
SETTLEMENT REPORT OF THE
KARNAL DISTRICT.

SETTLEMENT REPORT

OF THE

KARNAL DISTRICT, 1909.

BY

A.M. STOW, ESQUIRE, I. C. E.,

SETTLEMENT OFFICER.



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FROM

THE HON'BLE MR. H. P. TOLLINTON, I.C.S.,
*Revenue Secretary to Government,
Punjab and its Dependencies,*

TO

THE JUNIOR SECRETARY TO THE FINANCIAL
COMMISSIONERS, PUNJAB,

Dated Lahore, 1st May 1912.

Revenue and Agriculture.
Revenue.

SIR,

I AM directed to acknowledge the receipt of the Final Settlement Report of the Karnal district with the First Financial Commissioner's review thereon, received under cover of Mr. Williamson's letter No. 222, dated 13th March 1912.

2. The main feature that is worthy of notice in connection with the re-assessment of the Karnal district is the large increase in irrigation and the great drainage improvements which have taken place since the district was last assessed, partly by Sir Denzil Ibbetson and partly by Sir James Douie. Nalas have been canalized, and measures have been taken to stop percolation from the main Western Jumna Canal. As a result, the general health has improved and the fever-stricken conditions described by Sir Denzil Ibbetson no longer prevail. The remodelling of the whole Western Jumna system in 1900 has regulated the supply of water in the various branches. Percolation at Indri and Munak, where the water is headed up for the Sirsa and Hansi Branches. still continues, but the evil has been much diminished and occupies the constant attention of the canal authorities. The measures taken have in many parts of the district entirely altered agricultural conditions and the increase in the irrigated area amounts to 118,815 acres or 45 per cent.

3. Population, which had steadily risen from 1881 to 1901, when the figure stood at 881,495 received a set-back in 1911, when the total only amounted to 799,857. The district has suffered severely from plague, and it is to this fact that the large decrease must be attributed. In spite of the fact that the extension of irrigation has resulted in the contraction of the grazing area—and as to this the Settlement Officer sounds a warning note—the numbers of cattle have increased in almost every part of the district. The actual increase in horned cattle amounts to 30,035 head.

4. At the time the forecast of operations was drawn up it was estimated that the increased revenue would amount to between 2½ and 3 lakhs, or 23 per cent. to 27 per cent. on the expiring demand of 11 lakhs. This was based on an estimated increase of 21 per cent. in cultivation and 15 per cent. in *prices*. As a matter of fact the increase in cultivation only amounts to a little under 12 per cent., and this is due both to an increase in irrigation and also to an increase in barani area following on greater stability in agricultural conditions. The actual enhancement of the demand amounted to 28 per cent. in spite of the fact that the increase in cultivation was over-estimated. But a rise of 28 per cent. has rightly been taken, as the increase in the irrigated area has been so great

and the rise in prices was largely underestimated when the forecast was drawn up. It was then estimated at 15 per cent., whereas the assessment reports show that the actual rise was—

in Panipat 24 per cent.,
 in Karnal 25 „
 in Thanesar 15 „ and
 in Kaithal 25 „

5. The settlement was started in October 1904 and was not concluded till September 1910, a period of 6 years. This was a year longer than was estimated, but the delay was due to experiments in map correction and in *killabandi* which will prove useful elsewhere. It is interesting to notice that *killabandi* did not succeed in getting into favour. This is attributed to the large amount of land held in self-cultivation. The cost of the settlement thus rose to Rs. 8,25,895, some Rs. 90,000 of which, the Settlement Officer says, may be recovered from jagirdars. The Financial Commissioners should report for the information of Government what has actually been recovered. The original estimate of cost was 7½ lakhs.

6. In the Lieutenant-Governor's opinion the Karnal settlement shows how unfairly an attempt to limit the proportional increase by districts and tahsils would work, even in one of the older districts of the province where agricultural conditions have been revolutionized by canals. Thus, in the Kaithal tahsil the re-assessment gave results varying from a decrease of 11 per cent. in the unhealthy Naili Circle to an increase of 112 per cent. in the fine Nardak Circle, which since the last settlement had been irrigated by the Sirsa Branch of the Western Jumna Canal. In the Karnal tahsil the percentage of enhancement varied from 8 per cent. in the Indri Khadir to 58 per cent. in the Karnal Nardak. Yet there is little doubt that the circles where the enhancement has been greatest bear the lightest assessment. It may be said with confidence that only in tracts where agricultural conditions have been unaffected since the previous settlement by canals or railways can any general limitation on the rate of enhancement be imposed, in fairness not only to the general tax-payer, but to the people of the district concerned. This is especially the case where it is proposed to grant a long-term settlement which is no doubt desirable when the conditions admit of such an arrangement.

7. The Lieutenant-Governor agrees that the term of settlement in Karnal shall be 30 years. His Honour is pleased to confirm the assessments made and sanctions the cesses proposed.

8. I am to convey the thanks of Government to Mr. Stow whose work was very careful and thorough and also to Mr. Kennaway and to Rai Sahib Hira Singh.

I have, &c.,

H. P. TOLLINTON,

Revenue Secretary to Government, Punjab.

No. 222.

FINANCIAL COMMISSIONERS' OFFICE :

Dated LAHORE, 13th March 1912.

FROM

H. S. WILLIAMSON, ESQUIRE,

Offg. Junior Secretary to the Financial Commissioners, Punjab,

To

THE HON'BLE MR. H. P. TOLLINTON,

Revenue Secretary to Government, Punjab.

The Hon'ble Mr. A. H. Diack, C.V.O.

SIR,

I AM directed to forward the Final Settlement Report of the Karnal district with the 1st Financial Commissioner's review thereon. A copy of letter No. 684, dated 4th October 1911, from the Commissioner of Delhi, is also enclosed for information.

I have, &c.,

H. S. WILLIAMSON,

Offg. Junior Secretary to the Financial Commissioners, Punjab.

Review by the 1st Financial Commissioner, Punjab, of the Final Settlement Report of the Karnal district.

THE Karnal district as at present constituted is made up of the tahsils of Karnal, Kaithal, Thanesar and Panipat.
Past fiscal history.

As regards the past settlement history of the district, it is formed out of two district tracts, firstly, the part of the Karnal district which was settled by Sir Denzil Ibbetson in 1872—1880, that is, the whole of tahsil Panipat and the Karnal pargana of tahsil Karnal, and, secondly, the Kaithal and Thanesar tahsils and the Indri pargana of Karnal tahsil. This latter tract was settled by Sir James Douie, and the orders of Government on his Final Settlement Report were passed in 1894. The past fiscal history of these two tracts has been given by Mr. Stow in detail in chapter II of his report.

2. The physical features of the district at the last settlements are detailed in chapters I and II of Sir Denzil Ibbetson's Final Settlement Report of Karnal and in paragraphs 2 and 3 of chapter I of Sir James Douie's Settlement Report of Karnal-Ambala. The physical features of the present day are given at length in chapter I of Mr. Stow's report. The chief change in the character of the country has been effected by artificial measures connected with improvements in canal irrigation and drainage. In the tract settled by Sir James Douie, perennial canal irrigation was confined to 12 villages in the south of the Bangar and Nardak circles of the Kaithal tahsil. Since 1890 however the Sirsa Branch of the Western Jumna Canal has been extended to these circles, and the average area now irrigated from the Western Jumna Canal may be estimated at 40,000 acres in the Bangar and 42,000 acres in the Nardak circle annually. The Sarusti Canal in these two circles also affords irrigation to an average area of 5,900 acres annually. This irrigation has changed the face of these two circles, large portions of which were formerly in an undeveloped and precarious condition. In the Naili circle the improvement in the water-logged and unhealthy state of the villages round Pehowa has been seriously taken in hand. The changes in the Sarusti Naddi and the construction of the Sarusti Canal leading out of the Sainsa Jhil have led to some stoppage of the damage to the soil and to some improvement in the climate and health of the people, while incidentally the canal provides irrigation for some 7,900 acres in this circle and some 1,800 acres in the Bangar Pehowa circle. Irrigation from the Sirhind Canal also has been cautiously extended to the Powadh circle, resulting in 5,500 acres of average annual irrigation. Measures have also been taken to stop the damage from water-logging, due to percolation from the main Western Jumna Canal between Radaur in the Thanesar tahsil and Indri in the Indri pargana and some portion of this depressed area has been reclaimed. In the portion of the district settled by Sir Denzil Ibbetson the changes have been no less momentous. The inequalities of Western Jumna Canal irrigation and the interruptions in natural drainage, by which some villages had prospered unfairly, while others had deteriorated into fever-stricken swamps, are summed up in a memorable indictment by Sir Denzil Ibbetson in paragraphs 165-67 of his Final Settlement Report. A complete revolution has fortunately been effected by the realignment of the Main Line and Delhi and Hansi Branches between 1880 and 1890. The Sirsa Branch through the Indri pargana opened in 1891. In 1896 the Chautang and Rakshi Naddis were canalized. In 1898 the Nardak circle of Karnal began to receive irrigation from the Nardak Branch. In 1900 the remodeling of the whole Western Jumna system was taken in hand with a view of equalising the volume and supply and regulating the distribution. The result of these measures has been the reclamation of water-logged areas, improvement of drainage, amelioration in the climate, and the health of the people in the Karnal and Panipat Bangar and extension of irrigation to tracts which never had it in the Panipat Bangar and Karnal Nardak circles. Few villages now suffer from swamping or other ill-effects.

3. The revolution in irrigational matters has been followed by progress in many other directions. The district is now well provided with railways. The North-Western Railway skirts the northern part of the Thanesar tahsil near Jagadhri. The Ambala-Delhi line runs down through the centre of the Thanesar, Karnal and Panipat tahsils. Part of the Powadh circle is served by the Dhuri-Jhakal line. The southern part of the Kaithal Nardak and Bangar circles is fringed by the Southern Punjab Railway while the Narwana-Kaithal and Kaithal-Thanesar line traverses the centre of the Kaithal tahsil. Road communications have improved *pari passu*, and markets and ginning mills are accessible, allowing the cultivator to reap the benefit of the rise in prices for export staples of recent years. In the tract dealt with by Sir Denzil Ibbetson cultivation has increased in 30 years from 258,192 acres to 314,692 acres, and in that settled by Sir James Douie in 20 years from 736,429 acres to 797,061 acres. This increase of 117,132 acres of cultivation in the district is in part due to extension and improvement of canal irrigation and in part to increase in barani cultivation induced by the more general agricultural security now prevailing. Except in the Thanesar tahsil and the Indri pargana and the Guhla sub-tahsil one-third of the cultivated area is now protected by irrigation. There has been a marked increase in the areas of the three valuable staples of cane, cotton and wheat. Accompanied by a rise in prices varying from 15 per cent. in Thanesar tahsil to 31 per cent. in Karnal tahsil since the previous settlements, these items form an important index to the general advance in the prosperity of the people.

4. Between 1881 and 1901 the population of the district steadily rose with the expansion of irrigation and cultivation and the amelioration of the climate of areas previously water-logged. In the decade following 1901, however, plague has taken a terrible tithe from the Karnal district, and the population in the census of 1911 stands at the low figure of 799,857. It has still to be learnt what the economic effect of this disastrous scourge will be.

5. In spite of the increase in cultivation and consequent disappearance of grazing grounds and the proportional expansion in the growth of more valuable export products, horned cattle show an increase in the district as a whole and in every tahsil individually except tahsil Panipat as may be seen from the following table :—

Tahsil	Number of horned cattle at last settlement.	Number of horned cattle at present settlement.
Thanesar	130,767	153,398
Kaithal	203,559	213,778
Karnal	177,117	196,870
Panipat	126,313	113,745

The increase for the district is 30,035 head. In the Panipat Khadar and Bangar there is an increase of 20 per cent. and 12 per cent., respectively, in plough cattle and 28 and 6 per cent. in milch cattle, the decreases of 45 and 43 per cent. being only in the case of other cattle. The profits from ghi alone apart from sales of young stock, hides and bones are estimated to value 4½ lakhs of rupees.

6. It may be generally assumed that where the sale price of land at the close of settlement is 40 times or more per acre the expiring demand, the progress of the tract has been considerable and the demand has been light in its

incidence. This was a marked feature of the Karnal settlement. The price of land was at the commencement of Mr. Stow's settlement 84-fold the current demand in the Panipat town lands and 42-fold in the rest of the Panipat Khadar. In the Karnal tahsil the multiple varied from 42 and 52 in the Bangar circles of Indri and Karnal to 61 and 43 in the two Nardak circles, while in Karnal town the figure was 112. In the Kaithal Bangar Nardak the price was 119 and 152 years' purchase of the land revenue. In Thanesar the price was 40 years' purchase in the Bangar circle and 55 in the Khadar. In the southern and northern Chachra the price was 62 and 72 years' purchase of the land revenue, while in the Bet Markhanda the figure was 100. The only circles with low figures and multiples are the Indri Khadar (30), the Karnal Khadar (38), and the depressed Naili circle of Kaithal (36).

7. The rise in competition cash rents has, as has been noted by Sir James Douie in paragraph 5 of his recent review of the final settlement of the Delhi district, been a feature of the recent settlements of the south-east Punjab. In Karnal at the last settlements, as Mr. Stow observes in paragraph 22 of his report, true competitive rents were unknown in the major part of the tract dealt with by Sir Denzil Ibbetson and cash rents were undeveloped in the portion of the district settled by Sir James Douie. Now while the proportion of the cultivated area in the hands of tenants has slightly increased, the value of the kind rents has generally risen and cash rents are important and are taken over a considerable area in the following circles:—

Karnal	...	Karnal Khadar.
		Karnal Bangar.
		Karnal town.
		Karnal Nardak.
Panipat	...	Khadar.
		Bangar.
Karnal	...	Indri Khadar.
Kaithal	...	Powadh.
Thanesar	...	Bangar.

A comparison of the average normal rent now prevailing and those pre- vailing at last settlement in the first six of these circles is given by Mr. Stow in paragraph 22 of his report in dealing with the development of rents. A similar comparison may be made for the circles of Indri, Thanesar and Kaithal settled by Sir James Douie—

—				Chahi.	Nahri.	Barani.		
—				Rs. A. P.	Rs. A. P.	Rs.	A.	P.
Indri Khadar	...	...	Settlement	...	...	4	8	0
			Now	...	...	5	1	0
Kaithal Powadh	...	...	Settlement	...	...	2	8	0
			Now	...	4 5 0	5	6	0
Thanesar Bangar	...	...	Settlement	...	...	4	0	0
			Now	...	...	6	2	0

The cash rents accordingly offer a very valuable field for the study of the general progress in prosperity of the district, besides indicating the relative strength for assessment purposes of the various soils and circles.

8. The assessment has been fully discussed in chapters IV and V of the final report by Mr. Stow, and the results are summed up in paragraph 48 of his report. The largest increase was taken in the southern part of the Kaithal tahsil (112 per cent. in the Nardak and 69 in the Bangar circles) and in the Karnal Nardak circle (58 per cent.), where new canal irrigation with consequent expansion of cultivation had completely changed the condition of the country. In the depressed Naili and Andarwar circles an increase of only 2 per cent., much lower even than the increase in prices, was taken owing to the special condition of the tract. The water held up at Indri in the Western Jumna Canal still injuriously affects by percolation the Indri Khadar circle which also has a poor soil, and in spite of an increase in cultivation and some high chahi rents in places, an increase of only 8 per cent. was taken here. In the Thanesar Bangar the increase was confined to 4 per cent. as there was a fall in cultivation and well irrigation. In the other circles the increase taken was compatible with the general increase in prosperity and the rise in prices. The general result is a rise of 28 per cent. for the district. In two tahsil, Karnal and Panipat, where the conditions were similar to those of north Delhi the increases were 23 and 22 per cent., respectively. In the unirrigated Thanesar tahsil the rise was 22 per cent. In Kaithal the increase was 49 per cent., operations having resulted in little difference in the demand of the Guhla portion of the tahsil and a large rise in the newly irrigated southern portion of the tahsil.

9. Mr. Stow has singled out two aspects of the assessment for comment, the treatment of nahri land and the treatment of land inundated from torrents. The Western Jumna Canal nahri assessments have been commented on at some length in paragraphs 7 and 8 of Mr. Meredith's review of the Final Settlement Report of Rohtak and again in paragraph 6 of the Government orders on that report. They have been subsequently alluded to in paragraphs 6 and 7 of Sir James Douie's review of the Delhi Final Settlement Report. In regard to inundations from torrents, the reasons for Mr. Stow's proposals to introduce a compulsory fluctuating assessment in the Naili circle are detailed in paragraph 42 of his Kaithal Assessment Report ; but Government, agreeing with Mr. Merk's views, did not accept these proposals, and ordered that a fixed assessment should be imposed and that the villages should have the option of applying for fluctuating assessments if they required them. Protective leases for wells and deferred enhancements in villages where large increases were taken, ensure the easy working of the new demand. A careful scheme for suspensions and remissions in insecure villages has been drawn up by Mr. Stow and approved of by Sir James Douie.

10. While in Rohtak the Settlement Officer felt somewhat pessimistic about the results of correction of maps at the present settlement, Mr. Stow gives a more encouraging account of results in Karnal. The process employed was complete re-measurement on the square system in tracts like south Kaithal and Karnal Nardak where canal irrigation had caused much change. Pargana Karnal was also re-measured on the square system to secure uniformity with the rest of Karnal tahsil. In the rest of the district, Guhla, Indri pargana, Panipat and Thanesar tahsils, the aim was to correct and bring up to date the good existing maps on the square system of Sir James Douie's settlement and the good plane table maps of Sir Denzil Ibbetson's settlement. Tracing were made and corrected in the field. Except in Panipat the result of the measurements is recorded in katcha bighas. In Panipat the record is in pakka bighas, but these have been reduced to katcha bighas in the record. Certain experiments in map correction and *killabandi* occupied a considerable period and incidentally added to the cost of the settlement, though the experience gained doubtless saved time and money in settlements elsewhere.

11. The preparation of the pargana note-books containing valuable data for the future working of the settlement has been carried out with great care. The preparation of muafi registers, the institution of a regular

graded zaildari system, the substitution of inamdars for the unsatisfactory alambardars, and the steps taken for the reduction of superfluous lambardars and the improvement in position and remuneration of village headmen for the future followed the lines which have already formed the subject of comment in Rohtak in paragraph 12 of Mr. Meredith's review of the Final Settlement Report.

12. The cost of the settlement was Rs.8,25,895, of which nearly a lakh of rupees will be recovered from jagirdars. This may be set against the increase in annual revenue of Rs. 3,01,180. The tract is an enormous one with great variation between circles, and the previous settlement operations were also of a lengthy and costly character. The duration of this settlement, however, was largely contributed to by the experiments referred to in paragraph 10 above and by the length of the discussion on the method of assessment of canal-irrigated land.

Cost of the settlement.

13. The term of the new settlement should, in the Financial Commissioner's opinion, be 30 years. That was the term of the last settlement in the area settled by Sir Denzil Ibbetson, and the conditions of that area and the greater portion of the tract settled by Sir James Douie are such that a long term is suitable. It is only in the Bangar and Nardak circles of Kaithal that the rapid development of irrigation and the impossibility of at once taking an enhancement proportionate to that development point to a 20 years' term as more appropriate. But there also, for the reasons that influenced Government in fixing the longer term for the Rohtak district, and particularly because of the likelihood of the occupiers' rates on the Western Jumna Canal being raised before very long, the Financial Commissioner recommends that the term be fixed at 30 years.

Term of settlement.

14. Mr. Stow has well justified his selection for the arduous task of the Karnal settlement. His report is excellently written and contains a good account of the district and a clear and concise summary of the results of reassessment. The description of the operations of settlement indicates the painstaking thoroughness which is characteristic of Mr. Stow's work and with which Mr. Diack was impressed when he dealt as Settlement Commissioner with the assessments of the Panipat and Kaithal tahsils.

The Settlement Officer.

15. Mr. Kennaway, as Assistant Settlement Officer, carried out the assessment of the Thanesar tahsil in a very creditable manner and rendered other useful assistance to the Settlement Officer. Mr. Stow acknowledges gratefully the help and advice received in the revision of maps and records from Rai Sahib Hira Singh, whose ripe experience, gained in every grade of the Settlement Department, made him an invaluable assistant. The Financial Commissioner also desires to acknowledge the service rendered by this veteran officer in developing the system of map correction which has now been generally adopted in Punjab settlements. The Tahsildars all did good work and it would be invidious to signalize any for special commendation.

Other officers.

The 3rd March 1912.

No. 684, dated 4th October 1911.
From—Lieut.Col. C. M. DALLAS, Commissioner, Delhi division,
To—The Junior Secretary to the Financial Commissioners, Punjab.

WITH reference to your No. 7249, dated 13th September 1911, forwarding an advance proof copy of the Settlement Report of the Karnal district, I do not know whether I am expected to submit a review of that report as orders have already been passed on all points referred to therein except regarding the period of the settlement. Mr. Stow's report seems to be a careful and comprehensive one dealing fully with all necessary matters, and it seems, therefore, unnecessary for me to say anything.

I would, however, recommend that the settlement be sanctioned for a period of 30 years from the date of the announcement of the new assessment, *i.e.*, from kharif 1909.

Settlement Report of the Karnal District, 1909.

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CHAPTER I. —THE DISTRICT.

1. The present Karnal district has an area of 3,124 square miles. The river Jumna forms its eastern boundary and across that river the district is faced by the districts of Saharanpur, Muzaffarnagar and Meerut in the United Provinces. To the north lie the Jagadhri and Ambala tahsils of the Ambala district while the north-west and western boundaries are formed by the Patiala and Jind States. On the south are the Gohana tahsil of the Rohtak district and the Sonapat tahsil of the Delhi district.

The extreme breadth of the district is 44 miles and the extreme length 64 miles.

2. The District comprises four tahsils, Panipat Karnal, Thanesar and Kaithal. It is traversed from north to south by the watershed between the Indian Ocean and the Bay of Bengal. To the east of the watershed is the Khadar or riverain tract of the Jumna; west of the watershed lies the Bangar, upland plain stretching parallel to the khaddar throughout its entire length. These two divisions are common to the three eastern tahsils, Panipat, Karnal and Thanesar. To the west of the Karnal Bangar, however, stretches a high and once arid country known as the Nardak, to the west of which again lies the Bangar tract of the Kaithal tahsils, resembling the uplands of Rohtak and Hansi. The Bangar tracts, except in Thanesar, and the whole of the Nardak are now fully irrigated by the Western Jumna Canal. In the north of the district, in the Thanesar tahsil and the Guhla sub-tahsil of Kaithal, the country to the west of the Bangar is traversed by a series of hill torrents, of which the most important are the Markanda, Umla, Sarusti, Chautang and Rakshi. On the action of these streams the prosperity of this northern tract depends. Their influence is shown in the great diversity of soils they have formed, from the fertile loam of the Markanda Bet to the stiff clay of the Chachra and Naili covered with dense thickets of dhak (*butea frondosa*). The Ghaggar may be said to form the northern boundary of the district, but beyond it are a few outlying estates scattered in Patiala territory belonging to the jagirdars of Arnauli and Sidhowal and included in British territory for political reasons. They lie in an extensive plain intersected by sandhills, but with many rich loamy hollows in which well cultivation is easy and profitable.

The district is everywhere well wooded. The fertile fields of the Khadar and Bangar are studded with groves of mangoes and jamoa, while in the Nardak, Chachra and Naili masses of dhak trees form the feature of the landscape, varied by the pipal, bhor, and pilkhan. The palm tree is plentiful in the Khadar, and the kikar is often found, but the shisham is comparatively rare except where planted on canal bank or by the road-side. A number of trees not indigenous to the district are found on the old Imperial canal. Grasses are plentiful in the Bangar and Nardak, the best for grazing being dubra, anjan and palwa. Panni is useful for thatching. The Khadar produces most inferior grazing, except near the Jumna, where the grass is protected by the fringe of jhao brushwood adjoining the river —bed.

3. In the months of July, August and September, when the river is in flood and good rainfall has reduced the demand for canal water, the Jumna is a formidable river. Its waters often cause considerable damage to villages on its banks and penetrating inland through the numerous flood channels intersecting the Khadar are anything but beneficial to the kharif crops. The silt of the Jumna is not so valuable as the silt of the Punjab rivers. The deposit contains too much sand. At the same time the villages whose kharif crops are damaged

are undoubtedly gainers in the rabi. Of the flood channels which traverse the Khadar tract, the most important are the Nun in the Northern Indri Khadar, the Puran or old Jumna near Kunjpura, and the Dolaha which flows through Barsat and occasionally brings floods as far inland as Panipat city. At present the set of the river in the Karnal tahsil is towards the districts of the United Provinces, and a considerable area was added to the Karnal district in 1908. In the Panipat and Thanesar tahsils, however, the set is towards the Punjab or right bank, and some of the best land in the district, including many valuable wells, has been carried away during the last few years.

4. Whenever there is a slackening in the demand for water in the districts served by the Western Jumna Canal, the canal authorities dispose of the surplus supply collected in the upper reaches of the canal through large escapes which conduct the water back into the Jumna and form a somewhat important feature in the agriculture of the Khadar. These escape channels, after a short artificial course tail off into some natural depression leading to the river. The Kanjun and Dhanaura escapes, which take out of the canal above Indri, have a short course, and have little effect on the country through which they pass. But the Indri escape, or Budha Khera nala, and the Rer escape, or Khojgipur nala, are more important. The former takes the surplus water from the Indri lock and runs down the channel of the old Western Jumna Canal to Budha Khera, a few miles north-east of Karnal, and thence by an old channel into the Jumna. The body of water thus disposed of is considerable and the moisture benefits a few villages near Indri. The junction of this channel with the main stream of the Jumna at Kairwali gives rise to heavy floods in some riverain villages in the vicinity. The effect is not always beneficial, and the large village of Barsat has been particularly unfortunate. The deep catch water drain known as the Rer or Munak escape, and to the zamindars as the Khojgipur or Ganda nala, carries surplus water from the Munak Regulator and drains the south of the Karnal tahsil. It has been much improved since settlement. The banks have been strengthened and the channel bridged in several places. From Babail its course has been changed, thus removing a source of danger to some prosperous riverain villages of the Northern Khadar. Instead of holding up the floods as at settlement it conveys them along with the surplus canal water through an old winding arm of the river to join the Jumna at Khojgipur, some 12 miles south of its former outfall.

5. The old canal at the time of Mr. Ibbetson's Karnal settlement still ran from Indri downwards in the old channel, which was practically identical with the Badshahi canal constructed by the Moghals. It wound its course through the khaddar, and did not enter the bangar till it reached the old Imperial bridge on the Grand Trunk road, 4 miles south of Karnal. The evils which resulted from faulty alignments, disregard of the natural drainage, and excessive irrigation are described at length in the Karnal Settlement Report (paragraphs 159—169).

Fortunately the state of affairs described by Mr. Ibbetson had not long to wait for a remedy. The re-alignment of the main line from Indri to Munak and of the distributaries was actually being carried out when Mr. Ibbetson wrote, and in August 1885 the old canal between Indri and Rer was finally closed and relegated to its proper position as a drainage line.

From Tajewala in the Ambala district, where the Western Jumna Canal takes out of the Jumna as far as Indri, the alignment of the old Badshahi canal is followed with but few modifications. This reach is really an arm of the Jumna pressed in the service by the original constructors of the canal, and has now to carry the whole supply of the modern system. Two-thirds of as much of the Jumna river water as is available for irrigation is taken as far as Indri in one united stream, the volume of which since the opening of the Sirsa Branch greatly exceeds that carried at last settlement. In this reach considerable damage has been caused by percolation owing to the water held up at the Indri Regulator to supply the Sirsa Branch which leaves the Main Canal at this point.

Below Indri the main canal continues navigable as far as Delhi. Between Indri and Munak, where the Hansi Branch strikes westwards to irrigate Jind and Hissar, several subsidiary channels are given off. The Nardak Distributaries constructed in 1897-98 takes out of the main line at Uchana, and gives much needed irrigation in the Nardak tracts of Karnal and Kaithal. The Budha Khera and Karnal Distributaries irrigate land in the vicinity of Karnal town. The Bazida Distributary taking out at Gogripur serves the centre of the Karnal pargana and extends to the northern villages of Panipat. The Goli Distributary taking out above the regulator at Munak irrigates a few villages in the south-west corner of the tahsil. At Munak water is again headed up to give a sufficient supply for the Hansi Branch, and here again percolation has caused some damage.

The old Delhi and Rohtak Branches have been completely abandoned except where their course happens to coincide with a new rajbaha. At present the main supplies of canal water for the Panipat tahsil are drawn from the Delhi Branch and the Hansi Branch, which bifurcate at Munak on the borders of the Karnal tahsil. The Delhi Branch through its main distributaries, the Madlauda, Gohana and Asrana Rajbahas, irrigates the greater part of the Bangar circle. The Joshi Minor and Butana Rajbaha of the Hansi Branch serve the villages on the Jind and Rohtak border. The Kabri Branch taking out of the Main Canal near Karnal, is brought over the Panipat border and irrigates the extreme north-east of the Bangar circle and the town of Panipat. The small area of canal irrigation in the Khadar circle is supplied by this rajbaha.

The distributaries of the Delhi Branch are the most satisfactory in their working. They are controlled from Binjhol, the head-quarters of the Panipat Canal sub-division. The Panipat villages at the tail of the Joshi and Kabri Distributaries which are in the charge of the Karnal Canal sub-division are loud in their complaints. These distributaries have never worked satisfactorily. The Butana rajbaha of the Hansi Branch managed from Rohtak gives ample supplies.

The Sirsa Branch opened in 1890 takes out at Indri and strikes due west. No irrigation is done from the main line in the Karnal tahsil. But the Habri Rajbaha, which takes off at Badhera, irrigates a few villages in the Indri Nardak. Entering the Kaithal tahsil the main line runs from north-east to south-west, parallel to and about 4 miles to the south of the Kaithal-Thanesar road. Two main distributaries, the Sidkan and the Habri Rajbahas, irrigate the country between the Sirsa Canal and the drainage line of the Chautang which was formerly the boundary of the territory belonging to the Bhai of Kaithal. The villages lying to the south-east of this drainage line were without irrigation until the opening of the Nardak Rajbaha in 1898. All these rajbahas have been aligned on the most approved principles, and when clear of silt their command of the irrigation area is almost perfect.

The Sirsa Branch irrigation is controlled by the Sub-Divisional Officer at Mundri, the Nardak Rajbaha is under the immediate charge of the Sub-Divisional Officer at Karnal. As at settlement, the southern villages of the Kaithal tahsil bordering on Jind are irrigated from the Mowana Rajbaha of the Hansi Branch, which gives excellent supplies.

6. *Hill streams.*—The Rakshi has a course of little more than 10 miles from the point where it enters the Thanesar tahsil on the east to the town of Ladwa where it joins the original stream of the Chautang. Except to a few of the upper villages, its floods are not very important and below Ladwa the channel is deep enough to carry off the water without inundating the surrounding fields. The Kurukshetar cut from the Rakshi to the sacred tanks of Thanear still exists, but the channel is not kept properly cleared and its floods do harm as often as good.

The Chautang has altered its course a good deal since settlement. Shortly after entering the Thanesar tahsil and about 3 miles from the boundary the original channel has silted up, and, although one or two subsidiary channels are visible, the bulk of the water follows a series of depressions on the left bank of the old stream in a course roughly parallel to it until it enters a large lake about 3 miles north of Ladwa. From here the overflow escapes down the Ladwa-Shahabad road and so into the Rakshi and its original bed at Ladwa. Some of the flood water rejoins the original stream and is partly diverted into the Sarusti by the Sultanpur cut, and partly flows down the old bed to its junction with the Rakshi at Ladwa. Near the border of Ambala a few villages benefit by the silt which the Chautang carries in its upper reaches. Below the point where the old channel has silted up, the villages almost without exception have suffered from the diversion of the water into the fields. In many places the present course of the stream is marked by no defined bed, and what were formerly rice fields have become mere jhils or, owing to over flooding and denudation of the surface soil, are now unfit for cultivation. A scheme for clearing the old bed and restoring the stream to its original channel has been taken up.

The Rakshi and Chautang enter the Karnal tahsil in the north of the Bangar between Indri and the Grand Trunk road. The Sirsa Branch cuts across the course of both these streams, which are siphoned under its bed. Up to 1897-98 the flood water brought across the line of the Sirsa Branch was allowed to inundate the country to the west of the Grand Trunk road. But since that year, partly by straightening the original drainage channels and partly by digging new water-courses, the floods have been much reduced. On the whole, these works have been advantageous. The system, half drainage and half canal, is supplemented to a certain extent from the Sirsa Branch. Enough water is given for rice sowings in a year of average rainfall, but for the spring harvest only one watering can be supplied. The original streams still continue their course through the Nardak, taking overflow from the Chautang Canal system and surface drainage. Few large villages in the west of the Karnal tahsil are still dependent on the floods of these natural channels.

The Sarusti above Singhaur has no defined bed, but in its lower reaches, where it can overflow its banks, it becomes useful to the rice-lands of certain villages. Its floods, however, rarely extend to any distance, it carries no silt, and its banks are usually high and steep. Near Thanesar they are sufficiently low to enable certain villages to obtain some benefit by the erection of "bunds" these have recently been prohibited in the interests of the Sarusti Canal, the supply of which depends upon the water collected in a large lake, called the Sainsa jhil, in the neighborhood of Pehowa.

The Markanda is distinguished from the rest of the hill-streams of the district by its extensive flooding and by the heavy deposits of silt which it leaves in the more favoured villages. Sand is more rarely deposited, and as a rule only in the vicinity of the banks. If we are to judge by the experience of the expiring settlement, its natural vagaries have been somewhat over-estimated in the past. It is true that in some places the bed of the river is on the ridge of the country, and the conditions which make of sudden changes are therefore always present. The question of controlling its waters is mainly an engineering one and is complicated by considerations of the supply of water for the Sarusti Canal. The construction of the road and railway bridges which span the river within 200 yards of each other at Shahabad, and the training works which run for several miles east and north of that town, confine the stream to a definite bed for the first few miles of its course through the Thanesar tahsil. They have also given it a sharper current for some distance below these works, and this has operated to keep it in its existing bed. The

Kalsani Channel has been closed, and the full stream now sets strongly on Kalsana, 3 miles below the bridges. Some 4 miles below Kalsana a branch strikes south along the western border of Ajrana Khurd, and it was expected at last settlement that this would shortly become the main channel. These expectations were not realized. Though the branch still carries a considerable supply of water in the rains, it is quite a subordinate stream and its floods do not spread beyond the borders of the few villages through which it passes where it empties itself into the Sainsa jhil. East of this branch there are marked indications of the formation of a new channel running south of Ajrana Khurd and thence towards Lukhi. The main stream up to 1906 continued in its old channel, joining the Sarusti in the Sainsa jhil. It will thus be seen that, throughout its whole course, the Markanda up to 1906 occupied nearly the same position as it did at last settlement. In 1905, however, it showed signs of an intention to break away along an old depression from Kanthala towards the Umla in the Kaithal tahsil.

The Umla has a course of only about 8 miles through the north-western corner of the Thanesar tahsil, but its floods enter the district from Ambala much higher up at Bhokar Mazra. Below this point they combine with the water of the stream which is called at different points in its course the Dhara, Gadla, or Jodha, nala, and several villages in the direct line of the inundation now suffer from over-flooding; even in the winter rains the waters often spread to an extent sufficient to drown the less hardy spring crops. Autumn crops can only be sown with any prospect of success in the higher ground, at least in years of normal or excessive rainfall. The same conditions, however, may be said to prevail in all villages of these parts which are exposed to the direct action of the Markanda and Umla floods, and they render the question of assessment one of no ordinary difficulty. Further west, the Umla runs under the large and populous villages of Thol and Ismailabad. But it floods to any extent only on its left bank, where its sphere of influence is almost continuous with that of Markanda. The latter stream carries much more silt than the Umla, and its floods are consequently held in higher estimation. It is certainly a fact that the Markanda villages are generally more prosperous, and the soil is better than in those served by the waters of the Umla.

The Umla and Markanda, as they issue from the Thanear tahsil, affect some villages in the eastern corner of the Naili circle lying north and east of the Thanesar-Pehowa road and its continuation towards Guhla. The Umla eventually joins the Ghaggar at Kharak, while the bulk of the Markanda water finds its way into the Sainsa jhil where it joins the Sarusti. Roughly speaking, the road from Ambala to Pehowa may be said to separate the Umla flooded area on the west from that of the Markanda on the east. But the boundary is constantly overstepped. The action of both streams at this point in their course is identical. Both are depositing silt and improving the villages which they affect. During the 4 years of settlement the Markanda has laid down rich deposits in the large village of Bhorak and is slowly improving a few small estates near Pehowa. But the principal change has been wrought in the villages bordering on the Sainsa jhil. The Markanda entering the jhil from Bibipur deposits all its remaining silt in the low-lying land of the surrounding villages. At the end of the flood season the water of the jhil is drawn off by the Sarusti Canal, leaving stretches of admirable soil on which the finest crops of gram and wheat can be raised.

The natural drainage channel fed by the floods round Pehowa is known as the Sarusti nadi, though the waters it carries are mainly those of the Markanda. A large tract known as the Sarusti Naili depends for its prosperity on the proper management of these floods. It is unnecessary to enter here into the details of the arrangements for the distribution of the water in the nadi. They are described in full in paragraph 30 of the Kaithal-Guhla Assessment Report.

From the Sainsa jhil issues the artificial work known as the Sarusti Canal, designed primarily to drain the Jhil and incidentally to irrigate the higher lands to the south of the Sarusti nadi. A main outlet has been dug on the south side of the jhil, and the flood water coming down this outlet is regulated by a sluice constructed on a bridge carrying the Pehowa-Thanesar road. A few miles further down, the Kaithal Branch strikes off southwards and irrigates the high land between the Sirsa Branch of the Western Jumna Canal and the Sarusti Nadi, the Main Canal continues to run along the Bangar bank just above the Sarusti valley, and two rajbahs (No.1 and the Tail of Guhana Rajbaha) irrigate the villages immediately south of the main lines. Rajbaha No. 2 irrigates two villages to the west of the main line.

The Main Canal was opened in 1896, the Kaithal Branch in 1899, the Guhana Rajbaha in 1902 and the Kaithal Minor in 1906. A Rajbaha (No.3) taking out at Nawach and commanding about 1,000 acres between Nawach and Kaithal is under consideration.

The canal has achieved a large measure of success. In the rainy season Pehowa is still at times inaccessible, but the floods are carried off by the end of September, and the climate is gradually improving.

The main branch of the Ghaggar known as the Untsarwali nadi passes to the east of the cluster of Karnal villages lying east of Arnauli, and is joined near Bhagal by another channel known as the Gadra and by what remains of the Umla floods. The stream has here excavated a channel about 40 feet deep, and flows westwards till the mouth of the Puran is reached at Dhandauta. In high floods some water passes down the Puran, but the main body of water, augmented by the Patiala nadi at Ratta Khera Lukman, flows on south-west till it leaves the Karnal district at Urlana.

The Puran from Dhandauta to Bubakpur was the original bed of the Ghaggar. At Bubakpur it took a turn, and passing through Lalpur and Bhatian followed the course of the present main stream. A band was erected at Bubakpur to force the water down towards Agaundh, and this Agaundh Branch is now regarded by the people as the Puran nadi. The Puran has silted up throughout its length, and every year a deposit of sand, about 15 feet high, is piled at its mouth. The channel was cleared at last settlement and again in 1906. But the result is unsatisfactory. It is of course out of the question to place an ordinary regulator in the Ghaggar. The cost would be prohibitive, even if no objection were made by the Patiala and Bikaner States, or by the Canal Department. But it should not be impossible to raise the floods by a stop dam in the bed of the channel, and regulate their flow by a gate at the mouth of the Puran.

7. The volume of water which enters the district by river flood or canal provides a natural sub-surface reservoir which is of the utmost importance to agriculture. Except in the Nardak and the Kaithal Bangar south of the Sirsa Branch, the water level is nowhere lower than 40 feet below the surface of the ground. Wells are therefore not difficult or expensive to sink, except where the changes in the alignment of the canal have disturbed the sub-surface water-table. The Khadar tracts are naturally the most favoured. Water is found at 12 to 18 feet, and the cost of a masonry well is not more than Rs. 300. In the Bangar of Thanesar and Karnal, and the similar tracts of the Kaithal tahsil known as the Pehowa Bangar and the Andarwar, the water level is lower and the cost proportionately higher. Similar conditions prevail in the Chachra of Thanesar, the Naili and the Powadh villages beyond the Ghaggar.

Unbricked wells are dug in times of need throughout the Khadar, especially in Indri, while in the Panipat Khadar a cheap and easily constructed well is made of unmortared bricks of a special pattern. Where percolation from the canal has disturbed the original water levels, as in the Karnal and Panipat Bangars, the sinking of a new well is a serious undertaking. Water

is found at 10 or 12 feet, but this is not a true water level, and the cylinder must be carried down to tap the original water-bearing stratum, irrespective of the percolation from the canal. The work has to be done is water all the time, and the cost is almost prohibitive. But by sinking a pipe of iron or dhak wood to tap the water-bearing stratum the expense is reduced and will not then exceed that of a well sunk in the Indri Bangar.

In the Thanesar tahsil and in all Bangar tracts the wells are worked by a rope and leather bucket. But in the Indri, Karnal and Panipat Khadars the Persian wheel is almost invariably found. The use of the rope and bucket in these tracts is rare and indicates great industry or an exceptionally good supply of water. The Persian wheel is also the rule in the Powadh villages.

For the Persian wheel a smaller class of bullock is required than for the rope and bucket wells. But in either case the strain on the bullocks in a year of drought is very great, and the increasing cost of the animals is a very serious moment to the zamindar who depends on well irrigation. Except in the Karnal and Panipat Khadar, where the labour at the wells is incessant, this form of irrigation is reserved as far as possible for the rabi harvest.

8. *Sailab.*— The effect of the Jumna floods has been already described as harmful in the kharif, though beneficial in the rabi harvest. The value of sailab Land on the banks of the Jumna is little higher than that of ordinary barani land in the Khadar.

Between Radaur in the Thanesar tahsil and Indri, the land on either bank of the canal suffers from percolation to a greater or less extent. On the right bank matters have been improved by a system of silting reaches which have raised the level of the ground and made cultivation again possible. The villages which have received most benefit from these operations lie in the Thanesar tahsil. Those on the left bank in the Karnal tahsil have suffered to a much greater extent, and in spite of an extensive system of drainages it has been necessary to undertake the large embankments and silting reaches now in course of construction. The state of things is due to the water held up at the Indri Regulator to supply the Sirsa, Branch which leaves the Main Canal at this point. But beyond this belt of water-logged soil the effect of percolation is beneficial to crops. The moist area extends further east than in 1886, but since the opening of the Sirsa Branch in 1891 has given rise to excessive water-logging, it is doubtful whether the land is as valuable as it was at last settlement. In 1886 the old canal to the south of Indri had just begun to be used as an escape. The land of some villages on its banks was entered at settlement as sailab. But these villages have become much drier since settlement, and the area of canal sailab has been restricted in this direction. Between Indri and Munak the Main Canal affects a strip of land of varying width along its banks, especially near Munak. The result is on the whole beneficial to the villages in that part of the district with the exception of Munak itself.

The silt deposited by the Markanda is generally of the highest quality, and is the chief factor in the prosperity of the tract known as the Markanda Bet. The silt of the Umla is less beneficial, but in the upper course of that stream the alluvial soil is fertile enough.

The action of the Markanda and Umla in the lower part of their course is somewhat as follows. The floods turn aside from villages which they have raised in past years by deposits of silt to others on a lower level. The first layers of silt are deposited in depressions, where the soil is usually a hard clay covered with dense masses of panni and dab grass. In a year of good floods I have seen 6 inches or more of the most excellent soil superimposed on the original clay bed. Next year the process is repeated, and at the end of three or four years the old depression contains about 2 feet of the best possible loam.

As the floods subside the people sow wheat in the cracks of the soil, securing very fair crops with little expenditure of trouble. With each succeeding flood the silt deposited becomes lighter and more sandy. The land is then regularly ploughed and gram is usually substituted for wheat. If the floods continue to affect the village, the soil becomes the good Seoti of the Bet Markanda. But before this stage is reached the water is often diverted in another direction owing to the rise in level created by the floods themselves.

Below Pehowa a large area is flooded yearly from the Sarusti Nadi either by spill from the main channel or by artificial cuts. The soil is very Sarusti and Ghaggar sailab. Stiff, but if well flooded, produces excellent crops of rice and gram.

9. The averages recorded at the tahsil rain gauges for the last 28 years show roughly the distribution of the Rainfall. rainfall:-

						Summer- April to September.	Winter- October to March.	Total
Thanesar	...	...	...	...	...	25.02	4.29	29.31
Karnal	...	...	...	...	...	27.33	3.87	31.2
Panipat	...	...	...	...	...	22.19	3.69	25.88
Kaithal	...	...	...	...	...	15.56	3.63	19.19
Guhla	...	...	...	...	...	15.06	3.65	18.71

The advantages of the Khadar and Bangar tracts, on the borders of which the three first gauges are situated, are sufficiently apparent. There is a marked and sudden diminution of the rainfall as soon as the stiff soil of the Chachra and Nardak tracts are reached. The natural state of this region is extremely precarious, and, before the recent extensions of the Western Jumna Canal, was one of the most insecure in the province. The Bangar of Kaithal, especially in the southern villages, is fortunate in possessing a lighter soil where a crop may be raised with far less rain than in the Nardak.

It must not be forgotten that the success of the canal crop also depends very largely on the rainfall. The kharif of 1905 and the rabi of 1908 are striking, but by no means solitary examples of the failure of canal water as at present distributed to mature a crop when the rainfall is unfavorable.

CHAPTER II.—PREVIOUS SETTLEMENTS.

10. The administrative fabric reared by the Moghal Emperors was destined to crumble under the successive revolts and invasions of the Prior to British rule. the eighteenth century. The country north of Delhi, impoverished by the armies of Nadir Shah, by the hordes of Mahrattas and the opposing Imperial troops, fell an easy prey to the Sikh marauders flushed with the victory at Sirhind. The northern part of the district was parceled out between a number of Sikh chieftains and their adherents, of whom the most important were the Bhais of Kaithal, the Sardars of Thanesar and Ladwa and the Pathan Chiefs of Kunjpura. The country south of Karnal was a no-man’s land, seized sometimes by the Sikhs and sometimes by the Mahrattas and their adherents. Throughout the country the rule was the rule of the strongest. The state of things prevailing in the Delhi territory was graphically described by the Civil Commissioner in 1820:-

“Revenue administration there was none, the cultivator followed the plough with a sword in his hand ; the Collector came at the head of a regiment, and if he fared well another soon followed him to pick up the crumbs”

As for the rule, or rather misrule, in the Sikh States, Mr. Douie remarks*: “Their revenue system consisted in squeezing the weak, and getting as much as they could out of the strong”.

11. This is not the place to enumerate the preliminary stages in the formation of the old Panipat district, the northern part of which corresponded to the present Panipat tahsil and the Karnal pargana. It is sufficient to note that the process was completed in 1824, and summary assessments had been introduced in almost all villages except those assigned to the Mandal family in the Karnal pargana.

These summary assessments were extremely oppressive, amounting to half the gross produce of the cultivation in well developed villages, besides assessments of grazing and a tax on cattle. But in fact the assessments were purely nominal and were never collected. What could be got from the people was taken, and the remainder accumulated as balance. The mode of collection was as vexatious and extortionate as the assessment was oppressive. It is unnecessary to repeat here the vivid description of the chaotic administration given in paragraph 125 of the Karnal Settlement Report.

By 1828 the revenue survey of the district had been completed, and by giving firm ground to work upon had rendered impossible those gross inequalities of assessment which had till then been unavoidable. The half-share principle was abandoned, and the demand was estimated to absorb about a fourth of the gross produce. The demands, however, still averaged Rs. 3-8-0 to Rs. 4-3-0 on cultivation in small weakly estates, and Rs. 2-6-0 to Rs. 3-3-0 on the whole culturable area in fully peopled villages. Field-to-field records were prepared showing the proprietary and cultivating tenures. Direct management was still frequently resorted to and balances were large, but the general state of affairs was greatly improved. After the famine of 1833 the assessments were again largely reduced, and between 1836-39 the outstanding balances were remitted.

In 1837 the revision of settlement was ordered and finally reported on by Mr. Edmonstone in 1842. The last summary demands were reduced by 15 per cent. in the Khadar of Panipat and Karnal, and the incidence of the revenue per cultivated acre was Rs. 2-11-0. In the Bangar, where canal irrigation had brought prosperity, the current demand was raised by 6 per cent., and the incidence upon cultivation was Rs. 2-8-11. Mr. Ibbetson, after revising this settlement, considered that it had worked well, especially in the Panipat tahsil, but sufficient allowance had not been made for the inferior soil and the still more inferior cultivation of the Rajputs and Syeds who held the northern villages of the Karnal Khadar.

In The Bangar the settlement was soon vitiated by the deterioration of soil caused by the faulty alignment of the canal, by over irrigation and flooding, and Mr. Ibbetson considered the remissions inadequate.

Up to 1847 the Mandal jagirdars collected their share of the produce in kind, and, possessing neither the name nor the authority of executive officers, were involved in constant struggles with the proud and quarrelsome Rajputs who compose the population of the majority of villages included in the grant. The unsatisfactory state of this tract was brought to the notice of Government from time to time, but it was not till 1847 that a settlement was sanctioned. The settlement was carried out by Mr. Gubbins, but the result was received with discontent by both the Mandals and the people, and in 1852 Mr. Ross was ordered to revise the work. Even this revision was not considered satisfactory, and in 1855 Mr. Ross again reported on the tract. He took the rates Captain Larkins was then using in his revision of the Kaithal settlement, increased them somewhat, and adopted them as a guide, But he made little

*For a full description see Mr. Douie's report, paragraph 17.

use of them, and trusted rather to his knowledge of the tract and to the past history of each village. Sanction to the new arrangements was delayed by the Mutiny and the transfer of the district to the Punjab, but in 1860 the Punjab Government sanctioned the settlement as having already been in operation for some years, "on the distinct understanding that the rights of the Mandals are limited to an assignment of the revenue, and do not extend to the management of the land, and that in the event of calamities of the season, deterioration by saline efflorescence, or other reasonable cause, the zamindars shall receive the same equitable indulgences as are granted to Khalsa villages."

12. The Settlement of the Panipat tahsil and of the Karnal pargana were revised by the late Sir Denzil Ibbetson in 1873—1879.
Mr. Ibbetson's settlement.

In the Panipat Khadar, the inhabitants of which were characterized as prosperous, though not inordinately so, the demand of 1876 was enhanced by 2.4 per cent., while the additional cesses raised the total increase to 6.4 per cent. or 11.9 per cent. on the demand of the previous settlement. The incidence of the burden was redistributed so as to afford much needed relief to many of the estates which had, from various reasons, become impoverished.

The soil of the Panipat Bangar, naturally most fertile, had been deteriorated by the faulty alignment of the canal and its distributaries, and by over-irrigation which had water-logged the country and had called into existence the evils of reh and swamp. The population had been debilitated by sickness. The condition of villages was very unequal. Those on high ground which had not suffered from flooding were in the most prosperous condition, while the estates which had been most severely stricken by reh and swamp were in the most pitiable state.

The increase taken in this circle was only 1.4 per cent., while additional cesses raised the enhancement to 5.3 per cent. on the total burden of 1876 and to 6.2 per cent. on that of the previous settlement. Up to the revision of settlement, canal irrigated land had been assessed like other land to a full assessment realized year by year irrespective of the area irrigated. The result was that villages which suffered from swamp and reh were forced to continue irrigation in order to meet a demand which had been excessive. The most noteworthy feature of Mr. Ibbetson's arrangements was the separation of a portion of the demand in the form of owner's rate charged on the area actually irrigated harvest by harvest. The people were thus in a position for the first time to reduce their irrigation if circumstances so demanded, instead of being forced to continue irrigation in order to meet the demand. In practice the owner's rate was fixed at half the occupier's rate, or rate charged by the canal Department for water supplied.

In the Karnal Khadar, though the soil in general is not fertile, a considerable portion of it is always very sandy and poor. Since the settlements which Mr. Ibbetson was revising, the demand had been reduced considerably. The Jat and Ror villages Mr. Ibbetson considered on the whole prosperous, but some of the Taga, many of the Rajput, and all the Syed villages were greatly impoverished and sadly needed relief. In this circle a reduction of 8.7 per cent. on the current demand was given, which the imposition of the new cesses reduced to a relief of 4.4. per cent. on the total burden.

In the Karnal Bangar, as in the corresponding tract of Panipat, the soil, naturally fertile, had been seriously deteriorated by reh and swamp. The people were much reduced by sickness, but it was found possible to increase the demand, as two of the largest and best villages had improved. The increase taken was 12.4 per cent., or with cesses 16.9 per cent. on the demand of 1876, and 19.7 of the demand taken at the previous settlement. This circle, like the Panipat Bangar, benefited from the re-adjustment of the internal distribution, and by the introduction of the owner's rate system.

The Karnal Nardak was then an arid tract of scanty rainfall, and more than 90 percent. of the cultivated area was under inferior sorts of grain. The cultivation, unsupplemented by the produce of cattle, was quite unequal to the needs of the population, but on the other hand there was ample room for expansion in the higher and drier soils. The population was multiplying rapidly, but was still the poorest in the district and their resources had been much impaired by the cattle epidemic of 1869. In this circle a reduction of 19.3 was given in the current demand, equivalent with cesses to a reduction of 16.8 per cent. of the total burden as it stood in 1876 and to a reduction of 13.5 on the demand of 1856.

Of this well-known settlement it is sufficient to say that the records and assessment attained a rare standard of accuracy and justice, and the author is gratefully remembered by all as the founder of a new era of settled prosperity.

13. The Thanesar district, which eventually included the Pipli (now
The Indri pargana. Thanesar and Kaithal prior to Mr. Douie's assessment. Thanesar) tahsil, the Indri pargana, and the Kaithal tahsil, was formed gradually by lapse on the failure of heirs, as in Radaur, Thanesar and Kaithal, by the deposition of the Raja of Ladwa in 1846 and by the reduction of the remaining chiefs to the status of Jagirdars. As territories escheated to the British Government they were summarily settled, the assessment being in almost all cases most oppressive. The summary settlement of the lapsed Kaithal State was made by Sir Henry Lawrence in 1843 and revised by Captain Abbott four years later. This revision was intended to be the regular settlement, but was never reported to Government for sanction. The regular settlement was actually carried out by Captain Larkins in 1853—1856. The rest of Pipli and Indri had been assessed by Mr. Wynyard between 1848 and 1852. But it was soon found that the villages could not pay Mr. Wynyard's assessments, and Captain Larkins was ordered to revise them. He submitted his report in 1856, but other revisions were required and the demand for Pipli and Indri was not finally fixed until 1862.

Mr. Douie, who revised Captain Larkins' Kaithal settlement, considered that it had worked well. As to the Pipli (Thanesar) tahsil, Mr. Douie thought that the Bet Markanda, and part of the Northern Chachra, the Bangar, and the Khadar had enjoyed a moderate degree of prosperity since the revision of 1862. The Pehowa Naili, now transferred to the Kaithal tahsil, the Southern Chachra, and part of the Northern Chachra suffered partly because of the unhealthy climate and partly because the full demand was collected in good and bad seasons alike without regard to the precarious nature of the harvests.

14. Mr. Douie's revision, known as the Karnal-Ambala settlement,
Mr. Douie's settlement. lasted from 1882 to 1889, and embraced the Kaithal tahsil and the Indri pargana of the Karnal district, and the Pipli and the Jagadhri tahsils of the Ambala district. The Pipli tahsil has since been transferred from Ambala to Karnal, and is now known as the Thanesar tahsil. The Jagadhri tahsil is still part of the Ambala district, and with it we are not now concerned.

In the Powadh circle, which includes most of the villages south of the
The Kaithal tahsil. Ghaggar, nearly all of which are in the Jagirs of the Bhais of Arnauli and Sidhowal, the increase taken was 11 per cent.

Only a trifling enhancement of 3 per cent. was taken in the small Andarwar circle on the watershed between the Sarusti and the Ghaggar. In neither of these circles had there been any large increase of cultivation or prosperity.

The Nardak and Bangar circles of Kaithal were then unirrigated, with the exception of a trifling amount of well irrigation in the villages bordering on the Naili tract. In the Nardak little more than 1/3rd was under cultivation, but this area and the number of ploughs at work was double what it had been thirty years before. Population had risen by 45 per cent. The crops, as in the

Karnal Nardak, were inferior grains, and the people, chiefly Rajputs, depended largely on their cattle. The enhancement, excluding owners' rates, taken was 44 per cent. on the existing demand.

In the Kaithal Bangar, which occupies the western half of the southern uplands, nearly 2/3rd of the area was under tillage. In some of the largest estates no waste remained. The increase in population was 38 per cent. The crops were of the same class as in the Nardak, but tillage was more careful. Though the grazing had been much curtailed, the people managed to keep a large number of cattle. The increase taken amounted to 48½ per cent.

Mr. Douie considered that the demand in the Nardak and Bangar was fairly secure under existing circumstances. But the Sirsa Branch Canal was extended to the tracts, and the demand was paid with ease.

Owing to the tahsil boundaries then existing, Mr. Douie was compelled to divide the Naili tract into two circles, the Kaithal Naili and Pehowa Naili. In the Kaithal Naili, the area flooded by the Sarusti and the Ghaggar, there had been practically no changes, and the condition of the landowners was unsatisfactory. The demand was practically unaltered, though the internal distribution was much changed. In the Ghaggar estates large reductions were granted, but these were more than counterbalanced by the increase taken in the Sarusti villages.

In the Pehowa Naili, flooded by the Umla and Sarusti, there had been an increase in cultivation and the number of ploughs, but cultivation had declined. As in the Kaithal Naili, the demand was left practically unchanged.

The small Pehowa Bangar circle had prospered on the whole; cultivation had increased by 46, and population by 20 per cent. since the settlement of 1856. An increase of 24 per cent. was taken.

Mr. Douie described the Pipli (Now Thanesar) tahsil as on the whole far from prosperous and as having suffered much from previous over-assessment between 1850 and 1862. A comparatively small increase was taken, amounting to only 7 per cent. for the whole tahsil. But whereas the assessments of the prosperous Markanda Bet and the Northern Chachra were raised by 13 and 10 per cent. respectively, the large and unfertile circle known as the Southern Chachra was given a reduction of 13 per cent. Progressive assessments were given in villages which had been recently developed by Mali immigrants. Slight increases were taken in the small Bangar and Khadar circles.

In Mr. Douie's opinion the Indri pargana, in spite of the reductions given at three revisions settlement, was still not prosperous, and further relief was required. Population had declined. Well irrigation, except in the Khadar, had decreased. The value of land was small in the upland circles, and the outturn precarious. In the Khadar, the land was poor, and the valuable canal sailab had lately been reduced by 3/5 ths. There had, however, been a rise in the cultivated area, though, owing to the varying classification of cultivation and new waste, the exact increase is a matter of doubt. In the Khadar, where cultivation was stationary, a reduction was given of 7 per cent. on the existing demand, the greater part of the decrease being given in jagir estates which had not been given the full benefit of previous revisions. In the Bangar there was a slight increase of cultivation, but well irrigation and population had declined. The decrease in canal sailab was balanced by a considerable increase in canal irrigation.

The revenue was left practically unchanged. The population and cultivated area of the Nardak had increased, but well irrigation had declined. Produce was most precarious, and the fixed demand was retained. Fluctuating assessments were, however, given to 22 estates of the circle.

The introduction of fluctuating assessment was a noteworthy feature of Mr. Douie's settlement. During Settlement operations a number of estates in the Naili, the Southern Chachra and the Indri Nardak, were placed under fluctuating assessment. In the Indri Nardak circle this system was continued in 22 villages, and others were to be allowed the option of applying for it. The Deputy Commissioner, with the sanction of the Commissioner, was to have the authority to cancel the settlement of any estate of which more than one year's demand was in balance, and to collect the revenue at fluctuating rates. Similarly, in the Naili and Southern Chachra villages, the people were given the option of accepting at any time during the currency of the settlement an assessment fluctuating with the area of crops harvested.

It was realized at the time that the people would avoid a fluctuating demand if possible. As will be seen, the introduction of irrigation from the Western Jumna Canal caused the number of villages under fluctuating demand to be reduced. In the Naili only a few villages which had utterly broken down applied for a fluctuating demand.

Mr. Douie's settlement was considered eminently fair. The large increase of cultivation and the introduction of canal irrigation in the south of Kaithal has caused the assessment to become extraordinarily light. Elsewhere the demand has been paid without difficulty, except in the Naili and Southern Chachra, where conditions of the last few years have been such as to make any assessment difficult to meet.

CHAPTER III.—PROGRESS SINCE THE LAST SETTLEMENTS.

15. Thirty years have elapsed since Sir Denzil Ibbetson settled Panipat. and the Karnal pargana, and twenty years since Mr. Douie settled the remainder of the district. The intervening period has seen important changes. In 1879 Sir Denzil Ibbetson left a tract swamped and water-logged by the ill-designed alignment of the canal; cultivation was being ruined by saline efflorescence and population racked with fever and ague. Within the next five years improvement had begun. The canal was realigned and the worst faults in the distribution of the water removed. The health of the people began to revive, and cultivation reverted to more wholesome conditions. At the close of Mr. Douie's operations in 1889 the whole of the Nardak of Karnal and Kaithal was an arid tract subject to continual recurrence of famine. The Kaithal Bangar was unirrigated. By 1891 the Sirsa Branch had begun to irrigate, to be supplemented by the Nardak Rajbaha in 1898.

These changes have altered the face of the district. Except in Panipat, the tracts which have not shared in canal extensions, whatever their previous prosperity, have remained comparatively backward and stationary. Their population has not increased, nor is their productiveness greater. On the other hand, the regions of chronic scarcity have become flourishing stretches of cultivation. Villages have grown out of all knowledge, and the value of produce harvested steadily year by year has increased enormously.

Besides these special advantages, Karnal has shared in the general development which has been in progress for the last 20 years. Railways have been built and roads improved. New markets have sprung up, and local trade now reflects the international movements of commerce. The rise in prices and the demand for labour have had a profound effect on the development of tenures and rents and the value of land. The rise in the price of cattle and of dairy produce is also a marked feature of the last 30 years. These are changes which deserve detailed consideration.

16. Between 1880 and 1890 canal irrigation was still confined to the main line and the Delhi and Hansi Branches. Their distributaries had all been realigned, but no great extensions had been made; the area of irrigation

in each village had altered considerably, but the total area recorded as irrigated by the canal remained very much as before:—

							1880	1890
							Acres.	Acres.
Karnal	...	...	...	...	...	...	25,280	20,938
Panipat	...	...	...	...	...	...	72,981	68,256
Kaithal	...	...	...	...	...	...	10,809	9,283
Total district							109,070	98,477

The next advance of scarcely less importance was the opening of the Sirsa Branch in 1891. The change which this brought about in the condition of the Kaithal tahsil and of the Indri pargana is strikingly exhibited by the following figures, which show the area recorded as canal irrigated between 1890 and 1900:—

							1890	1895	1900
							Acres.	Acres.	Acres.
Karnal	...	...	...	...	...	...	20,938	32,034	49,633
Panipat	...	...	...	...	...	...	68,256	69,621	72,461
Kaithal	...	...	...	...	...	...	9,283	27,482	96,200
Total district							98,477	129,137	218,294

In 1896 the Chautang and Rakshi nadis (see paragraph 6) were canalized ; in 1898 the Nardak Rajbaha was opened, and by 1900 the district was in possession of better water-supply than it had ever enjoyed.

In 1900 it was determined that the position and volume of the distributing outlets should be re-arranged throughout the Western Jumna Canal system, as was being done elsewhere on the great canals of the province. The project known as “the Remodelling Scheme” was put in to operation and the canal irrigation of the district was thrown temporarily out of gear. Villages refused to dig new water-courses connecting their fields with the new distributing outlets in hopes that the orders would be changed. Unluckily the seasons of 1901-02 and 1902-03 were of the worst description, and complaints of crop failures on irrigated land were rife. Matters, however, gradually adjusted themselves, and by 1905 the new arrangements were in full swing. The progress in irrigation since then especially in Karnal and Kaithal has been very great:—

			KARNAL		PANIPAT.		KAITHAL	
			Irrigated.	Matured.	Irrigated.	Matured.	Irrigated.	Matured.
			Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1900-01	...	...	29,913	29,293	33,997	33,526	74,284	71,808
1901-02	...	...	29,880	27,582	43,134	37,438	80,900	73,265
1902-03	...	...	29,460	26,422	36,780	31,539	96,437	92,405
1903-04	...	...	28,884	26,855	38,828	36,454	91,957	89,893
1904-05	...	...	32,575	31,546	44,609	43,120	105,552	95,600
1905-06	...	...	51,224	50,633	57,962	55,563	115,276	102,844
1906-07	...	...	49,814	47,547	49,497	48,723	121,749	119,487
1907-08	...	...	43,004	35,448	47,488	43,222	97,106	85,828
1908-09	...	...	44,939	40,929	41,878	38,579	97,566	87,507

17. Extension of canal irrigation has been accompanied by a large extension of cultivation depending solely on the rainfall. Probably the Nardak villages would in any case have brought large areas under the plough. But the large population attracted by the security of irrigated cultivation has added to their permanent resources the more speculative produce of *barani* tillage. The following figures will serve to illustrate the growth of the cultivated area since 1879:—

							1879.	1889.	1909.
							Acres.	Acres.	Acres.
Panipat	...	...	...	...	...	...	158,512	...	180,521
Karnal	Karnal-Pargana	...	...	...	...	...	99,680	...	134,471
	Indri pargana	...	...	...	...	...	...	139,939	138,164
Thanesar	...	...	...	...	...	...	...	206,430	212,202
Kaithal	...	...	...	...	...	...	...	390,060	446,695

The changes in the relative security of the various parts of the district are shown by the following percentages of area irrigated to cultivation:—

							SETTLEMENT, 1879.		SETTLEMENT, 1889.		1909	
							Well.	Canal.	Well.	Canal.	Well.	Canal.
Panipat	...	...	...	...	...	...	34	46	...	...	30	33
Karnal-Pargana	...	...	...	...	...	...	24	25	...	...	16	32
Indri-Pargana	...	...	...	...	...	...	...	...	11	1	19	7
Thanesar	...	...	...	...	...	...	...	...	6	...	10	...
Kaithal	...	...	...	...	...	...	...	...	5	3	5	31

18. The improvement in the character of the crops is even more remarkable. The relative proportions of the different crops have undergone considerable change since settlement. The increase in the three valuable staples, wheat, cane and cotton, is evidence of the steadily growing wealth of the district, while the large area of fodder crops points to the increasing necessity of providing an artificial fodder-supply to supplement the loss of the old grazing grounds.

19. Twenty years ago the Grand Trunk road running north and south along the western edge of the Khadar was the only metalled road in the district, and the North-Western Railway only skirted the fringe of the Pipli (Thanesar) tahsil. The opening of the Delhi-Umballa-Kalka Railway in 1892 and the extension of the Southern Punjab Railway to Kaithal in 1899, have given considerable stimulus to trade. In the last 10 years cotton-ginning factories have sprung up at Samalka, Panipat and Karnal near the railway stations of the Delhi-Kalka Railway and there is a considerable movement in all kinds of staples at these centres, as well as at Gharounda and Shahabad. Cotton-ginning factories have also been built at Kaithal, and the extension of the Delhi-Kalka

line from Thanesar to Kaithal has increased the trade in that art of the district. The railway projected from Jind to Panipat should open up a very prosperous part of the country. Metalled roads connect Kaithal and Karnal, Pehowa and Thanesar, Thanesar and Ladwa, and Karnal and Indri. Tracks along the side of the Main Canal are of assistance to village traffic, and a good unmetalled road runs from Karnal to the river, and another from Pehowa to Guhla. Although some routes, notably in the Khadar, have been somewhat neglected by the District Board, the general communications of this large district have been improved out of all knowledge since the last settlements were made.

20. A comparison of the prices prevailing 20 and 30 years ago with those which the people now obtain for their produce formed the subject of a separate report on which orders were passed by the Settlement Commissioner in his letter No. 847, dated 9th March 1906.

The prices thus, sanctioned were used as the basis for estimating the value of the landlords' share of the produce where rent was taken in kind. The percentage of increase in prices since the last settlements was estimated for each tahsil to be as follows:—

				Panipat.	Karnal.	Thanesar.	Kaithal.
(1) Gazetted prices	...	...	...	24	24	...	25
(2) Assumed prices	...	...	...	24	31	15	16

The sanctioned estimate of prices, being based on the figures for the years preceding 1905 was distinctly moderate as compared with the high rates which have since prevailed.

The statement below shows annas per maund:—

		Wheat.	Barley.	Gram.	Sarson.	Maze.	Jowar.	Bajra.	Ziri.	Dhan.	Moth.	Cotton.	Gur.
SANCTIONED PRICES.	Panipat	31	18	21	43	20	20	24	24	20	...	64	42
	Karnal	31	18	21	43	20	20	24	24	20	28	64	42
	Thanesar	29	18	21	43	20	20	24	24	18	28	60	42
	Kaithal	{ *31 29 }	18	21	43	20	20	24	24	20	28	64	42
GAZETTED PRICES IN	1905-06	49	40	41	...	46	46	58	...	...	...	98½	80
	1906-07	44	29	34	...	35	30	40	...	...	...	98½	71
	1907-08	78	53	69	...	61	...	75	...	...	...	107	71
	1908-09	66	38	49	...	49	41	52	...	107	...	107	88

*31 in canal-irrigated tracts Nardak and bangar Kaithal.

To obtain the value of the actual credit the zamindar receives from his *bania*, a deduction must be allowed from the Gazette prices. But even with this deduction, it is obvious that agriculture is a profitable business in the

perennially irrigated tracts of the district. To illustrate the advance in the as 20 years it is calculated that a rupee of land revenue which in 1889 was produced by 3 bighas under wheat at the low estimated outturn of 2 maunds to the bigha, is now produced by one bigha.

On the other side of the account it must be remembered that the zamindar is rarely able to await the turn of the market. He usually disposes of the produce as soon as it is reaped to the bania middleman, and receives not cash but a book-credit against an old, but rarely diminishing debt. His information is inadequate, and the crop, the area of which he was induced by high prices to increase, will often fall in price and disappoint him. Nor must it be forgotten that his bullocks-his chief pride and anxiety-cost about twice as much as they did twenty years ago. The rise in wages affects him little, for the village menial whose services he commands are paid as before in grain. But the harvesting of the wheat crop demands extra labour, the growing expense of which is a serious burden. The cost of living has undoubtedly increased. But with all these drawbacks the advantages to the producer of the present high prices are so obvious that they are admitted even by the zamindar himself.

21. Sixty-eight per cent. of the cultivated area is in the hands of self cultivating peasant proprietors, the proportion being largest in Kaithal (78 per cent.) and smallest in Thanesar (57 per cent.) the figures for Karnal and Panipat being 65 per cent. Each. The proportion of land so held is now somewhat less than it was 20 years ago. The partition of the Skinner Estate in Panipat and Karnal was followed by the sale of practically all the villages owned by the family. In some cases the Jat and Arain tenants were strong enough to buy proprietary rights, in others the Skinners have been succeeded by bania members of the Mandal family or wealthy zamindars. The area of cultivated land held by rent-receiving landlords has been increased by grants of waste land to civil and military pensioner, while several estates formerly kept as grazing reserves by the Mandal and Kunjpura families have been opened to cultivation.

The area held in occupancy tenure has naturally undergone little alteration. But the tenure of land by tenants-at-will paying at revenue rates is bound to diminish under pressure of increasing population.

Tenants-at-will hold 7 per cent. of the cultivated area at cash rents and 16 per cent. On rents represented by various shares of the produce. The prevalence of any particular form of rent is largely a matter of custom. But a cash rental commends itself to non-resident landlords, such as the Mandal jagirdars and the wealthy mahajans of Panipat, or to incompetent owners such as the Syeds of the Karnal Khadar who though resident, are anxious to avoid the trouble of *batai* collections. In Kaithal, Thanesar and Indri the rent-receiving classes are chiefly village money-lenders, who are able to supervise the division of the produce themselves.

The Panipat city lands are held on the tenure known as "ijara," the tenant paying a fixed rent in maze for the kharif and in wheat for the rabi harvest.

22. The most interesting feature in the development of the district during the last 30 years has been the adaptation of rents to meet the increase and improvement of population, the expansion of cultivation the improvement and extension of canal irrigation, and the rise in the prices of agricultural produce. Thirty years ago Mr. Ibbetson wrote that true rent throughout by far the greater part of the tract settled by him was practically unknown. There was, however, a certain number of villages owned by non-cultivating proprietors

such as original Musalmans, the Mandals and the Skinners. On the rents taken in these villages, Mr. Ibbetson based his estimates on the renting value of land. His estimated rent rates for the five circles in the tracts settled by him compare thus with the present estimates:-

					Mr. Ibbetson's estimates.	Present normal rent.	REMARKS
					Rs. A. P.	Rs. A. P.	
Karnal Nardak	...	...	...	...	1 10 0	2 9 0	
Karnal Khadar*	...	...	...	...	3 10 0	4 15 0	
Karnal Bangar	...	...	...	...	4 2 0	4 2 0	
Panipat Khadar*	...	...	...	...	4 3 4	6 2 0	*Excluding towns of Panipat and Karnal.
Panipat Bangar	...	...	...	...	5 5 0	4 13 0	

In the case of rents taken in kind be considered that in the Nardak circle of Karnal the landlord's share of the produce on irrigated and manured land was 1/3rd and for other land 1/4th. In the rest of the tract, i.e. in the Panipat tahsil and the Bangar and Khadar circles of Karnal, the landlord took 1/3rd on irrigated land and 2/5ths on dry land. In the part of the district settled by Mr. Douie cash rent was even 20 years ago imperfectly developed. In the Kaithal tahsil the rent in kind taken by the landlord was 1/4th of the produce. In the Thanesar tahsil the rate varied from 1/2 in the Khadar and 2/5 ths in the Bangar and Bet Markanda to 1/4th in the inferior villages of the Southern Chachra. In Indri the common rate was 1/3rd.

The principal factor in the development of rent in the old irrigated tracts of the district has been the introduction of the owner's rate system. The intention of Government was that the owner's profits on canal- irrigated land which escaped assessment should be tapped by the owner's rate. But the owner on being called upon to pay the owner's rate promptly shifted the burden on to the shoulders of the tenants by adopting that from of rent in which the owner and the rant share between them the revenue and canal charges in the same proportions as they share the produce. The old rate of 1/3rd on irrigated land has now developed into an arrangement by which the landlord takes 1/3rd of the grain and pays 1/3rd of the revenue and cesses and of the owner's and occupier's rates, together with the cesses imposed on the owner's rate. The landlord also takes 1/3rd of the fodder if he has provided 1/3rd of the seed. The calculations made in the Panipat Assessment Report show that the 2/3rds of the land revenue and cesses, which is paid by the tenant, is approximately equal to the 1/3rd share of the canal dues which is borne by the landlord, and that the expense of providing 1/3rd of the seed is practically balanced by the receipt of 1/3rd of the fodder. The owner is therefore left with has old 1/3rd share of the produce intact, the owner's rate, which the owners was intended to pay, being borne by the tenant. The landlords of the Panipat Khadar who take rent in kind have not been slow to follow the example of their fellows, in the Bangar and it is common, but not universal, to find the tenant responsible for 2/3rds of the revenue and cesses. This increase in the rental in kind corresponds to the increase in cash rent which has been noted above. In the newly irrigated tracts of the district, i.e. the Karnal Nardak and the Bangar and Nardak circles of Kaithal, the owner continues to take 1/4th and apparently considers that the enhanced value of his 1/4th share of the canal-irrigated crops compared with his share of the old produce of unirrigated tillage, and the fact that the tenant is in all cases responsible for the owner's rate, is a sufficient increase in the rent he receives. In the less progressive tracts of Indri and Thanesar there has been practically no change in the rent

rate whether taken in cash or in kind, and in the Powadh circle of Kaithal there has actually been a decrease in the rental, which is due to the ravages of plague and the migration of the population to more favorable tracts.

Population.

23. The population of the district at the last 3 enumerations is shown below:—

Year.	Population (including Karnal and Panipat towns).	Increase per cent.	Density per square mile of cultivation.
1881 	819,753	...	561
1891 	860,256	5	525
1901 	881,475	3	507

The population (excluding Karnal and Panipat towns) averaged 485 per square mile of cultivation in 1901. The pressure on the soil is lightest in the Kaithal tahsil and highest in Panipat, but in that tahsil the density is less than in 1881. In Karnal the population has remained on the whole stationary. In the Khadar Bangar of Indri, where the climate is notoriously unhealthy, there has been a decline, but in the Karnal Nardak population has increased by 31 per cent. In Thanesar there has been a slight but general decrease.

24. The chief agricultural tribes of the district are Jats, Rajputs, Gujars, Rors, Kambohs, Syeds and Pathans, the two first being by far the most important.

Tribal distribution.

Jats are found in all parts of the district and are particularly numerous in the Kaithal tahsil. They are good cultivators, hard-working and thrifty and receive great assistance from their women. The Jats of Panipat and Kaithal tahsils are physically strong, and generally prosperous. Those of the Indri pargana and Thanesar tahsil, owing chiefly to climatic influences, are somewhat degenerate. Rajputs predominate in the Nardak of Karnal and Kaithal, and in the Bet Markanda circle of the Thanesar tahsil, The extension of canal irrigation in Karnal and Kaithal has converted them from a semi-pastoral to an agricultural life, and throughout the district they may be said to have made a marked advance in industry, thrift and prosperity, Gujars are numerous in the Khadar circle of Panipat and the Nardak and Bangar circles of the Kaithal tahsil. With few exceptions, their social position is somewhat inferior and depressed. They still pay but little attention to cultivation, and are addicted to cattle- lifting. The Rors are chiefly to be found in the Indri Nardak and the adjoining tract of Kaithal. Like the Jats, they obtain great assistance from their womenfolk in field work. They are energetic and hard-working, but rank below the Jats in the social scale. Of the minor tribes, Kambohs are the most important, and their remarkable industry does not seem to be affected by the enfeebling climate of the Khadar tracts, where their villages are situated. The Syeds, who have important settlements in various parts of the district, notably at Barsat and Pundri, are for the most part rent-receivers and are not usually successful cultivators. The Pathan Nawab of Kunjpura and the Mandal family of Karnal are the principal landowners of the Karnal tahsil, and have also acquired interests in other parts of the district. Arains and Malis are not numerous, but the cultivation of the Panipat Arains, and of the Malis in the Thanesar tahsil, is unequalled. Of the non-agricultural tribes, Brahmans and Baniyas are the chief landowners. The former are generally genuine agriculturists but seldom lose their character as *parohats*, or family priests, to the village community, Bania landowners are of all grades, from the important families of Panipat, Karnal and Ladwa to the ordinary village shop-keeper who has foreclosed his mortgage on a few acres.

25. Detailed statistics relating to transfers are given in the assessment reports. The following table shows the percentage of total area and cultivated area sold since settlement and under mortgage at the close of the new measurements:-

	SALES.				MORTGAGES			
	PER CENT.		PRICE PER ACRE.		PER CENT.		MORTGAGE MONEY PER ACRE.	
	Total.	Cultivated.	Total.	Cultivated.	Total.	Cultivated.	Total.	Cultivated.
			Rs.	Rs.			Rs.	Rs.
Karnal	9	9	31	55	5	7	29	40
Panipat	12	8	50	86	6	10	83	86
Thanesar	12	12	45	74	11	15	44	54
Kaithal	4	4	25	42	4	6	20	28
Total	7	8	37	63	6	8½	40	50
To agriculturists	4	5	37	62	2 ½	3 ½	41	50
To non- agriculturists	3	3	37	65	3 ½	5	39	50

The sale of the Skinner Estates in Panipat and purchases of Malis in Thanesar account for The large proportion sold in these tahsils. The Skinner Estates have passed to some extent into the hands of agriculturists, but have also been taken up very largely by the money-lending classes. Mortgages when not to the agriculturists are chiefly to Bantias and Brahmans. Details of transfers by tribes are given in the assessment reports. Jats and Rors of the Panipat and Karnal tahsils have added to their holdings, but have lost ground in Kaithal.

Prior to the passing of the land Alienation Act the proportion of Rajputs' holding alienated was comparatively large. They have, however, benefited considerably from that measure. The total mortgage debt amounts to about 48 lakhs. The unsecured debt was estimated at the time of the village inspections to amount to some 63 lakhs. The burden of unsecured debt which each proprietary holding bears in addition to the debt secured by the mortgages is Rs 52 in Panipat, Rs 64 in Karnal, Rs 72 in Kaithal and 28 in Thanesar. The average size of a holding in karnal and Kaithal is about 25 acres, of which about 12 acres are cultivated. Indebtedness is not therefore so great a matter in these two tahsils, where much land awaits development. In Panipat the average holding is only 12 acres, of which about 7 are cultivated. The superior fertility of Panipat land, however, enables the burden to be borne without too great difficulty. In Thanesar the holding are approximately of the same size as in Panipat. The small amount of debt for each holding shows equally the prosperity of some parts of the tahsil, and the unwillingness of money-lender to tie up his money in the less productive villages.

26. Twenty years ago a large part of the district was pre-eminently a grazing country. The canal has brought a change, and the interests of the Karnal farmers are now more agricultural then pastoral . But the number of cattle is still large , especially in the Nardak , and the provision of grazing is of considerable importance. Under the latest arrangements a few Government estates have been reserved exclusively for grazing, and cultivation is prohibited. But

these reserve benefit only the villages in their neighbourhood. With the spread of cultivation there is a danger of grazing grounds disappearing altogether. It is doubtless true that the canal, which is largely responsible for the diminution of the waste, is itself an insurance against dearth of grazing, inasmuch as more grass is found in canal-irrigated fields, and fodder crops can be raised with the aid of canal water. But stall feeding is never the same as grazing, and, however much to the advantage of the individual cultivator it may be to break up the waste, the village community as a whole always regrets the disappearance of its grazing grounds. Accordingly in almost every village the owners have agreed to reserve a certain area as charand. Mr. Douie in granting proprietary rights to lessees of Government lands at last settlement set apart an area for charand which was not to be broken up under penalty of a fine. It is, of course, impossible to prevent a whole village from breaking up its jungle, but the arrangements now made furnish the community as a whole with a means of restraining the selfishness of individuals. It is to be hoped that any village which has recourse to the provisions of the Land Revenue Act in order to preserve their jungle will receive all assistance from the authorities in this important matter.

27. A certain proportion of animals used for draught and for the plough
Cattle. are bred locally, but the best are always importations from the Rohtak and Hissar districts. A distinct type formally existed in the Bangar and Nardak tracts : but owing to the spread of canal irrigation and the necessity of importation to supply the increased demand for plough cattle, the distinctive breed has disappeared . Young stock are exported in large numbers by Banjaras and other traders to the United Provinces. The Nardak and the Naili Villages maintain large number of buffaloes. The animals are usually of great size, but in type inferior to the best buffalos of the Kundi breed to be found in the Hissar and Rohtak districts. They are exported in large numbers to the central districts of the Punjab.

28. The value of the ghi as calculated in the assessment reports, for the
Profits from live stock. whole district, amounts to over 4½ lakhs per annum. Besides this, the profits from hides and skins and bones can be gathered to some extent from the following statement which shows the yearly exports of the products by rail :—

							Hides and skins (in maunds).	Bones (in maunds)
Panipat	...	...	...	...	...	...	2,304	8,557
Karnal	...	...	...	...	...	...	926	3,270
Thanesar	...	...	...	...	...	...	800	2,958
Kaithal	...	...	...	...	...	...	2,188	10,153

The profits from sale of young stock and buffaloes are considerable, but impossible to calculate. Profits from the hides and skin chiefly the menials whose prerequisites they are. But if one may judge from complaints received, the owners in large villages are displaying a tendency to annex this source of profit for themselves.

29. With the exception of the Powadh circle of Kaithal tahsil and
Miscellaneous income. certain scattered villages, the people do not generally take up military service. Besides some income from the sale of firewood, there is little income from the grazing leases in Kaithal, the Nardak circles of Karnal and the Chachra, circle of Thanesar, where it was taken into account in assessment.

CHAPTER IV.— THE PRESENT SETTLEMENT.

30. The forecast of the settlement was submitted to Government in June 1904. The Financial Commissioner anticipated an increase of some 2½ to 3 lakhs of rupees in the fixed land revenue assessment. It was estimated that the settlement would last for 5 years cost some 7½ lakhs. The Government of India sanctioned the revision of the record and the reassessment of the district in their letter No. 1048-257-2, dated 27th July 1904, and the settlement started on the 1st of October 1904. As usual, the work consisted of two parts:—

- (a) The preparation of a new record —of-rights.
- (b) Reassessment.

It is now considered unnecessary to delay an assessment report until the new records are complete. But as a matter of fact the final assessments in all tahsils were based on statistics taken from the revised record, and it will therefore be convenient to treat this part of the subject first.

A. — REVISION OF THE RECORDS.

31. At Mr. Ibbetson's settlement the village maps of the Panipat Tahsil and pargana Karnal were prepared by means of the plane —table. The unit of measurement employed was the *gatha* of 99 inches, and the area were recorded in the *pakka* or Shahjehani bigha, which is three times the size of the ordinary *kacha* bigha used by the zamindar in most parts of the district.* The survey was characterized by extreme care and accuracy, but the minute measurement of every boundary and the consequent multiplication of field numbers was adversely criticized. Mr. Douie's measurement in the Indri pargana and the Kaithal and Thanesar Tahsils were made on the square-system at present in use, the unit of measurement being the *Karm* of 57 inches, and the areas being recorded in *Kacha* bighas. Colonel Wace's definition of a field as "a parcel of land lying in one spot in the occupation of one or of several persons jointly and held under one title" was strictly adhered to. With a view of introducing uniformity in the records of the district, colonel Wace suggested that Mr. Ibbetson's maps should be revised, and the number of fields reduced in accordance with the definition followed in the rest of the district, and that area should be entered in *kacha* bighas. The suggestion was carried out in 1884. The number of fields in Mr. Ibbetson's tract was reduced by system of clubbing (*ishtimal*), and a new record was prepared showing the area in *kacha* bighas. The result was far from satisfactory. The fields as altered were often exceedingly large and most irregular in shape, and in revising the maps and records of the Panipat Tahsil the staff were ordered to fall back on Mr. Ibbetson's original papers and neglect this intermediate revision.

32. Having regard to the fact that in a large portion of the district there had been little extension of cultivation and the fields would be easily traced on the old map, it was decided to dispense with re-measurement where possible, and to confine operations to the correction of the existing map. Accordingly in the Panipat and Thanesar Tahsils, in the Indri pargana, and the Gulha Sub-tahsil, a tracing was made of the old maps and corrected in the field. In the south of Kaithal and Karnal Nardak, the face of the country had been changed by canal irrigation, and re-measurement on the square system was necessary. It was also decided to remeasure the rest of Karnal pargana

* See footnote page 25, Panipat Assessment Report.

on the square system with the *Kacha* bigha as the unit of area in order to secure uniformity with the rest of the Karnal Tahsil. In the Panipat Tahsil the old *Shahjehani* bigha was retained in revising the measurements, but as the area in the adjoining tahsil of Delhi District have been recorded in *Kacha* bighas, the present settlement record for Panipat shows areas in both *Pakka* and *Kacha* bighas, and the unit of area for the whole district it will henceforth be the *kacha* bigha. Survey work of both kinds was in full swing by the end of 1904.

33. The resettlement of all the districts in the Delhi Division fell due about the same time. Karnal being Killabandi and other experiments. the first in which re-measurement on any considerable scale was found necessary, it became the field for several experiments, the expenditure of time and money on which has all been shown against this settlement, while most of the benefit has accrued to the more fortunate settlements of Rohtak, Hissar and Delhi. The first of these experiments was an attempt to introduce from the Chenab Canal into the newly irrigated canal villages of Kaithal and the Karnal Nardak, the *killabandi* system, under which the survey square—the unit of grant—is subdivided into 25 squares or *Killas*. The square in the *kacha* bigha notation does not lend itself to subdivision into acre squares and it was necessary to substitute rectangle of 1 acre each, equivalent to $4\frac{4}{5}$ *Kacha* bighas (96 biswas). In order that each rectangle might consist of an even number of bighas, and also to introduce a measure of area which would be an even fraction of an acre, it was considered advisable that the bigha throughout the district should consist of 24 biswas instead of twenty. The result of this decision was to retard the progress of work successfully begun all over the district, and especially in the Kaithal and Karnal Tahsils. (A short description of the *killabandi* system will be found in paragraph 53 of Mr. Abbott's settlement report of the Jhang District.)

Of the merits of the *killabandi* as a means for distributing waste lands about to receive irrigation there can be no doubt; and its adoption in the proprietary lands of the Gujranwala and Jhang Districts shows that it may be usefully extended. But, whatever the success attained elsewhere, it was soon evident that the self-cultivating owners of the Eastern Punjab were not disposed to accept a system which partitioned their best fields and obliterated the boundaries of their ancestral holdings, offering them only in return the remote advantage of more accurate canal assessment and possible immunity from re-measurement. The only success achieved was in estates owned by single proprietors, who recognized the advantage in having field of a uniform size for calculation of their rental. Elsewhere the system was definitely abandoned in September 1905.

Measurements in the bighas of 24 biswas were, however, continued till March 1906, when it was realized that the people preferred their old measure of area. Both these experiments caused considerable delay in the work of remeasurement.

The correction of maps was also retarded. Where maps are as accurate and boundaries have changed so little as in parts of Karnal, it is now recognised that there is no justification for chaining the sides of every field as was done in this settlement. Proposals to dispense with this chaining were submitted unofficially in April 1905, but it was not until March 1907, when the work was nearly completed that sanction was given to the present procedure (see appendix XXI to the settlement Manual).

34. The survey was completed by December 1907, and the district is now in possession of the following Village, Tahsil and District maps prepared. village maps:—

- (1) The original Government map (Shajra part sirkar) filed in the District Record office. In the case of remeasurement on the

square system, this map consists of the mapping sheets supplied by the Director of land Records, and contains the original work of the Patwaris in the field checked by the supervising staff. Where correction of the old map was considered sufficient the new map is a pencil tracing on the usual mapping sheets of the village map prepared at last settlement, brought up to the date and corrected in ink by the Patwaris under supervision in the field. It is therefore to all intents and purposes original work. The credit of this device is due to Rai Sahib Hira Singh, who was posted to Karnal as Extra Assistant Settlement Officer, in June 1905.

It should be noted that the maps of the Panipat Tahsil were prepared on a different principle, The maps of the last settlement were too minute to be traced on ordinary mapping sheets. A tracing on ordinary tracing paper was given to the Patwaris who corrected the field boundaries in ink on the spot. The result was then traced on to the ordinary mapping sheets. The maps of a few villages in all tahsils dating from before June 1905 were also prepared on this method. In the case of the Panipat Tahsil and these other villages the original tracing has been filed with the fair copy.

- (2) The Patwari's copy (*Shajra part Patwar*) prepared on longcloth and kept by the Patwaris.
- (3) The rough cloth Girdawari map (*Shajra part Girdawari*) used by the Patwari in his daily work.

In the case of canal villages, copies of the maps on cloth have been supplied to the Canal Department, who paid the cost of their preparation.

The village maps present no special features having been prepared according to the rules in the mensuration manual. Colonel Wace's definition of a field been adhered to except where the result would give a field of an inordinately large size. For facility of Girdawari work and canal assessment the size of a canal-irrigated field has been limited to one acre.

An index map on the scale of 4 inches to one mile has been placed with the Government copy of the village map. A map has been made for each tahsil on the scale of 2 miles to the inch by piecing together the index maps, and a district map (4 miles to the inch) has also been prepared.

35. The amount of partition work in this settlement has been very considerable. It was obvious that the introduction of canal irrigation into villages with large unpartitioned area would give rise to a great number of such cases. The majority of partitions decided in the south of the Kaithal and the Nardak circle of Karnal were of this nature. But it was also found elsewhere, especially in Panipat, that the people had for years been acting upon partitions made privately, which had hitherto found no place in our records. It was considered advisable to incorporate these private partitions in the present record, and this decision imposed a large amount of tedious, though not very difficult work on the settlement staff. Some 20,000 partitions of all kinds were dealt with during the period of settlement. Of these some 1,600 necessitated a judicial decision, the remainder being dealt with by the ordinary mutation procedure. The brunt of the work fell on Rai Sahib Hira Singh, Extra Assistant Settlement Officer, who is entitled to credit for the zeal with which he supervised this important branch of settlement.

36. In order to bring to light as many unattested mutation as possible and facilitate the work of settlement, a detailed jamabandi was prepared for every village in 1904 by the ordinary revenue staff of the district supplemented by a small extra establishment. The number of mutations, the attestation of

which was necessary in order to to complete the record, give some indication of the task which remained for the settlement staff.

Five years average before September 1904—18,412

1904-05	...	...	22,536
1905-06	...	...	35,576
1906-07	...	...	50,696
1907-08	...	...	69,409
1908-09	...	...	18,346
			<hr/>
Total	...	...	196,563
			Average 39,313

The main features of this part of work were the removal of the entries of ghair-hazir (absentees) and ghair-qabiz (persons out of possession) from the record, the care taken to record the conditions as to the share of the Shamilat in transactions of sale and mortgage and the number of partitions.

Under the Financial Commissioner's order the entries of ghair-hazir and ghair-qabiz have been removed from the proprietary column after a strict enquiry by the extra Assistant Settlement Officer as to the circumstances of each case.

It was found that the mutation orders regarding sale and mortgage often omitted to state whether the transactions included a share of Shamilat or not. In such cases the parties were required to produce documentary evidence of their claims, or in the case of oral transactions to come to some agreement, otherwise transfer of the share in the Shamilat was omitted from the records.

B.—ASSESSMENT.

37. The chief problem to be dealt with in the reassessment of the district were—
Progress of assessment work .

- (1) The enhancement to be taken on account of extended cultivation and irrigation, the rise in rents and prices, and the generally increased prosperity of the people.
- (2) The assessment of canal irrigated land.
- (3) The treatment of the tracts subject to inundation from hill torrents.

Of these the second presented the chief difficulty. Discussion as to the principles on which the assessment of lands irrigated by the Western Jumna Canal was to be regulated retarded the announcement of the new demand. But in view of the important issues involved, a certain amount of delay was inevitable.

It was decided that the first assessment report should deal with the Karnal tahsil, the conditions of which would give rise to discussion of all the points on which orders were to be obtained. It was also determined to amalgamate the adjoining circles of the two parganas composing the tahsil. A report on these lines was submitted in June 1907 (before the new measurements were complete) and was review by the Settlement Commissioner in November of that year. The Financial Commissioner, however, disapproved of the amalgamation of the two parganas and wished for more accurate statistics. A Supplementary Report was therefore submitted in August 1908, on which final orders were passed by Government in February 1909.

Reports for the other tahsils were submitted and orders received on the following dates :—

		<i>Submitted to Settlement Commissioner.</i>	<i>Government orders received.</i>
Panipat	...	June 1908.	February 1909.
Thanesar	...	August 1908.	May 1909.
Kaithal	...	April 1909.	September 1909.

The village assessments were all announced by the end of September 1909, and the new demand for the whole district was collected with the kharif instalment for that year.

38. According to the common practice in the Punjab, each Tahsil was divided into assessment circles roughly corresponding to the physical conformation of the country. The special report as to assessment circles was submitted in September 1905, and the Settlement Commissioner sanctioned the following sub-divisions of each tahsil for the purposes of assessment.

Panipat.	Karnal.	Thanesar.	Kaithal.
1. Khadar. 2. Bangar. 3. ... 4. ... 5. ... 6. ...	Khadar. Bangar Karnal. Bangar Indri. Nardak.	Khadar. Bangar. Bet Markanda. N.Chachra. S.Chachra. ...	Nardak. Bangar Kaithal. Bangar Pehowa. Naili. Indarwar. Powadh.

It is not necessary to detail here the extent to which these sub-divisions differ from those made at previous Settlements. The changes were few and were described in the special report referred to. As mentioned in the preceding paragraph, the Financial Commissioner subsequently ordered the old assessment circles, Khadar, Bangar and Nardak, to be retained for the two parganas of the Karnal tahsil, Karnal and Indri, instead of one Khadar and one Nardak circle for the tahsil. The town lands of Panipat and Karnal were assessed separately. It will be convenient if the statistics for these two urban tracts are maintained separately in future.

39. Each assessment circle was further subdivided according to the qualities of different soils and their facilities for irrigation. The question of the soils was dealt with in the special report on assessment circles referred to above. The following soil classification was sanctioned by the Settlement Commissioner :—

Irrigated	{	1.	Chahi	...	Irrigated by wells.
		2.	Nahri	...	Irrigated by canals.
		3.	Abi	...	Irrigated from tanks.
Unirrigated	{	4.	Sailab		
		5.	Barani		
		6.	Bhur		
		7.	Tibbi		
		8.	Dahr		

Chahi irrigation was further subdivided into irrigation from bricked and from unbricked wells, and in the case of nahri, distinction was made between irrigation by lift and by flow. Soil was considered chahi or nahri which had been actually irrigated in two or more harvests during the four years preceding Settlement and for which permanent means of irrigation still existed.

Irrigation from tanks is rare and entails great labour. It is, however, useful in assisting to ripen the rice crops if the late rains are unfavourable. Numerous ponds and jhils which have survived the drainage system in the Karnal and Panipat tahsils are let to Jhinwars for sanghara (water nut) cultivation and bring in considerable rents to their owners. The best description of the unirrigated soils of the district is given in the paragraph 4 of Mr. Ibbetson's Karnal Settlement report. He says : "There is no real clay, the soil varying from stiff loam to pure sand. The stiffest loam is found in hollows and drainage lines, where the action of the water has washed out the sandy particles. It is locally known as *Dakar* and is differentiated by the clods not crumbling in the hands. The sandiest soil is known as *bhur*. It is found in the riverain tract, chiefly in patches lying in the beds of old river channels and also occasionally on the watershed, where it would seem to have been collected by the wind. It includes all soils that do not form clods under the ploughs. Intermediate soils are classed as *rausli* and vary in quality between the two extremes."

In assessment no difference was made between *dakar* and *rausli*, but both *Bhur* and *Dahr* (a harder kind of *dakar* yielding crops of coarse rice, and failing that nothing) were taken into consideration in assessing the villages where these soils were found. The term *tibbi* was confined to the cultivated sand hills of the Powadh circle.

40 The standard of assessment has been fixed by Government as half the rental or net assets calculated on the basis of rents either in cash or produce paid by tenants-at-will to their landlord.

Rents both in cash and in kind are found in all parts of the Karnal District, and in most circles it was possible to ascertain the standard of assessment by reference to both guides.

41. A basis for the cash rent estimate was obtained from the statements of rents drawn up after the entries for each holding had been carefully attested during the preparation of the records. These rents were analyzed under the following heads :—

Estimate of Half-Net-Assets standard by cash rental.

- (a) Rents paid by mortgagors to mortgagees.
- (b) Rents paid by tenants –at –will to mortgagees
- (c) Rents paid by tenants –at –will to owners.

Rents under head (a) were neglected as being complicated by questions of interests due on the mortgage and by other relations between the original owner and the mortgagee. My own proposals were based entirely on rents coming under head (c), which I considered gave the truest idea of the real letting value of the land free from all suspicion of rackrenting for immediate profit. This list was carefully scrutinized, and I eliminated all rents believed to be falsely stated, rents specially low on account of relationship or services rendered by the tenants, or for land brought under cultivation for the first time as well as the high rents of fruit gardens, or land leased for special garden crops, and all zabti rents. The result was considered the normal rent. As owners generally keep the best land for their own cultivation, it could be safely assumed that land cultivated by the owners themselves could be rented as these normal rents. Accordingly, to ascertain the total rental of a circle, the normal rents were applied to the recorded cultivated area, an allowance, which usually amounted to 15 per cent. on unirrigated, to 10 per cent. on irrigated land, was made for land unlet owing to fallows and uncollected rents.

The Financial Commissioner, however, considered that there was no justification for omitting the rent on the land let by mortgagees to tenants -at-will, because these rents were voluntarily paid by the tenants, and really represented his estimate of the letting value of the land. Such rents were usually higher than those paid to owners, and their omission led to a result below the truth. The Financial Commissioner therefore increased the pitch of my normal rents by including in them rents paid by tenants-at-will to mortgagees, and his action was approved by Government.

The Financial Commissioner was also of the opinion that a reduction of 10 per cent. should be allowed from these increased normal rents to cover the cost of collection and managements and to provide a margin of safety. To this course, however, Government did not agree. I had applied my rent rates to the recorded area of each soil. The Financial Commissioner, however, applied his higher rates to an average irrigated area of well and canal land which was considerably lower than the recorded area.

The assessment standard by cash rents therefore amounts to the result of applying $\frac{1}{2}$ the normal cash rent as enhanced by the Financial Commissioner (less the deduction for fallows and uncollected rents) to an average irrigated area.

42. The calculation of assessment standard to be deduced from rents in kind is more complicated. The first factor to be determined is the area of crops harvested in a circle. From this area must be deducted crops grown solely for fodder and the outturn of the remainder must be estimated. Applying to this result the sanctioned commutation values (vide Settlement Commissioner's letter No. 847, dated 9th March 1906), the total value of the crops is arrived at. From this amount must be deducted the value of the customary payments to village menials which are made before the landlord can take his share to the produce, one half of which is the Government standard of assessment.

Throughout the District the area of crops was taken to be the average area matured during the period 1900-05.
(a) The area of crops. This cycle may be considered as generally representing the ordinary agricultural conditions of the district. One excellent season (1900-01) was balanced by one extremely bad (1901-02), the harvest of one year (1902-03) was indifferent and two were very fair (1903-05). The choice of these years was, if anything advantageous to the zamindars, especially in the Nardak circles of Karnal and Kaithal, where irrigation expanded considerably after 1905. To enable allowance to be made for this improvement, statistics were also given for the year following 1905 up to the date of submitting the report.

The crops statistics recorded by the Patwaris from year to year were found to be substantially accurate, and the results for each village generally tallied with its common reputation for fertility or the reverse.

Crops grown solely for fodder such as *Chari, Gowara and Methi* were excluded from calculation. No deduction was made for crops cut green, but on the other hand nothing was added to the estimate on account of the share of straw which the owner usually, but not invariably, takes along with his share of grain.*

The estimates for this part of the calculation were based on the outturns adopted at the last settlement, those used in recent settlements of adjoining tracts, the results of crop experiment, and the Settlement Officer's enquiries during village inspections. Since the settlement of Panipat and the Karnal pargana the iron sugar-crushing mill had universally adopted, and it

* The Bet Markanda circle forms an exception to this statement. There Mr. Kennaway took into account the landlords' share of the valuable wheat straw.

was therefore possible to assume a higher outturn for *gur* than was possible 30 years ago. The decrease of heavy canal irrigation and of jungle floods justified a decrease in the assumed outturn of rice, the cultivation of which receives less attention than formerly. Crop experiments were conducted over a considerable area, and were of assistance in checking assumptions, but in most cases the yields assumed were those employed for similar calculations at last settlement.

The outturns actually adopted in this settlement for the principal crops are given below in maunds to the acre :—

Statement showing the yields in maunds of principal crops.

		Wheat	Gram.	Ziri.	Maize.	Jowar.	Cotton.	Cane
Bangar	...	{ 14½	12½	13	13	7	7	26
		8	8	9	7	5	4	15
Khadar	...	{ 13½	11½	12	13	7	7½	27½
		7	8	9	7	4	4	15
Khadir Indri and Karnal		{ 11½	11	12	12½	7	6	7
		5	6	7½	7	2½	6	7
Bangar Indri	...	{ 13½	11	9	15	7	}	6
		5	6	7½	7	4		
Bangar Karnal	...	{ 13½	11	13½	15	7	}	6
		5	6	7½	8	4		
Nardak Indri and Karnal		{ 12½	11	12	14½	7	}	6
		5	6	7½	8	3		
Bet Markanda	...	{ 12	10	10	12½	3½	}	6-4
		7	6	7½	7½	2⅓		
Khadar	...	{ 12	10	10	12½	3½	}	6-4
		6	6	7½	7	2½		
Bangar	...	{ 12½	10	10	15	3½	}	6-8
		6	7	7½	8	2½		
N. Chachra	...	{ 12	8	10	14	...	}	6-4
		6	7	7½	7	2½		
S. Chachra	...	{ 11	7	10	12½	4½	}	5-12
		5	5	7½	7	3		
Nardak	...	{ 12	12	12	12½	6	7	24
		5	6	6	10	4	3½	...
Bangar	...	{ 12	12	12	12½	6	7	24
		5	6	...	10	4	3½	...
B.Pehowa	...	{ 12	12	12	12½	6	6	18
		5	6	5	10	4	3	18
Naili	...	{ 11	12	12½	12½	6	6	}
		6½	7	8	10	4	3	
Andarwar	...	{ 13	}	10	12½	6	7	...
		5		...	10	4	3½	...
Powadh	...	{ 12	6	10	15	5	7½	}
		5	6	6	12½	4	3¾	

Mr. Douie, however, when reviewing the Karnal Report as Settlement Commissioner, doubted whether the estimates of unirrigated jowar and gram, and perhaps wheat, were not too low. He therefore added 20 per cent. to the half-net-assets estimate for barani crops in the Khadar and Indri Bangar, 15 percent. in the Nardak, and 10 per cent. in the Karnal Bangar. In the Government orders passed on the Thanesar Tahsil Assessment Report the rates of out-turn were severely criticized as unduly favourable to the zamindar.

The extent to which the sanctioned commutation values fall below the high level of prices now prevailing has already been commented on in paragraph 20.

(d) Valuation of produce.

For certain crops cash rates per acre were taken, to ½ of which Gov-
ernment is entitled :—

Cotton.	Sugarcane.	Vegetables.	Chilles and spices.	Tobacco.	Poppy.	Indigo.	Sanni and hemp.
Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs.	Rs. A. P.	Rs. A. P.	Rs.	Rs.
6 4 0	6 12 0	4 8 0	16	5 4 0	6 12 0	7	7
7 4 0	9 10 0	7 0 0	...	16 0 0	...	...	...

No valuation of the straw was made. It was considered that the whole might
be set off against the large expense incurred in the feed of bullocks.

The principal menials paid from the common heap are the Chamar,
who provides the leather work for the
(e) Deductions for village menials. agriculturists, the Badhi and Lohar,
who furnish respectively the wood and iron work, and in the Khadir tracts
the potter, who makes the earthen pots required for the Persian wheel.
The value of the sheaves taken by the reaper as his daily wage has also to be
allowed for, as well as doles by way of charity to Brahmins and Fakirs.
In the Karnal tahsil 12 per cent. was allowed to cover the cost of these
customary payments, stress being laid on the dearth of labour and character
of the Rajput population. In Panipat and Kaithal only 10 per cent. was
deducted. Mr. Kennaway in Thanesar allowed as much as 12 to 14 per cent.,
but his proposals were considered to err in the director of leniency.

The owner's share of the produce remaining after the deduction for
fodder crops and menials'dues, varies
(f) Owner's share of the produce. throughout the district. One-half or
two-fifths is usual in the rich wheat lands of the Bet Markanda and Thanesar
Khadar. The one-third share is almost universal in the Panipat Khadar and the
Bangar circles of Karnal and Panipat, one-half and two-fifths being taken only
when the landlords have helped to defray some of the minor expenses of
cultivation or have worked with the tenant in the field. The one-fourth share
is the rule in the Nardak tract and generally throughout the Kaithal tahsil.
On canal-irrigated land in Panipat and also in the Panipat Khadar the owner
taking one-third of the produce has also to pay one-third of the land revenue
cesses and canal rates, and if he takes one-third of the fodder has to provide a
similar share of the seed. For sugarcane the tenant usually pays at a rate
lower than that prevailing in the village for other crops.

43. In Panipat town and in some villages of the Panipat Khadar and
Karnal pargana, the owner takes a rent
Rents in gain. in grain usually fixed at so many
maunds of maize and wheat in the proportion of one –third maize and two-
thirds wheat. This tenure is known as "Ijara". To ascertain the theoretical
half net-assets standard in this case all that is necessary is to calculate the
value of the total amount of grain which is paid as rent according to the sanc-
tioned communication prices.

44. The half –net –assets standards calculated by cash and kind rents respec-
tively were then compared and checked
Check on correctness of the half net-assets esti- with the result given by enhancing the
mate. existing demand in proportion to the
percentage of increase in the cultivated area and the rise in prices. A fur-
the check was afforded by the statistics of the price obtained for land at
various periods since last settlement. The price per rupee of land revenue
assessed on the land sold, or, in other words the number of years' purchase
which the buyer of the land was prepared to pay, was worked out for quinquennial
periods. It was assumed that the profit which an intending purchaser of land

expected was not less than 4 per cent., and that he did not wish to pay more than 25 times the annual profit for the land. The proportion by which the number of years' purchase exceeded 50 indicated the extent to which the existing revenue might be enhanced.

45. A suitable assessment for the circle, and rates for each class of soil were then proposed, and at the same time to assist the distribution of revenue over villages crop rates were devised on the basis of the rates given by the produce estimate.

46. The principles which should govern the assessment of canal-irrigated land were enunciated by Sir James Wilson as Financial Commissioner in his Review of the Gohana Tahsil Assessment Report, and his conclusions were accepted by the Punjab Government. Sir James Wilson's proposals practically amount to continuing the policy followed since 1878 in the districts irrigated by the Western Jumna Canal, under which the fixed land revenue represents the assessment the land can pay when unirrigated, and whatever is assessable on irrigation is taken in the form of a fluctuating rate on actual irrigation. The difference between the rent rates of irrigated and unirrigated land clearly indicated what was the increase of net profits in the shape of the rent to a land-owner from the use of canal water. Enhancements of the total charges for the use of canal water were made to amount as nearly as possible to half this increase of net profits. But at the same time it was ordered that rate of the fixed assessment on canal land should exceed that for unirrigated land. Because even though the excess profits of canal irrigation were assessed by a fluctuating canal advantage rate this did not put on terms of equality land which can never be irrigated and land which is commanded by the canal and can be irrigated when the owner wishes. A higher fixed land revenue on land irrigated by the canal allows for the greater security of its crop in bad season; for in a year of drought it will have at least some crop and some fodder and high prices will be obtained for its surplus produce. Beyond the differentiation made at last settlement there were practically no guides as to the extent to which the rate of the fixed nahri assessment should exceed that on unirrigated soil. Some indication, however, of the amount to be set apart as a fluctuating demand was afforded by the average collections of owner's rate, which represent the fluctuating demand imposed on the owners and now transferred by them to the tenants.

47. The Government of India, however, disapproved of the proposals take a portion of land revenue assessment in the form of an addition to the canal water rate, and consequently no enhancement has been made in the total rates paid for the canal irrigation. But in their letter No. 256, dated 19th November 1909, the Punjab Government ordered that the Nahri rate sanctioned should not be applied to any average irrigated area, but to the area recorded as Nahri in the record-of-rights. The result of this order was to increase the sanctioned assessment of the district by Rs. 15,920. Thus the only wet assessment imposed on Nahri land as a result of settlement operations was the portion of the fixed demand representing the difference in the circle rates for nahri and barani respectively.

48. Before proceeding to discuss the detailed assessment of each tahsil it will be as well to consider the total results of the reassessment. The demand actually announced is compared below with the demand of the last year of the expiring settlement and the demand sanctioned by the Government for each tahsil together with the additional canal assessment necessitated by the order conveyed in the Punjab Government letter No. 256, dated 19th November

1909. Of this demand, Rs 67,980 must be considered a fixed assessment on canal land, that is to say the difference in circle rates for Nahri and Barani respectively.

1	2	3	4	5	6	7
Tahsil.	Circle.	Old fixed demand.	Sanctioned new fixed demand.	Final new demand.	Increase per cent. of column 5 on column 3.	REMARKS.
PANIPAT.	Panipat town	Rs. 25,605	Rs. 32,000	Rs. 32,805	28	
	Khadar	1,20,034	1,50,000	1,49,974	25	
	Bangar	1,62,912	1,94,800	1,96,000	20	
	Total tahsil ...	3,08,551	3,76,800	3,78,779	23	
KARNAL.	Khadar Karnal	48,752	58,000	59,005	21	
	Karnal town	8,093	13,000	13,000	51	
	Bangar Karnal villages ...	32,747	41,500	42,600	30	
	Nardak Karnal	33,662	52,000	53,212	58	
	Khadar Indri	80,915	85,000	88,046	8	
	Bangar Indri	49,875	54,000	55,315	11	
	Nardak Indri	23,901	27,000	27,555	15	
	Total tahsil ...	2,77,945	3,30,500	3,38,733	22	
THANESAR.	Khadar	27,400	31,142	31,035	13	
	Bangar	41,068	42,746	42,674	4	
	Bet Markanda	94,464	1,20,471	1,19,960	27	
	North Chachra	51,070	65,112	64,994	27	
	South Chachra	26,492	35,251	35,145	33	
	Total tahsil ...	2,40,494	2,94,722	2,93,808	22	
KAITHAL.	Nardak	53,756	1,14,400	1,14,225	112	
	Bangar Kaithal	69,075	1,16,220	1,16,735	69	
	Banger Pehowa	12,067	15,000	15,480	28	
	Naili	61,465	61,500	62,675	2	
	Andarwar	16,234	16,000	16,630	2	
	Powadh	28,368	31,000	32,070	13	
	Total tahsil ...	2,40,965	3,54,120	3,57,815	49	
	TOTAL DISTRICT ...	10,67,955	13,56,142	13,69,135	28	

In villages where the increase was large, the whole demand was not imposed immediately. Part of the assessment was deferred for 5 and in some cases for 10 years. Details of deferred assessments will be found in paragraph 83.

CHAPTER V.—ASSESSMENT BY TAHSILS.

(a) Panipat.

49. The whole tahsil is wonderfully secure, for in addition to its resources in the way of irrigation it enjoys an average rainfall of 23 inches, the annual fall having been below this figure in only 7 of the 22 year ending with 1906-07. In such years the wells are worked to their utmost capacity in the Khadar, and all the canal water that can be got is utilized in the Bangar. Few suspensions and no remissions of land revenue were necessary on account of drought during the term of the expiring settlement.

50. Cultivation increased by 13 per cent. in the Khadar and 15 per cent. in the Bangar, since last settlement. In the former circle the number of the wells in use grew from 2,416 to 2,770, with a corresponding rise of 15 per cent. in the area irrigated from them, which, in view of the care taken to manure and practically to make the soil of the Khadar well land, is a substantial gain. The land that has been brought under the plough in the Bangar is of good quality, but there has been no increase of irrigation in the circle. The Panipat Bangar is one of the favoured tracts that could afford to endure a reduction, but, while gaining by the stoppage of water-logging, the tract now receives less canal water than it did. The small area irrigated from wells in the Bangar at last settlement has become smaller still, which shows that the restriction of canal water has not yet been felt to such an extent as to induce the cultivators to bring old wells into use. Numbers of such wells might yet be brought into work, though not without difficulty and expense. But there can be no doubt that these would be increased if there was a real want of water for irrigation.

51. The population is very dense, being estimated at 717 per square mile of cultivation in the Khadar and 578 in the Bangar. But it is no denser than at settlement, and the average size of proprietary holding (7.4 cultivated acres for the tahsil) is not minutely small. The Bangar Circle has suffered severely from plague since the last Census, and its population is now less than at last settlement. The Khadar has suffered little. The figures for cattle are satisfactory. The decrease in ploughs in the Bangar is curious, considering that cultivation has increased in the circle.

52. The selling price of land is high in the Khadar, especially in Panipat town. In terms of land-revenue the price has risen from 47 fold to 84 fold, and the mortgage money from 40 to 47 fold in Panipat town land, while in the rest of Khadar circle the sale price has risen from 33 to 42 fold, though the mortgage consideration has remained stationary at about 50 times the land revenue or has been decreased in the Bangar the sale money was from 27 to 50 fold in 1895-1900, but has since dropped to 22 fold. The mortgage money is fifty times the land revenue in the last 5 years compared with 43 in the first. In the matter of mortgages, the money-lenders, among whom Brahmans Bohras from Rajputana are notorious, are the only holders, and they hold land in mortgage from every agricultural tribe. In sales the agricultural community have held their own, and the sale of the Skinner estates has added somewhat to the possessions of the old proprietors, though more to those of money lending-classes.

53. The chief features of the history of the cropping of the tahsil are the decrease of rice cultivation, marking diminished swapping, and the large development of cotton and fodder crops since last settlement. The area under wheat has remained steady, while that under cane, though more subject to fluctuation, has somewhat increased in both circles. The nature of the cropping in the Khaddar emphasises the fact that it is a well circle and a rich one growing valuable crops. The Bangar cropping, thanks to the large proportion irrigated, approximates to it. Higher rates of yields in Panipat than in Karnal are justified by the greater fertility of the tract.

54. More than half of the land in the Bangar, and more than two-thirds in the Khadar are cultivated by the proprietors themselves. But a fair idea of the renting value of the whole can be obtained from the cash rents paid on one-fifth of cultivation in the khaddar and one-twelfth in the Bangar. On one-twelfth of the Bangar cultivation and on nearly 5 per cent. of the Khadar, rents are paid in kind, and the produce estimate affords a useful

check on the inferences drawn from cash rents. At last settlement Mr. Ibbetson wrote that true rent was unknown in the tract. His rent rates of Rs 4-1-0 and Rs 3-7-0 per acre in the Khadar and the Bangar were based on acreages of 961 and 536 respectively, paying partly cash and partly fixed grain rents. True competition cash rents now average Rs. 6-2-0 per cultivated acre in the Khadar and Rs. 4-13-5 in the Bangar. The Financial Commissioner included rents paid by tenants-at-will to mortgages in his calculation of normal rents with the following results :—

	KHADAR EXCLUDING PANIPAT TOWN.			BANGAR.		
	Area on which rents are paid.		Average rent paid.	Area on which rent are paid.		Average rent paid.
			Rs. A. P.			Rs. A. P.
Chahi	5,015		7 3 0	332		8 7 0
Nahri ... ..	...		...	1,429		5 11 0
Barani	1,645		5 0 0	2,384		4 4 0

About 5 per cent. were allowed on unirrigated land in the Bangar to cover uncollected rents and fallows. For the purpose of calculating the half-net-assets estimate by cash rents the following rates were used , applied in the case of Chahi and Nahri land to actual average irrigation:—

	KHADAR EXCLUDING PANIPAT TOWN.			BANGAR.		
	Area in acres.	Half-net-assets rate	Resulting assessment.	Area in acres.	Half -net-assets rate.	Resulting assessment.
		Rs. A. P.	Rs.		Rs. A. P.	
Chahi (actually irrigated) ...	37,220	3 8 0	1,30,270	4,000	4 3 0	16,750
Nahri (actually irrigated) ...	...	...	...	43,000	2 13 0	1,20,938
Barani and Sailab ...	20,824	2 8 0	52,060	65,779	2 0 0	1,31,558
Bhur	1,754	1 8 0	2,631	...	...	...
Total ...	59,798	...	1,84,961	112,779	...	2,69,246

The produce estimate in the Khadar amounted to Rs. 2,00,991, and in the Bangar as calculated by the Financial Commissioner to Rs. 2,79,720.

55. The half-net -assets standard obtained by a comparison of these two estimates was considered to be about Rs. 1,94,000 in the Khadar. In the Bangar the similar standard was taken by the Financial Commissioner to be Rs. 2,80,000, which represented a full wet land revenue assessment, on the assumption that the total fluctuating canal charges remained practically as they were. Of the amount thus estimated for the Bangar Circle the Financial Commissioner proposed to take Rs. 1,90,000 as a fixed dry demand, being an increase of 17 per cent. over the old fixed demand of Rs.162,912. He considered that Rs.48,000 should be added to the existing fluctuating canal charges by increasing the scheduled rates for certain crops. The total of the fixed dry assessment, together with the proposed addition to the fluctuating canal charges, amounted to Rs. 2,38,000 or 85 per cent.

of the half-net assets estimate. In the Khadar the Financial Commissioner proposed a fixed assessment of Rs. 1,50,000, or 77 per cent. of the half-net-assets estimate. These proposals were accepted by the Punjab Government, but enhancements of canal rates were recommended to the Government of India on a lower scale than was contemplated by the Sir James Wilson.

As explained above (paragraph 47) the proposals of the Punjab Government was not accepted by the Government of India. No increase was made in the canal water rates, and the sanctioned demand was limited to Rs. 1,50,000 for the Khadar (excluding the Panipat town), Rs. 32,000 for Panipat town and Rs. 1,90,000 for the Bangar. In accordance with the orders conveyed in the Punjab Government letter No. 256, dated 19th November 1909, an addition of Rs. 4,800 was made to the amount previously sanctioned as the fixed assessment for canal land. The total wet assessment on land, i.e., the difference in circle rates for nahri and barani, respectively, is calculated to amount to Rs. 19,184. As most canal villages distributed the revenue by an all-round rate, this calculation is merely nominal.

The assessment actually imposed in each circle was Rs. 32,805 in Panipat town, Rs. 1,49,947 in the rest of the Khadar, and Rs. 1,96,000 in the Bangar circle.

(b)—*Karnal*

56. The assessment orders for the Karnal tahsil may be summarized under the following heads—
Assessment Circles.

- (i) Pargana Karnal settled by Mr. Ibbetson 30 years ago—
 - (1) Karnal Bangar.
 - (2) Karnal town lands.
 - (3) Karnal Khadar.
 - (4) Karnal Nardak.
- (ii) Pargana Indri settled by Mr. Douie 20 years ago—
 - (5) Indri Khadar.
 - (6) Indri Bangar.
 - (7) Indri Nardak.

57. This circle is very similar to the Panipat Bangar. Since Mr. Ibbetson's settlement in 1880, its condition has very much improved owing to the realignment of the canal and the substitution of a dry fixed assessment and an owner's rate on the area actually irrigated for the previous wet fixed assessment. Except for a comparatively small area, the water-logging from which the tract suffered so much has ceased and the health of the people greatly improved. Population increased by over 7 per cent. during the currency of the last settlement, and cultivation by 16 per cent. the area recorded as irrigated by the canal decreased from 19,951 acres to 16,054, but, with regard to the previous evils due to over-irrigation, this is a matter for congratulation, and in a dry year half the cultivated area is still actually irrigated by the canal. For 7 per cent. of the total cultivated area figures existed on which to base a cash rent estimate. The *chahi* rented area is small and includes excellent land near Karnal, so that it was not safe to apply the high *chahi* rent as it stood to the whole circle. The cash rents for the purposes of the estimate were taken as follows :—

Rent per acre

				Rs.	A.	P.
Chahi	...	...	...	6	0	0
Nahri	...	...	...	4	12	0
Barani	...	...	...	3	2	0

These rents were much lower than in the Panipat Bangar. The resulting rates were applied to the average area actually irrigated in a typical series of

years. The area actually irrigated from wells on the average of the 13 years, 1895-1908, which included both wet and dry years, was 777 acres and the high chahi rent-rate was applied to only 700 acres.

The average areas actually irrigated by the canal in the 8 years after 1900, when the remodelling of distributaries may be considered to have taken effect, was only 11,633 acres, so that it was not considered safe to apply the high nahri rent to more than 12,000 acres. The remaining areas were treated as barani. The half –net-asset estimate based on rent paid in kind gave the assessable demand as Rs. 46,682. But the Financial Commission discarded the produce estimate as untrustworthy, and assumed, on the basis of the cash rents, that a full fair wet assessment of the circle would be about Rs 58,000. His proposal for the fixed dry land revenue of this circle were:—

Soil.	Area in acres.	Revenue rate per acre.			Resulting assessment.
		Rs.	A.	P.	
Chahi (actually irrigated)	700	2	8	0	1,750
Nahri (ditto)	12,000	1	8	0	18,000
Barani	17,883	1	2	0	20,118
	30,583	.....			39,868

I was instructed to aim at a fixed dry assessment for the circle of Rs. 40,000, an increase of 22 per cent. over Mr. Ibbetson’s dry assessment of Rs. 32,747, while cultivation land increased by 16 per cent. and the prices risen by more than 22 per cent . The rates proposed by Financial Commissioner compared as follows with those employed by Mr. Ibbetson for his dry assessment in this circle :—

Soil.	Half-net-assets rates now estimated.		Mr. Ibbetson’s dry rates.		Rates proposed by the Financial Commissioner.	
	Panipat.	Karnal.	Panipat.	Karnal.	Panipat.	Karnal.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
Chahi	4 3 0	3 0 0	2 12 0	2 4 0	3 8 0	2 8 0
Nahri	3 4 0	2 6 0	1 13 0	1 5 0	1 13 0	1 8 0
Barani	1 14 0	1 9 0	1 6 0	1 1 0	1 8 0	1 2 0

In accordance with the orders conveyed in Punjab Government letter No 256, dated 19th November 1909, an addition of Rs 1,500 was made to the previously sanctioned demand as the fixed assessment of canal land. The actual assessment imposed on this circle was Rs. 42,600.

58. Of the lands included in Mauza Karnal no less than 40 per cent. are leased on true competitive cash rents, so that there was an unusually good, basis for a cash rent estimate. The average area actually irrigated from wells was only about 1,400 acres against the recorded *Chahi* area of 2,084 acres. In the case of *Nahri* the actual irrigation of the last two years greatly exceeded the recorded *Nahri* area, owing to double cropping, and the high *Nahri* cash-rent-rate could not be applied to more than the recorded are. The half-net-assets estimate therefore was—

Soil.	Area in acres.	Half-net-assets rate.			Resulting estimate.
		Rs.	A	P.	
Chahi(actually irrigated)	1,400	5	0	0	7,000
Nahri(recorded area)	1,850	4	8	0	8,325
Barani	3,548	1	10	0	5,766
Total ...	6,798	...			21,091

This estimate may be roughly checked as follows :— 40 per cent. of the cultivated area actually pays cash rents aggregating Rs. 17,353 and if it is assumed that the remaining area could be let at similar rates , the renting value of the whole estate is Rs. 43,382.

The old fixed assessment was only Rs. 8,093,-an extraordinarily light assessment .In the face of the rent statistics and in the fairness to the owners of outlying villages and to the Mandal Jagirdars, the Financial Commissioner raised my proposed fixed assessment of Rs. 11,500 to Rs.13,000.

No addition was made to the fixed assessment of canal land in this estate, as the area recorded as canal irrigated has already been fully taken into account.

59. The average area actually irrigated on the average of the 13 years 1895-1908 was 13,800 acres, and 14,000 acres were assumed as assessable to the *Chahi* rate. The *Nahri* area is small, the recorded area being only 2,296 acres. For a cash-rent estimate an unusually good basis existed in the cash rents. The figures are as follows :—

SOIL.	NORMAL RENT PAID TO OWNERS.		RENTS PAID BY TENANTS-AT-WILL TO MORTGAGEES.		TOTAL RENTS.				
	Area.	Rent paid.	Area.	Rent paid.	Area.	Rent paid.	Average rent per acre.		
	Acres	Rs.	Acres	Rs.	Acres	Rs.	Rs.	A.	P.
Chahi	3,511	21,154	1,026	6,801	4,537	27,955	6	2	0
Nahri	356	2,189	60	379	416	2,568	6	3	0
Jumna sailab ...	452	1,730	5	30	457	1,760	3	14	0
Barani	1,321	5,143	245	1,398	1,566	6,541	4	3	0

About 10 per cent was deducted on sailab and Barani land to allow for fallows and uncollected rents ; and as the rents on sailab and barani were much the same, these classes were lumped together. The resulting half-net-assets cash rent estimate was as follows:-

Soil .	Area in acres.	Half-net-assets rate.			Resulting estimate.
		Rs.	A.	P.	
Chahi (actually irrigated)	14,000	3	0	0	Rs. 42,000
Nahri	2,296	3	0	0	6,888
Barani and sailab	15,218	1	14	0	28,534
Total cultivated ...	31,514	...			77,422

The half renting value of the whole circle was estimates at Rs. 75,000 by the Financial Commissioner. The old assessment was Rs. 4,875. Population and plough cattle have increased in the last 30 years, and the circle is, as a whole, prosperous and secure. The fixed assessment proposed by the Financial Commissioner and accepted by Government, and its distribution by rates, are shown below:—

	Area in acres.	Mr. Ibbetson's revenue rates.			Half-net-assets rate.			Revenue rates.			Resulting assessment.
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	
Chahi (actually irrigated) ...	14,000	2	2	0	3	0	0	2	6	0	Rs. 33,250
Nahri (ditto) ...	2,296	...			3	0	0	1	10	0	3,731
Barani and sailab	15,218	1	4	0	1	14	0	1	6	0	20,925
Total cultivation ...	31,514	...			...			...			57,906

I was instructed to aim at a fixed dry assessment of Rs. 58,000, which gave an increase of 19 per cent. on the present fixed demand , while the total fixed assessment *plus* the increase of Rs. 1,000 in the fluctuating canal charges, amount to 79 per cent. of the half-net-assets estimate of Rs.75,000. As at last settlement, this circle has been assessed at considerably lower rates than the Panipat Khadar, but the rents here are considerably lower than they are in that circle.

No addition was made to the fixed assessment of canal land in this circle, as the amount involved was considered too small to be taken into account. The assessment actually announced was Rs. 59,005, or an increase of 21 per cent. on the old demand.

60. In Mr. Ibbetson's time the Karnal Nardak was a high arid tract, with water at great depths, having only 27 per cent. of its area cultivated and hardly any part of it irrigated, and being chiefly occupied by cattle-grazing Rajputs. Since then its agricultural condition has been revolutionized by the realignment of the Western Jumna Canal and the extension of irrigation to this circle, though even now it is covered with dense *Dhak* jungle, varied by

stretches of cultivation. Forty-four per cent. of the total area is under cultivation, and 15 per cent. of the total area(34 per cent. of the cultivated area) irrigated by the canal. Population has increased by more than 30 per cent. since 1881, and sign of the prosperity are everywhere apparent. Cultivation and irrigation are certain to extend still further during the next 30 years. The Financial Commissioner assumed that 22,000 acres were likely to be irrigated in future from the canal on an average of years. The area recorded as Chahi was 2,542 acres, but well irrigation has been decreasing, owing to the introduction of the canal, and the Financial Commissioner assumed only 2,000 acres as the assessable average of this class of soil.The remaining area was treated as barani. The rent rates vary greatly, being full rents near Karnal, and not yet full rents in the newly irrigated villages further west. The Financial Commissioner’s estimate of the half-net-assets of the cultivated land, based on cash rents was as follows:—

Soil.	Area in acres.	Half-net-assets rate.			Resulting estimate.
		Rs.	A.	P.	
Chahi (actually Irrigated)	2,000	1	14	0	3,750
Nahri (ditto)	22,000	1	14	0	41,250
Barani	41,576	0	14	0	36,379
Total Cultivation ...	65,576	...			81,379

It was considered that the produce estimate of Rs. 63,000 failed to take into account the spread of irrigation, and half the present renting value of the cultivated land was therefore estimated at Rs. 80,000. The Financial Commissioner thought that in assessing for 30 years this rapidly developing tract, the estimate of present half-net-assets might be safely approached. The fixed assessment sanctioned was as follows:—

Soil .	Area in acres.	Mr. Ibbetson’s revenue rate.			Half-net-assets rate.	Revenue rates proposed by the Financial Commissioner.	Resulting assessment.
		Rs.	A.	P.		Rs. A. P.	
Chahi (actually irrigated) ...	2,000	1	14	0	1 14 0	1 8 0	3,000
Nahri (ditto) ...	22,000	0	9	0	1 14 0	0 14 0	19,250
Barani	41,576	0	9	0	0 14 0	0 10 0	25,985
Total cultivation ...	65,576	...			...	...	48,235
Grazing area ...	60,391	0	0	8	...	0 1 0	3,774
Total ...	...	...			...	...	52,009

I was instructed to aim at a total fixed dry assessment of Rs. 52,000. The actual assessment imposed was Rs. 53,212,- an inreas of 58 per cent. over the old fixed assessment of Rs. 33,662. This assessment is light in present circumstances, and will probably become very light as cultivation and irrigation develop. No addition was made to the fixed assessment of canal land in this circle, as the amount involved was considered too small to be taken into account.

61. The improvement since Mr.Douie’s Settlement 20 years ago has not been so great as in the Karnal Nardak. Indri Nardak. But the Cultivated area has increased by 10 percent., and the recorded Chahi area by 10 percent., though the number of wells in use has fallen off slightly. Canal irrigation has been introduced since last settlement, more than a fifth of the total cultivated area being now classed as canal irrigated. The area to be assessed as *Chahi* was assumed to be 2,200 acres. The total recorded nahri area was 7,680 acres, and on the average of the three years1905—1908, the average matured nahri area was 6,308 acres, with 12 per cent. allowance for kharaba. Seven thousand acres were therefore taken as the actual average irrigation at present. Rather more than half this area is depended on the Chautang Canal, irrigation from which is charged only at occupier’s rates, or only two-thirds of the usual total of fluctuating canal charges. The area on which cash rents are paid was very small, and the rents paid in the adjoining and similar Karnal Nardak were taken as a guide, the barani rent rate being reduced from Rs.1-12-0 to Re. 1-8-0, to allow for the inferior soil and the precarious cropping, especially on the *dahr* cultivation. The estimate of the half-net-assets by cash rents was therefore as follows:—

Soil.	Area in acres.	Half-net-assets rate.			Resulting estimate.
		Rs.	A.	P.	
Chahi (actually Irrigated)	22,00	1	14	0	Rs. 4,125
Nahri (ditto)	7,000	1	14	0	13,125
Barani	23,535	0	12	0	17,652
Total ...	32,735	...			34,902

The kind rent estimate of Rs.28,888 was rejected, being based on low prices and low assumed outturns, and on the areas of 1900-05,when only 3,488 acres of matured Nahri crops were grown. A safe estimate of the half-net renting value of the cultivated area of the circle under present circumstances was held to be Rs. 32,000. The rates sanctioned for a fixed dry assessment were as follows:—

Soil.	Area in acres.	Mr.Douie’s revenue rate.			Half-net- assets rate.			Revenue rate proposed by Financial Commissioner.			Resulting assessment.
		Rs.	A.	P.	Rs.	A.	P.	Rs.	A.	P.	Rs.
Chahi (actually irigated) ...	2,200	2	0	0	1	14	0	1	12	0	3,850
Nahri (ditto) ...	7,000	...			1	14	0	0	12	0	5,250
Barani	23,535	0	10	0	0	12	0	0	10	0	14,709
Total cultivation	32,735	...			...			...			23,809
Grazing area	35,303	0	0	6	0	1	0	...			2,206
Total ...	...	...			...			...			26,015

I was instructed to aim at a fixed assessment of Rs. 26,000. I was allowed to put a lower rate on *dahr*, as the barani rate could safely be raised to 12 annas or more on the best unirrigated land. The actual assessment as announced was Rs.27,555, —an increase of 15 percent. on the old demand. No addition was made to the fixed assessment of canal land in this circle, as the amount involved was considered too small to be taken into account.

62. This circle is comparatively stagnant. Population and wells in use have fallen off, but there has been an increase in cultivation of 6 per cent., and a considerable extension of canal irrigation, and prices have risen by over 25 per cent. The recorded chahi area is 11,589 acres. The actual average area annually irrigated in the thirteen years 1895-08, was 7,108 acres, and in the three years 1905-08 of which two were very dry years, 7,827 acres. The Financial Commissioner took 7,200 acres as the assessable area. The recorded nahri area was 2,270 acres : the actual cropped nahri area of the three years, 1905-08, averaged 2,045 acres. Two thousand acres were assumed as the assessable area. The following rates were taken for the half-net-assets based on cash rents:—

Soil.	Area in acres.	Half-net-assets rate.			Resulting estimate.
		Rs.	A.	P.	
Chahi	72,00	2	8	0	Rs. 18,000
Nahri	2,000	2	0	0	4,000
Canal Sailab	1,116	2	0	0	2,232
Barani	33,298	1	4	0	41,622
Total cultivation ...	43,614	...			65,854

The revised kind rent estimate of Rs. 55,405 ; but as was based on low out-turns and prices and on a estimate of canal irrigation, the half-net-assets were placed at Rs. 62,000. The old assessment was Rs. 49,875. The following fixed dry assessment was sanctioned :—

Soil.	Area in acres.	Revenue rate.			Resulting assessment.
		Rs.	A.	P.	
Chahi (actually irrigated)	7,200	2	4	0	Rs. 16,200
Nahri (ditto)	2,000	1	4	0	2,500
Canal Sailab	1,116	1	12	0	1,953
Barani	33,298	1	0	0	33,298
Total cultivation ...	43,614	...			53,951

I was instructed to aim at a fixed demand of Rs. 54,000, and the actual assessment imposed amounted to Rs. 55,315, an increase of 11 per cent. on the old demand. No addition was made to the fixed assessment of canal land in this circle, as the amount involved was considered too small to be taken into account.

63. The Khadar of the Indri pargana is the worst tract of the kind along this part of the Jumna, being inferior both to the Khadar of Pipli and Jagadhari to the north, and to that of Karnal and Panipat to the south. Its soil is throughout inferior being either the lightest of sand or the stiffest of clay. The Jumna floods do a good deal of harm, and the lands they moisten are little more productive than those dependent on rain. Percolation from the canal still swamps considerable areas, though it improves the productive power of others. The tract has long been in a stagnant condition, while its neighbours

have been rapidly becoming more prosperous. Cultivation has increased by only one per cent. since Mr. Douie's Settlement, the number of wells in use has slightly decreased, and population has fallen off considerably, owing partly to the unhealthy climate and partly to emigration to more favoured tracts. On the other hand, cattle have largely increased, and the realignment of the canal has restored some of the fertility of a considerable area in the south of the circle. On the whole the circumstances of the tract called for tender treatment. The recorded Chahi area is 11,907 acres, but the average area actually irrigated in the 13 years, 1895-1908, was only 8,127 acres, and the average matured area of the three years, 1905-1908, two of them very dry years, 8,589 acres. Only 8,000 acres actually irrigated on a long average of years were considered as assessable at the high chahi rent. The remaining area classed as chahi was treated as barani. A considerable area was available for a cash rent estimate. The half-net -assets estimate based on cash rents was as follows:—

Soil.	Area in acres.	Half-net-assets rate.			Resulting estimate.
		Rs.	A.	P.	
Chahi (actually irrigated)	8,000	2	8	0	Rs. 20,000
Canal Sailab	4,422	2	2	0	9,397
Jumna Sailab	14,424	1	8	0	21,636
Barani	34,969	1	6	0	48,082
Total cultivation ...	61,815	...			99,115

The estimate by kind rents was Rs.1,01,640, and half the present renting value of the circle was taken as one lakh. The following rates were sanctioned :—

Soil.	Area in acres.	Revenue rate.			Resulting assessment.
		Rs.	A.	P.	
Chahi (actually irrigated)	8,000	2	4	0	Rs. 18,000
Canal Sailab	4,422	1	14	0	8,291
Barani and Jumna sailab	49,393	1	3	0	58,654
Total cultivation ...	61,815	...			84,945

I was instructed to aim at an assessment of Rs. 85,000, an increase of 5 per cent. on the total assessment, Rs. 80,915, and equivalent to 85 per cent. of the estimated half-net-assets. The actual assessment announced was Rs. 88,046, an increase of 8 per cent. on the old demand.

(c)— *Thanesar*.

64. The demand of the year 1887-88 for the tahsil as now constituted was Rs.2,28,763. This was raised at General conditions. Mr. Douie's revision which took effect from that year, to Rs. 2,43,966, a reduction being allowed in the Southern Chachra and the increase obtained from the other circles. The working of the assessment was proof both of its moderation and of the secure position of the tahsil, for during the currency of settlement it was only necessary to remit Rs. 11,094. The rainfall returns also testify to the security of the tract, the average rainfall for the last 20 years being 29 inches. The demand for the year 1906-07 was Rs. 2,40,364, the reduction since 1887-88 being due to diluvion. Thirty-one per cent. of the revenue is assigned.

65. The limit of increase in cultivation had been reached at Mr. Douie's settlement in the Bet Markanda and Cultivated area. probably in the Bangar also. In the other three circles there was then , and still is , a considerable margin for increase ; but while the cultivated area has greatly increased in the two Chachra circles it has remained stationary in the Khadar. The largest increase in the number of cattle of all kinds have also occurred in the two Chachras, though the increase is general throughout the tahsil, there has been a considerable increase in the area irrigated from wells in the two Chachras, and a large number of old wells have been brought into use. The decrease in the number of wells and in the area irrigated from them in the Khadar and Bangar circles is no less indubitable and no less striking. The water-table in the two Chachras appears to have risen since last settlement.

66. The population of the two Chachra circles has increased since last settlement, but in the other circles there Population. has been a decrease. Thanesar has been benefited by an immigration of the Malis, but there appears to have been an emigration of menials , and there has been a large mortality among all the classes from plague. Of agricultural tribes the Jats and Rajputs are the more important. Kambohs are numerous in the Bangar and Khadar. Bannias have taken strongest hold in the Bangar and Northern Chachra circles. Pressure on the land is not excessive.

67. The percentage of the cultivated area sold since settlement varies Transfers. from 7 per cent. in the Bet Markanda and 11 per cent. in the Khadar, to 17 Per cent. in the Bangar and 21 per cent. in the Southern Chachra. As much as 22 per cent. of the cultivation is now under mortgage in the bet-Markanda, 15 in the Khadar and Bangar and 8 per cent . in the two Chachras. These proportions are comparatively high but an examination of the prices paid for land in terms of the land revenue of the area sold suggests that the lightness of the demand has tempted capitalists to acquire the land of the more thriftless among the agriculturists. The value of land, however, has risen considerably and one pleasing feature of alienations in the past is the acquisition of land by Malis in the two Chachras.

68. The decrease since last settlement in the proportion of the land cul- Proportion of area cultivated by owners and by ten- tivated by the owners themselves, to that ants respectively. cultivated through tenants paying rent, was very marked, being due partly to mortality from plague and partly to the acquisition of land by non- agriculturists. Proprietors now cultivate 60 per cent. of the cultivation in the Chachra and about half in the other three circles. Rent is paid in kind on one-third of the total cultivated area in all circles. Cash rents are of the importance only in the Khadar and the Bangar, where they are paid on 8 and 11 per cent. of the cultivation only, though they have gained in popularity in all circles since last settlement.

69. In these circumstances the produce estimate was the principal Half net assets estimates. foundation of the assessment proposals. The estimate based on cash rents were recognized as reliable guides to the assessment of the Khadar and Bangar circles, and afforded a useful check on the produce estimate in the other circles. The estimates are compared below :—

	Bet Markanda.	Khadar.	Bangar.	Northern Chachra	Southern Chachra.
	Rs.	Rs.	Rs.	Rs.	Rs.
Half assets by kind rents	1,39,082	36,502	38,260	63,207	25,666
Half assets by cash rents	2,35,921	45,625	48,474	88,060	45,092

there have been increases of 500 acres in chahi and 2,400 acres in the nahri land (Sirhind Canal Irrigation), counterbalanced by a decrease of 2,000 acres in the area recorded as “*tibbi*”.

72. There are more wells in the Naili circle than in other, but they are there worked only if the floods are short. The depth to water averages 25 feet. The only circles in which well-irrigation is of importance are the Andarwar and the Powadh. The proportion of chahi cultivation to the total is greater in the former than in the latter, although the depth to water is 33 as compared with 22 feet. In the Nardak, Bangar and Bangar Pehowa the depth to water is 66, 63 and 41 feet respectively, and there is little cultivation from wells. In the Naili the crops grown are not of the less valuable varieties, but the crop returns show the area of crop failure to the enormous.

73. The increase in population during the last 20 years was 46 per cent. in the Nardak and 22 per cent in the Bangar, largely due to immigration of cultivators on the spread of canal irrigation. The Bangar Pehowa is a tract more similar to those two circles than to the other three, and there also population has increased with cultivation. In the Andarwar and Powadh the figures of 20 years ago have barely been maintained: this is due to the general unhealthiness of the former circle and to plague in the latter. In the Nail circle there has been a considerable drop, for which the malarious and unhealthy climate is partly responsible, but which is also partly due to the emigration of menials and cultivators consequent on the droughts of the last 14 years. In all circles the density on cultivation is light, and the average area of the proprietary holding is large, being lowest in the Andarwar, where it is 6 acres, and rising as high as 21 acres in the Nardak. Jats hold the bulk of the cultivated land of the tahsil, and predominate in most of the circles, but the so-called Jats of the Andarwar and Powadh circles include Jat Sikhs. The Jats of the Naili are of poor physique, but those of the southern part of the tahsil are among the best of their tribe. Rajputs are numerous in the Nardak and Naili circles, holding half the cultivation in the former and nearly as much as the Jats in the latter, and are industrious and of good physique. Rors are a strong element in the Nardak and Bangar Pehowa circles, in each of which their holding exceeds that of the Jats. Gujars own a considerable proportion of the Naili and Bangar Pehowa circles, and have also substantial holdings in the Nardak and Bangar.

74. The percentages of the total cultivation (a) sold since last settlement, and (b) now under mortgage are as follows for the various circles:—

	Nardak.	Bangar.	Naili.	Bangar Pehowa.	Andawar.	Powadh.
Percentage sold	5	3	6	5	2	5
Percentage under mortgage	3	6	11	4	12	11

75. Good prices are obtained, varying from Rs. 40 to Rs.70 per acre of cultivation, but for assessment purposes the most useful examination of prices is obtained by stating them in terms of the land revenue of the land sold:—

	Nardak.	Bangar.	Naili.	Bangar Pehowa.	Andawar.	Powadh.
Average 1887-1890	39	55	44	37	24	25
Average 1900-1905	94	107	54	94	43	36

The rise in price is noteworthy; even the Naili has partaken in it though to a less extent than the other circles. The Punjabi purchaser generally looks to get 6 per cent, or more, but if we take 5 per cent. as the rate and take the prices of the quinquennium ending with 1905, we find by Sir James Wilson's formula that the investor must estimate the profit from land to be, from 5 to 6 times its assessment in the Nardak, Bangar and Bangar Pehowa circles, and from 3 to 4 times its assessment in the Powadh, Andarwar and Naili circles.

76. The small Andarwar and Powadh circles have always been agricultural rather than pastoral circles, and in these the numbers of live-stock have fallen off somewhat since settlement. In the Bangar Pehowa circles, too, the income from live-stock is of secondary importance, but the numbers have increased, and the annual income is estimated at Rs. 11,000. The remaining three circles formed originally a great grazing ground, and the Naili still remains so, with cultivation a secondary consideration. In that circle the number of horned cattle has increased, and is equal to the number of population. The annual profit is estimated at Rs.31,000. In the Nardak and Bangar where much grazing land has been brought under the plough since settlement, the number of cows has diminished while the number of stall fed buffaloes and of plough bullocks has increased ; the profits from stock in these circles, however, are still considerable, and are estimated at Rs.53,000 per annum in each circle. In the Nardak the culturable waste still remaining is more than double the area remaining in the Bangar, and I therefore proposed to put an assessment on the waste in the former, but not in the latter circle.

77. Of miscellaneous income there is little or none except in the Powadh circle where military service is readily taken by the Jat Sikh population. The Southern portion of the tahsil has benefited considerably by the construction during the term of settlement of the Southern Punjab Railway which runs along its south-west border, besides being connected with Kaithal town by a branch line. In the remainder of the tahsil there has been no improvement in communications since last settlement, and the Naili circle, in particular, is very badly off for roads.

78. The work of framing an estimate of the income to the owners from their cultivated land was attended with special difficulty because so much of the land is cultivated by the owners themselves. Taking the Nardak and Bangar circles together, 1/12th of the cultivation is in the hands of tenants-at-will paying rents in kind, and only 1/29th is held by tenants paying cash rents. In the remainder of the tahsil 1/5th is in the hands of tenants of the former class, but only 1/66th is held on cash rents.

To take the half net assets estimate by kind rents first. The rates of yield applied to the cycle areas were for canal-irrigated cane, cotton and wheat, moderate, being 24, 7 and 12 maunds, respectively. These were the governing crops on canal-irrigated land. The rates of 4 maunds an acre for jowar and from 5 to 8 maunds per acre of unirrigated rice were low. Fodder and straw were neglected in calculating the owner's share of the produce-liberal treatment in a tract where cattle are a valuable asset. An allowance of 10 per cent, was made for payments to menials from the common heap, and the landlord's share of the produce remaining was 1/4th everywhere except in the Powadh, where it was 1/3rd. All canal charges are paid by the tenant except in the Powadh where the owner pays 1/3rd, and so it is only there that they come into the calculation. The scale of commutation prices was framed three years ago on a consideration of the prices recorded up to 1903-04, and was low, judged by the rates that had rule since that year ; it was the same, however, as had been used in the assessment of the Karnal and Panipat tahsils, except that outside the Nardak and the Bangar wheat was valued at 29 annas a maund (as in Thanesar), instead of 31 annas.

The areas on which true cash rents are paid are very small in all circles, the largest being 700 acres in the Nardak and 400 in the Bangar. A half asset estimate was worked out for each circle from the rents which were considered representative. A deduction of from 10 to 12 per cent. was allowed for short collections, even on irrigated land, and of 15 per cent. on barani.

Assessment.

79. The new assessment is compared below with the old demand and the estimate of half net assets:—

				ESTIMATE OF HALF NET ASSETS.		Old demand.	as Assessment sanctioned.	Assessment imposed.	Increase per cent on old assessment.
				Cash.	Produce.				
				Rs.			Rs.	Rs.	
Nardak	...	...	...	1,41,631	156,551	53,756	1,14,400	1,14,225	112
Bangar	...	...	...	1,56,406	163,024	69,075	1,16,220	1,16,735	69
Bangar Pehowa	...	...	...	16,528	15,592	12,067	15,000	15,480	28
Naili	...	...	...	49,415	67,805	70,730	61,500	62,675	-11
Andarwar	...	...	...	12,160	12,370	16,234	16,000	16,630	2
Powadh	...	...	...	30,546	31,335	28,368	31,000	32,070	13

The above figures omit the assessment which was considered available for enhancement of rates on the Western Jumna Canal and for the Sarusti Canal, a small irrigation system taking out of the Sainsa jhil and managed by the district Board. But the assessment shown in the statement includes an additional fixed assessment on canal land of Rs. 5,400 in the Nardak and of Rs. 4,220 in the Bangar-Kaithal Circle imposed in consequence of the orders conveyed in Punjab Government letter No. 251, dated 19th November 1909.

The assessment takes into account the immense improvement in the Nardak and Bangar circles brought about by the extension of irrigation from the Sirsa Branch of the Western Jumna Canal. Much of the enhancement taken in these circles is to be realized by progressive assessment (see paragraph 83). On the other hand in the rest of the tahsil the increase taken is small, and a considerable reduction has been given on Mr. Douie's assessment of the Naili circle which has suffered from a cycle of bad seasons.

CHAPTER VI – OTHER DETAILS OF ASSESSMENT.

80.

Distribution of demand over villages.

The total assessment sanctioned for assessment circles was proportioned to each village with the greatest care, both by Mr. Ibbetson and Mr. Douie, and their village assessments were of the utmost value as guides in distributing the present sanctioned demand. The relative value of each estate from a revenue point of view was discussed with the people, both at village inspections and afterwards, when the orders of Government were known.

Four standards were used in deciding the demand for each village:—

- (1) The demand by soil rates obtained by applying the dry rates sanctioned for each soil to the areas of each soil as ascertained at new measurements ; in the case of well and canal irrigation to the average area irrigated on a period of 13 years for wells and 8 years for canals. To give the total assessment it was necessary to add the sum obtained by applying to the canal area the all-round rate of the additional wet assessment intended to be taken by an enhancement of the canal schedule.
- (2) Crop rates arrived at by applying to the cropped area of 1900-05 rates based on the half net assets produce estimate modified so as to produce the sanctioned demand when applied to the average cropped area of the circle.
- (3) The demand given by applying to each class of soil the average rent taken for that soil in the village.
- (4) The demand given by applying the circle rent rates for each class of soil to the areas of the village.

I also applied the all-round rate of last settlement to the present cultivated area. This guide was especially useful in Panipat where the people generally distributed by an all-round rate.

The rent rate in Panipat and the crop rate in Kaithal were of the greatest assistance. Before arriving at the dry assessment it was necessary to subtract from the demand by crop and rent rates the result of applying to the canal area the wet assessment which was proposed as an enhancement of the canal schedule.

81. The preliminary work necessary for the distribution of the assessment over holdings was completed before the announcement of the village assessments. The principles on which the assessment was to be made were explained to the people and they were invited to state the method in which they would distribute the demand. In the case of well-irrigation the wells were classified by the people themselves under the direction of the Tahsildar, who checked the results with statements showing the average irrigation from each well during the preceding 13 years. When the demand of the village was announced these preliminary arrangements were again discussed with people and the final results recorded. Where the villagers preferred to distribute by an all-round rate the work was comparatively simple. Where they preferred to differentiate between soils the rates were determined after a discussion of calculations which had been worked out beforehand. In most villages of the Panipat tahsil all land-owners possess a proportionately equal share of the various classes of land. The people therefore generally preferred anal-round rate, although they fully understood that under that system they would not be entitled to remission if wells went out of use. But in the riverian villages where the river has caused damage to valuable well lands, and is likely to cause more, although the original distribution was made by an all-round rate, a separate rate was devised for well lands in order that the owners might obtain remission of revenue if a well were destroyed by river action. Should a well be washed away, the revenue of the chahi land will be deducted from the whole demand of the village, and the remainder distributed afresh by an all-round rate. In the Panipat canal villages, in spite of the fact that the original demand had been distributed by an all round rate, the additional nahri parta subsequently announced was usually placed on canal land. In the other tahsils the people usually preferred to distribute according to soils. In all cases the demand was announced on the spot, holding by holding, and each owner was supplied with a slip showing the old and new demand for his holding. After the objections, which were few, had been decided, the result was incorporated in the record of rights and a list showing the demand for the whole village was given to each lambardar.

82. The following periods of exemption from well abiana were sanctioned in the case of well newly constructed or repaired (*vide* letter No. 297 S., dated 27th July 1909, from the Senior Secretary to the Financial Commissioner, to the Settlement Commissioner) : —

Tahsil.	Circle.	Number of years.
Panipat	Whole	20
Karnal	Khadar { Indri ... Karnal ... }	20
	Other circles ...	30
Thanesar	Southern Chachra ...	30
	Other circles ...	20
Kaithal	Powadh ...	20
	Other circles ...	30

83. The amount of assessment deferred for 5 to 10 years, the exemptions from revenue granted on account of wells and roadside trees, and the reduction on account of muafis dealt with under paragraph 570 of the Settlement Manual, are shown below:—

Tahsil.	DEFERRED ASSESSMENT.			REDUCTION ON ACCOUNT OF			Total.
	1st five years.	2nd five years.	Total.	Muafis dealt with under paragraph 570, Settlement Manual.	Protective leases for wells.	Road side trees.	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Panipat	7,796	3,225	11,021	...	1,374	30	12,425
Karnal	8,904	3,038	11,942	144	2,817	256	15,159
Kaithal	38,715	10,216	48,931	10	1,769	...	50,710
Thanesar	6,010	1,275	7,285	697	1,529	...	9,511
Total ...	61,425	17,754	79,179	851	7,489	286	87,805

In accordance with the orders regarding deferred assessment detailed in paragraphs 498 and 499 of the Settlement Manual, the Deputy Commissioner has to submit a special report on the state of the villages affected before the full assessment is imposed.

It will be seen that the enquiries at the end of the 5-yearly periods will be concerned with very considerable sums and will require careful treatment.

84. At the enquiry made after the announcement of the new demand it was found that no change in the payment of revenue instalments was either necessary or desired by the people, except in the Thanesar tahsil where it was proposed to fix a single instalment payable on 15th January instead of two instalments payable on 1st December and 1st February. The dates of revenue instalments sanctioned by the Financial Commissioner in his letter No. 812,

dated 16th February 1910, to Settlement Commissioner, are now 15th June for the rabi instalments throughout the whole district except the Nardak and Bangar circles of Kaithal tahsil where the date will be 15th July. The kharif instalment falls due on 15th December in Kaithal tahsil except the Powadh circle, Bangar, Panipat, Nardak, Indri and the three circles of the Karnal pargana and on the 15th January in the rest of the district.

85. Under the provision of last settlement,* a few estates in the Indri Nardak circle of the Karnal tahsil and in the Naili circles of the Kaithal tahsil were under fluctuating assessment in 1904. Under present orders no system of fluctuating assessment will be introduced except in estates whose proprietors apply for it. Hitherto no such application has been received and the district administration has been relieved from a considerable strain during the six-monthly crop inspections.

86. The rules for assessing land, subject to the action of the river Jumna and its spill channels including the Western Jumna Canal escapes, will be found in the appendix A, which also contains the rules for the treatment of land subject to the floods of hill torrents such as the Markanda, Umla and Ghaggar.

The procedure in the case of the Jumna dialluvion assessments differs somewhat from that in vogue elsewhere in the Punjab, owing to the absence of a fixed boundary between the Punjab and the United Provinces, except in the Thanesar tahsil. In consequence of the decision that no demarcation of the riverain boundary is to be undertaken, proceedings will continue to be governed by the deep stream rule modified by the custom prevailing in the villages concerned.

87. Under the orders of the Government † extensions of canal irrigation are subject to an additional rate of 4 annas per acre in villages to which canal irrigation has been extended since settlement. In villages which were canal-irrigated at settlement, the rate imposed will be the difference between the settlement officer's assessment rates on *nahri* and *barani*. If the area of canal irrigation has been reduced reductions are allowed at similar rates. No change is made in the assessment of a village if the sum resulting from the application of the rates is less than Rs.50, or a tenth of the revenue of the village. Detailed rules for the working of this supplementary assessment will be found in appendix B.

CHAPTER VII – MISCELLANEOUS REVENUE ARRANGEMENTS AND OTHER MATTERS.

88. The vernacular village note-books maintained since 1885-86 have now been supplemented by a new series, the first entry in which are the figures of the present settlement. Considerable attention has been devoted to the pargana or abstract village note-books. These books now contain the following information for each village:—

- (a) The note recorded by the Settlement Officer at the last settlement.
- (b) The statistics maintained since 1885 till the close of the present settlement operations.
- (c) Sketch map of the village showing the principal physical features.
- (d) An abstract of statistics used during assessment operations.
- (e) The assessment note recorded at the present revised settlement.
- (f) A sheet for an abstract of statistics in a new form designed to show the fluctuations in the crop and general prosperity of each estate, year by year, with special reference to the need for suspension and remission of revenue.ϕ

* See Punjab Government letter No.270, dated 11th May, 1894

† Proceedings No.63 (Rev. & Agri.), June 1910 Revenue.

ϕ A scheme for working suspension and remission of land revenue will be found in Appendix C.

89. In consideration of extended canal irrigation and cultivation and the consequent increase in field numbers, Revenue establishment of the district. the patwari establishment was increased from 335 to 344, not including 15 assistants. The number of field kanungos was raised from 15 to 17.

The sanctioned scale of patwaris establishment (*vide* letter No. 1897, dated 9th July 1909, from the Director of Land Records to Settlement Commissioner), is as follows:—

				No.	Pay. Rs.
1st grade patwaris	...	...	...	134	14
2nd grade patwaris	...	...	...	133	12
3rd grade patwaris	...	...	...	77	10
				<hr/> 344	
Assistants	...	...	...	15	8
				<hr/> 359	

Had the Naili villages of Kaithal tahsil accepted fluctuating assessment, the number of 3rd grade patwaris would have been increased by 6. But as the assessment of the Naili circle is now entirely fixed, these extra patwaris were not required.

The sanctioned scale of the kanungo establishment (*vide* Punjab Government letter No.17 Revenue, dated 8th January 1910) is as follows:-

				Pay. Rs.
1 sadr kanungo	...	...	...	60 to 80
1 assistant to sadr kanungo		...	...	30
4 tahsil office kanungos		...	...	40
1 tahsil office kanungo (Guhla)		...	...	30
4 field kanungos	...	...	...	30
13 field kanungos	...	...	...	25

90. The zaildari system was introduced at the settlement of the Panipat tahsil and the Karnal pargana by Zaildars. Mr. Ibbetson. Shortly afterwards the system was extended to the rest of the district as it then existed i.e. , excluding the present Thanesar tahsil. No zaildar was appointed in Thanesar, though the inamdars who took their place practically corresponded to zaildars in everything but in their remuneration. At the beginning of this settlement there were 16 zaildars in Karnal, 7 in Panipat and 15 in Kaithal, and 14 inamdars in Thanesar. Their remuneration was very uneven. The Panipat zaildars in some cases receive as much as Rs. 700 per annum, while the Thanesar inamdars had to be content with only Rs. 60. Under the new proposals sent up during settlement and sanctioned by Government (Punjab Government letter No.180, dated 22nd May 1909 and No.650 S., dated 24th June 1909), zaildars have been appointed throughout the district and divided into three grades of Rs. 300, Rs. 250, and Rs. 200. The boundaries of zails, though primarily based on tribal distinctions, have been slightly altered in order to make them correspond as far as possible with the boundaries of thanas. Some alterations in the proposals were made on a subsequent reference by the Deputy Commissioner, and the final arrangements are those sanctioned in Financial Commissioner's letter No. 2144, dated 23rd April 1910.

The total remuneration of zaildars, which roughly amounts to 1 Re. per cent of the land revenue, is Rs. 11,750.

91. Mr. Ibbetson appointed ala-lambardars in the Panipat tahsil and the Karnal pargana, but, with a few exceptions, ala-lambardars had not shown themselves deserving of the remuneration of 1 per cent. of the land revenue, which they deducted from the revenue of their village. The system was therefore definitely abolished under the orders conveyed in Punjab Government letter No. 233 S. Rev., dated 1st June 1909. No new appointments had been made during settlement and none will be made in future; existing incumbents will so far as possible be absorbed in the arrangements for sufaidposh inamdars. Sufaidsposh inams were created along with the zaildari system in the tract settled by Mr. Douie.

A sum of Rs. 3,000 amounting roughly to $\frac{1}{4}$ per cent. of the land revenue of the district has been set apart for the remuneration of sufaidsposh inams in all tahsils.

Jagirdars are now not exempted from the zaildari and sufaidsposh contribution, but in the case of muafis of less value than Rs.50 per annum when the muafi does not comprise the whole village, the contribution is not levied.

92. An account of the arrangements for the appointment of village headmen from the time to of annexation up to Mr. Douie's settlement will be found in paragraph 155 of the Karnal Gazetteer, 1892 edition. It is sufficient to remark that the present arrangements are far from satisfactory, especially in the north of Kaithal and in the Thanesar tahsil, where it is not uncommon to find 3 or 4 headmen in a village, the total revenue of which is less than Rs. 300. Efforts have been made throughout the settlement to reduce the number of those appointments where the amount of pachotra was not sufficient to induce the lambardars to carry out the duties assigned to them under the land revenue rules. In accordance with the orders contained in Senior Secretary to the Financial Commissioner's letter No. 5891, dated 5th November 1908, the scheme for the reduction of village headmen in suitable cases has been prepared and made over to the Deputy Commissioner. This was a work of considerable magnitude, as the constitution and circumstances of over 1,450 villages had to be examined and noted on, before the registers could be properly prepared. It is to be hoped that Deputy Commissioners will find the detailed notes of use when considering the appointments of village headmen or the reduction of the posts. Owing to the extension of canal irrigation the pachotra of lambardars in Karnal, Panipat and south of Kaithal will generally be found sufficient, and there need be no hesitation in demanding from the headmen in those tahsils the full exercise of their legal duties. In Thanesar and the Guhla tahsils the improvement in the status of the lambardar will no doubt be effected in time ; but the process must be gradual. The inferior status of the lambardars in those parts of the district is one of the least satisfactory features of the general administration.

93. In addition to the scrutiny of village headmen, the chaukidari arrangements of the district were overhauled by means of the registers prepared by the settlement staff.

94. Settlement operations in the Thanesar and Kaithal tahsils were somewhat retarded by the preparation of files for the acquisition of land in connection with the new railway between Thanesar and Kaithal. Similar work was undertaken in Panipat tahsil for the Jind-Panipat Railway.

95. The investigation of muafi grants was a tedious task. The number of grants to be attested at the commencement of settlement operations was 1,065.

Every case was reported on in full by the Tahsildars. The state of the institution for which the grant existed was examined and the existence of the

muafidar attested. I myself compared the present circumstances of the muafi with the conditions of tenure laid down in the original sanctioning authority. The number of grants to be entered in the registers has now been reduced to 653.

Seventeen cases of grants in perpetuity have been reported for resumption. By the application of the procedure laid down in paragraph 570 of Settlement Manual, 215 grants for the term of settlement have been resumed as grants form Government, and in accordance with the wishes of jagirdars, 123 grants held in jagir villages "at the pleasure of jagirdars" have been cancelled. Resumption was ordered in 22 cases of life grants.

Grants in perpetuity below Rs. 10 in value where the muafidars are also the owners of the land will like other grants be recorded in the muafi register. But in future succession to these grants will only be recorded in the ordinary revenue records. The serial number of these grants in the muafi registers will be duly entered in the jamabandi, and the grants will be revised at next settlement. In the case of succession to other grants files will be prepared as before.

96. The total cost of settlement up to the end of September 1910 amounted to Rs. 8,25,895. Some
Cost of settlement. Rs.90,000 of this will probably be recovered from the jagirdars, but orders as to the exact sum are awaited.

97. Some of the reasons for the comparatively high cost of the settlement have been described in paragraphs
Training of Officers. 31-33. Apart from the expenditure on experiments in mensuration and the elaborate nature of the survey the cost of training a considerable number of Assistant Commissioners, Extra Assistant Commissioners, Naib Tahsildars and Kanungo candidates was borne by the settlement. Fifteen Assistant Commissioners and 3 Probationary Extra Assistant Commissioners received settlement training in Karnal, and 43 candidates for the post of Tahsildar and Naib Tahsildar.

98. Mr. Kennaway, C.S., was in charge of assessment work in Thanesar
The staff. as Assistant Settlement Officer and dealt with several large cases outside that tahsil. The heavy work involved by the settlement of a large district was thus materially lightened and Mr. Kennaway's valuable assistance is deserving of acknowledgement. Mr. Garbett, C.S., officiated as Settlement Officer for three months in 1909 during my absence on privilege leave and did much useful work, especially in connection with the preparation of the Riwaj-i-am for which he was entirely responsible. The post of Extra Assistant Settlement Officer was held for the first six months by Lala Bishambar Dyal, and for the remainder of the settlement by Munshi Hira Singh. The latter officer brought wide experience to the task : his knowledge of settlement work in general and his efficient control of a staff somewhat inefficient in its lowest grades were deservedly rewarded by the title of Rai Sahib bestowed on him towards the close of the settlement. I can only repeat here my grateful acknowledgements for his hard work and well-considered advice.

The Tahsildars were able and experienced, and the settlement was fortunate in being supervised by such experienced Revenue Officers as Pandit Nand Lal, Lala Wali Ram, Sheikh Ghulam Mohi-ud-din, Lala Ranjit Gopal, M. Kifayat Ali and Chaudhri Mumtaz Hussain. The Naib Tahsildars as a whole were the weak point of the staff, but Pandit Sarwan Dass, M. Jawahir Singh, Syed Muhammad Raza and Munshi Ilahi Bakhsh were far above the average. Lalas Ladha Ram and Lakhmi Das were efficient head clerks and Sheikh Abdul Qadar and Malik Muhammad Naim exceptionally good readers.

Orders required.

99. Orders are required as to the period of Settlement.

April 1911.

A.M. STOW.

Appendix A.

Rules for the assessment of lands affected by the River Jumna and its spill channels, the Western Jumna Canals and hill torrents.

General.—By Notification No.36, dated 28th January 1884, by the Government of India, Home Department, the deep stream of the Jumna was declared to be the boundary between the Punjab and the United (then the North-Western) Provinces, and no village therefore can have a fixed boundary (except in Thanesar where the boundaries of the riverain villages are fixed) or any boundary except the deep stream. The above notification was amplified by Punjab Government notification No. 194,* dated 2nd April 1884, in which, with the approval of the Government of the North-West (now the United) Provinces, rules were issued to guide the revenue staff of the two provinces in fixing the deep stream, and in deciding disputes as to the boundary of jurisdiction or of proprietorship. These instructions should be carefully followed, and nothing in the following rules should be held to supersede them.

In accordance with the entries in the village administration papers of the last settlement the boundary of proprietary right is the deep stream rule. Consequently land not washed away, but transferred from one side of the deep stream to another by avulsion and clearly identifiable, remains the property of the original owner or owners, although as the deep stream is the boundary of jurisdiction a change of jurisdiction takes place and the land becomes a part of the province to whose side of the deep stream it is transferred. This modification of the deep stream rule does not, however, affect di-alluvion procedure, of which, as of jurisdiction, the boundary is the deep stream:—

A.—Assessment rules applicable to estates subject to the action of the Jumna.

1. When by river action land assessed as cultivated is carried away or rendered unfit for cultivation or land assessed as pasture is carried away, or rendered unfit for grazing, the assessment thereon shall be remitted.

2. New uncultivated land added by alluvion which is fit for grazing, unassessed land which has become fit for grazing owing to the action of the river, and assessed cultivated land which has from the same cause ceased to be fit for cultivation but is fit for grazing, will be assessed at $2\frac{1}{2}$ pies per kacha bigha, or one anna per acre.

3. New cultivated land added by alluvion since settlement shall on first cultivation be assessed at the full rate stated below if the crops are of the first class and at half that rate if the crops are of the second class. The full rate shall be Re. 1-4-0 per acre. All crops excepting peas, masur, melons, vegetables and fodder are first class crops.

4. No assessment shall be imposed under rule 3 on crops which yield a 4-anna outturn or less, and if the outturn is more than 4 annas and less than 8 annas, only half the rate assessable under these rules shall be imposed.

5. Land assessed at half rates under rule 3 shall be assessed at the full rate as soon as first class crops are grown on it. The settlement rate, or the full rate imposed under rule 3, shall not subsequently be lowered because the land is found to be sown with inferior crops, unless there is reason to believe that its equality has deteriorated owing to river action. The word river action (*sadma darya*) included a continued change in the course of the river which prevents land assessed at first class rates from continuing to produce first class crops.

6. The classification of land should not be too minute. If a survey number is not very large, it will usually be best to apply a single rate to the whole number, although different parts of the field may differ somewhat in the character of the crops grown.

7. In calculating the revenue no fractions of a bigha less than half will be taken into account. Any number of biswas below six will be disregarded. Six to 14 biswas will be treated as half a bigha, and any number of biswas above 14 as a whole bigha.

B.—Assessment rules applicable to estates subject to the action of the canal, torrents and canal escapes.

1. When by the action of a canal or canal escape or a torrent, land assessed as cultivated is carried away or rendered unfit for cultivation, or land assessed as pasture is carried away or rendered unfit for grazing, the assessment thereon shall be remitted.

2. When new culturable waste is formed either by accretion or by cultivated land ceasing to be cultivated, and the said culturable waste is fit for grazing, such waste shall be assessed at $2\frac{1}{2}$ pies per kacha bigha or one anna an acre. The same rate shall be imposed on land hitherto unassessed when it is rendered fit for grazing by canal or torrent action.

3. The classification of land should not be too minute. If a survey number is not very large, it will usually be best to apply a single rate to the whole number, although different parts of the field may differ somewhat in the character of the crops grown.

4. In calculating the revenue, fractions of a bigha less than half will be taken into account. Any number of biswas below 6 will be disregarded. Six to 14 biswas will be treated as half a bigha, and any number of biswas above 14 as a whole bigha.

* Appendix to these rules.

The underlined words do not apply to Thanesar tahsil.

5. When cultivated land has been materially injured by the action of the canal, or of torrents, or of canal escapes, but is still capable of cultivation, half the assessment imposed at settlement shall be remitted. The full rate shall be reimposed if the land again becomes of average quality.

6. Land which was unassessed at settlement, but has since become capable of cultivation owing to the action of the canal, or of a torrent, or of a canal escape, may be assessed, according to its quality, at the full village assessment rate for unirrigated land or at half the full rate, provided—

- (a) that the above rates shall not be imposed, unless the land is actually cultivated ;
- where in the same estate there are two rates, one for land which at settlement
- (b) was affected by the canal or escape channel or a torrent and one for land which was not so affected, the former is the rate to be used in applying this rule.

C.—Procedure : Measurements and preparation of records.

1. Each Tahsildar shall at the end of the autumn girdawari submit to the Deputy Commissioner a list of villages affected by the river or the canal or by torrent action.

The list will show—

- (i) the villages affected by the river Jumna ;
- (ii) those affected by the spill channels of the Jumna, such as the Nun and Puran Nalas, in pargana Indri, or the Dolaha Nala, in pargana Karnal;
- (iii) those affected by the percolation from the Western Jumna Canal and by the Kanjnun, Dhanaura, Budha Khera, Rer (Khogipur) escapes;
- (iv) those affected by the Umla and Markanda torrents, including the Betan and Gadla channels;
- (v) those villages not coming under quadrennial attestation in which the Tahsildar proposes to make measurements (the grounds of his proposal should be explained).

2. As soon as the river has fallen to its ordinary cold weather level, measurements will be made in the case of estates on the Jumna and its spill channels (*i.e.*, clauses (i) and (ii) above) in order to bring to record the changes caused by the river action and to assess land which has improved or deteriorated from the same cause.

3. In the case of estates affected by canal percolation or by canal escapes or by hill torrents measurements will ordinarily only be made in the year when the quadrennial attestation of the estates takes place, provided that the Deputy Commissioner may order the lands in any estate to be measured and assessed in a year other than that of quadrennial attestation if changes have occurred in the estate as a whole, or in individual holdings of sufficient importance to render this course desirable. In the case of a large estate, part of which comes under special attestation in one year and part in a second year, the measurements should, as a rule, be made in the first year.

4. In estates having fixed boundaries (*i.e.* Thanesar) changes are confined to alteration of class, the total area of each estate remaining unaffected.

5. (i) Elsewhere in each year as soon as the river has fallen to its ordinary cold weather level, which will generally be by December 1st, the patwari will go over the part of the estate liable to be affected by river action and note the areas affected, making measurements in order to bring to record the altered areas, and to enable the Collector to ascertain the revenue to be remitted or imposed.

(ii) He should first make a tracing from his map of the village of the part of the area liable to be affected by river action, and will show on this the area—

- (a) lost by diluvion;
- (b) thrown out of cultivation or damaged by water or sand;
- (c) gained by alluvion;
- (d) brought into cultivation for the first time;
- (e) liable to have its assessment increased.

The tracing should not show a larger area than necessary, but should show not only the fields affected, but also those which actually touch them. These tracings will be on unbacked mapping sheets. A half or quarter mapping sheet may be used if this will show all that is required.

(iii) When land has been lost or thrown out of cultivation the patwari will by offsets from the nearest squares fix the position (1) of the near edge of the deep stream and (2) the line of erosion, which will not necessarily coincide with the edge of the deep stream. He will shew the former by a red line, and the latter by a blue line, at each end of which he will affix the year and his signature. He should write Dhar Kalan against the deep stream and “Burdi” against the blue line. If whole fields have been affected, the area will be taken from the jamabandi; if only a part, the area will be ascertained by chaining. In any year where there has been no change except diluvion, the previous year’s tracing may be used and a fresh tracing need not be prepared.

(iv) When land has been gained by alluvion the position of the edge of the deep stream and of the land gained will be ascertained by producing the squares of the village and taking offsets. The patwari will indicate the position of the deep stream and limit of the old land by red and blue lines as in clause (iii) writing *Dhar Kalan* and *Baramad* with the year at each end of the line to which the entry relates. The field numbers to be given to the new area should start from the last number in use in the old map, the highest numbers being given to those fields which are nearest the river. If the new land is uncultivated the limits of the survey numbers should correspond with the limits of the squares.

6. When the field numbers are according to squares, sub-numbers will not be made for plots of new cultivation or for temporary cultivating holdings. The premature record of cultivators' sub-numbers should be avoided because such divisions are often obliterated and recast, and their introduction into the map and annual papers complicate future business. It would be better to enter such land as "baramad shamilat," if the owners prefer to treat it as shamilat, or "malikiyat mukhtalif malikan bamujib kaghzat sabiq" if they intend to keep their former ownership. When the owners apply for demarcation the old boundaries can be laid down properly on the ground. When the river after obliterating the boundaries of the fields keeps its deep stream unchanged the same procedure should be observed as above, *i.e.*, the old field boundaries will not be shown on the di-alluvion map, but the land will be shown as banjar or ghairmumkin "shamilat", or as bajar or ghairmumkin "milkiyat mukhtalif malikan bamujib kaghzat sabiq."

7. Rules 4 and 5 do not apply to estates on the canal, the Budha Khera escape, or spill channels of the Jumna.

8. The patwari will draw up in duplicate khasras of land lost by diluvion (Form A*) gained by alluvion (Form B*) and improved or deteriorated by river action (Form C). In Form C he will fill up the first columns in ink and columns 10 to 12 in pencil. He will also make in the register of fields previously assessed below full rates (Form D) the necessary entries relating to crops grown in the past year, or, in the case of villages affected by torrents, the canal or the Budha Khera escape, in all years since alluvion and diluvion measurements were last made.

9. The kanungo will satisfy himself that the patwari has included in his maps and khasra all land which under rule 4(ii) should be included, will test the measurements and check the khasra.

10. As soon as the khasra has been checked by the kanungo, the patwari will prepare in duplicate in Form E, a village abstract of changes due to river or canal action. He will make all the entries in column 1 to 3, and also those giving the details of area and revenue for the previous year in ink. the entries showing deductions and additions and the area and revenue for the current year will be made in pencil.

11. The Tahsildar shall test the maps, &c., on the spot, and pass orders as to classes of land, rates and revenue after inspecting the fields and examining the entries in the khasras and in Form D. He shall cause to be entered in ink in the khasra the class and rate for each field as determined by himself. He shall at the same time make the patwari enter in Form D the rate against each field of which the class has been changed, and also all fields assessed for the first time below settlement or full rates. He will also have an extract from Form D, showing those numbers only of which the assessment has been changed in the current year, put on the file. This extract will only give the entries relating to these fields for the past four years. Form E will be completed by the patwari under the Tahsildar's directions. The Tahsildar will add a brief note to the file, explaining the changes which have occurred and his assessment proposals. He will then sign the maps, khasras, extract from Form D, and abstract of area and revenue (Form E), taking over the extract and the Government copies of the other papers. He will also sign the register (Form D) which the patwari will retain in addition to his own copies of the other papers.

12. When the Revenue Officer who is empowered to pass final orders on the assessment disposes of the case, any corrections in the paper required will be made in the Government copies, and the patwari will be ordered to correct his own copies. He will also prepare induplicate a khewat showing the result of the new assessment (Form F) and forward both copies to the tahsildar through the kanungo. The Tahsildar will see that the khewat agrees with the orders, and signing both copies will file one with the record and return the other to the patwari. The latter will embody the new figures in future bachh papers, and will give free of charge a fard, showing the result to each khatewar concerned.

13. The whole file regarding changes of assessment due to river or canal action shall be prepared on Lucknow paper stitched at the back in book form. The tracings of maps will be placed in an envelope of the full size of the file and will not be folded more than twice.

14. The district report of changes of assessment due to river or canal action will be prepared in Form G

15. Cases frequently occur in which remission of the current demand is required in consequence of destructive inundation, although no permanent injury has been done to the soil rendering a reduction of revenue needful. When making his inspection, the Tahsildar should report on all such cases, including cases occurring in estates in which no measurements will be made in the current year. Reports recommending such remissions should be made in Form A or B appended to Revenue Circular No.31, and should be submitted for sanction along with Form G.

* Not required for Thanesar.

FORM A.

Khasra of diluvion.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Serial No.	Khasra No.	No. of holdings.	Owner, briefly.	Tenant, briefly.	FORMER.		LAND REMAINING.			LAND LOST.			REMARKS.
					Area in bighas.	Class of land.	Area of calculation.	Area.	Class of land.	Area.	Class of land.	Rate.	

- NOTE : — 1. Columns 7, 10 and 12. There are the following classes of land:—
- (a) Unassessed (kharif parta).
 - (b) Paying settlement rate on cultivation, or banjar (band obasti),
 - (c) Paying full rate (kamil).
 - (d) Paying half rate (adna).
 - (e) Assessed culturable waste (banjar).
2. The total of the area shown in column 11 will represent the extent to which the area of the area of the village has been reduced by diluvion.

FORM B.

Khasra of alluvion.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Serial No.	KHASRA NO.		Khewat No.	Owner, briefly.	Tenant, briefly.	Area of calculation.	Area.	Class of land.	CROPS.		REVENUE.		REMARKS.
	Old.	New.							Kharif.	Rabi.	Class.	Rate.	

- NOTES.— 1. Column 2.—If the new land cannot be identified in any settlement record this column shall be left blank and column 5 shall be filled in according to the provisions of paragraph 7 of the wajib-ul-arz of the village.
2. Column 8. —Total of the area shown in this column will represent the extent to which the area of the village has been increased by alluvion.
3. Column 9. — The entry will show whether the land is cultivated or if uncultivated whether culturable or unculturable.
4. Column 12. —This column will only be required for cultivated land and the only entries will be assessed at full rates” (kamil) or “assessed at half rates” (adna).

V
FORM C.

Khasra of changes in class of land due to river action.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Serial No.	Khasra No.	Khewat No.	Owner, briefly.	FORMER.			PRESENT.				CROPS.			REVENUE.		REMARKS.
				Tenant, briefly.	Area.	Class of land.	Rate of assessment.	Khasra No.	Area of calculation where necessary.	Area.	Class of land.	Kharif.	Rabi.	Class.	Rate.	

FORM D.

Khewat showing changes in revenue of holdings due to river action as ascertained at end of kharif 191 .

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Khewat No. in last jamabandi.	Khatauni No.	Name of owner and of tenant where necessary .	Assessment o Khata according to last year's papers.	KHASRA NO. , FORMER.				PRESENT.				DIFFERENCE.		Revenue of kahata as now fixed.	REMARKS.
				Old.	New.	Class of land.	Rate.	Demand .	Class of land.	Rate.	Demand.	Increase.	Decrease.		

FORM E.

Register of fields assessed at half rates and of fields assessed as culturable waste.

1	2	3	4	5	6	7	8-28
Khasra No.	Owner and tenant (briefly).	SAMBAT 19 , A.D.					Previous columns to be repeated for 3 more years.
		Area with details.	Crops.		Rate.	Remarks.	
			Kharif.	Rabi.			

FORM

Statement of diluvion and alluvion

[illegible]

NOTE 1—The figures in column 7 should agree with the
2—The assessment in columns 24-26 is also taken as

F.

assessment made in 19 for the

[illegible]

figures in column 26 of the statement for the previous year.
the prospective assessment for the next agricultural year.

FORM G.

Statement of financial results of alluvion and diluvion assessment for the district made in division 19 , and for the agricultural year (kharif 19 and rabi 19) and the proposed remission in the revenue roll and amount to be collected as fluctuating revenue.

1	2	3	4	5	6	7	8	9	10	11	12	13
District.	Tahsil.	Assessment circle.	River.	Jama of villages affected for agricultural year previous to period under report, kharif 19 rabi 19 .	Gross increase of assessment due to alluvion, &c. (including jagir).	Gross increase of assessment due to diluvion, &c. (including jagir).	Net increase (khalsa) to be collected as fluctuating revenue.	Net decrease (khalsa) to be remitted.	New assessment of villages affected for agricultural year, kharif 19 rabi 19 .	REMISSION PROPOSED ON ACCOUNT OF INJURY TO CROPS BY INUNDATION.		REMARKS.
										Kharif 19 .	Rabi 19 .	

NOTE—Column 3.— When the assessment circles are numerous, this column may be omitted under sanction of the Commissioner.

Column 4.— The figures for the large rivers of the province should be given separately. Those for minor streams may be lumped together.

Column 9, 11 and 12.—The amounts shown in column 9 will be struck off the rent roll of the succeeding agricultural year, not so the amounts shown in columns 11 and 12.

Column 13.—Note in the column the officer by whom the assessments were made and tested, and the method adopted in assessing. Reference should be made to settlement reports prescribing such method, or to corresponding conveying special sanction.

No. 3806, dated 8th November 1909.

From—A. H. DIACK, Esquire, Settlement Commissioner, Punjab,

To—The Settlement Officer, Karnal.

IN reply to your letter No. 860, dated 1st November 1909, suggesting certain amendments in the Dilluvion rules for the Karnal district, I have the honour to say that the modifications proposed may be made.

Appendix B.

Rules for increase or reduction of assessment on extensions or contractions of canal irrigation.

IN making the changes of soil classification prescribed by the note regarding column 7 of the jamabandi form (paragraph 22 of Standing Order No. 23), no field or part of a field—

- (a) Shall be converted from barani to nahri unless the khasra girdawari shows it to have been irrigated in two out of the four years ending with that to which the jamabandi relates ;
- (b) Shall be converted from nahri to barani unless it has not been irrigated in the year to which the jamabandi relates, and likewise in the two preceding years.

2. If only part of a field has been converted from barani to nahri or *vice versa*, no change of classification shall take place if the area affected is less than one pakka bigha.

3. The new entry of nahri in place of barani or barani in place of nahri shall be made by the patwari in red ink. The field kanungo shall see that the changes made are in accordance with rule 1, and shall sign the new entry. He shall further, by an examination of the khasra girdawari, satisfy himself that a change of entry has been made by the patwari wherever such a change was required. He shall carefully check the totals of nahri and barani entered at the end of the jamabandi, and shall attest them with his signature. In his note on changes in soil entries attached to the jamabandi (see instructions appended to the jamabandi form in paragraph 22 of Standing Order N. 23) he shall state exactly what he has done to ensure correct entries. In attesting jamabandis, Tahsildars and Naib Tahsildars must pay special attention to these new soil entries.

4. When the total of the nahri area differs from that show in the last jamabandi, the field kanungo shall apply to the excess area or to the reduction of area, as the case may be, one of the following rates: —

- (a) In villages which were canal irrigated at settlement, the difference between the Settlement Officer's assessment rates on nahri and barani.
- (b) In villages to which canal irrigation has been extended since settlement 4 annas per acre.

5. If an additional nahri assessment under these rules has already been imposed on, or a reduction made in, a village at a previous quadrennial attestation, the area to which the rate referred to in the preceding paragraph will be applied, will be the excess or reduction of area since the last imposition or reduction of nahri assessment. If no previous assessment has been imposed or reduced, the area will be the excess or reduction of area since last settlement.

6. If the sum resulting from the application of the rates detailed in rule 4 to the area defined in rule 5 is less than Rs. 50 or than $1/10^{\text{th}}$ of the revenue of the village (whichever is less), no further action will be taken, but the field kanungo will note the result of the calculation in his attestation note on the jamabandi, and the Tahsildar or Naib Tahsildar who attests the jamabandi should check the calculation and should state in his attestation note that he has done so.

7. If the above sum amounts to Rs. 50 or more, or, in villages the revenue of which is less than Rs. 500, to $1/10^{\text{th}}$ of the revenue of the village or more, the patwari will prepare a list in the following form and forward it to the field kanungo. After it has been checked and

Patwari Circle

Tahsil

for the year 19 .

NOTE—Columns 7 and 9.— If part of a field is affected the word “min” Should be added. If a whole holding is affected no detail of field numbers is required, the words “salim khata” are sufficient.

Columns 11.—For rate see rule 4. It will be uniform for the village concerned.

Columns 12, 13, 15 and 17. — Detail of muafi, if any, should be noted in red ink.

8. On receipt of the detailed statement the Tahsildar shall have an abstract for the tahsil prepared in duplicate by the wasil-baki-navis in the form below. A *separate abstract will be prepared for each canal division concerned*. After signature a copy of the abstract with the detailed statement will be forwarded by the Tahsildar to the Collector so as to reach his office not later than July 31st :—

Abstract showing nahri assessment payable on account of extensions of canal irrigation or remissible on account of reductions of the same in

9. After the statements have been checked in his office, the collector shall report the amount of the assessment to be imposed and to be reduced through the Commissioner for the sanction of the Financial Commissioner *and shall inform the Executive Engineer of the proposal made, sending him at the same time the abstracts for information and return.* On receipt of sanction he will return the detailed statements to the Tahsildar, ordering him to have the addition to or the reduction from, the assessment incorporated in the kharif bachh.

10. In incorporating to changes due to addition or reduction of assessment in the bachh the patwari shall, whether the assessment on nahri and barani is distributed at an all-round rate or by differential soil rates, impose or reduce the nahari rate on or from the holdings affected taking the details from the statement in rule 7.

11. Field kanungos and Revenue Officers must carefully check the patwaris' bachh work and see that the above orders are correctly carried out.

Appendix C.

Scheme for working suspensions and remissions in the Karnal district.

MUCH of the Karnal district is secured against the worst effects of droughts by sufficient irrigation from wells or canals. A scheme for working suspensions and remissions need therefore only take account of the most precarious circles.

The circles which are considered insecure are:—

(1) The Nardak-Indri circle	...	...	Karnal tahsil
(2) The Northern Chachra	...	...	Thanesar
(3) The Southern Chachra	...	...	„
(4) The Naili	...	...	Kaithal
(5) The Andarwar	...	...	„
(6) The Bangar-Pehowa	...	...	„

The scheme proposed for these circles is based on that prepared by Mr. Kitchin for the Rawalpindi district. At the head of the new statistical form which has been bound up with the village abstract note-books (a copy of which is appended to this note) has been entered the averages of cultivations, irrigation and cropped areas for the ten years, 1899-1900 to 1908-09. The incidence of the new demand for each harvest on the average matured area of that harvest has been entered in columns 31 and 32 in black ink. This may be regarded as the normal rate. Each village has also been classified as follows:—

- A.—Village secure, suspensions ordinarily never needed.
- B. —Suspensions ordinarily needed after a series of bad seasons.
- C. —Suspensions needed only after two bad harvests.
- D. —Village insecure, suspensions needed after single bad harvest.

The letter showing the classification of the village has been entered in red ink at the top of each statement. A danger rate calculated at about twice the normal rate has been devised for the villages falling under classes C and D, * and has been entered in columns 31 and 32 under the normal rate.

A separate register of insecure circles has also been prepared for ready reference, apart from the statement in the abstract village note-books.

It has been found impossible, however, to devise a danger rate based on the cropped area which will accurately represent in all cases the necessities of a village in the matter of suspensions and remissions. In the first place villages in fixing a proportion of the demand payable in each harvest frequently disregard the proportion which the crops of one harvest bears to the total harvested area of the year. A village which harvests two-thirds of an annual crop in the rabi not infrequently elects to pay its revenue in two equal instalments, and it was not thought advisable to bring pressure to bear on the people to induce them to make the payment of their instalments correspond with the proportion of crops harvested in each season. Moreover, in Karnal generally and specially in the circles regarded as insecure, much of the people's income is derived from sale of young stock of buffaloes or from the profits obtained from the manufacture of ghi. The danger rate based on the matured area cannot possibly take into account this sort of income. The really important features of the scheme are the classification of villages on broad lines, and the short note of a line or two by the Settlement Officer which has been added in the forms of abstract village note-books and the register.

The rest of the district as said above may be considered secure; but in every circle a few villages are to be found which get no canal irrigation or whose fiscal history has been so disastrous as to necessitate special treatment being given to them. Special note has been made in case of these villages. The use to be made of the danger rate in connection with suspensions of land revenue is explained in paragraph 563 of the Land Administration Manual. When the question is one of recovery of arrears, the rate to be referred to is the normal rate (paragraph 575 of the Land Administration Manual). Ordinarily there should be no recovery of arrears in a harvest in which the incidence of the land revenue instalment on matured crops has not fallen below the normal rate. The amount of arrears to be recovered should in no case exceed the amount of the current land revenue instalment, however good the harvest may be.

Insecure estates in Karnal belong to the class in which remission after revenue has been suspended for three years is not, as a rule, necessary (see paragraph 576 of the Land Administration Manual and paragraph 86 of Mr. Douie's Final Settlement Report).

* See statement appended to this scheme.

Remission should not be granted to well-to-do- landlords and men of the capitalist and professional classes, who take cash rents, unless it is shown that the rents has not been realized, because remission to the landlord should be accompanied by a remission of rents under section 30 of the Tenancy Act. When remissions are proposed, Tahsildars should report carefully what rents such landlords take, and if they take cash rents, whether they have realized them or not.

With regard to collections reference may be made to Mr. Douie's remarks in paragraph 86 of the Karnal-Ambala Settlement Report: "There need be no hesitation in letting suspensions run on for longer periods if each harvest is carefully watched, and recoveries made from time to time whenever a good season provides the landowners with a sufficient surplus."

CHIEF AGRICULTURAL STATISTICS OF MAUZA

گوشواره حالات دیہی و وضع

TAHSIL

DISTRICT KARNAL.

[illegible]

Danger rates for classes C. and D.

The following danger rates are sanctioned for tracts C and D:—

		Class.	Kharif.	Rabi
<i>Karnal tahsil</i> —				
Nardak Indri Circle and other inferior villages in the tahsil.	{	C	Rs. 4 both harvests.	
		D	„ 3	„ „
<i>Thanesar tahsil</i> —				
S Chachra and	...	C	Rs. 4	Rs. 5
N Chachra Circles	...	D	3	4
<i>Kaithal tahsil</i> —				
All insecure circles, i.e, Naili, Andarwar, Bangar, Pehowa and other inferior villages in parts of the tahsil.	{	C	Rs. 4 both harvests.	
		D	„ 3	„ „

Villages Classed as D should have the usual suspension statement prepared every harvest for the Collector's inspection. For classes C and B suspension statement should only be prepared if the collector thinks necessary.

GLOSSARY OF VERNACULAR TERMS.

Vernacular terms.	Meaning or explanation.	Para.
Abi ...	Land watered by lift from a river or creek or tank ...	39
Ala Lambardar ...	Chief village headman ...	91
Anjan ...	A kind of grass (<i>Andropogon iwarancusa</i>) ...	2
Bajra ...	Spiked millet(<i>Holcus spicatus</i>) ...	20
Bangar ...	Upland ...	2
Bannia ...	A money –lender and grain trader ...	20
Banjara ...	Trader, generally a cattle dealer ...	27
Barani ...	Land cultivated on rainfall ...	8
Batai ...	Division of produce as a form of rent ...	21
Bet ...	The riverain ...	14
Bhor ...	A tree (<i>ficus bengalensis</i>) ...	2
Bhur ...	Very sandy soil ...	39
Bigha ...	A standard of land measure,— pakka = 5/8 of an acre, kacha = 5/24 of an acre.	20
Bund ...	A dam, protective embankment ...	6
Chahi ...	Land irrigated by wells ...	39
Chari ...	Fodder ...	42
Charand ...	Grazing ground ...	26
Chaukidar ...	A village watchman ...	93
Dab ...	A kind of grass (<i>Poa cynosuroides</i>) ...	8
Dahr ...	A very stiff soil on which only coarse rice can be grown ...	39
Dakar ...	Hard clay soil found in depressions ...	39
Dhak ...	A tree (<i>Butia frondosa</i>) ...	2
Dhan ...	Rice (<i>Oryza glutinosa</i>) ...	20
Dubra ...	A kind of grass (<i>Cynodon dactylon</i>) ...	2
Gatha ...	A lineal measure -99 inches ...	31
Ghair hazir ...	An absentee ...	36
Ghair qabiz ...	Out of possession ...	36
Ghi ...	Clarified butter ...	28
Girdawari ...	Crop inspection ...	34
Gowara ...	A pulse (<i>Dolichos psoraloides</i>) ...	42
Gur ...	Unrefined sugar ...	20
Ijara ...	A fixed rent in grain ...	21
Inamdar ...	An influential person in a village to whom cash allowance is paid to secure his services.	90
Jagirdar ...	An assignee of land revenue ...	2
Jamabandi ...	Record-of-rights ...	36
Jamoa ...	A variety of the jamon tree (<i>Sizygium jambolanum</i>) ...	2
Jhao ...	Brushwood (<i>Tamarix dioica</i>) ...	2
Jhil ...	A sheet of water, a marsh, a swamp ...	6
Jowar ...	Great millet (<i>Holcus sorghum</i>) ...	20
Karm ...	A lineal measure 57.125 inches ...	31
Khadar ...	Low lying land near a river ...	2
Khalsa ...	Government dues (<i>as contrasted with jagir</i>) ...	11
Kharif ...	Autumn harvest ...	3
Kharaba ...	Failed area of crops ...	61
Kikar ...	A tree (<i>Acacia Arabica</i>) ...	2
Killa ...	A measurement of 8 kanals and 18 marlas ...	33
Killabandi ...	Reomdelling of the fields on rectangles ...	33
Lambardar ...	A village headman ...	92
Methi ...	Fenugreek (<i>Trigonella fenugracum</i>) ...	42
Moth ...	A small pulse (<i>Phaseolus aconitifolius</i>) ...	20
Muafi ...	Assignment of land revenue ...	95
Muafidar ...	Holder of a muafi, an assignee of land revenue ...	95
Nadi ...	A hill stream ...	6
Nahri ...	Land irrigated by canal ...	39
Nala ...	A stream, a canal or drainage cut ...	4
Pachotra ...	A 5 per cent, remuneration paid to a lambardar on the col- lection of land revenue ...	92
Palwa ...	A grass (<i>Andropogon annulatum</i>) ...	2

Vernacular terms.			Meaning or explanation.	Para.
Panni	...	...	A grass (<i>Andropogon muricatum</i>)	2
Pargana	...	...	A tract of country comprising a number of villages	12
Prohat	...	...	A family priest	24
Pilkhan	...	...	A tree (<i>Ficus infectoria</i>)	2
Pipal	...	...	Do. (<i>Ficus religiosa</i>)	2
Rabi	...	...	Spring harvest	3
Rajbaha	...	...	A canal distributary	5
Rausli	...	...	A moderately sandy loam	39
Reh	...	...	Saline efflorescence in the soil the	12
Sailab	...	...	Land irrigated by inundation, flooded or kept permanently moist by a river	8
Sarson	...	...	Rapeseed (<i>Brassica campestris</i>)	20
Sofaidposh	...	...	A yeoman grantee	91
Thana	...	...	A police station and the area attached to it	90
Tibbi	...	...	A sand hill	39
Zabti rent	...	...	Cash rents levied on account of crops of which the produce in not divided	41
Zail	...	...	A group of villages	90
Zaildar	...	...	A non-official in charge of a zail, a rural official	90
Zamindar	...	...	A land-owner	7
Ziri	...	...	Fine rice (<i>Oryza sativa</i>)	42