are generally low, and the bed sandy, but there is said to be "a bed of firm rock" under the site of the Agra Canal weir at Ckhlá. Religious reverence is due to the Jamná from the Hindú, though in a less degree than to the Ganges.†

* Not in "almost every point" as stated in the Gazetteer page 4.

† A mixture of rationalism in spiritual matters is apparent even in India. When asked the reason *why* the Ganges was more sacred than the Jamná, a Hindú (of course heretically) replied, "Because its water never putrefies." Fifty years ago the assertion would certainly have been—"It does not putrefy because it is so sacred."

Chapter I.]

General aspect of the District,

Old bed described.

It passes close under the Fort at Delhi, and it must always have rounded the Eastern point of the rocky 'Ridge' at Wazirábád. But in the northern part of the district it appears formerly to have had a course much to the west of that which it holds at present. The drainage channel called the 'Budhi nála,' which comes down under the very doors of Sunipat, would seem by the conformation of the country to have been the old bed of the Jamná, and this is supported by strong and general tradition. The course of the Budhi marks off the division of the country into Khádar and Bángar. The Khádar which, as might be supposed, lies low, may be defined as the soil which at some time or other lay either under the river or to the east of it. *The Bángar in old times lay immediately to the west of the stream, and the ascent of the old bank is in most places plainly visible. How or when the river changed its course is not known, but there seems some probability that the change was violent rather than a gradual one. The physical conformation above alluded to favours this, while some countenance is also given to it by the fact that the shapes of the village areas in the Khádar do not at all suggest a gradually elongating boundary as would probably be the case had the river gradually receded. Nor is the latter supposition rendered likely by the circumstances, so far as known, of the origin of those villages. There is a Khádar Chak in Pánipat Tahsíl of Karnal, so that the locality of disturbance is beyond my ken. It may at any rate be considered certain that the river once flowed beneath the walls of Sunipat and down south by Narelá, to somewhere near Azádpur† on the Grand Trunk Road near Delhi, where, beginning to feel the influence of the hills, it must have turned sharply to the east. Below Delhi its course seems to have been in the same way immediately east of the Bángar bank. This in the immediate vicinity of the city abuts almost directly on the stream where it now runs; the soil is hard, high, and in many places, rocky. The Khádar after re-appearing in the fertile lowlands of Indarpat and Ghyáspur is again cut off

* An interesting evidence of this (first suggested by my friend Mr. Ibbetson) is the elongated slip-like shapes of most of the eastern Bángar villages. They evidently abutted on the river, and part of their areas is made up of the Khádar land deserted by it. But east of this again the land is slightly higher, also favouring the theory of a sudden change to the east.

† This of course leads to the inference that the country east of this line is Khádar. As a fact it is, and it was not well done, I think, to class some of it as Bángar. This, however, probably was because some villages took canal water. The point is noticed further on—see para. 243.

General aspect of the District.

[Chapter I.]

at Okhlá, where the Bángar bank juts boldly forward, giving an advantageous site for the head of the Agra Canal. For some few miles below this the ground continues the same, but then the old river would seem to have taken again a more westerly course than the present—to have passed close by the ancient village of Tilpat: then turning again south-east along a 'nalá' still visible, to have rounded closely the high bank on which the Khádar-Bángar villages in this part mostly stand. From Gharorá to Cháensá this line is very conspicuous. The Khádar south of Delhi is thus a very narrow slip, of country, often only a single village in breadth.

§ 8. The country immediately south of Delhi as far as Máhraulí, Toghla-kábád, and Molarband is rocky and undulating. This and the picturesque ruins abounding almost everywhere give the scene an interest not often found in the plains of India. Beyond this again to the south the country lying between the hills to the west and the Khádar already described on the east, becomes more flat and open, and so fit for the passage down the eastern side of its length of the Agra Canal which keeps an almost perfectly straight course at a low level down into the Palwal Tahsíl. Parallel with it, roughly speaking, is the metalled road to Agra which passes through Ballabgarh at a distance of 22 miles from Delhi.* The soil of this part is mostly a light sandy loam, which under good hands is very fairly productive. The country between the Agra Road and the hills to the west, begins to get level a few miles below Badarpur; it is mostly sandy, bearing the detritus from the hill slopes, and in the rainy months is marshy and in places flooded,—the passage of the water is toward the south where it debouches at the top of the Palwal Tahsíl.

§ 9. The above will give a general idea of the physical features of Delhi. Some of them will be described in greater detail further on in connection with special matters relating to revenue. But I think it well here to make some remarks on the drainage of the district. The subject is of primary importance from a revenue point of view,

* It is not correct to say as has been said in the District Gazetteer that this part "is naturally the poorest and least fertile of the District." The whole hill tract and much of the land under the hills in various parts is inferior to the Ballabgarh Bángar. Nor is it "almost entirely dependent on the seasons for its cultivation." The Chak has 830 wells irrigating at a fair estimate 7864 acres or 14 per cent. of the cultivated area. I think the information quoted must have been obtained from Thornton's Gazetteer which either was inaccurate or must have described a country quite different in its features from those of the Ballabgarh Bángar as they are now.

Para. 8.

South Division of the district.

Para. 9.

Drainage of the district.

Ballabgarh.
Bángar.

Wrongly described in the 'draft' Gazetteer.

Chapter I.]

General aspect of the District.

Southern drainage.

since a regulated abundance of water supply is one of the essential conditions of a prosperous and efficient system of husbandry.

The drainage of the Delhi district as may be easily seen from the map is divided completely by the hills, and may be separately considered in these two portions. The drainage of the southern part is simple. There are three main outlets for the north Ballabgarh drainage in its rush down eastward from the hills to the river—the Bārāhpulā, Tekhand and Burhiyā naddīs. The general flow of these water courses which is too violent in flood to be of much use in irrigation, is to the east, but here and there owing to local peculiarities of soil, their course is changed, and they go sometimes east, sometimes south.

The North Ballabgarh Naddīs.

1 Bārāhpulā.

2 Tekhand.

3 Burhiyā.

The Bārāhpulā drains the slopes of the hilly villages north-east of Máhraulī, and crossing the Agra Road under a fine bridge (from the number of arches of which it takes its name) runs into the Khádar just south of Humáyún's tomb. The Tekhand naddí drains the lands west of Máhraulī, crosses the road about 4 miles below the Bārāhpulā, runs over the canal by a super-passage $2\frac{1}{2}$ miles below Okhlá, and then runs southward into the river. The Burhiyā naddí drains the whole of the hills lying in the vicinity of Arangpur to its south-west and south. It is larger than the Tekhand nalá and in flood it is sometimes violent enough to stop the passage of travellers at the point where it crosses the Mathrá Road. There was a bridge here a few years ago, but having been carried away in 1875, it has not been replaced, nor is there any sign of the Public Works Department feeling itself called on to do so. The want is a conspicuous one, and if not supplied by Government might in charity be seen to by the District Rates Committee. The south Ballabgarh drainage runs more decisively south-east. The torrents and drainage channels on this part beginning from the north are as follows:—

South Ballabgarh drainage.

(1.) Meolá Maharájpur channel.

(2.) The Parsaun naddí.

(1.)—There is a small channel issuing from the hills south of the village Meolá Maharájpur which comes down on to the low ground of Fatehpur Chandilá. I do not think this gets any further.

(2.)—A much larger stream called the 'Parsaun' comes down from the Badhkhāl hill on the same low ground in Fatehpur Chandilá, a little to the south of the other. It crosses the Agra Road under a bridge and fills the tank at Farídábád. Thenceforward it divides; one branch of the watercourse goes down the old imperial road toward the

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Majesar lands and then turns eastward on to Sihi. The second goes more directly to Sihi passing by the 'ábádí' of that village and so on near Súrat Rám's garden to Ballabgarh. Thence it crosses the main road again on to the low ground of Ranherá. Before the Agra Canal was dug the water used to spread over the fields of Majherí and Chandáoli.

(3.)—A third channel descends from the hills south of Badhkhal through the Daulatábád land, and round to the south through Ajraundá into the limits of Majesar village. There it splits up into two streams; the main one passing between the two 'ábádís' of Majesar passes through the west lands of Ballabgarh on to Ranherá Jhíl; the other passes north of Majesar into Sárán; some water too from this nalá comes down on the south lands of Daulatábád, through Mináru to Sárán and meets the last named stream in the 'dahar' of Gaunchhí village.

(3.) Badh-
khal Nála.

(4.)—Another stream comes down from the hills on the confines of Bhánkrí and Páli on to Dabuá lowlands, then through Gházípur and Naglá Gújarán touching the south-west corner of Sárán, and falls into Gaunchhí 'dahar.' When in heavy flood it does not stop there but passes on to Shamápur too.

(4.) Bhán-
krí channel.

(5.)—There is a stream locally known as 'Bandhwán-báj' which comes down south of the last named on to Kherí Gújar.

(5.) 'Bandh-
wán-báj.'

(6.)—The sixth torrent comes out of the Páli hill. Passing by the south of the 'ábádí' of that village, it goes to Kherí, like the other.

(6.) Páli
naddí.

(7.)—Another nalá comes down from the hills near Kothrá Muhabatábád. It passes to the north of Pákal and touches the north of the Nekpur lands joining with Nos. 5 and 6 in Kherí Gújarán. Thence running on through the south-west corner of Naglá and the north of Koreishípur it goes through Sarúrpur and Mádápur and joins No. 3 and 4 in Shamápur. Thence moistening the lands of Jhársetlí, Kandháolí, and Kaelgáon, it passes through Naglá, Jogián, Harphalá, Mahólá and Kabúlpur Bángar, out of the district.

(7.) Pákal
Naddí.

(8.)—This nalá comes out of the hills under Mángar; it

(8.) Mángar
Naddí.

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is injuriously violent, and when in flood brings down a large body of water. Its line lies close by Dhauj, Tíkri Kalán, Fírozpur Kalán, Ladhiapur into the Jhíl of Kabúlpur Bángar.

(9.) Kot
Naddi

The largest
are Nos. 8, 3,
9.

Drainage
east of the
Agra Canal.

(9.)—The last naddi is the one issuing from under Kot, this is nearly as bad as Mángar nalá when in flood—and damages the lands of the villages through which it flows when it comes down in heavy rains—it passes through Alam-pur, Sarohi, Khorí-Jamalpur, Bijupur into the marsh at Sarmatla in Palwal and thence on to the Jhíl of Khalípur. Of all of these the most violent are No. 8, the Mángar one—No. 3 from Badhkhal, and No. 9 from Kot in the order named. There is no perennial stream, however, and except in the rainy season the effects are seen only in the undulating character of the ground, here and there cut into more clearly marked channels—the permanent moisture of the lower lands, and in a few villages, a pool of standing water which, though in dry seasons it disappears altogether, in wet ones swells into a Jhíl or marsh of considerable size. Thus in the cold weather I once found the road unpleasantly flooded between Sarmatla on the border of Palwal and Ballabgarh; and duck can be generally shot on the ponds near Gaunchhi throughout the winter months. As instanced just now the Agra Canal has materially altered the drainage of the east-half of the Ballabgarh Tahsíl. There is now no room for any considerable length of drainage flow on that side. There is an escape dug from the canal south of Tilpat opposite the place where the water of the Burhiya naddi comes in, and this meanders on in a slimy shor-mixed stream through the low Khádar north of Bhopáni on toward Bhaskaula where it gets a doubtful exit into the river. The want of drainage here is shown in the prevalence of 'shor' which more or less affects all the land lying in this neighbourhood.

Para. 10.

Drainage
north of the
hills.

The Budhi
Nala.

§ 10. Turning to the drainage north of the hills and beginning at the further end of the district—the first drainage line that draws notice is the channel of the Budhi nalá mentioned above in para. 7 which runs down almost due south, on the east side of the Bángar Chak. This comes down to within a few miles of Delhi, but in the latter part of its course it becomes very serpentine, and hence is called there the 'Nág nalá.' It has no clear outlet but is partly intercepted by the Gungá Toli escape, dug from the canal 13 miles above Delhi. The large sheet of water near Bhalswá Jahángírpur marks the continuation of this channel, which sooner or later it is hoped will be cleared

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out again. There are outlets for the drainage from the west dug into this channel near Jagdispur and Ládpur below Sunipat, but no outlet alas exists for the water when it comes there, except a very irregular passage down by Pitampurá which does not do its work at all properly.

§ 11. Besides this nalá, the Khádar has a depression, well defined in some parts, blocked up by cultivation in others, running down from Kheri Tagá with a fork on one side through Pipli Kherá, and another through Rámnagar. Between Dhatúri and Malikpur the channel is well defined, but in Murthal it grows doubtful, appearing again in a perfect net-work of hollows and sinuous depressions in Kunashpur, Dipálpur, and Kheoráh. Hence it takes a turn rather more south-east and joins a nalá of the river at Máhraulí. From the large pond in Piplá Kherá a small trench (it can hardly be called a ditch) has been dug for a considerable distance to the south-east to carry off the rain water, but it has not been vigorously followed up or kept in repair, and so is of little practical use. It may be asked what is the need of drainage channels in the Khádar where the water supply is never too abundant, but this remark supposes a greater power of absorption in the soil than actually exists. As a matter of fact the Khádar does need drainage though in comparison of the Bángar not so much. There are not a few places in the Khádar where 'Reh' or 'Shor' is apparent, especially under the lee of the Grand Trunk Road. This work forms in some places a 'band' several feet above the level of the adjacent country and necessarily impedes the passage of the rain drainage toward the river. It is true there are scientific bridges at different places—but the breadth of waterway was, it would seem, intended to be enough to protect the road, rather than specially to allow free unimpeded passage of the drainage.

Para. 11.

Other Khádar drainage channels.

Need of drainage in the Khádar.

The Grand Trunk Road as a drainage obstructor.

§ 12. But the damage done in this way by the Grand Trunk Road is a mere trifle compared with the grievous injury that has been for many years going on in the Bángar by reason of the bad alignment of the Western Jamná Canal and want of proper provision for drainage of the rain water and surplus moisture from irrigation. The Settlement Officer of Karnal no doubt will dwell on this point in his report, and the evil there is perhaps more painfully glaring than in Delhi, but even here it is bad enough and makes one wonder at the comparative unconsciousness of responsibility, manifested in some ways by our English administration.

Para. 12.

Bad state of the Bángar as regards drainage.

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General aspect of the District.

The W. J.
Canal as a
drainage ob-
structor.

As, however, there is some* reason to hope that the matter will now receive systematic attention, I need not do more than briefly note the facts for the warning, it may be of those that come after. The alignment of the Canal, as it has stood for some fifty years since its reconstruction, is throughout a great part of its course in this district in a *valley*—and in order to allow of irrigation on the higher grounds receding from its side, its bed has been raised so as to be not seldom higher than the adjacent fields. Percolation has been of course immense. Then the distributaries have hitherto been constructed on the same principle without any thought of economy of land or water. The watercourses often intersect each other—often run parallel side by side for long distances. It is not wonderful therefore that the damage done by waterlogging is immense, and in places all but irretrievable. With the best system of drainage possible and the best care and attention in watching over and enforcing that system it will be a long time before the Bāngar recovers itself.

Para. 13.

The Bāngar
drainage.

Six lines
West of the
Canal.

§ 13. One branch of the drainage of the Delhi Bāngar runs down to the west of Bali Kutabpur, then south south-west to Pugthalla (see para. 69) on through the two Bajānās and so into Rohtak to meet with the other lines at the Najafgarh Jhil. Another depression systematised into a drainage cut starts from Juan and goes south south-west by Salemsar Majra and Mahipur and so like the other out of the district. A third runs due south from Bhatgaon through Nirthān; a fourth crosses the line of the Canal at Bhadana and Jharauti with, as may be imagined, a terrible effect; while a fifth, a very important line, runs due south from the two Tharās by Nizāmpur Khurd, Kutabgarh, and passes between the two large villages Lādpur and Kanjhaolā with a course to the south-west into Rohtak. A sixth lies south-east of Pūthkhurd and goes through Sahābabād, Daulatpur,

* I wish I could say certainly that this part of the drainage question was not in the limbo of deferred schemes—but two years ago I wrote—“It is true the present realignment of the Canal is designed to improve the drainage. But the removal of obstructions in the present drainage lines is quite as important and as urgent a work. Yet this after being authoritatively directed many months ago, appears to have been as authoritatively shelved. A heavy responsibility lies with those who do this.” It is indeed hard to write strongly enough on the point without seeming to be sensational, but I wish to record my deliberate conviction that the district has through the bad drainage of Canal lands lost in productive power about as much as it has gained elsewhere since last settlement, and this loss must be measured yearly by lakhs. The only remedy is an efficient through drainage passing direct to the Jamnā and not round by the Najafgarh Jhil.

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Rithala (a large part of whose lands is simply marsh) and Magholpur Khurd crossing the Rohtak road about a mile east of Nángloi Jat, and falling into the Najafgarh Jhíl in the limits of Nángloi Saiyad.

These drainage lines are not mere depressions scientifically determined to be such: they are patent to an ordinary observer riding over the ground if he carefully watches the lie of the land, and two things that always are affected by this, the character of the cultivation and condition of the soil. Except the last line the lower part of the channels lies in Rohtak where they come in at the top of the Najafgarh Jhíl.

These lines
are patent to
observation.

§ 14. On the other side of the Canal the directions of the drainage flow are perhaps not so clear, but still they may for the most part be made out. One small line goes down between Ahulana and Atael—another larger one runs south-east from Khúbru through Shekhpura and Aghwánpur—a third from Dabárpur in the same direction through Máhrá into the Khádar below Shahzádpur. The outlet of these three is clear, or might be made so, into the Budhi nalá mentioned above in para. 10. But below this there is more difficulty. There is a flow south-east from Juán but it gets obstructed somewhere about the road where it passes through Barwásni, and I doubt if much water passes on to Mailana though that seems the natural direction. About Rohat there is almost a basin, and the escape dug nearly due east to Nasírpur Bángar at present does but little good. It appears to be used to take off superfluous canal water rather than for relieving the neighbourhood by drainage. Further down there is a sinuous depression below Katlupur passing through the north-east lands of Bowána round by Sanauth into the Gangá Toli escape. This escape was dug possibly to take off the surplus water of the canal and not for drainage purposes, though its direction is shaped so as partly to serve them. It carries off some water from Sanauth and Razapur Kalán and then running sharp to the south turns again to the east at the Grand Trunk Road which it crosses a mile south of Alipur and thence on in the same direction to Garhí Khusru and the nalá running past Burári.

Para. 14.

Drainage
lines East of
the Canal.

§ 15. The western lines, as has been already said, converge on the Jhíl below Najafgarh—there are two main passages into this—one to the north of Jharaúdah and east of Dicháon comes into the lowlands at Nawáda Hashtsal. The other and larger body of drainage comes in between

Para. 15.

The Najaf-
garh Jhíl.

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Mandela Khurd and Bākargarh running south-east to Pind-wāla Kalān and meeting the large Jhīl below Chhāola. The main Jhīl lies to the south-west and west of this and is fed, as already noted, by the Sahibi drainage from Gurgāon and the flow of hill water on the west side of the Delhi hills. This last comes down in several places; the most distinct lines perhaps are those lying about Dābri, and Pālam.

A more particular account of the Najafgarh Jhīl, considered in its revenue and irrigation aspects, will be found in paras. 70 and 71 of Chapter IV. It is sufficient to note here that the area drained by it is estimated at 3,072 square miles—and its water surface with a depth of 12 feet in the water gauge at Nanak Heri is 56,657 acres or about 88½ square miles.* In 1833 its area was estimated at 52½ square miles, but I do not know the time of the year this refers to. Its outlet is a drain passing with a muddy sluggish flow to the north-east by Kakraula, Nilauthi, and Basei across the Rohtak Road about 3 miles west of Delhi, and emptying itself into the Jamnā just above the village of Wazirābād.

Para. 16.

Climate of
the District.

The weather
fit for each
season.

§ 16. The climate of the district is what might be anticipated from its position, as lying between the plains of the Punjab and those of the more tropical parts of Bengal. The cold weather is much like that of the Punjab—and there is a bleak north-west wind which makes the temperature seem lower than it actually is. On the other hand the hot weather begins sooner, by a good fortnight, though the nominal dates for commencing and leaving off pankhās are the same as those of Lahore. Tents become unpleasant after April 1, when if the season is a normal and favourable one, the hot wind ('lūh') begins. During the succeeding months down to the middle or end of June, the west wind should blow moderately and equally—a violent west wind is hurtful to the crops, while an east† wind is unhealthy for men. The four months—Phāgan—Chait—Baisākh—and Jeth—make up the 'Kharsa' season—the dry months. Then comes the 'Chaumāsa'—the four rainy months—Asārī

* In 1856-57 this gauge showed 15' 11" which would give a much larger area, but the capacity of the Jhīl has been ascertained only up to 12 feet on the gauge.

† 'Jeth chale pura,
Wuh bhi bura.'

*If the east wind blow in Jeth,
That is bad.*

'Jāt nachāwe tura,
Wuh bhi bura.'

*If a Jat (mount and) make a horse to dance,
That is bad.*

'Bahman bandhe chhura,
Wuh bhi bura.'

*If a Brahmin take to wearing a knife,
That is bad.*

Proverb
about the
weather.

General aspect of the District.

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—Sáwan—Bhádón—Asoj. In this period plentiful rain is expected and wished for, especially in Bhádón.* In Asoj, however, it is getting too late for cotton and til.† The air then, if the west wind blows, is fresh and healthy—the east wind is very debilitating and is said to produce boils and fever. Asoj brings us on to October when the nights are beginning to get cool. Then comes the feverish season which is always bad in Delhi, but during the last few years has been so fatal as in some parts to materially diminish the population. The canal villages which might be thought most likely to suffer have not been distinguished lately in this way. Toward the end of November or the beginning of December matters begin to improve, for the ‘Jára’ or cold season has well begun. The four months Kátik—Mangsir—Poh—Mágh, bring us round again to the ‘Kharsá.’ Rain is almost unknown in November, but is thought good for husbandry in December,‡ as if there is no rain, there

The weather
fit for each
season.

* There are many sayings in the popular vocabulary exemplifying this :—

(1.)—‘Barsega Sádhi (Asárh or Hár),
Karegarábád.’ *If it rain in ‘Hár.’
It will make (the country) prosperous.*

(2.)—‘Sáwan ki Jhari
Motion ki bhari.’ *The showers of Sáwan.
Are filled with pearls.*
‘Sáwan ki Jhari
Sukhi gili-sab hō gai hari.’ *(In) the showers of Sáwan.
Dry and moist (soil) all becomes
green.*

(3.)—‘Barsega Bhádón
To Sakhi hongí donon :’ *If it rains in Bhádón.
Then both harvests will be (good).*

while heat for Jeth and rain for Bhádón are pithily indicated as desirable in the forcible lines

(4.)—‘Ghana na ant ka bolná ; ghaní na ant ki chup
Ghana na ant ka barsná ; ghaní na ant ki dhup.
Bhádón ant ka barsná ; Jethon ant ki dhup
Bhádón ant ka bolná ; Bahuon ant ki chup.’

which may be translated thus :—

Talk as a rule is good but not too much ; silence is good but not too much.

Rain is good but not too much ; sunshine is good but not too much.

But the more we get the better, of rain in Bhádón, or sun in Jeth, or talk in our story-tellers, or silence in our wives.

† ‘Asoj men jekar láge jhari

Tilon tel, na bāñon puri.’

If it rains in Asoj, the til wont give (good) oil, nor cotton trees (good) pods.

‡ ‘Pāni áyá Mangsir

Gehún áyá rangsir.’

With rain in Mangsir the wheat will be of good colour.

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Para. 17.

Delhi Boil.

will be heavy work for the oxen in watering the young rabi crops,* and in Poh though late it is better than nothing.†

§ 17. The only peculiarity in the way of disease in the district is the Delhi Boil. The causes of this sore are as yet not known, but the best local opinions point to a scorbutic origin. Some years ago in the Indian Medical Gazette there appeared a memorandum by Lord Mark Kerr, sounding a pœan over the supposed fact that "at the end of eight years" (after his Lordship's return home from India in 1864) "the disorder has almost entirely disappeared from Delhi." Enquiry was instituted by the Sanitary Commissioner with the Government of India, but the reply received did not show any evidence either one way or another. There had been no doubt a decided temporary decrease, but it was not as yet certain to be permanent—and conclusions were considered premature.‡ At the city Dispensary in Delhi the annual average of cases treated for this disease for the last five years (1875–79) is 37.

* 'Mangsir men nahin de kor

Kyûn bailon ko legayâ Chor'?

If watering is not given in Mangsir—surely a thief has carried off the oxen!

† 'Barsegâ Poh,

Mâra mota jamkar bhî ho'

If it rains in Poh, there will still be something of a crop, full or thin.

‡ Lord Mark Kerr had assumed that the sore was caused by the state of Delhi. His Lordship writes:—

Lord Mark Kerr's Pœan on its supposed disappearance.

"Before my arrival in India, I had heard of the existence of certain "boils and sores in many eastern cities which, having once been places "with enormous populations, and all the requirements of wealth and luxury—well drained and well watered and adorned with numerous trees "and gardens—had in the process of centuries become, for the most part, "desert wastes, their canals and watercourses choked up and their early "vegetation unwholesome weeds."

"I knew such to be the case at Bagdâd, Aleppo, and other places. "When I arrived at Delhi, I found the inhabitants and those with whom "I, as Brigadier General, was most concerned, the garrison both European "and Native, to a great extent suffering from boils, sores, and unsightly "fungus-looking growths on their hands and limbs, and I found Delhi "within the walls a surface of barrenness covered here and there for the "space of 2 miles in length and 500 yards in breadth by foul weeds, heaps "of demolished buildings with wells and water-ducts choked up." As a remedy, trees and grass were planted—and his Lordship's opinion is that it was completely successful.

The men of the cavalry regiment at the Kabulgat were entirely free, and men sent out "among the trees and verdure" of the old cantonment, rapidly improved. The Durya Gunje aqueduct was restored. Lord Mark Kerr left India in January 1864.

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§ 18. In the villages irrigated by the Western Jamná Canal the standard of health and vitality is materially lower than elsewhere. This fact attracted the attention of Government as long ago as 1847, when a Committee was appointed to enquire into the sanitary state of irrigated districts. The Medical Officer, Dr. Dempster, in his memorandum forming part of the report, showed that in many villages of this part, 75 per cent of the people had disease of the spleen, and that the average proportion of the persons thus diseased to the total population of the villages, examined during the enquiry, was nearly 50 per cent.

Para. 18.

Health of
Canal villages.

Enquiry in
1847.

The Punjab Sanitary Commissioner when called on for opinion and facts, said that there was great doubt as to the latter, consequently an opinion induced from them would be premature. He evidently inclined to the opinion, however, that the disease could be said only to be in abeyance. The cases in the Dispensary though less than half in 1870 and 71—as compared with the five years before, had in the earlier months of 1872 again mounted up to nearly their former numbers.

Lord Mark
Kerr on the
Delhi Boil.—
(Continued).

The Government of India was not satisfied with the reply and again referred the point to the Punjab, but nothing more was elicited.

For the following medical description of the sore, I am indebted to the courtesy of Lálá Rám Kishendás, Assistant Surgeon in charge of the city Dispensary at Delhi :—

“This disease is similar in its nature to Biskra (?) Button, Aleppo evil, Lahore sore, Mooltan sore, &c.; it would be better, therefore, to call all of these by a common name; and the designation ‘Oriental sore,’ proposed by some writers, is the most appropriate.

“It attacks persons of all ages and positions in life, and both sexes indiscriminately, but children between the ages of five and ten seem most liable to it.

“Depraved nutrition from climatic influences is believed to be the cause of its production, but the exact nature of these influences is unknown.

“It attacks generally the most exposed parts of the body, *e. g.*, the face, fore-arms, hands, legs, and feet, but has been seen on the chest, abdomen, and other parts, generally covered, as well. It commences as a papular eruption, attended with itching—soon followed by a crushed pustule and ultimately by irregular ulceration, which may last any length of time, but which, so far as I have seen, never destroys the deeper tissues.

Medical
description of
the Delhi Boil.

“There is no certain cure for it: strong caustics sometimes eradicate it by destroying the nucleated cells contained in the meshes of the tissues attacked. There are several stimulating and astringent native remedies in vogue as specifics for the sore, but I have never seen any material benefit arising from them. Change to a better climate has appeared beneficial to troops, suffering from it.

“Its pathology is under dispute; some observers of authority say it is of a parasitic origin, while others of equally high reputation deny this altogether.”

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Para. 19.

Later In-
quiry of 1867.

Dr. Adam
Taylor's Re-
port.

§ 19. In 1867 another inquiry was instituted by the Government of India and the results reported by Dr. A. Taylor, Civil Surgeon of Delhi. This report has been printed (Selections from the Records of the Government of the Punjab and its Dependencies New Series No. VI), so that I need not do much more than refer to it. Dr. Taylor showed clearly the presence of an unusual amount of Spleen disease, and its close connection with the degrees of swampiness and want of drainage found in various parts. The villages "enjoying the greatest advantages" of irrigation were almost invariably those where the debilitating disease assumed its most prominent form. The perusal of the report is in general depressing,—but in para. 77 he speaks of the beneficial effect, produced by the enlargement of the drainage cut from the Najafgarh Jhil to the Jamna, in 1857. In 1845, he says, the splenic enlargements were 43 per cent. while now in 1867 they were only 5.37. The flood level had sunk 3 feet, and the aspect of the people is healthy and robust.

Para. 20.

Alleged evil
effects of
canal water.

§ 20. Besides fever, the zamindars of the canal villages complain that copious irrigation of the land brings with it, though they do not know how, impotence in the men. On this point information is of course very doubtful: it may be noticed that the earliest report on the matter, that of Mr. Sherer (Selections from the Records of the Government of India in the Public Works Department No. XLII) expressed an opinion which would provoke strong dissent now-a-days.

"The unfruitfulness of women in canal villages is a subject of common remark, and the consequent difficulty of inducing other Jât families to give their daughters to the men of Panipat, and the environs of the canals generally, is very great: and yet it is a most *singular circumstance that nothing will persuade the villagers to drink canal water*, which chemical analysis has shown to be quite free from noxious ingredients."

Impotency
said to be in-
duced by
canal water.

Dr. Taylor heard that sexual incapacity existed greatly among men, but that women were not barren in the same proportion. The present report is the same; and it is said in addition that the women are generally more healthy than the men. Two reasons are given—the women come from other villages—often villages not irrigating from the canal—and so have a healthier stock to begin with. Secondly they work more than the men. This sounds strange—and is only half true—but there is no doubt that the women in the canal villages look less lazy and demoralized than the men, who

General aspect of the District.

[Chapter I.

are indeed a very degenerate race.* Many villages now drink canal water though they abuse it as the cause of all their woes.

§ 21. There is nothing special to record of the district in respect of cholera. The city of course suffers when any cholera is hanging about, but the other parts of the district are, if anything, more free from it than the average. The last epidemic was in 1878 when the deaths for a short time were very high. But cholera is not so fatal as fever, which for the last two or three years has been very prevalent during the autumn months.

Para. 21.

Cholera.

Fever.

§ 22. The average rainfall for the whole district during the 12 years 1869-1879 is 23·1 inches. This is the result of carefully abstracting the monthly returns published in the Punjab Gazette but it is, I think, curious when compared with the larger rainfall in Pānīpat, and the larger rainfall on the other side in Gurgāon, which certainly has the reputation of being a thirsty tract as compared with this district. The Tahsīl averages do not help us in the matter, as Delhi has a larger figure than the others, thus—Sunīpat gives 22·7—Delhi 25·5—Ballabgarh 21·3 inches. The yearly averages for the district are here noted:—

Para. 22.

Rainfall.

1867-68	68-69	69-70	70-71	71-72	72-73	73-74	74-75	75-76	76-77	77-78	78-79
26·2	8·2	20·6	24·7	25·8	24·5	31·7	21·0	34·9	21·7	13·5	24·0

The striking deficiency in 1868-69 accounts for the scarcity in that year—the other bad year 1877-78 had, it will be noticed, a considerably larger rainfall, though it was less than $\frac{2}{3}$ of the annual average. But 1877 was not so severely felt in this district as in Rohtak and Gurgāon. A detailed analysis of the figures will be found in Appendix No. I. I have had the months arranged in three divisions according as their rainfall may be supposed to affect the Rabi crop—

* I remember when appointing Head Lambardārs in canal villages noticing how in large places of three or four hundred proprietors—hardly a single man came up to vote who had not some bodily defect. He was either palpably suffering from spleen—or was ill-nourished and weakly, or lame, one eyed, semi-paralytic, or the like.

Chapter I.]

General aspect of the District.

Rainfall for
each crop.

the Kharif crop—or both crops: the grouping is thus:—

For the	{ April ...	Common	{ Aug. 16—31	For the	{ October.
Kharif	{ May ...	to both	September...	Rabi •	{ November.
crop ...	{ June ...	crops ...		crop ...	{ December.
	{ July ...				{ January.
	{ August ...				{ February.
	{ (1—15) ...				{ March.
	—		—		—
	4½ Months...		1½ Month ...		6 Months.

The average rainfall in the first period; *i. e.*, the purely Kharif rains is 13·4—for the rains common to both crops as above defined 6·9—and for the Rabi alone about 3 inches.

Para. 23.Years of
scarcity or
drought.

§ 23. A note of past years of scarcity may conveniently be made here, seeing that the main cause of a failure of food is a failure of rain. These, as known by tradition or reported by different authorities,* are the years A. D. 1345; 1631; 1661; 1739; 1770; 1783-84; 1803-4; 1813-14; 1819; 1825-26; 1827-28; 1832-34; 1837-38; 1860-61; 1865; 1868; and 1877.

Of these the worst are said to have been 1783-84, 1803-4, 1837-38, and 1860-61. Perhaps this is said because there is a more commonly known tradition of these years than of others, especially of the terrible 'chalisa' 1783-84 (Sambat 1840.) But the earlier famines are well known in histories. Muhammad Tughlak's savage extravagance in his war schemes brought on, it is said, the famine of 1345, wherein men ate each other. Shah Jahan saw two years of drought 1629-30 and this induced the scarcity of the following year. Aurangzeb's reign had the famine of 1661, in which, in spite of the personal exertions of the Emperor, multitudes perished, and at least as many at Delhi, as in other places ['chirag-kenichē andhera']. In 1825-26, it is said, there was great drought in Delhi—out of a revenue demand of 28,72,272, the balances were 10,59,212. In the Northern Division of the Territory a whole year's revenue was remitted, and in the Western Division there was considerable distress. Suffering

* The facts of this para. were chiefly taken, I think, from an official report of the North West Provinces, but I forgot to note the reference, and cannot now recall the name of the writer.

General aspect of the District.

[Chapter I.

again occurred in 1832-33, while in 1837-38 bread-riots came into fashion, and unlimited relief was ordered for those who would work. In Pānipat alone 26,000 rupees revenue was remitted and elsewhere no doubt in proportion. This trouble was put an end to by rain in February 1838.

The events of the post-mutiny famines are fresh and well known;—in 1860-61 a system of large earth works was started for the employment of sufferers—chiefly in the Ballabgarh Tahsil. Some of these works, as will be noted in the proper place, have fallen out of repair, while others have been rendered useless by the construction of the Agra Canal.

Post Muti-
ny famines.

Chapter II.]

Products of the District.

CHAPTER II.

*Products of the District—A. Spontaneous—
Mineral—Vegetable, and Animal.***Para. 24.**Minerals of
the District.

§ 1. The noticeable minerals of the district so far as known are Stone, Crystal, Kankar, and Chalk—though it is said the quartz-like formation of the hills * renders the existence of gold not impossible, and the known presence of crystal at Arangpur has been recently alluded to as favouring the probability.†

Para. 25.

Delhi Stone.

§ 2. The quartz-like kind of stone is hard and not easily worked, except for uses not requiring delicate shape—it is seen as its best in many of the old buildings round Delhi where it fitly harmonises with the sombre dignity of the Pathán Style. For the Agra Canal a considerable quantity was used; but for the new Delhi Branch, I believe, the softer and more malleable Agra stone has been preferred. There is also a sandstone found in the hills near Ballabgarh which is soft and looks handsome when worked up. The Rájá's palace, now the Tahsíl at Ballabgarh, shows some very pretty pieces of this work in pillars and arches

Para. 26.Crystal at
Arangpur.

§ 3. The only place where crystal has been brought to the surface is in the limits of Arangpur, a hill village about 2 miles south of Delhi. A mine here was first started, it is said, a hundred years ago by the Rájá of Ballabgarh who spent a good deal of money in getting out and sending for sale a supply of the mineral. Most of the pieces, however, were small octagonal blocks of no great commercial value, and after this one attempt the Rájá gave up

* Their scientific description is given as follows :—

"A core of quartzite with more or less vertical bedding, and the associated rocks as far as they are exposed on the flanks of the ridges indicate advanced metamorphism."

Medlicott and Blanford's Manual of Geology of India page 52.

Gold to be
found at
Arangpur.

† See an enthusiastic letter in the Indian Agriculturist for June 1880. The idea of finding gold at 'Sona' in Gurgaon loses any basis it might have in the name of the place when it is noted that the word is 'Sohná.' But the mineralogy of the writer may be more accurate than his philology; and those who take an interest in the district may hope so, though hardly able to expect as he apparently does, that the "very considerable sum of money" required for the Afghan War "may be drawn from the valley of Arangpur." See also para. 204

Products of the District.

[Chapter II.

the enterprise and closed the mine. After the mutiny a Khatri of Delhi took a contract for working it; but after spending some 1,500 rupees in trying to find the Crystal, gave up the attempt and his contract also. The locality of the mine is rather inaccessible; it lies to the south-west of the village which itself is a collection of huts at a considerable distance from the main road. Dr. Thompson in his report on rock Crystal mines * says that "the Crystal does not occur in its primitive position but in a secondary deposit of siliceous breccia very highly impregnated with iron; each crystal is encased in a sheath of hæmatite. As we go downwards the rock becomes less ferruginous, and lower still is met with in pieces of pure quartz, embedded in a matrix of almost pure white clay."

§ 4. Kankar† is found more or less extensively throughout the district. In Sunipat it is not regularly worked but in nine villages it has been found and doubtless might be obtained, if needed, in a good many more. In Delhi Tahsil 33 villages produce it, chiefly in the subcolline and marshy parts. In Ballabgarh 22 villages are shown as producing it. Very little digging is required to reach the beds—the chief element in its cost is that of carriage and transport to the place where it is required for use. It is not appropriated for roads in this district so exclusively as in others where it is the only material available. Macadamite is also used, and the station roads are many of them laid with 'Bajri' a reddish gravelly Kankar‡ found in the beds of hill torrents and such like places. 'Bajri' is cheaper than Kankar, but is not so durable and softens more under heavy rain.

Para. 27.

Kankar.

§ 5. Chalk is either worked or known to exist in Kasumpur, Mahraili, Malikpur Kohi, and Arangpur. It is dug out of a rude mine made by sinking a shaft 30 or 40 feet deep, and 5 or 6 feet in diameter, and then making tunnels in all directions horizontally at the bottom. The blocks ('dalla' or 'dhir') that are turned out whole are sold on the spot—the smaller pieces ('tikya') are taken to Malcha village and there washed and dried, and then sold for whitening. The local idea, I know not whether correctly, makes

Para. 28.

Chalk.

* Quoted at p. 47 of Punjab Products.

† "A calcareous concrete consisting of carbonate of lime in irregular kind of foliated pieces."

Punjab Products p. 141.

‡ "Disintegrated gneiss" as Mr. Baden Powell says, p. 39 Punjab Products.

Chapter II.]

Products of the District.

stone fuse into chalk by a kind of subterranean ignition. The product is of some value: in the village of Kasúmpur the lease of the chalk mines has for some years past brought in an income of over Rs. 300/- on the average. The expenses of excavation, carriage, washing, and making up into cakes for market sale are estimated at Rs. 15/6 per 100 maunds, the bazar price of which is about Rs. 30/-.*

Para. 29.

Salt.

Saltpetre.

§ 6. Salt is not now made anywhere in the Delhi district though it used to be in certain Khádar villages where the marks of the earth-beds ('sar') are still evident. Saltpetre is occasionally made in different parts. During the last ten years 30 licenses have been given for this purpose in 15 villages.†

Para. 30.

Soils of the District how classified locally.

§ 7. The soil of the district is mainly alluvial and is classified as Dákar, Rauslí, and Bhúr which are described respectively as a clayey loam, a half sandy half clayey loam, and a sandy loam degenerating in its inferior state to mere sand. The zamíndár distinguishes the three kinds according to their degrees of consistency—the Dákar clods are hard and stiff, not easily broken—the Rauslí while looking firm as a clod should crumble in fine pieces when let fall from the hand to the earth—while Bhúr as a rule does not lie in clods at all.‡

The villages where salt-petre is made.

* The zamíndárs do not dig the chalk themselves, they lease the right to strangers, generally men of low cast, living in the neighbourhood. Cooly labour at this work fetches 2½ annas per diem for the digger working down below, and 2 or only 1½ annas for the lighter work on the surface.

† These are:—

Sunipat—Rámpur, Kundal, Pináná, Nizampur.

Delhi—Dindhásá, Malakpúrzer Najafgarh, Ken.

Ballabgarh—Bhopání, Jaik alias Unchágáon, Sháhjahánpur, Mújerí, Síhí, Phapúnda, Aghwánpur, Fatehpur Billoch.

‡ A comparison with other classifications in the Punjab is given below:—

DAKAR is equivalent to	RAUSLI is equivalent to	BHUR is equivalent to
'Chiknot'—Gurgáon.	Less clayey 'Narmot'—Gurgáon.	Inferior 'Magdá'—Gurgáon.
More clayey 'Narmot'—Gurgáon.	Superior 'Magdá'—Gurgáon.	'Bhúr'—Gurgáon.
Rohí—('chikní mitti' when very stiff)—Bárf and Rechná Doáb.	Less clayey 'Dosháhi'—Bárf Doáb.	Inferior 'Mairá'—Bárf Doáb.
More clayey 'Dosháhi'—Bárf and Rechná Doáb.	Superior 'Mairá'—Bárf Doáb.	'Tibba'
'Sikand'—Montgomery.	'Gasrá'—Montgomery.	'Retti'—Montgomery.
'Karkaní'—		

Products of the District.

[Chapter II.

§ 8. The productive qualities of the soils may be estimated from their description. 'Dákar' is strong and fertile if it is well worked and its particles well separated—but it is generally too stiff for the comparatively light ploughs of the native agriculture, while its great retentiveness of moisture requires a favourable succession of wet and dry weather. 'Rauslí' is more easily worked, and is more porous; with less natural strength and forcing power, it is on the whole as good as 'Dákar' because it mixes better with manure, and allows the chemical action of the air freer scope. A light 'Rauslí' likes a brackish ('malmala') water well—the zamíndárs know this though to a stranger they not unfrequently make the complaint 'pání bil-kul khára,' (our water is altogether salt) as proving the want of productiveness in the soil. This is referred to further on under para. 65 with reference to irrigation.

§ 9. The kind most commonly met with is 'Rauslí.' In fact 'Dákar' is hardly found except in drainage lines, or old beds of pools and ponds, while 'Bhúr' representing sand scarcely at all mixed with vegetable decayed matter is also rare: the proportion as found in the district cultivated area is Rauslí 79 p. c., Dákar 13 p. c., Bhúr 8 p. c.

§ 10. There is a considerable difference in the various assessment circles in respect of the distribution of soils. 'Dákar' soil is found extensively in low lying lands where the passage of drainage water either free or impeded, may be suspected. It is also formed in canal lands by the accumulated deposit of alluvial matter which is brought down by the canal, and the layer of decayed vegetation which generally works into the ground year by year. 'Rauslí' is the normal soil of the Bángar, and 'Bhúr' represents the result of drainage washing away the lighter particles of soil or rock, so that it is not unnaturally found most largely in the Khádar near the river, or in the tracts immediately lying under the hills: the average of the assessment chaks as regards the distribution are given here:—

Para. 31.

Their productive qualities compared

Para. 32.

Respective proportions found.

Para. 33.

General feature of distribution.

Distribution 'chakwár.'

Chapter II.]

Products of the District.

Chak.	Soil.	BALLABGARH.		DELHI.		SUNIPAT.		TOTAL.	
		Area.	Percentage	Area.	Percentage	Area.	Percentage	Area.	Percentage
* Khādar- Bāngar.	Dākar ...	1,235	3	1,152	13	9,575	13	11,962	10
	Rauslī ...	32,025	82	6,354	69	56,705	80	95,084	79
	Bhūr ...	6,093	15	1,682	18	4,872	7	12,647	11
Bāngar.	Dākar ...	1,240	2	13,288	18	29,120	25	43,648	17.
	Rauslī ..	49,842	86	58,723	79	82,705	71	1,91,270	76
	Bhūr ...	6,788	12	2,514	3	5,157	4	14,459	7
Dahri or Dābar.	Dākar ...	2,942	14	9,201	17	...	...	12,143	16
	Rauslī ...	11,970	58	41,408	78	...	...	53,378	73
	Bhūr ...	5,525	28	2,640	5	...	...	8,165	11
Zerkohī.	Dākar ...	178	1	796	4	...	...	974	3
	Rauslī ...	10,212	56	17,038	95	...	...	27,250	75
	Bhūr ...	7,757	43	213	1	...	...	7,970	22
Khandrāt.	Dākar ...	...	...	14	...	...	...	14	...
	Rauslī ...	6,254	100	4,598	92	...	...	10,852	97
	Bhūr ...	...	...	364	8	...	...	364	3
Kohī.	Dākar ...	18	...	60	...	...	...	78	...
	Rauslī ..	14,493	90	12,713	100	...	...	27,206	94
	Bhūr ...	1,579	10	52	...	...	...	1,631	6
Total of District.	Dākar ...	5,613	4	24,511	14	38,895	21	68,819	13
	Rauslī ...	1,24,796	79	1,40,834	81	1,39,410	74	4,05,040	79
	Bhūr ...	27,742	17	7,465	5	10,029	5	45,236	8
		1,58,151		1,72,810		1,88,134		5,19,095+	

* In Sunipat this is *wholly* Khādar: in the other two Tahsils the villages mostly contain both Bāngar and Khādar soil.

+ The revised measurements give a slight increase on this of 322 acres, viz., 5,19,417, see para. 39 and para. 200.

Products of the District.

[Chapter II.

§ 11. Coming to vegetable products of the soil; the district is not well wooded throughout, but in many parts the trees are abundant enough to give a pleasant variety to the landscape, and in some a bird's eye view of the country from an elevated spot * gives an effect not unlike that of an English park. In other parts, particularly in the hills, in the marshy lands near Najafgarh, and in the inferior parts of the Khádar, trees are scarce, and there is nothing to relieve the monotony of the prospect. Along the Western Jamná Canal are fine avenues of 'shisham' and other trees, and promising plantations of 'kíkar' and 'shisham' have sprung up on the banks of the Agra Canal. The Mathrá road is not well shaded nor, except in a few parts, is the Grand Trunk Road in the north.

§ 12. The commonest trees are the well known 'kíkar' (*Acacia Arabica*), and 'Jál' (Punjábí. 'pílu' or 'van'—*Salvadora oleoides*). In uncultivated lands these are specially found. In Sunipat for instance there are woody stretches of the 'Jál' extending for miles, and in the hot weather especially if the Rabí crop has been poor, hundreds almost thousands of the more destitute classes are to be seen feeding and sleeping by turns in the stunted groves. I have seen the same in the Punjab but the 'Jál'-eaters here seem more vagrant than there.

§ 13. The 'pípal' (*Ficus religiosa*)—'farásh' (*Tamarix Indica*)—'nim' (*Azadirachta Indica*)—'bor' (*Ficus Indica*)—'bakain' (*Melia sempervirens*)—'dhák' (*Butea frondosa*)—and 'bér' (*Zizyphus jujuba*) are indigenous and found in many places—as also the bushes—'karíl' (*Capparis aphylla*)—'khair' (*Acacia catechu*)—'jánt' (*Sesbania Ægyptiaca*)—and 'hingót' (*Balanites Ægyptiaca*). I doubt whether 'shisham' and 'sirís' are indigenous in the sense of not having been introduced from other parts—they grow well only where they get more than natural moisture. In canal villages a common tree is the 'jamoá' or 'jamúá' which I understand to be a variety of the 'jáman'—the natives call it as a synonym 'chotá jáman.'† The fruit-trees

Para. 34.

Trees in the district generally.

Para. 35.

Commonest kinds.

Para. 36.

Indigenous trees.

Fruit-trees.

* Some of these 'Coigns of vantage' are the 'kot' in Sunipat town—the highest house in 'Kheri Khurd'—the Ridge at Delhi—the Kutab at Máhrault—and the top of the Taksil building (the old Rájás palace) at Ballabgarh. The view from the top of Tilpat mound too is worth seeing.

† But query whether this is the same as the *Elæodendron Roxburghii* mentioned in 'Punjab Products' and in 'Punjab Plants'? From the description there given I doubt it. This tree grows on the side of small water-courses on the edges of fields, reaches a height of 50 or 60 feet, and has a dark fresh foliage like the 'jáman.' The fruit is very inferior.

Chapter II.]

Products of the District.

found in the more favoured spots are numerous and good. Some gardens near Delhi produce mangoes of a delicious flavour: the 'jámans' (*Sizygium jambolanum*) are not bad, while oranges, peaches, plums of sorts, lemons, pomegranates, guavas, figs, 'alúchás' (*Prunus domestica*), 'imlí' (*Tamarindus Indica*), &c., are also found.

Para. 37.

Special
plants.

§ 14. One or two plants seem to deserve mention here on account of their importance to the agriculturist as a source of income or as affording valuable material for various agricultural purposes.

'Singhára.'

(1).—The 'Singhára' or water-nut (*Trapa bispinosa*) grows in ponds and pools of standing water in many parts of the district, though I could never ascertain what conditions are necessary for its growth. It is said, however, that the water must be clean (an expression to be interpreted, I fancy, according to Jat rather than English ideas,) and the soil of the bed of the pond should not be under the influence of 'reh.' Colonel Sleeman in his "Rambles of an Indian Officer" says:—

"The long stalks of the plants reach up to the surface of the water (in which they grow,) and upon which float their green leaves, and their pure white flowers expand beautifully among them in the latter part of the afternoon. The nut grows under water after the flowers decay, and is of a triangular shape, and covered with a tough brown integument adhering strongly to the kernel, which is white and esculent, and of a fine cartilaginous texture. They ripen in the latter end of the rainy season and are eatable till November."

The best plants are then (Hindú month 'Kátik') left for seed: in 'Manghsir' the cultivators break the nuts off and put them in 'matkás' keeping the vessels always filled with water, changing it every other day. In 'Mágh' they take the seed to a pond and throw it in broad-cast—or if the water is scarce they sow it in beds ('kiáris') with water standing in them. The plant shoots up in the spring, its green head is called 'chhátí.' There are two kinds—'hará' (green) and 'lál' (red.) The green kind is generally eaten fresh, while the red is ground into a flour which is eaten by Hindús at times of abstinence ('bart') from food. They are allowed to eat fruits ['phal-ahár'] among which this is reckoned.

The produce of the plant is very variable, but a biswa of land covered with water should grow 1 or 1½ maunds,

Products of the District.

[Chapter II.]

giving 20 or 30 maunds to the bigha. The price is also uncertain; at the first incoming of the crop especially if it is a light one, the fresh nuts will cost 1 or $1\frac{1}{2}$ anna a ser—in the full season they may come down to 8 or 6 annas per maund, and when very cheap may be only 'taka dhari'—i. e., 6 pies for 5 sers = 4 annas a maund. Dry nuts are sold at 8 sers per rupee. The Najafgarh 'Jhāl' used to be noted for its produce of this article which is considered a light and healthy food—but at present though it certainly grows there, it is not so largely cultivated as formerly. The sowing is done by 'Jhīnwars' (Kahárs) who are allowed to use the village ponds for the purpose by the zamíndárs either as return for services to the community, or on payment of rent, say Rs. $\frac{2}{4}$ a 'bighá' or on condition of letting the families of the proprietors take a portion of the crop from time to time as they need it for food. The 'singhárá' in some villages is a valuable source of water-income ('jalkar') to the community.

(2)—'Jhāū' (Panj-pilchi—*Tamarix dioica*) is found chiefly in Khádar uncultivated land, especially in the 'belás' of the river. It grows sometimes seven or eight feet high, but on the average reaches only to a man's waist: and answers to many uses with the zamíndár—either as fuel, or made up into baskets, or rustic brooms (wherewith to sweep his threshing floor)—or lining the sides of a kachá well. The baskets are made by 'kahárs' who pay 1 anna per day for the right of cutting as much of the bush as they can carry away in their 'banghy.' The actual cash income therefore is not much, except on lands near the city, but the agriculturist looks on it as of considerable use.

(3)—'Sarkandā' * (*Saccharum procerum*) is a reed that grows to a height of 10 or 12 feet—it is found in alluvial marshes but also on the side of the canal, and sometimes of its distributaries. It must have moisture, and is fond of mud. Some villages such as Máhraulí, Tebri, Daulatpur, and Burari make very considerable sums of money by the sale of this reed. It is used for the roofing of thatched buildings, and for the reed-chair which is so much in fashion among natives. Its price is measured by sheaves, each tied up with a rope made of the leaves, two and a half cubits long. Such a sheaf is called 'bīnd' and is worth about an anna.

(4)—'Pāla' (*Zizyphus nummularia*) is a small thorny bush-weed which grows pretty well all over the district, but chiefly in poor lands, and especially on the ridge-like tract of land in Delhi Tahsíl near Nangloi Jat, and Bakanvāla.

'Jhāū.'

'Sarkandā.'

'Pāla.'

* See Punjab Plants—page 261 where it is given as *Saccharum sara*.

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Products of the District.

Para. 38.

Wild animals.

In Sunipat it favours Lálberí and Rajlú and that sandy neighbourhood, while in the hills it grows extensively. In the Ballabgarh Bāngar too there is a great deal. This uninviting plant gives a very useful food for buffaloes, cows, and goats. Camels and goats indeed like it better than any thing almost. It is considered heating and so is good for the cold weather. It is cut twice in the year (in Kátik and Cheyt) with a 'gandásí' (see para. 54 Chapter III), and is sold at 3, 4 or 5 maunds the rupee. When it is remembered that this grows as a weed it is evident that waste land yielding it is something to be considered in assessment.

§ 15. The wild animals of the district are wolves and foxes, jackals, hares, and deer ('hiran' and 'chikára.') In the Khládar, also the pig is found, and 'pára' (hog-deer.) The mongoose is not uncommon and hedgehogs are sometimes seen in the fields; while monkeys in some of the villages bordering on the shady avenues of the Western Jamná Canal, are quite a nuisance.* The 'Nil gáe' is occasionally found in the wilder parts of the uncultivated jungle, and once one was seen to bound across the open ground outside the Kashmir gate. Snakes there are, but not in great abundance. The natives distinguish three kinds. 1 'Kála'† (black)—poisonous, almost always fatal. 2 'Pílá' (yellow) not fatally poisonous. 3 'Chitkauria' (spotted)—worse than the 'pílá' but not so bad as the 'kála.' Ducks of various kinds are found in the ponds in the cold weather, snipe in several places in marshes—quail are not uncommon in the fields—partridges both black and grey are abundant—and 'kúlan' are fond of the fields of gram when the grain has not yet hardened.

* I once heard it seriously urged as an objection to the alignment of a rájbahá through the lands of the speaker's village—that the canal officers would be sure to plant trees, and trees would be sure to bring monkeys—and monkeys would do all sorts of damage to the crops. The fact is a serious one, especially as the Jat may not kill a monkey even when he catches him 'in furto manifesto.' All that he can do is to station a loud-voiced kamín at the point he most wants guarded, hoping that he wont go to sleep. But as a rule the monkeys look in portentously good condition.

† 'Kále ke ágé díwá na ballá'—is a well known saying among the zamíndárs. Literally "In presence of the black (snake) the lamp wont burn." There is an idea that if a 'kála sámp' gets into the house, the lamps burn dimly, under the fascination, as it were, of the animal. As a proverb it means, there is no doing anything against a powerful person.

Agricultural Products.

[Chapter III.]

CHAPTER III.

Products—B—Agricultural Products with some remarks on the agriculture of the District.

§ 1. The principal crops of the district with the areas under each, as ascertained during the recent measurements, are given below :—

[Statement of area in acres under each crop at the time of measurements.]

Para. 39.

Crops and areas under each.

	DELHI.	Ballabgarh.	Sanipat	TOTAL.	REMARKS.	
K H A R I F.	Cotton	4,939	11,521	12,375	28,835	The difference between the total here given and that entered in S. 12 of Chap. X, viz., 5,19,417 is due to the 'do-fasli' land which here of course appears twice. The area of cultivation shown in para. 33, viz., 5,19,095 acres was the area of the uncorrected and unrevised Statements.
	Vegetables ...	457	253	391	1,101	
	Chillies	347	58	1,173	1,578	
	Sugarcane ...	15,714	129	14,939	30,782	
	Rice	3,962	1	7,856	11,819	
	Juár	30,616	24,985	45,988	1,01,589	
	Indiancorn ...	1,018	1,450	5,572	8,040	
	Bájrâ	45,836	36,535	7,949	90,320	
	Til	5	8	7	20	
	Másh	435	61	717	1,213	
	Hemp	38	69	48	155	
	Charí	603	923	...	1,526	
	Ghuár	3,457	2,144	9,579	15,180	
	Lobia	60	1	3	64	
	Italian Millet	5	...	71	76	
	R A B I.	Mothí	1,474	2,009	3,732		7,215
Múng		593	97	103	793	
Chená, &c. ...		126	1	139	266	
Wheat		30,806	2,1313	57,103	1,09,222	
Wheat & Gram		8,287	2,190	14,050	24,527	
Wheat and Barley		5,301	4,838	690	10,829	
Barley		15,155	25,824	3,162	44,141	
Barley and Gram		9,472	21,839	2,162	33,473	
Gram		23,818	2,964	16,483	43,265	
Melons		1,448	55	51	1,554	
Ajwain, Saunf, &c.		350	59	83	492	
Tobacco		560	464	262	1,286	
Onion		30	24	37	91	
Safflower		71	142	75	288	
Sarsaun		118	54	247	419	
Taráh		560	643	1,553	2,756	
Masúr		8	79	13	100	
Arhar		238	52	...	280	
Peas	789	439	201	1,427		
<hr/>						
TOTAL, ...	2,06,696	1,61,224	2,06,814	5,74,734		

Chapter III.] Agricultural Products.

The largest acreages it will be seen are as follows:—

The largest crops.

K H A R I F.		R A B I.	
	<i>A cres.</i>		<i>A cres.</i>
Juár	1,01,589	Wheat	1,09,222
Bájrâ	90,320	Barley	44,141
Sugarcane	30,782	Gram	43,265
Cotton... ..	28,835	Barley and Gram...	33,473
		Wheat and Gram...	24,527

Some crops, such as sugarcane and rice, are hardly ever grown except on irrigated and manured soil—while others are for the most part grown on land dependent on rain for its moisture. Among these last are Bajrâ, Juár and Channâ.

Para. 40.

Produce estimates how far trustworthy.

In Sunipat how formed.

Estimates now given of the principal crops.

§ 2. The rates of produce as ascertained partly by experiment and partly by the opinion of the most intelligent zamíndárs, are also given in Appendix II, and the average prices of each as computed for the last 20 years in four quinquennial periods, in Appendix III. It will be seen further on (in Chapter XI) that the estimates of produce as at first obtained by experiment, only, were not received as trustworthy. Those given now are better, though they cannot be depended on altogether. In Sunipat I took the opinions of selected zamíndárs, and the result founded on their individual answers is certainly not below the mark. Taking the average of all estimates obtained during the settlement, and checking them by my own knowledge, I should give the produce of the principal crops per acre as follows* :—

C R O P.	K H A R I F.		C R O P.	R A B I.	
	Irrigated	Unirrigated		Irrigated	Unirrigated
Juár ... ..	...	240 sers	Wheat	440 sers	240 sers.
Bájrâ ... ..	...	180 sers	Barley	480 sers	240 sers.
Sugarcane ...	720 sers	360 sers	Gram ... ..	...	360 sers.
Cotton	190 sers	110 sers	Barley & Gram	500 sers	320 sers.
			Wheat & Gram	480 sers	300 sers.

* But see also remark in the tabular statement in para. 43 of this Chapter.

Agricultural Products.

[Chapter III.

The above I believe represent the average crops of the district, throughout. Of course on some lands the manured and irrigated yield of wheat (for instance) would be much higher. It might be 28 or even 20 maunds. But such a yield is exceptional, and any general estimate founded on figures approaching this would be utterly fallacious. In drawing up produce estimates as I formerly noted once (in giving opinion as to the best way of carrying out the intention of Book Circular XX of 1871 of the Financial Commissioner,) the great difficulty is to select fields fairly representing the average conditions of the tract under report. The actual cutting, carting, and weighing can be easily managed. I believe the large majority of experiments attempted in the Delhi Settlement were honestly carried out; the error undoubtedly lay in the selection of fields above the average when taken together. This selection it seems to me should have been made by the Settlement Officer himself as a most difficult and anxious part of his assessment work. That Mr. Wood did not do this or think of doing it only shows me (who have seen his careful and conscientious way of doing things in other points) that he did not rely greatly in his own mind on produce estimates at all, but leant more on the anticipated results of his village to village inspections which were very thorough. How far this is the right method of assessment I need not discuss here, but this much may be noted that *all* assessment must depend either on a tacit reference to a produce estimate ready made in the mental background, or on the estimate of the general condition of the village or tract in question as seen paying such and such an assessment. And anything which can render more accurate the habitual produce estimate formed by the Settlement Officer during his inspections, must render greatly more probable the accuracy of his general assessments.

In my letter No. 370 of 1878 above referred to, I explained at length the measures I should advocate for obtaining accurate estimates of average produce founded on experiments.

§ 3. The modes of cultivation are for the most part those in ordinary use, and do not seem to require detailed notice, but I make a few remarks, following the order, taken in Punjab Products (see page 211 on the method of sowing, weeding, &c.,) noting chiefly only difference from what is there written. The 'hári' crop is called locally 'sádhi,' the Kharíf 'sáwaní.' Land bearing two crops is called 'dofaslí' but this means two full crops, such as wheat, after

Remarks on produce estimates as connected with assessment.

Para. 41.

Order of remarks in this chapter.

Local names of harvests.

The terms 'dofaslí.'

Chapter. III]

Agricultural Products.

'Fáusil'
'badhwár.'

cotton—while for land which bears a lighter crop after a full one, such as 'channá' after juár, there is another name 'fáusil.' Land giving one crop a year is called 'badhwár'* Three crops in a year are very rare indeed in Delhi—they can be managed only by putting in a fast growing crop like 'chíná,' and the land requires rest after it. Two crops even are impossible without manuring.

Para. 42.

The comparative importance of the two crops.

§ 4. The comparative importance of the harvests varies in different parts—as a general rule, the Khádar mainly depends on its Rabí crop—while the Bángar rain-lands naturally yield their revenue in the autumn harvest. And this point will indeed tell pretty well the proportion of the crop. The villagers have themselves within certain limits decided how much revenue shall be paid on each crop (see Chapter XI,) and this shows pretty plainly the relative importance of each. In Bángar well lands the proportion is about half and half and the canal lands are pretty much the same.

Para. 43.

Tabular Statement of Agricultural operations for various crops.

§ 5. The following tabulated statement gives the leading facts respecting the cultivation of the chief crops—while a more detailed account of the cultivation of melons and sugarcane, both of which present in a way special features, will be found in Appendix No. IV. The estimates of produce here given are those of the Extra Assistant and Superintendents. They are not too high for good soil, but for a *general* average of the whole district, I prefer my own estimate which is for the most part lower.

* The word was originally, I should think, 'Bhadwár'—meaning the land depending on the 'Bhádón rains for its cultivation.

Agricultural Products.

[Chapter III.]

Crops.	Harvest.	When sown.	Sown after watering ('palewá') or without.	Quantity of seed per pakka bigáh.	Number of ploughings.	Number of hoeings or cleanings.	Is manure used or not.
Juár.	K H A R I F.	Asádh.	Without watering.	6 sers.	2 to 5	1	Manure not used.
Bájra.		Asádh.	Without watering.	2½ sers.	2	1	Manure not used.
Rice.		Asádh.	Without watering.	7 sers.	6	2	See Wheat.
Hemp.		Asádh.	Without watering.	3 sers.	2	No cleanings.	Manure not used.
Indian Corn.		Asádh.	Without watering.	6 sers.	2	3	Manure used on cháhi land.
Chillies.		Asádh.	'Palewá.'	¼ ser.	5	4	Manure used 240 mds. to a bigáh.
Indigo.		Chait and Baisakh.	'Palewá.'	¾ to 1 ser.	2	Cleanings not required.	Manure not used.

Chapter III.]

Agricultural Products.

Irrigated or un- irrigated land.	Month of harvest.	Produce per pakká bigáh.	Preceded and succeed- ed by what crops.	Remarks as to weather, rain, and soil required.
Unirrigated.	Kátik.	3 to 6 mds.	Preceded by wheat, and succeeded by gram	Good rain is wanted for juár and bájrā in the early rain season July and first part of August.
Unirrigated.	Kátik.	3 to 6 mds.	Preceded by wheat, and succeeded by wheat, or barley.	Of the two bájrā is gener- ally sown on the poorer soil. The character of bārāni land may be distinguished in no small degree by no- ticing this.
Irrigated.	Asauj and Kátik.	3 to 25 mds.	Wheat and gram— (‘gochani.’)	Is grown in only the more swampy villages of Sunipat Canal Tract.
Unirrigated.	Kátik.	3 mds.	Preceded by juár, and ‘makái,’ and suc- ceeded by wheat, barley, or gram.	Not important in this district: it generally is sown as a border to sugar- cane.
Unirrigated, (3 waterings given in time of drought.)	Asauj and Kátik.	10 to 12 mds.	Preceded by barley, or wheat, and succe- ded by gram.	
Irrigated (15 to 20 waterings.)	Kátik.	6 to 15 mds.	Cotton.	Grows best in the hot— strong soil of the Delhi Khandrat—it wants much manuring and very copious irrigation.
Irrigated.	Poh.	7 to 15 mds.	No crops specified.	Very rarely grown, I don't remember seeing more than two or three fields.

Agricultural Products.

[Chapter III.

Crops.	Harvest.	When sown.	Sown after watering ('palewá') or without.	Quantity of seed per pakka bigáh.	Number of ploughings.	Number of hoeings or cleanings.	Is manure used or not.
Másh.		Asádh.	Without watering.	6 sers.	2	1	Manure not used.
Múng.		Asádh.	Without watering.	6 sers.	2	1	Manure not used.
Moth.	K H A R I F.	Asádh.	Without watering.	6 sers.	6	1	Manure not used.
Cotton.		Chait to Asádh.	Do., 'Palewá' if sown in Chait	7 sers.	3 to 5	4	Manure used on Cháhi land only.
Sugarcane.		Phágun and Chait.	Palewá.	18 'púls' each púli = 164 'gandás' (bits of cane)	5 to 10	5 to 9 or 10	Manure used.

Chapter III.]

Agricultural Products.

Irrigated or un-irrigated land.	Month of harvest.	Produce per pakká bigáh.	Preceded and succeeded by what crops.	Remarks as to weather, rain, and soil required.
Unirrigated.	Kátik.	3 to 6 mds.	Preceded by wheat, barley and gram ('béjhar,') or barley—and succeeded by wheat on land left fallow after the crop is cut.	'Másh' 'Moth' and 'Múng' are all light crops and do well with comparatively moderate moisture.
Unirrigated.	Kátik.	3 to 5 mds.	Wheat, or 'béjhar,' or barley—then múng after allowing the land to lie fallow for some time—after múng wheat or 'béjhar.'	See above.
Unirrigated.	Kátik.	3 to 5 mds.	Preceded by 'béjhar' and succeeded by múng after múng, 'béjhar' or barley.	See above.
Irrigated (3 or 2 waterings.)	Asauj to Manghsir.	Cháhi 3 or 4 mds. Bārāni 1½ to 2 mds.	Preceded by wheat, and succeeded by cotton—generally 6 months' rest allowed.	Extensively grown, but I do not think it is often of fine growth, or very good quality—the rain for it should be early—and the season not too cold at the time when the picking begins.
Irrigated (5 to 8 waterings with rain; 15 or 20)(but without.) [See also Appendix IV.]	Manghsir to Chait.	10 to 40 mds. ('Gur.')	Cotton.	See separate note Appendix IV.

Agricultural Products.

[Chapter III.]

Crops.	Harvest.	When sown.	Sown after watering ('palewá') or without.	Quantity of seed per pakká bigáh.	Number of ploughings.	Number of hoeings or cleanings.	Is manure used or not.
Wheat.	R A B I.	Kátik.	'Palewá,' if the soil is 'do-faslí;' otherwise, without it.	21 to 30 sers.	6 to 9—	Cháhi—2 Bárání—1	Manure used on cháhi land, not on bárání.
Barley.		Kátik.	See above.	15 to 21 sers.	6 to 9—	Cháhi—1 Bárání—none.	Manure used on cháhi sometimes on bárání also.
Gram.		Asauj.	Without watering.	12 to 15 sers.	3	No cleanings.	Manure not used.
Tobacco.		Mágh.	After watering.	2 sers.	5	3	Manure used as for wheat
Sarson.		Kátik.	See 'Wheat.'	1 ser.	6	No cleaning.	See Wheat.
Chiná.		Mágh.	See Wheat.	$\frac{1}{2}$ ser to $\frac{3}{4}$ ser.	6	3	See Wheat.
Melons.		Mágh.	Without watering.	$\frac{1}{4}$ ser.	6	3	Manure used.

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Agricultural Products.

Irrigated or un- irrigated land.	Month of harvest.	Produce per pakká bigáh.	Preceded and succeed- ed by what crops.	Remarks as to weather, rain, and soil required.
If irrigated, 6 waterings are given.	Baisákh.	Cháhí—10 to 13 mds. Baráni—5 to 8 mds.	Bájra or juár. If preceded by Bájra, wheat will grow better and yield a good outturn.	Wheat is not grown gener- ally except in good soil, and there are various distinc- tions drawn in some parts as to quality of seed.
As above.	Chait.	Cháhí—11 to 16 mds. Baráni—6 to 9 mds.	Bájra or juár—(see above).	Barley stands to wheat as bajra does to juár—a zá- mindar will rarely grow barley if he thinks the ground will grow wheat well.
Unirrigated.	Chait.	5 to 9 mds.	Preceded by juár, and succeeded by the same.	A light crop, wants early rain, and the winter rain (‘maháwal’) and a gentle equal wind. A dry blast withers the plant.
Irrigated (20 waterings).	Jeth.	15 to 20 mds.	Preceded by cotton, and succeeded by juár.	Like pepper in preferring the dry, hot soil of the khandral and copious water- ing.
See Wheat.	Baisákh.	3 to 5 mds.	See Wheat.	This brings out the salt of the soil, which tobacco likes exceedingly.
Irrigated (15 waterings).	Jeth.	12 to 15 mds.	Preceded by cotton or juár, and succeeded by juár.	A very rapid crop, and requiring copious irrigation, said to show bad cultivation, I know not why—thus the proverb.
If irrigated, once, but it is generally un- irrigated being grown in moist lands.—(See Appendix IV).	Jeth.	50 to 250 mds.	Preceded by ‘makáí,’ succeeded by the same.	‘Chiná, chorí chakárí Háre kare kisán’ Let a broken down hus- bandman do one of three things, culti- vate chiná,* thieve, or go out in service. See separate note Appen- dix IV. * But some wag alluding to the labour of cultivating the crop has replied. ‘Chiná, chorí, chakárí Mardón hí ká kám’ Cultivating chiná, thiev- ing, and ser- vice are, fit work for men.

Agricultural Products.

[Chapter III.

§ 6. Sowing for the Rabi begins in Asuj the latter part of September, and continues till Manghsir has half gone—the beginning of December—the order of sowing is gram, barley, wheat. Channa is always sown with a rough drill ('orhná') fastened on to the plough. This is merely a thick piece of bamboo, the upper end of which has been split into many slips and opened out so as to form a kind of trumpet shape. It is strengthened with an iron ring put inside ('andí') and bound with leather outside—the top part of the 'orhná' is called 'dórhí.' It is big enough at the mouth to let a man's full hand in. The sower walks along with his 'chádar' full of seed, and takes out a handful with his right hand and gives it to his left hand to drop down the 'orhná'—the left hand remaining on the 'dórhí' and guiding the plough.*

Barley is sown with a drill; or broadcast (Ballabgarh 'pabhér'—Delhi 'pabhér' and 'bakhér'—in Sunipat 'bakhér' and 'khindáo.') Wheat is sown with a drill and also broadcast, and in the northern part of the district in the furrow (khúd) without the drill.

§ 7. Sowings for the Kharif (except for sugarcane of which the special treatment is described further on) begin in Chait with cotton and juár for fodder. Then come bájrâ, the juár intended to give full crop 'makkeí'—'urd'—'moth'—'múng'—'juár,' &c., &c. 'Makkeí' and 'moth' can be sown up to 15 Sáwan. Both modes of sowing are used—broadcast is however preferred when the ground is well moistened as after good rains. When the land is dry the drill is more used.

§ 8. The ordinary number of ploughings is for the Kharif crops five, and for the Rabi nine. The first ploughing is called 'pár'—the second 'dosar' the third 'tesar'—the fourth 'chausar'—and the fifth 'panchbáhini'—after this there is no special name till the ninth when it is 'naubáhini' and this is enough. But sometimes for sugarcane more is done. The depth of ploughing is only six fingers breadth and is often only three—this is of course merely scratching the ground. Seed is put in about 3 fingers-breadth deep.

Good ploughing is a pakká bighá per day—work goes on from early dawn to evening with two hours rest in the middle of the day. But this of course is work in the Indian style, and allows for some half dozen pulls at the 'hukkáh'—

Para. 44.

Sowing for the Rabi.

Para. 45.

Sowing for Kharif.

Para. 46.

Number of ploughings, their names :

their depth.

Work how long kept up.

* Most of the guidance is done with the voice 'Barrh' turns the animal to the right, to turn it to the left, it is necessary to say 'ah' (the 'h' very soft)—and as to stop them, the man makes a noise with his lips ('puchkání') for turning, the turn is always made from right to left—this is the cry at the end of each furrow.

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Remark on
well-work.

four times before mid-day and twice afterwards. Some rest is necessary of course for the bullocks, and to make sure that their necks will not be galled by the yoke ('júá'). I do not know that any special damage is attributed to the rotatory motion at the Persian wheel, but well-work generally is very trying for the animals; the husbandman says, it is as bad for them as gambling is for a man.* The 'sohágá' is used after ploughing, for levelling the ground and breaking the clods ('dalle,' 'dhím.') It is also called 'mahz.' A little 'sohágá' according to the usual way of making diminutives† is 'sohági' or 'mahjí.'

Para. 47.

Lucky days
for the zamín-
dár's plough-
ing, &c.

§ 9. Propitious times ('mahúrat'), are sought for ploughing—and certain days must be somewhat humoured. Thus on Monday and Saturday a prudent man will not plough with his face to the east—according to the proverb:—

'Som Saníchar, púrab básá,' (basta.)

'Mangal o Sukr mitáwan sánsá,' (quiet your fear.)

'Disá-súl.'

On Monday and Saturday the Demon of the four quarters ('Disá-súl') remains in the east—his location is not so fixed during the rest of the week as give rise to any other proverb, but a zamindár will not of his own accord go northward on Tuesday and Wednesday—westward on Friday and Sunday—and the south must be avoided on Thursday ('Brihaspat.') These limitations are, I am assured, strictly observed. Wednesday is good for sowing and Tuesday for cutting the crop.

'Budh bowái'

'Mangal láí.'

Para. 48.

Harvesting
how managed.

§ 10. Crops are harvested by the zamíndárs themselves, but they generally require the aid of hired labourers—so that in almost every village some of this class will be found. They are for the most part chamárs, but sometimes 'chúhrás.' Mális generally cultivate on their own account, but at times work as labourers. Brahmins often go shares

Hired la-
bourers.

* 'Bail ko kúa,
Mard ko júá.'

Diminutives
how formed.

† A little 'kolhú' will be 'kolhú'—a little well 'kuí.' A pond = 'let' (smaller than a 'johar')—a little pond 'letrí.' 'Johar' itself gives 'johri.'

'Kassá' is the big spade-like instrument (also called 'jhám') used for cleaning out wells—'kassí' is the ordinary implement used by a man. A little bed is a 'palangrí.' A little mouse is 'chúhí.'

‡ Of course a 'hákim's' order, such as a summons to court, must be obeyed whether on a lucky or unlucky day. But the zamíndár will explain his want of success in a suit by saying 'disá-súl ko gayá, is waste natijá burá honá tha.'—'I went to the devil, so I was bound to be unlucky.'

Agricultural Products.

[Chapter III.

(‘sájhi’ or ‘sánjhí’) with the proprietor—furnishing one yoke of oxen to one of the owners. A Jat does this too when he is poor.

The rates of pay for the Kharíf season are 2 annas per diem + a ‘rotí’ of $\frac{1}{4}$ seer weight—but the bread given in is sometimes enough for a full meal. The owner calls on the men he wants for next day the evening before, and looks them up too in the early morning. Then they all go a-field together and begin work. When six ‘gharís’ of the day have passed, the ‘bási’ meal (see para. 134) is brought by the owner’s boy or girl for all the men. After this work goes on again till noon when the main morning meal comes on. The labourers provide this for themselves unless it be a dear season for labour, when the proprietor will have to find it. The work is again resumed, after a pull at the ‘hukkáh,’ and goes on in a quiet way till sundown or after that—and then they all go home together. No one forces the labourers to stay, for no one is extremely anxious to go: they even take an interest in getting the crop cut and gathered in quickly. The general understanding is that the cutting goes on till sundown and the collection of the sheaves after that. Pay is given that evening or the day before. If payment is not made,* the man is known and marked, and they laugh at him the next season.

In Rabí the labourer mostly takes grain—he won’t take cash. The rate is 4 seers—or more, reckoned by sheaves (‘púlís’) which give something less than a seer each. In order to see that he is not cheated by very big sheaves being taken, the owner puts his own people to arrange the stock (‘kúndrá’)—the big sheaves are put down at the bottom, and so are safe. A man cuts about $\frac{1}{4}$ paccá bighá in the day.

The hired labourer eats three times a day—and there is not much inferiority in his diet to that of the land proprietor. He has not the rank of the zamíndár but otherwise is happy.

* Some country poet has given an amusing stanza showing the homely altercations that sometimes arise in these matters :—

‘Sikhar dopahri, kallewári,

‘Shábásh mere bháion ne !

‘Húí shám, din laga chhipne

‘Ab kiyon ghúre jamáion ne !

At the time of the early meal (kallewári) and at full mid-day you were saying ‘Bravo! my boys.’ But when evening comes and the day begins to die (hide) why do you look angrily on us who are your sons-in-law (a characteristic expression of abuse is to call a man a father, or brother of one’s wife.)

Rates of pay, Kharif.

Procedure.

Payment when made.

Pay in Rabi by sheaves.

A man’s work per day.

Status and condition of the hired labourer.

Proverb showing occasional quarrels.

Chapter III.]

Agricultural Products.

Para. 49.

Hoeing and weeding.

§ 11. Hoeing and weeding ('nalái') are considered good for all crops but some need this more than others. Sugarcane is never satisfied in this way—cotton likes also much to be clean, while wheat will do with one good hoeing, also juár, and bájrā. Pepper wants a lot, and tobacco the same.

Para. 50.

Manure.

§ 12. Manure is generally the dung of cows, buffaloes, or bullocks fastened up in the house. No zamíndár hesitates to handle it—it would be most unreasonable, for dung and mud serve him instead of wall-papering. The ashes of cow-dung pats ('ūpla') and of any wood burnt—but not those of the 'khoi' (cane-straw refuse)—all come into use. The great enemy that prevents the supply of manure being much larger than it is the custom of burning such pats for fuel. All but the best families use their women in making them up. When made, they are placed inside a square enclosure called a 'bitaura.' The pats are dried, put inside, and it is then built up solid, and then closed for future use. When the pats are needed, a hole is made in the side and they are taken out as wanted.

Para. 51.

Fallows and Rotation of crops.

§ 13. There is no custom of fallows in the district. The statements show only 633 acres, and of this a good deal is owing probably to the prospect of new assessment coming on. The soil indeed has very little rest now-a-days whether from the greed of the zamíndár or from the acceleration which appears going on generally in the slow-paced oriental life. Land, left unsown after one crop is reaped, during the succeeding season is called 'tapar'—next year if it is still left so, it becomes 'banjar.' 'Bahan' is really the name for land after it is ploughed ('bahná'), when sown, it takes the name of its crop. Rotation of crops is partially practised, for the zamíndár has his predilections and prejudices which may be taken as embodying the results of traditional experience about the succession of crops, thus after wheat will come 'juár,' or cotton, or 'moth,' with advantage; after sugarcane, cotton, or 'juár' or 'urd'—after cotton 'makkaí' is very good. The best rotation is given as follows:—sugarcane—then cotton, then tobacco—then pepper, or 'makkaí.'

Para. 52.

Carting grain the threshing floor.

§ 14. The grain when cut is carted to the threshing-floor ('pair'—Punjábí, kalwára)—a collection of these is called a 'khátá.' The owner will generally see to his crop himself by sleeping there at night till it is threshed out, which he loses no time in doing.*

* 'Pair aur bair,
Jaldi kar.'

With your threshing-floor and your enemy, deal quickly.

Agricultural Products.

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§ 15. Grain is either stored in 'kothás' or rooms of the house (see para. 136,) or in 'kothís' in one of them—or in a large canvas bag 'théká' which stands upright by the weight of the grain in it, and holds 50 or even 100 maunds. All kinds of grain are housed in this way. The animals attacking grain when thus stored (besides rats and mice of course if there are any) are 1. 'sursali' 2. 'khaprá' 3. 'dhorá.' Of these the 'dhorá' is a winged insect with a little round body; if the 'khaprá' is put into a granary where he is, he dies not being able to abide the savour of the other! The 'khaprá' is a kind of weevil that confines his depredations to the top of the store—not going more than a span deep. The 'sursali' is a kind of red ant, I saw it once but forgot to note its appearance. He is as bad as the 'dhorá.'

Para. 53.

Modes of storing grain.

The animals which attack it in the granary.

§ 16. The implements used by the zamíndár are as follows:—The plough ('hal')—of which the wooden share is 'panyará'; the yoke for his oxen ('júá')—'sántá' is the whip he urges them with when lazy or refractory—otherwise he does a great deal with the animal's own tail which he twists and twirls in a manner which by its results would seem most significant. The reins he checks them with are 'rás.' He has besides, his axe ('kuhári')—and the spade-hoe ('kassi')—the common country hoe ('kharpá')—and the small hand scythe with jagged edges like a saw ('dráti')—with which he cuts most of his crops. The 'gandásá' is a chopper for cutting up 'juár' stalks and sugarcane—and a smaller tool of the same kind is a 'gandási.' The 'khodálá' 'khoduá' or 'rámpará' is a kind of 'spud' with a thick handle used for making holes when the line of action is the same as that of the hand—thrust downward. A smaller one is a 'khodáli'—'kasólá' is a tool used for hoeing, smaller than a 'kassí' but working on the same principle. The village carpenter has his 'karaunth' or saw—his axe of course, which is heavy and effective—the 'bassolá' is the hoe-like tool with which he so cleverly smooths and planes his wood—a smaller one 'bassoli' is the apprentice-tool which he first puts into the hands of his boy when teaching him the trade. 'Nihan' and 'nihání' are the large and small chisels which he strikes with the 'bassolá' turned backward (oudhá.) 'Barmá' or 'siyár' is the gimlet and 'kamání' the bow-like instrument with which he works it. 'Randá' is the plane. For the black-smith the chief tools are:—the anvil ('airan')—the hammer ('ghan')—and 'hathaurá' a smaller one—and the pincers ('sindás' and 'sindási.')

Para. 54.

Agricultural implements.

The carpenter.

The Black-smith.