CHAPTER II.—ECONOMIC.

Section A.—Agriculture, including Irrigation.

Agriculture Including Irrigation.

The soils of the district.

108. The surface of the country, though flat, everywhere undulates more or less and a perfectly level stretch of any great extent is rare. In the settlement of 1878 much attention was paid to differences of soils which were classified under names introduced from the then North-West Provinces. The main soil of the district, a good light-coloured alluvial loam, which with sufficient moisture yields splendid crops in return for little labour, was termed *rausli* and the light sand of the ridges *bhur*, while two clay soils were distinguished according to their tenacity by the names *dákar* and *matiyar*, the former splitting into fissures after irrigation. The clay soils exist only in depressions to which the greater part of their argillaceous matter has been washed by rain from the surrounding higher lands, and are found chiefly along the drainage lines or in the naturally flooded (*dahri*) depressions of Jhajjar. The people recognise clearly that the main practical distinction is between irrigated and unirrigated land, though different fields will according to the greater or less tenacity of their soils, produce varying crops with varying falls of rain, and for this reason in the recent settlement the only rain land soil which has been specially distinguished is the poor light *bhur*, while the rest have been classed together as *barani*. The whole of the soil contains salts in greater or less degree and throughout the district it is the presence of canals or rainwater tanks on which they are sunk which keeps the drinking wells sweet; and a sweet well soon turns to brackish and even to salt if this influence is removed. Some taste vapid, some brackish, some like pure brine, while there are in Zahidpur wells from which salt is produced by evaporation. Many wells too are called *telia* and the water of these has a curious oily scum very visible in the tea-pot. The village where the sub-soil water is brackish is called *khára biswa* by the people.

Saline efflorescence.

109. *Reh* or *shor*, is to be met with both in the canal tracts, and where the wells are brackish. The evil is not very serious and is certainly less than it was before the remodelling of the canal. Sarsadh and Busanah in Gohana *tahsil* are the worst affected villages, but even there there are signs of improvement. In Chamari of Rohtak *tahsil* however the mischief appears to be on the increase.

Systems of cultivation of different crops.—Irrigated crops.

110. The following account of the system of cultivation in the district is reprinted from the settlement report :—

Cane cotton and wheat are of course the chief irrigated crops. With the exception of an occasional acre on the wells or floods of the *dahri* tracts cane is entirely a canal crop. Wheat is mainly a canal crop, though a little is grown on the Jhajjar wells, and after the subsidence of the floods, when it is usually irrigated by bucket-lifts. If grown *barani* it is so generally in the form of

CHAP. II, A.

Agriculture Including Irrigation.

gochni, so that if the wheat fails the gram may spread and take its place. Nearly half the barley of the district is found on the Jhajjar wells of which it is the crop *par excellence*. As a *barani* crop it is preferred to wheat, withstanding drought better and needing less tilth, but, like it, is often mixed with gram, when it is known as *bejhar*. The pulses are usually sown mixed with millets, *mung* and *mash* with *jowar*, and *moth* in lighter soil with *bajra*. *Gowar* is mixed with both. Pulses generally are known as *masina* or mixtures and when themselves mixed together, as they often are in Jhajjar, as *dhangrala*—in which form they are usually sold to the *baniya* and by him as *moth*, the pure crop being called *gori moth*. Cotton is primarily a canal crop, but in a year of good early rainfall a considerable quantity is grown *barani* in the stiffer soils of the northern part of the district where, as in 1909, it sometimes answers better than the canal-sown crop.

Cane is grown in soil most carefully prepared and heavily manured. The ideal of ploughing is expressed in the proverb: *Nau bar ganda, das bar manda*, "Nine ploughings for cane and ten for wheat." After the plough follows the clod-crusher. The allowance of manure is from ten to thirty cart-loads an acre. A week after sowing the soil is broken up by hand, before the cane has sprouted; this is know as *andhi kodha* and after it has sprouted the *motiya* grass and other weeds need constant removal, involving in good tilth 10 or 15 weedings, though it often does not get so much. The clod-crusher follows the weedings until the crop is about two feet high. Sown on a *palewar* (preliminary watering) it needs three more waterings before the rains break, when, if the monsoon is full, it will not be watered again until the end of August: two more waterings are given after that if possible, and if the monsoon is poor it must have water in *Bhadon* to succeed.

It follows from the preparation the soil requires, the time the crop occupies, and the demands it makes upon the strength of the soil that it is usually followed and often preceded by a fallow, (as the crop is counted as a *kharif* crop there is always a paper fallow in the *rabi*, whatever happens); the most approved rotation is to give two fallows after cane and then sow wheat but there are villages where cane follows cane as soon as it is off the ground with no real fallow, for several years—a practice not to be commended.

Cotton is a crop which involves far less labour: two or three ploughings suffice, even when the land is *thápar*, that is, consolidated by having last borne a *kharif* crop or an irrigated *rabi* crop; but if that crop has been cane, the presence of manure in the soil reduces the number of ploughings. If the soil is *umrá*, that is, loose from having borne an unirrigated *rabi* crop, especially gram, one or at most two preliminary ploughings suffice. Irrigated cotton is sown after a *palewar* from *Chet* to *Jeth*. It needs the

CHAP. II, A.
Agriculture Including Irrigation.

kor (first watering after sowing) in *Har*, another watering in *Sawan* and a third in *Bhadon*. By far the most important is the *dusra pani* of *Sawan*, and if rain does not fall at that period and the canal supply—as not infrequently happens towards the tails—is short, it goes ill with the crop. Rain in *Asoj* spoils the crop, and water after *Bhadon* makes wood not cotton, but it is a common practice when the cotton is beginning to be picked to put on water and sow *methi* broadcast: a tenant will pay the land revenue of the field for the year for this privilege, and in the same way a man will give his field free of rent for gram to be sown in order to render the soil *umra* and more fit to bear the cotton crop. Cotton requires three or four weedings.* It will often receive a little manure, even when sown *barani*. The seed, which is sown broadcast, is first mixed with animal manure to start germination. Like sugarcane the crop needs rain, and artificial flooding is not enough to ensure a return. In *barani* lands cotton will often be followed by gram: on the canal by *methi*, *masur* or even wheat. It is no uncommon sight to see *methi* and *masur* growing up before the bolls are all picked and the cultivator of the former may be different from the owner of the cotton crop. More often, however, the ground is allowed a fallow or given two fallows and then sown with wheat.

Wheat itself, as noted above, needs a deal of preparation of the soil† but thereafter its cultivation is easy. It is seldom weeded, never more than once. The chief weed is *batua* and as that is picked for *sag* (greens) the weeding that it gets involves no extra labour.

Sown on a *palewar* in *Khatak* or *Maghair*, it gets the *kor* in *Maghair*‡ or *Poh* and *dusra pani* in *Magh*. Once in ear it needs no more water, but generally a third watering in *Phagan* is required before the ear forms. Wheat is most commonly followed immediately by cotton. It is doubtful if the sequence is a good one but the demands on the irrigated soil leave no alternative.

On the wells both wheat and barley are preferably sown without a preliminary watering; the more brackish the well the more essential is it that the crop should germinate on the moisture of the rains, and be later refreshed by timely winter rain. Barley takes less water, ripens earlier, and is more immune from damage by the scorching winds of March. It dislikes brackish water too less than wheat and hence its preponderance is most marked in the Bhur circle. Wheat requires 4 or 5 waterings after germination if it has to depend entirely on the well and barley 3 or 4, the daily capacity of a bucket being from $\frac{1}{4}$ to $\frac{1}{2}$ an acre. The tilth is careful

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* *Naulai nah bari dopatti, kya chugegi kupatti.*
If you don't weed it when two leaves high, what will the shrew pick ?.

† *Gehun khana chhaha tha, sadh men kyon nah laha tha.*
If you wanted to eat wheat why didn't you plough in *Har* ?.

‡ *Maghaur men nah diya kor, kiya tere baldan leyaya chor ?*
Not given the *kor* in *Maghair* ? What, had a thief stolen your bullocks ?.

?.II, A. except where the crop is committed to the mercy of Rajputs or Pathans, and the soil is usually heavily manured, in the case of wheat always so: authorities differ as to the value of manure for barley on brackish wells. Once the crop has germinated there is little labour beyond that involved in irrigation, for weeding is little done. The *batua* is indeed gleaned for the pot, but the *khartua* and *piaza* are as often left as removed. In most well villages outside the Dahri circles the water runnels require, owing to the lightness of the soil, to be puddled with clay each time they are used, which is a tiresome addition to the labour of the well.

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111. The *barani* cultivation is very simple, the stiffer lands going under *jowar* with its mixtures, or cotton, and the lighter under *bajra* and its mixtures. Both millets are usually sown with the drill, though on uneven sandy land *bajra* is sometimes thrown broadcast. The good husbandman ploughs all land not under gram in the winter, as next year's millets are improved if the land is turned when cool. In *barani* villages *bajra*, like cotton, will often get a little manure, though there is the danger of the crop being burned by this if the rainfall is scanty. *Jowar* is an exhausting crop and generally demands a following fallow though gram and even *gochni* will occasionally be sown after it if conditions are favourable. *Bajra* is followed by gram whenever the monsoon conditions permit, but this means scant ploughing and is the reason why so much of the gram of the district is a ragged crop and the normal outturn is low. The best gram is that grown *bhadwar*, that is on a fallow when the soil has been ploughed in *Bhadon*. It is a delicate and uncertain crop. It has great power to resist drought but will finally succumb with a rush: it is easily nipped by frost or burned up by cold winds. It is dear to all the burrowing and nibbling orders of creation. In 1909, it fell a prey to grasshoppers, and in 1910 to field-mice.

Like gram, *sarson*, to do well, should be sown *bhadwar*, and the difference between the crop so grown and that grown as a second crop is very noticeable. Of fibres *sani* (*crotolaria juncea*) is usually grown wet or dry in small separate plots and *san* or *patsan* (*hibiscus connabinus*) around the edges of sugarcane fields. *Til* is grown amongst cotton, irrigated or not as the case may be.

The precariousness of the rainfall usually ensures ample fallows for *barani* crops and this enforced rest is the reason why the yield, when crop there is, is comparatively good.

Population
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griculture.

112. By the census of 1901, of the population totalling 630,672, 385,194 persons are engaged in, or dependent on, pasture and agriculture. Of these 124,964 are actual male workers, 51,008 female workers, and 209,222 dependents. It is surprising to find the female workers returned as so much fewer than the male workers. This takes no account of the menial classes who are

primarily engaged in ministering to the needs of agriculture, *i. e.*, the carpenter, blacksmith, and leather workers. These number (including their dependents) 7,597, 5,484, and 38,354, respectively, and bring the grand total up to 436,629. Of persons not engaged in pasture and agriculture 5,373 are actually returned as partially agriculturist. Roughly speaking then two-thirds of the population is dependent on agriculture. The number of money-lenders and bankers with dependents was 9,434 and they again are largely concerned in financing agriculture.

CHAP. II, A. Agriculture Including Irrigation.

113. In paragraph 79 of his settlement report Mr. Fanshawe gives a table of the area occupied by different crops. He did not consider it correct in all particulars, and it is apparently the record of a particular year's sowings. The present records show the area of each staple sown, matured and failed, but when settlement operations began the old procedure was still current by which matured crops alone were classified by their kinds and failed crops were lumped together in one column. The figures here compared with Mr. Fanshawe's are the averages of the seven years 1898-99, 1900-01,—1904-05, 1906-07, which were selected as together representative of normal conditions.

The principal crops grown.

	Last Settlement.		Now.	
	Crop.	Area.	Area.	Crop.
Autumn crops.	Great millet (Jowar)	371,826	145,411	Jowar.
	Bulrush millet (Bajra)	260,793	210,904	Bajra.
	Mung	1,421	14,339	Mung.
	Moth	10,278	3,744	Moth.
	Mash	601	986	Mash.
	Gowar	12,099	35,471	Gowar.
	Sugarcane	14,808	22,324	Sugarcane
	Cotton	44,126	56,433	Cotton.
	Indigo	1,387	2,571	Indigo.
	Rice	4,327	453	Rice.
			30,827	Fodder.
			7,707	Others.
			539,973	Total crops matured
			205,306	Failed.
	Total ...	721,856	745,279	Total crops sown.
Spring crops.	Wheat	36,175	54,323	Wheat.
	Barley	29,280	28,053	Barley.
	Gram	107,118	101,454	Gram.
	Gochni	17,318	13,094	Gochni.
	Tobacco	170	310	Tobacco.
	Sarson	1,473	8,139	Sarson and taramira.
	Vegetables	645	1,424	Fruits, vegetables and roots.
	Mixed barley and wheat		1,681	Fodder.
		661	2,806	Other rabi crops.
			211,274	Total crops matured.
			49,903	Failed.
	Total ...	184,889	261,177	Total crops sown.
	Other crops, harvest unspecified ...	...	751,247	Total matured of year.
		2,343	255,209	Failed.
	Grand Total ...	908,988	1,006,456	Total sown of year.

CHAP. II. A.

Agriculture including Irrigation.

The figures show an increase in sowings of 10·7 per cent. as compared with an increase of 6 per cent. in the total cultivated area. Mr. Fanshawe, however, considered his figures below the mark, and a comparison of seven years' average, even if the result is a reliable and normal one, is not of great value with the results of a single year. It is natural enough that the increase of crops should be greater than that of cultivated area owing to the extension of irrigation. Marked increases are shown in cotton, cane and wheat, the growth of these valuable staples being even greater than appears from the figures as those of last settlement include and the present exclude the failed areas. This is purely due to the extension of irrigation. Rice is disappearing with the disappearance of the unhealthy swamps and excessive irrigation by the aid of which it was formerly grown. Indigo is shown to be more extensively grown than at last settlement, but this too is really a vanishing crop. Its price has always fluctuated wildly, and the adoption of the synthetic dye has made its culture a more precarious speculation than ever. It is grown for seed only, though latterly it is said to have been tested as a fodder crop. Gowar too is grown as a fodder crop being little if ever used for human consumption. The decrease in millets is probably exaggerated by the figures, though to some extent they have no doubt made way for irrigated crops. A portion of the crops now recorded as fodder, and the greater part of the kharif failed crops must be credited to their present account. It is noteworthy that in the selected years more than one-fourth of the crops of the district were recorded as failed.

The average outturn of different crops.

114. A detailed account of the estimated average outturn of the principal staples will be found in paragraph 31 of the settlement report. The figures are as follows in hundred weights per acre the variations being considerable in different parts of the district :—

	Cwts.	lbs.		Cwts.	lbs.
Sugarcane ...	23	24	to	16	8
Cotton irrigated ...	5	64	to	3	64
„ dry ...	2	96	to	2	16
Indigo ...	6	48	to	6	28
Jowar irrigated ...	8	4	to	7	16
„ dry ...	4	52	to	3	64
„ on sand ...	2	96	to	2	76
Bajra irrigated ...	4	52	to	4	32
„ dry ...	3	104	to	3	24
„ on sand ...	3	24	to	2	16
Mung, moth and mash ...	4	52	to	2	16
Gowar ...	4	52	to	2	76
Wheat irrigated ...	10	80	to	8	64
„ dry ...	6	88	to	4	32
Barley irrigated ...	10	80	to	8	104
„ dry ...	8	64	to	5	40
„ on sand ...	5	...	to	3	64
Gram ...	5	...	to	4	52
Gochni irrigated ...	10	40	to	8	64
„ dry ...	6	88	to	5	...
Sarson irrigated ...	4	32			
„ dry ...	3	84	to	3	42

CHAP. II A

Agriculture Including Irrigation.

The extension of cultivation in recent years.

115. The development of resources that has occurred since 1868 is shown in Table I of Part B.

	Acres.	Increase per centum.
Cultivation of 1862*	677,555	...
1878-79 (settlement)	906,351	34
1888-89	932,874	3
1898-99	960,389	3
1909 (settlement)	963,664	3

There is very little room left for extension now, the greater number of villages having reduced their available waste to the very minimum required for the support and exercise of their cattle and as a catchment area for the tanks, while the large uncultivated areas in the *dahri* tract of Jhajjar are hardly suitable for cultivation and the population too is not strong enough to bring them under the plough.

Agricultural implements.

116. Little or no progress has been made in the selection of seed or the improvement of agricultural implements. The varieties grown are those that have been seen in the district for a hundred years past, for the people are very conservative and unprogressive, and the crops suit the soil well enough. Seed is usually purchased from the local *baniyas* who make no attempt at selection, while complaints are made that the ginning mills from which cotton seed is largely purchased mix good and bad together indiscriminately.

With the exception of sugar-presses the agricultural implements seem largely stereotyped. A few are fashioned by the agriculturists themselves, but the bulk of them are made by the village carpenter, blacksmith and leather-worker in return for their customary dues. Only the labour of making and repairing is borne by the two former and the zamindar will have to pay the cost price of the materials used unless he provides his own, though the *chumar* finds the leather for the *sánta* and *narka* (goad and thong).

The repairs of a cart are considered an exceptional charge and for these the carpenter is paid, nor is he usually held responsible for the repairs of a *ghirri* though he will replace the pins free.

The following list comprises all the implements in common use:—

Hal, a plough.

Maij or *sohágá*, flat clod-crusher.

* (Figure approximate ; see paragraph 98 of Mr. Fanshawe's Settlement Report).

CHAP. II. A.

Agriculture Including Irrigation.

Ghirrí or *kolhú* round clod-crusher.
Drántí, a sickle.
Gandásí, a long handled chopper to cut thorns or sugarcane
Kuhárí, a hatchet.
Phálá or *kassí*, a large mattock-spade.
Khurpá, a grass spud.
Dikrí or *jíndrálá*, a drag rake dragged by men for levelling high land.

Gorí, a similar instrument, but dragged by bullocks.
Kasolá, a large mattock for weeding cane.
Kasolí or *khudálí*, a smaller mattock for weeding cane.
Gádí, a cart.
Ladhá, the same without side wattles.
Manjholí, a small cart, used as a carriage also.
Tanglí or *jelí* (*dosang*), a two-pronged fork. If four-pronged it is specified as *chausang*.

Sántá, an ox goad.
Bel, a chain used to secure cart bullocks at night.
Belan, hand ginning mill, also sugar-press.
Boyá, a small basket to take seed or food to the fields.
Charkhá, spinning wheel.
Chhájj, winnowing basket.
Dál, a bucket for lifting canal water.
Dráwá, a scarecrow.
Gharaunchí, a stand to prop a cart when out of use.
Kachaulí, a bowl used as a water clock.
Kolhú, a sugar-press.
Palrí, a basket holding 10 or 12 *sers* of grain.
Dotrálí, a rake.

The principal parts of a plough, their cost and life are as follows :—

Júá, the yoke, *bakain*, *shisham* or *kikar*, two years—eight annas.

Kánchwá, the three raised knobs; *simal*, the four pieces that fit on the neck; parts of the *júá*.

Halas or *hál*, the straight piece joining the yoke to the plough *oa*, the wedge fixing *halas* to *hal*; *sál* or *kikar*, seven or eight years—Rs. 2-8-0.

Hal, the body of the plough, *shisham* or *kikar*; six months—eight annas.

Kus or *phálí*, the iron share, eighteen months—eight annas.

Panihári, the wood supporting the share, *kikar* or mulberry, three months—one anna.

Hatha or *hathaili*, the driving handle; *kikar* or mulberry, one year; one anna.

Orna, the seed drill; bamboo; one anna.

Nárí or *nárka*, the leather thongs of the yoke; leather; six months; free.

Narápli or *nadhel*, a small peg in the *halas* which admits of the adjustment of the yoke; wooden.

Nesang, a small iron peg in the bottom of the *hál* which prevents its detachment from the *hal*.

Andi, the iron band clamping the *phálı* and *panihári*.

Jot the leather strap passing from yoke beneath the bullock's neck.

Pachhela, a wedge rammed under the plough to tighten up theshare.

Purli or *máni*, a button-sheath put on the share when out of use. Total Rs. 4·3.

Sugar presses.

117. The old wooden *kolhu* is now never seen, being entirely superseded by the Bihia iron mill. These, as the iron is somewhat soft and the wear and tear considerable and the consequent repairs beyond the power of the village blacksmith, are never purchased by the tenant, but rented from one of the several firms which establish depôts in central villages with a competent craftsman in charge. Of these there are several in the market, one owned by a Lahore merchant, two by Delhi *baniyas*, and one the property of the Nahan State. One mill will suffice for the outturn of about 15 acres and several zamindars combine to work it. The common charge for hire by the season is Rs. 25 for the press and Rs. 16 for the two iron *karáhas* or cauldrons, (with two *belis* or four *ser* lumps of *gur* for the *babu* thrown in), but the rates vary and in one village the competition of two firms has reduced them to below Rs. 30. The other principal appurtenances of the mill are the three glazed *kunds* into which the juice is first poured and the broad open *cháks* in which it is cooled, costing altogether about Rs. 2. The *cháks* which are strongly made are sometimes provided by the cook. Two are often used, a smaller one being required when the weather is warmer and the *gur* dries quickly. The *kunds* often have a hole near the top and when the juice begins to run out it is time for the next shareholder's pair of bullocks to come on.

The carts of the district.

118. Many of the carts are capable of carrying 40 to 50 maunds—a draught for three or four yoke, all are strongly constructed and admirably suited to the rough roads of the district. A good cart costs about Rs. 60 to Rs. 75 and will last five years in hard work. At last settlement there were between twelve or thirteen thousand carts in the district, and in 1909, 21,826 were registered: the increase is due to the spread of irrigation chiefly, for the carrying trade has declined since the opening of the railway.

CHAP. II, A.

Agriculture Including Irrigation.

The names of the important pieces which make up a cart are as follows:— Wheels, *paiya*, made of *kikar*; axle, *dhura*; the solid bars outside the wheels which keep them close to the body of the cart, *bánkh*; the main pieces which run from end to end, which are made of *sal*, and on which the upper work of the cart rests, *phar*; the side poles, *khúntá*, on which are stretched a netting of bamboo and cord, *barri*; the cross sticks, which support the cart in front when standing, *dahi*, and the log of wood, which similarly holds it up behind, *oláiwa*. The wattled flooring is called *chhíban*. The *gharaunchi* is the trestle on which the cart is supported when repairs to the wheel are necessary.

Furnishings of the well. Other implements.

119. The main furnishings of a well are as follows:—The wheel, *chák* or *bhaun*; the wood-work collectively, *dhánah*;* the rope, *láo*; the leathern bucket, generally made of buffalo skin, *charas*; and the iron ring, round which the bucket hangs, *mándal*. The annual upkeep of well and bucket costs Rs. 18 to Rs. 20. Besides the above implements there may be mentioned as necessary for the work of agriculture the threshing ground, *pair* or *gáhta* with its upright pole (*medn*) round which the oxen treading out the grain are driven; the platforms made of earth or supported on upright poles (*dámcha*), which are needed for the watcher of the crops to protect them from the birds, and the *gofia* or *gopia*, the sling with which he discharges his mud pellets (*gola*). Not a few of the implements are clumsy, but in some cases, at least, with cause. The cart must be heavy and strong to stand the joltings of the ruts of village roads; the plough must be light, and not penetrate too deeply at the time of sowing, for the rainfall is not always sufficient to penetrate far into the soil, and a damp bed of not a few inches deep is needed below the seed, for its roots to shoot down into. In the Gohana *tahsil* the use of a lighter plough for sowing is spreading; it is called *nág* or *nári* in contradistinction to the ordinary *baithial* or *modh hal*, while in the heavier soil of the Jhajjar *dahr* a stronger plough is sometimes seen.

Advances under the Land Improvements and Agriculturists Loans Act.

120. The sums advanced under the Land Improvement Loans Act (XIX of 1883) in this district are almost exclusively for the construction of wells. In the ten years ending 1908-09 only Rs. 68,014 were so advanced. The smallness of the sum arises from no difficulty in obtaining loans, but from the uncertainty of finding sweet water in the well tracts. If the staff of borers which is shortly to be provided can find a method of tapping a sweet supply of water, loans under this Act will probably increase in amount. In the same period Rs. 9,36,254 were advanced under the Agriculturists Loans Act (XII of 1884), the annual

*Many of these terms vary in different parts of the district: in Jhajjar the differences are marked.

advances ranging from Rs. 2,78,599 in 1905-6 to nothing in 1904-5 and 1908-9. These loans are for the purchase of fodder, seed and bullocks, and for the hire of the latter. Many a zamindar is not in a position, when the rains follow a drought, to purchase a pair of bullocks and for an expenditure of Rs. 6 to Rs. 10 he can get his lands ploughed and sown and avoid the cost of maintaining cattle. This form of loan though not strictly covered by the Act has been sanctioned in this district and is very popular. It is often said that a series of bad harvests and the indulgence that Government has shown in the collection of its demands has demoralized the Rohtak Jat and that many take advances in the hope that they will turn out a free gift; but, though the recovery of these demands has been often suspended, the amount that has finally been remitted or written off as irrecoverable is not very large.

CHAP. II, A. Agriculture Including Irrigation.

121. Agricultural banks are so far practically unknown in the district. A beginning has lately been made in three villages but the prospects are as yet very uncertain.

Agricultural banks and indebtedness.

In the matter of agricultural indebtedness what is said in the settlement report may be here repeated.

Between the settlement of 1879 and that of 1909 an area of 52,596 acres, or 50,490 cultivated, has been sold. Of the latter figure 28,764 acres were classed in the reports as having been sold to members of notified agricultural tribes, and 21,726 as sold to "others." At the time the assessment reports were written and the figures tabulated, the Gaur Brahmans had not been notified as an agricultural tribe, but 4,826 acres were noted as having been sold to genuine agriculturists who not being notified were classed as "others." Distributed by *tahsils* the figures are as follows :—

	To notified agricultural tribes.	To others.	Total.	Per cent. of cultivated area.
	Acres.	Acres.	Acres.	
Rohtak	7,494	7,708	15,202	5·5
Gohana	4,668	4,407	9,075	3·0
Jhajjar	16,602	9,611	26,213	8·8
District	28,764	21,726	50,490	5·2

These figures are obviously not alarming, and when analysed they are reassuring. More than half the sales are to members of notified agricultural tribes, generally indeed to members of the village

CHAP. II, A. Agriculture Including Irrigation.

to which the vendor belongs. With the exception of some sales which were due to the famine of 1877-78 when the revenue was collected in full despite the urgent need of relief, very few transactions indeed can be attributed to the pressure of the Government demand. Indeed these transactions do not belong to the settlement of 1879 at all, but having in many cases come on the records after 1879 are debited to its account. The cause of almost every sale was traced at village inspections and for the rest they were found to be due to undue expenditure or special and unavoidable calamities. An expensive marriage, the extravagance of a childless owner, the death of the bread-winner and the survival of a family too young to work, association with idle *fakirs*, the loss of cattle, the sale of land by an outsider who has been allowed to inherit in the female line—these are among the principal causes of sales. That sales are heaviest in Jhajjar is due no doubt to the fact that there are fewer savings there on which to fall back, and that less money can be raised on mortgage owing to the comparative inferiority of the soil.

It will be seen from paragraph 55 of his settlement report that these conclusions as regards sales reflect Mr. Fanshawe's experience of 30 years ago. It can hardly be said however that the existing burden of mortgage is due in the same degree to special causes. The figures compiled for each *tahsil* when the several assessment reports were written, and now retabulated on the new basis, are as follows :—

Mortgages with possession.	To notified agricultural tribes.		To others (including Brahmans).	
	Total.	Cultivated.	Total.	Cultivated.
	Acres.	Acres.	Acres.	Acres.
Rohtak	28,142	26,562	22,815	22,203
Gohana	18,262	17,912	19,999	19,548
Jhajjar	29,359	28,172	20,709	19,971
District	75,763	72,646	63,523	61,722

Mortgage at the time of last settlement in 1879 seems to have amounted to 51,078 acres and has more than doubled since. The tables of periodical totals appended to the present assessment reports show how great has been the rise since 1895-6, the year that ushered in a long lean cycle in this part of the province It cannot be denied that the people have, despite the liberal relief

given by Government, had a very hard struggle during this period, and that to this is due much of the present indebtedness. The statements, however, show an improvement since the introduction of the Land Alienation Act (XIII of 1900) and the critics who condemn this act and clamour for its repeal will find no support among the peasants of Rohtak who regard it as the most beneficent measure of Government passed within their memories. "If Government had not stepped in," they constantly say, "our whole land would have passed to the *baniyas*."

CHAP. II A. Agriculture Including Irrigation.

Fortunately considerably more than half the mortgage is *inter se*. It is noteworthy that in mortgages the Jhajjar *tahsil* does not lead in the same degree that it does in sales. Free-mortgage and little sale is the sign of a comparatively strong estate: the weaker estates are compelled to sell outright. Indeed in many rich estates mortgage is more a sign of easy credit than of real indebtedness.

Of the unsecured debt there are unfortunately no reliable figures. An attempt to calculate these claims was made during the assessment of the Rohtak *tahsil* but there was no time or means to check the allegations made, and the results are of little value. The rates of interest charged in the district are heavy, being seldom less than one pice in the rupee per month and often amounting to double this or to 2 per cent. per mensem compounded six monthly or oftener. The bulk of the money-lenders who do not require the security of the land are baniyas or less frequently Bohras. The Jat when he takes to money-lending usually requires possession as mortgagee.

The cattle the district.

122. The cattle of Rohtak are famous, and though the series of bad years has left its mark on them, the breed is fine in shape and size. A touch of the Hansi strain probably pervades them throughout. The oxen of the villages round Beri and Jahazgarh have a special reputation which is said to be due to the fact that the Nawab of Jhajjar kept some bulls of the Nagor breed (locally called after Bondh, a village in the neighbouring Dadri *ilaka*) at Chuchhakwas and allowed the cattle of the surrounding villages to have recourse to them. Small herds of their wild descendants may often be seen in and about the Chuchhakwas Birh, but since the confiscation of the Jhajjar estate breeding has been indiscriminate and no care has been taken in selection, with the inevitable result that the breed has deteriorated and is reverting to the original type. The true Nagori breed of bulls is becoming scarce and a pair of good Nagori cows cost from Rs. 300 to Rs. 350. Wild herds of the ordinary type are not uncommon in other parts of the district; they are called Ram Chonni and result from some pious act of release, but they multiply to the great detriment of the villages

CHAP. II A. Agriculture Including Irrigation.

concerned, for they are *sacrosanct* and immune from capture*. A fairly well-to-do Jat will, in ordinary seasons, have from 8 to 10 head of cattle of kinds large and small in his yard, and these will yield him four or five cart loads of manure yearly, but the famine cycle since 1896 has greatly reduced the numbers, and by consequence the income from the sale of *ghi* and stock which in 1878 Mr. Fanshawe calculated at about one and a-half and eight lakhs of rupees a year and which together in the present settlement have been estimated at seven and three-quarter lakhs. In the famine of 1877-78 the losses in one way and another by death, sales, transfers, were estimated by Mr. Fanshawe who made some very careful calculations and cattle censuses to be not less than 150,000. Since then besides many years of scarcity there have been three famines, and although the returns of cattle sold at the fair are somewhat misleading owing to a custom—peculiar it is believed to the Delhi territory—which prevails in the rainland villages of selling their oxen after one crop has grown up and buying afresh for the sowings of the next crop so as to avoid the intervening expense of upkeep, yet a comparison of the transactions of famine with normal years shows the drain on the resources of the district. Thus the sales of oxen and cows in the famine year 1899-1900 were roughly 16,500 above those of the previous year and in 1905-06 ten thousand in excess of the year before. A better index is the sale of buffalo-cows which in 1905-06 were more than twice as heavy as in the preceding year.

A calf is called *bachra* or *bachri* according to sex for the first two years of its life, then for two years more *bahra* or *bahri*, after which the full-grown bullock or *balad* is put to work, and the heifer has her first calf and becomes a *gai*. If taken care of a bullock will be fit for work for about ten years after which he becomes old, and is called *dhándu*. The oxen are emasculated at the age of about two and-a-half years by the *chamars* who follow the usual eastern practice of destroying the parts by blows from small sticks.

If well looked after, a cow will bear five or six calves, and live eighteen years. The average yield of milk is about five seers a day. The bulls of the country side are not all good. A large number of inferior animals who have been released as an act of piety, wander about the villages, and old bulls are left to mingle with the herds long after their prime of life has passed. The District Board owns nine Hissar bulls which are placed in charge of leading zamindars for the good of the neighbourhood. Buffalo-bulls are not common; most of the male calves are sold to dealers who take them to Sirsa and elsewhere where there is a demand for them. A young male buffalo is called *katra* for two years, and then for two years more *jhotra*; after four years of life he reaches the dignity of a full-grown

*I had to-day an application for permission to capture them.—*E. J.*—2-8-1910.

bull—*jhota* or *bhainsa*. The cow bears her first calf when four and-half years' old, and will produce six or seven in all. An old buffalo is called *khota* and a barren cow *bahlan*. The Rohtak buffaloes are fine animals, and owing to the presence of the tanks, are found almost in as large numbers in many rainland villages as in the canal estates. Those of the villages round Butanah and Nidanah are famous for their breed.

CHAP. II, A Agriculture Including Irrigation.

123. The price of cattle has increased considerably in the last 30 years. Mr. Fanshawe put the cost of a pair of fine oxen in full strength and vigour at Rs. 80 to Rs. 100, of a cow at Rs. 20 to Rs. 25 and a buffalo-cow at about Rs. 45. Now-a-days a workable young bullock costs anything from Rs. 40 to Rs. 200 and Rs. 65 or Rs. 75 is perhaps the normal price of an ordinary animal. Cows are usually sold at about Rs. 5 the seer of milk, and something over for the calf; more for a steer than a heifer. Rupees 30—45 may be taken as the average price of a cow. A buffalo-cow costs Rs. 80 to Rs. 100. It is said that a Rohtak butcher has recently sold one for Rs. 350 and has also sold a cow which gave 16 *sers* of milk and had a very fine calf for no less than Rs. 262. In another instance recently Rs. 500 was paid for a buffalo giving 22 *sers* of milk but this animal was apparently bred in Hissar. The returns of the Jahazgarh cattle fair do not show such high prices as these, but they include a great number of poor animals.

The price of cattle.

124. Many of the so-called horses are the merest ponies belonging to the village barber or baniya or religious mendicants. Writing in 1880, Mr. Fanshawe said that till recently no village headman used to possess horses, but a few had lately begun to display equestrian tastes. The improvement since then, which is marked, is due largely to the stallions kept at *tahsil* head-quarters, of which there are four, together with three donkey stallions. The latter are owned by Government, and the former by the District Board which maintains both classes. In many villages very passable mounts are to be seen; Samri and Garhwal in Gohana can each show eight or ten. I have known a zamindar get Rs. 200 for a good colt. The Guriani Pathans were once famous horse-breeders, but their trade has diminished though they still buy up animals at different fairs to sell again. There are at present three stationary and one itinerating veterinary assistants in the district and one inspector. A colt is called *bachera* and a filly *bacheri* until three years of age. The donkeys of the district belong entirely to the potters; they are miserable animals, always overworked. A well-fed donkey is as rare as a black swan. They cost about Rs. 12.

Horses and donkeys.

125. The camels are owned chiefly by a class called *rahbaris*, they rarely belong to Jats except in Matanhel (Jhajjar), and a few other villages. A camel is called *bota* or *boti* till it can carry a burden, and then *unt* or *untni*. The female bears after five years,

Camels.

CHAP. II, A. Agriculture including Irrigation.

and will produce six or seven young up to the age of twenty-five, and will live for thirty-five or forty years. A full-grown camel costs Rs. 70 to Rs. 100: they are emloyed chiefly in the carrying trade to and from Bhiwani and Rewari and places in the Gangetic Doab, (which is called by the Rohtak people Miyan Dab-darmiani doab), but in the sandier parts of the district are sometimes to be seen yoked to the plough.

Camels are shorn once a year too, the male whose back and shoulders are not clipped giving about 8, and the female 12 *chitaks* of wool. Camel's hair sells for about 5 *sers* the rupee. Pigs, which are only kept by sweepers, are shorn for the brush trade while the donkey's saddle bags are often made of human combings.

Wool, sheep and goats.

126. A very remarkable increase has taken place in the last few years in the number of sheep and goats kept in the district. Forty-seven thousand were recorded in 1875, while 121,433 were found to exist at an enumeration made in 1909. Some are kept by zamindars, especially Muhammadans, who have had to reduce their stock of milch cattle owing to bad years, but the majority are kept by the *chuhra* caste and are either their own property, or that of the butchers and farmed by them to the former on the *batai* system; that is to say, the young are divided between the two parties, the owner takes the fleece and the *chuhra* the milk. With such an increase in the flocks shearing is of some importance; it is very carelessly done, usually without any preliminary dipping, twice in the year in March and September in the case of sheep, and once a year in the case of goats. A shearer, who will dispose of 15 to 20 animals a day, receives a wage of from 3 to 4 annas. The hair obtained from a goat is about 4 *chitaks* and wool from a sheep 8 to 12 *chitaks*. Black sheep's wool sells for about Rs. 18 and white wool Rs. 20 a maund, while a goat's hair does not fetch more than Rs. 6 or Rs. 7. The ewes produce usually four lambs one at a time. Lambs are called *bhedi*, kids *pat* or *pataira*.

Hides.

127. The skins and flesh of animals which die in all villages belong by custom to the village *chamar*; the sweeper class generally receives one-tenth share of the flesh, and takes the hides of horses, donkeys and camels. A good skin of a cow or ox is worth Rs. 8 or Rs. 9 unprepared, and Rs. 14 to Rs. 15 when tanned and the skin of a buffalo Rs. 7 and Rs. 14; poor skins are worth much less. The shoes which a *chamar* has to supply to a family during the year are worth about Rs. 4. Cattle poisoning for the sake of the skins is happily rare.

The number of cattle at different periods.

128. Cattle censuses are very unreliable for ordinarily they are not synchronous, only being prepared for a fourth of the villages of the district in any one year nor are they made with great care.

CHAP. II. A.
Agriculture Including Irrigation

The figures in table 22 show the different counts for what they are worth. Mr. Fanshawe in 1875 (*see* paragraph 66 of his Settlement Report) enumerated 214,853 cows, 105,540 buffaloes and 98,581 bulls and bullocks. Three years later, after the great famine, the figures were 130,772, 50,568 and 59,281, respectively. As the result of the last sectional enumeration before the dry cycle which began with the famine of 1896-97, the number had risen again to 138,711 cows, 65,734 buffaloes and 195,360 bulls and bullocks, but to these must be added 152,247 young stock, which were apparently not separately counted in Mr. Fanshawe's census, making a total of 477,052 against his first figure of 418,974. By 1905-06 after the lean cycle the number had fallen to 397,734 and at a special enumeration made in 1909 it stood at 384,521. The most remarkable change is in the number of sheep and goats already noticed and in pigs which have not since been counted but must be many times the 8,014 recorded by Mr. Fanshawe.

Grazing, tending of cattle

129. The cattle of the district are in some respects ill-cared for. They are left to stand in filthy enclosures (*neora* or *ugár*) ankle-deep in half liquid manure. They are chiefly stall-fed,-chopped *jowar* stalks (*sáni*) being the principal fodder while in season the top leaves of the cane will be mixed, or some green *sarson* toppings. Working stock will get half-a-*ser* to a *ser* of gram a day and a little *gur*, and milch cattle also eat cotton-seed (*binola*) and oil-cake (*khal*), while the straw of *gowar* (*phaliár*) and of *mung* and *urd* (*páti*) and of gram (*khar*) are highly valued for cattle, and the wild *jhar-beri* is given for its milk-producing qualities. Best fed and best tended is the buffalo and every day the village urchins may be seen carefully washing them in the tanks. In the morning the cattle are turned out for exercise, and to pick up what they can in the waste ground of the village, but there are few patches of jungle which produce more than indifferent grass. When the crops are off the fields the stubble is grazed by all the cattle of the village. Grazing fees or *áng* are usually recovered from non-proprietors at the rate of Re. 1 per buffalo, 8 annas per cow and 2 annas or 1 anna per sheep or goat while a rate of 4 annas for young stock is sometimes levied. Where there is no village *shamilat* worth mentioning these fees are levied only on sheep and goats, but the herdsmen who tends a non-agriculturist's cattle for him receives a similar fee under the name of *bhit*. The *jowar* and *bajra* stalks of a good year are usually counted to be sufficient for the current and one following year, though in a rainland village, where the area under these crops is larger, it will last rather longer. *Bajra* fodder is not used so long as the *jowar* lasts.

In the Jhajjar *tahsil* there are the Chhuchhakwas, and Sunarwala *birhs* which afford relief to the surrounding villages,

CHAP. II, A.

Agriculture Including Irrigation.

but the grass produced is not of a good quality and canal water cannot be got on to them. The *birhs* are being gradually broken up for grants or leases to deserving officers and the remaining area is not great. Something might be done as a protection against famine if the Deputy Commissioners were empowered to require labour from each village to cut and store the *dáb* grass that grows so abundantly in years of ordinary rainfall.

Cattle fairs.

130. Two great fairs for the sale of cattle take place at Jahazgarh in September and March, the average annual number of bullocks, cows and buffaloes sold in the seven years, 1900-01 to 1906-07, being close on 33,000 while perhaps twice that number are exhibited. Prizes are given and fees are levied by a percentage on the price of the animals sold of one pice in the rupee. The average annual income from fees is between nineteen and twenty thousand rupees, of which the District Board contributes Rs. 9,000 to provincial revenues and keeps the rest. The fair is a source of some income to the surounding villages who sell fodder there. The fair is immediately succeeded by a donkey fair at Beri. Cattle fairs are also held at Dujana.

Cattle disease.

131. The more serious forms of cattle diseases are fortunately not very common in the district. Rinderpest (known as *máta* or *pet-chalna*) is rare, hæmorrhagic septicæmia (*galghotu*) only occasionally met with. Foot and mouth disease, however, (*rora*, *chapka*, or *munh kor*) frequently occurs in epidemic form and though not causing much mortality may seriously impede agricultural operations. The people sometimes employ an astringent gargle made of acacia bark, and for rinderpest drenches of *ghi* and pepper are used and cauterisation of the swollen part is practised in septicæmia, while *ghi* and milk are administered internally; but most faith is placed in a rope strung across two poles or from some convenient projections across one entrance of the village. On the rope are suspended charms written on paper generally by Muhammdan *fakirs* or particularly by a certain *bed* of Dujana at a cost of Re. 1 or Re. 1-4 and enclosed in some covering of tin or cloth, etc. All the cattle are then collected and driven out of the village under the rope, and water is sprinkled on the houses each side with a switch of *dab* grass. A line of milk and water will then be sprinkled right round the village site and a pot containing rice or sugar, etc., buried in the land of some adjoining village, taking care that the neighbours don't get wind of it. Till the ceremonies are complete no flour must be ground in the village or any crops cut or brought from the fields.

A line of cow-dung drawn right round the houses of the village is another good preventive of cattle disease and assists

toward off the evil eye generally. The more scientific methods of combating disease by inoculation, segregation, which are in the hands of the veterinary assistants, have not at present won popularity in Rohtak though some progress was achieved in an outbreak of rinderpest in 1910, and the advantages of the veterinary hospitals at the three *tahsil* head-quarters are beginning to be appreciated by the owners of stock.

CHAP. II, A
Agriculture Including Irrigation

132. The irrigation of the district is by canal or by wells (*kachcha* and *pakka*) and *dhenklis*, bucket lifts. The last named are now of any importance only in the southern Dahri tract of Jhajjar where they are worked pretty extensively in years of drought. Well irrigation varies enormously according to the season, dropping from thirty thousand acres in the famine of 1905-6 to sixteen thousand in the following year. It is an expensive form of irrigation and many of the wells are so brackish that seed requires rain for it to germinate, and the brackishness increases with a few years of deficient rainfall. Well irrigation is chiefly practised in the rabi and except when fodder crops must at all hazards be raised to save the cattle, it is little used in the autumn. From 60 to 70 per cent. of it is devoted to barley, which will do with two waterings after germination while wheat requires three.

Irrigation; crops grown by it.

On the canals cotton accounts for 38 per cent. of the irrigation, wheat for 21, and cane for 11, the remaining 30 being chiefly devoted to mixed crops as *gochni* (wheat and gram), indigo and fodder crops. Cane is the thirstiest crop and requires at least five or six waterings after germination to do well, while if rain does not fall in August it will be given as many as possible, up to ten or twelve; cotton requires three waterings after it has come up, of which the July water is far the most important; wheat requires about the same as cotton. There is no irrigation from tanks in the district though in years of decent rainfall water is occasionally lifted on the lower reaches of the Ganda Nala (Drain No. VIII), and everywhere efforts may be seen after a heavy fall to divert the rain from uncultivated land, *banis* and roads by shallow cuts, *ágam*, into the neighbouring low-lying fields.

Unki bairi kya kare jin ke mit diwan

Unki bairi kya kare jin ki khet niman.

"What harm can his enemy do whose friend is the Magistrate or whose field lies low?"

133. The evolution of the Rohtak Canal may be traced from the first attempt of Nawab Mardan Ali Khan about 1643

The evolution of the Rohtak canal

CHAP. II. A — Agriculture Including Irrigation.

A.D. to divert water to Delhi from the old channel constructed for the irrigation of the hunting ground of Hissar Firoza. Seeking to avail himself of the former line as far as possible the great engineer took his canal out of that dug more than 250 years before him at Joshi and followed the natural depression of the Nai Naddi to Gohana, from which point he turned off in a south-east direction to Jatola below Kharkhauda, a line that may still be clearly traced through the villages of Rabrah, Katwal, Bhainswal Kalan, Farmanah, Bidhlan, and Khandah.

The alignment was faulty and the works below Gohana by which the water was diverted from the depression and sent east on one occasion gave way involving the disaster noted in Chapter I. In consequence of this a new line to the east was dug for the Delhi Canal, and Rohtak was served by a branch canal. After fertilising the country for 120 years the Rohtak canal, which under the Mughals extended only as far as Gohana, ceased to flow about 1760 A.D., amid the chaos of the dissolving empire. In 1795 the canal which according to George Thomas' memoirs had brought in an annual revenue of 14 lakhs, was described as "out of repair, dried up, and in many places almost destroyed." It was spoken of regretfully then as the *nahr-i-bihisht*, the canal of paradise. Water was first restored in 1821, and four years later the canal was properly repaired and extended in 1831 to the town of Rohtak. It has run without interruption since then and during all the mad follies of the summer months of 1857 no one attempted to destroy the canal. Shortly after it was re-opened the famine of 1833-34 gave an immense impulse to irrigation and a second drought in 1837-38 led the people to turn their attention to the permanent use of the water of the canal.

But the *nahr-i-bihisht*, as it was called in fond recollection, soon earned a different reputation after it was re-opened. The alignment was still faulty, and made in the valleys; the drainage of the country was blocked. From 1840 to 1870 one commission after another reported on the resultant evils of this alignment, on the malaria engendered, on the universal prevalence of enlarged spleens, on the sterility of the women and the impotence of the men, on the excessive mortality especially among infants, and on the rapid deterioration of the soil by water-logging and the spread of salts. A very good account will be found in paragraphs 159 to 170 of the Karnal Settlement Report of 1883. Though the evil was never so great in Rohtak as it was in Karnal and Delhi which were nearer to the main line and received far more irrigation, the following figures from the reports of 1847 and 1867 show how rapidly the water level rose, and

health deteriorated :—

Locality.	Distance from canal.	Year.	Depth of water below surface.	Percentage of large spleens.	Percentage suffering from fever last 3 years before either report.		
Rohtak branch	Within half a mile	1847	28	44	47	33	37
		1867	5	41	36	36	51
Ditto	More than a mile	1847	49	29	34	34	27
		1867	7	47	44	54	68
Butanah branch	More than half a mile.	1847	102	16	41	36	22
		1867	45	7	33	28	32

Re-modelling and extension of the canal.

134. The re-modelling of the Western Jumna Canal took place at the end of the seventies and in the early eighties of last century, the chief alteration so far as the Rohtak lines were concerned being the abolition of the Rohtak Canal from Mathind to Gohana and the substitution of a line from Saragthal in the east, running into the old bed south of the town of Gohana itself, while some of the smaller lines taking out of the Delhi branch were also re-modelled. The results of these changes, and of the construction of drainage lines to remove the surplus water from the swamps, had a most beneficial effect both on the health of the country and the condition of the soil, but Government did not consider that sufficient had been done and a new re-modelling scheme which is not even yet completed has been in progress since 1895. The objects of this scheme were to extend irrigation to tracts which did not enjoy its benefits and so to insure a wide area against famine, and also still further to protect over-irrigating villages from the evils which they had not sufficient self-restraint to avoid voluntarily. Accordingly, in 1896, the Bhiwani and Bhalaut branches of the canal were cut, the former running to the west and the latter to the east of the old canal. At the same time to supply the water needed for the extensions the different branches of the canal were made to run in turn, the allowance of older villages has been reduced, the share allotted to each village being calculated with reference to its commanded area and its average irrigation in the past, while the old broad outlets have been replaced by narrow gauges varying from half to 8 or more *nals* according to the area each is supposed to command. It was not to be supposed that these changes would be made without great outcry from villages that considered they had vested rights in the water they had long

CHAP. II, A — Agriculture Including Irrigation.

used. In 1878, to take three instances, Sarsadh, Mahmudpur, and Butana were practically always irrigated throughout the estate; the former had *reh* badly developed and the second to this day complains of the lowness of the birth-rate; yet each village bewails bitterly the reduction of its supply. No doubt individual villages have suffered, and there are cases where the irrigating arrangements are far from satisfactory yet, but the general benefit that has resulted to the district is unquestionable. There is now no drainage line that is blocked, *reh* has decreased. health improved, and a larger area is protected against famine.

It is often argued that in these recent extensions the canal department has overshot the mark, and that the administration has attempted an impossible task, but it must be remembered that the capacity of a canal is based on normal conditions which have been much disturbed by the long series of droughts following 1895, and that in this district, on the borderland of the rainless zone, where the demand for water dwindles away in a year of good rainfall, and trebles and quadruples in a year of drought, the department is confronted with a peculiarly difficult task. It is the fact that the *tails* of the canals, especially in the Rohtak *tahsil*, are not yet well served, and it is in order to try and send down more water that outlets higher up which are shown in the registers to have irrigated more than the area allotted to them are constantly reduced—a course which not unnaturally is a cause of much grumbling; and which is not always carried out with sufficient care, the supply being reduced after sowings which means the ruin of the crop. No further extensions should be made until the irrigation on the existing lines is fully assured; judging from the experience of late years this will not be until the Sardah scheme is put in execution and the Western Jamna Canal draws off some of the water of the Eastern Jamna Canal.

The existing canal system.

135. Turning now to a description of the existing system the Bhiwani and the Butana branches take out of the main Hansi line in Jind territory, just above the northern border of Gohana tahsil. Of these the Butana branch flows south forking in Gangana, the left branch irrigating all the villages in its way down to Kathurah, where it tails off, any surplus that comes going to Sanghi in the Rohtak *tahsil*. The right or Barodah branch ends in the village that gives it its name; the branch is very apt to silt. The Bhiwani *rajbaha* which has a discharge at its head of 450 cusecs flows in a generally south-west direction. It divides in the extreme south of Garhwal into two branches the eastern being the Kanhaur branch and running to that village, while the west branch flows on under its old name right across the south-west of Gohana *tahsil* through Madinah and Bahalba

where it leaves the district, giving off as it goes the Mehm branch at Kharak Jatan, the Rewari branch in Bahalba, and several shorter courses for the supply of particular villages, while its daughter, the Kanhaur branch already mentioned does the same, the chief offshoot bring the Kalanaur minor.

The main Rohtak canal, now known as No. XII, takes out of the Delhi branch at Khubru with a bed-width of 15½ feet and a discharge of 112 cusecs and entering the district at Saragthal in the east of Gohana *tahsil* flows west to Gohana, where below the town it turns south-west and flows in the old bed of the Rohtak canal straight through the intervening villages to the town of Rohtak and its suburb Kutanah. It throws out no minors of any importance on the way, the only one of any size, the Ghilaur minor, being noted for its unsatisfactory working. Side by side with the Rohtak canal the Bhalaut *rajbaha*, which takes out at the same point but with the greater width of 24 feet and discharge of 265 cusecs, enters the district and gradually diverging from its sister turns off south-west at Kakanah and running on through the Gohana villages which it irrigates in its course to Rithal turns south through the east of *tahsil* Rohtak till it reaches Bhalaut, where it turns off south-east and runs to Sampla. This has four principal branches—the Bhainswal minor, which irrigates the south-east corner of Gohana tahsil, taking out of it in the Dehli District, the Jasranah branch, going off south-east from Rithal, and the short Asan branch to the east, and the Ismaila branch on the west side; of these the last branch flowing through Bohar, where it sends off a supply for the Rohtak civil station, turns south-east and tails off in Asendah south of Sampla.

Besides these three main lines the north-east of Gohana *tahsil* is supplied by two branches of No VIII canal taking out of the Delhi course: the western of these entering at Jowahra irrigates down to Mahmudpur and Mundlanah, while the eastern, the Chiranah branch, supplies villages down to the last named, Khanpur and Samri. At the same time the Isranah branch or No. IX enters the east of the *tahsil* at Kasendi and flowing west tails off in Gohana the north of which it is supposed to irrigate, but the command is low, the land is high and this minor is altogether inadequate to fulfil the demands made on it, and requires radical alteration. Lastly, the east of Rohtak *tahsil* is supplied by two branches from the Delhi main, *viz.*, the Sisanah branch and the Rohna branch, the latter including the Pai branch which again throws off branches to Sihoti from Kharkhandah and to Jainti in Delhi from Nilanthi.

Each branch of the Western Jamna Canal is supposed to run ten days a month, any surplus water being distributed where most

CHAP. II, A Agriculture Including Irrigation.

required but it is not yet always possible to run all the minors concurrently. Of the branches that take out of the Delhi main, the Bhalaut *rajbaha* generally receives first share of any surplus. The third main line, the Sirsa branch, does not touch the Rohtak district.

The large canals are called, as usual, *nahr*, and the main distributaries *rajbaha*, there being local names as *khalasi* for a broad minor and *sitko* for a narrow one. As soon as the water leaves the outlet or *mori*, and enters the zamindar's channel (*khánd* or *dhání*), the people are responsible for its distribution although the Canal Department, when desired to do so, draws up a *wár-bandi* or roster for them. The smaller runnels are called *phánki*. Both they and the *khánds* silt badly and are not kept sufficiently clean. A few regulators have recently been tried which are intended to draw a constant supply through the *mori*, whatever the height of the canal water is, but this matter is still in the experimental stage.

Extent of of canal irrigation. Occupiers' and owners' rates.

136. Some idea of the general increase of canal irrigation and of the fluctuations of demand in years of good and bad rainfall may be gathered from the following figures which with the exception of the first contributed by the Canal Department have been abstracted from the revenue entries. The quotations are in acres :—

Year.	Rainfall.	Matured.	Failed.	Total irrigated.
1872-3	26·7	...	...	51,876
Average 1865-66 to 1889-90	?	57,060	2,556	59,616
Average 1890-91 to 1894-95	30·36	57,201	1,885	59,086
Average 1895-96 to 1899-1900	14·41	1,30,846	10,885	1,41,731
Average 1900-01 to 1904-05	15·1	1,20,391	14,563	1,34,954
1900-01	28·41	1,01,034	2,250	1,03,284
1901-02	8·37	1,08,057	7,376	1,15,433
1905-06	7·23	1,59,261	49,443	2,08,704
1906-07	24·37	1,64,588	1,079	1,65,667

Up to the revised settlement of 1878 occupiers' rates only were charged and the revenue of irrigated tracts was fixed as a wet land revenue ; but in the revised settlement it was determined to assess all the land at dry rates and take the wet land revenue in the form of an owner's rate fixed at 50 per cent. of the occupier's

CHAP. II, A.

Agriculture Including Irrigation.

rates, a sum of twenty-five thousand rupees being added to the land revenue, which was so far above a true dry land revenue to compensate for the deficiency which was expected to result between the owners' rates so recovered and the amount that might have been taken as wet land revenue. The schedule of occupiers' rates which was in force in 1873 was raised in 1895 when a new schedule was introduced, the owners' rates being of course proportionately altered. As in point of practise the zamindars have always treated the two rates, together with the cesses leviable on the owner's rate as the price of water and the landlord has shifted on to the tenant the burden of the water-advantage revenue which Government intended to take from him, it was decided in 1907 that in the new settlement the existing changes should form a consolidated occupier's rate. †

The existing consolidated rates* for flow irrigation, so far as they concern the crops grown in this district, are shown below per acre, while for the insignificant area under lift irrigation two-thirds rates are recovered :—

	Rs.	a.	p.
Sugarcane	9	0	0
Rice	6	8	0
Gardens, vegetables, tobacco, orchards, drugs and spices...	5	8	0
Cotton, indigo, maize and all rabi crops except gram and *masur*...	4	0	0
Gram, *masur* and all other kharif crops ...	2	8	0

The canal measurements and assessments are made by the Irrigation Department.

The Western Jumna Canal paid an average interest on its capital outlay of 5·80 per cent. during the three years ending 1890 and of 7·79 per cent. during the following ten years.

Government title to land under the canals.

137. The question of Government title under the older canals and distributaries was owing to the informal way in which land used to be taken up, the disappearance of many records in the Mutiny, and the uncertainty as to whether or not compensation in any particular case had been paid, the subject of prolonged discussion and negotiation in the settlement of 1878. The subject is fully noticed in paragraph 114 or Mr. Fanshawe's Settlement Report, and it is unnecessary here to do more than record the decision finally reached. This was (1) that where there was reason to believe that compensation had been paid, and the people admitted the Government title, the entry of the Government proprietary right should be made, but that if they did not admit it, the possession of Government merely should be entered, and the claim of Government to be owner noted ; and (2) that where there was reason to believe that no compensation had been paid, if the people had consented to give Government the full proprietary title, this entry should be modified by the addition of the reversionary right of the people, and if they did not

† Mr. Maclagon's letter No. 125½ S. dated 22-29 May 1907.
* P. O. G. Not. No. 0250 R. I. dated 24th August 1910.

CHAP. II, A. Agriculture Including Irrigation.

consent, the Government should be entered in exclusive possession, as in the former records and admitting only a reversionary right of the villagers. Disputes as to possession were to be summarily decided on their merits in the usual way. These results were incorporated in lists which are filed in the Deputy Commissioner's office which have formed the doomsday-book of all subsequent procedure and to which reference should be made whenever the rights in such pieces of land come under dispute.

Well irrigation.

138. Mr. Fanshawe gave the total number of irrigation and brine wells in the district in 1879 as 2,088 in use and 639 out of use. Of the former 1,793 were masonry lined. Of the total number of wells 1,310 were stated to be sweet, 546 to be *malmalah* (slightly brackish), 39 *malwala* (causing the wheat to tiller too profusely), 604 as bitter and 228 as very salt.

In the recent settlement the total number of existing irrigation wells was found to be 2,744 masonry, and 873 unlined, or 3,617 in all. Of these 2,355 and 827 respectively, in all 3,182, were recorded as being in use. Almost all the wells are in the Jhajjar *tahsil*. The 2,448 masonry and 873 unlined wells then in Sampla and Jhajjar (now almost all in Jhajjar) were classified as follows :—

	Masonry.	Unlined.
Sweet	1,312	441
Malmalah	392	133
Brackish	744	299
Total	2,448	873

The manufacture of salt from brine wells has now almost disappeared and is confined to a few wells in Zahidpur which are not included in the above count. There has, therefore, been a satisfactory increase in the number of irrigation wells despite the disappearance of many old wells, owing to the breaking of the cylinder, sinking of the water level or other cause. The bulk of the wells belong to, and are worked by, the Jats and Ahirs, though in the north of the district a few wells round the village site are devoted by Malis to the growth of vegetables. The universal method of well irrigation is by wheel and leather bucket, though one or two enthusiasts have attempted experimental demonstrations of the Persian wheel which have usually been frustrated by the local carpenter. The depth to the water is great. It is least in the south-east of the Jhajjar *tahsil*, where in the old days of constant flood it is said that a man might drink from the lip of the well. Here the depth to the water is now about 21 feet. In the north-east of the *tahsil* it falls to 31 feet, in the centre to 30, and in the west to

CHAP. I
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49. The fact that in the north of this *tahsil* and in the non-canal villages of Rohtak *tahsil* the depth to water varies from 51 to 106 feet is sufficient indication that well irrigation can be little advanced in these parts. In the old canal tract of the north-east of the district, however, water is very near the surface and often sweet, and the real obstacle to the spread of well irrigation here lies in the preference of the people for canal water, well irrigation being at once far more extensive and laborious. Nevertheless in the interests of the district a partial substitution of well for canal irrigation in these parts would be most desirable.

An ordinary masonry well commands about 8 acres and an unlined well 6, per bucket. Of unlined wells, there are many varieties from the mere excavation of a cylindrical hole, though the stage of wooden cylinder or wattle lining up to the Jharli or chawah well which may be regarded as a masonry well unlined in certain strata. The Kosli wells, which are famous for their sweetness, or *amrit ka pani* (water of Paradise), are peculiarly narrow. These and all those for miles around are built of blocks of stone from the neighbouring hills and not of brick. The cost of a *kachha* well varies accordingly from Rs. 20 or so up to Rs. 100 or more. A masonry well varies in cost according to the depth of the water. Two hundred rupees is exceptionally cheap; from four to eight hundred is the more ordinary cost, while a big double well will cost Rs. 1,000 or more to construct. A *dhenkli* can be made for Rs. 5 to Rs. 10. The wells are often owned in most minute shares, especially among the Ahirs. Ordinarily they are worked by amalgamated labour, and where there are not enough shareholders, outsiders are introduced for the occasion, the profits of the crops being divided on a calculation of the number of bullocks and hands provided by each person. But among the Ahirs, as Mr. Fanshawe noted, owners often prefer to wait for their turn and then enjoy exclusive cultivation and in some cases they have to wait 25 years for the turn to come round. On the brackish well the same soil cannot be constantly irrigated and rotation of fields, not of crops, is practised. This is called *salpalat*.

Section B.—Forests.

The Government "birhs.

139. The only "forests" in the district are the Chuchakwas and Sunarwala Birhs in which Government has reserved 1,683 and 553 acres respectively, the rest of these and Birh Badri having been brought under the plough in reward grants and leases. The principal trees are several varieties of acacia. The reserves are of little commercial value, but form a valuable grazing ground for the surrounding villages. The average expenditure on the "birhs" is Rs. 405 and the average income Rs. 2,729.