CHAPTER II.—ECONOMIC.

A.—Agriculture including irrigation.

Soils.

The soils of the district have already been described. In the district, as a whole, the amount of moisture which can be obtained is of far more importance than the class of soil in which cultivation is carried on.

The soils of the tract may be broadly classified into three divisions:—(1) a fairly heavy, and in parts, hardish loam (*kathi* or *karri*), which is known as *rausli* in the Delhi direction, and *niwan* in the Budhlada tract; (2) a light shifting sandy soil called *bhur* or *tiba* (hillock), the latter term referring to the undulating character of the ground in which it is found; (3) a very heavy clay (*sotar*), which becomes as hard as iron and impossible to till except when flooded. Of the two former classes the loam (*kathi*) is generally preferred, but in a district where rainfall is precarious, the light sandy soil has its advantages. As is well known, less moisture is requisite for germination and growth in it than in a loamy soil, and in consequence a crop of some sort or other will grow in it on a scanty rainfall under which the heavier loam would remain unsown; but with a fair supply of moisture the latter will give a crop far superior to anything that can be taken from the former. Owing, moreover, to the greater evaporation from light soil more frequent falls of rain are required to renew moisture than is the case in the more loamy soil.

In the tract in which light soil is mostly found sandy hillocks (*tibas*) are intermixed with loamy valleys (*tal*), the soil of which benefits somewhat by the drainage from the sandy hills. Some of the most fertile spots in the district are those which consist of loamy soil in proximity to a piece of waste land of higher level (*uprahan*). The shifting nature of the sandy soil, as already noticed, renders agricultural operations in it difficult as the seed is apt to be choked with blown sand.

The manner in which the hard *sotar* clay is flooded by the Ghaggar and Joiya has already been noticed, and it has been shown how in Tahsil Fatehabad the stream is confined in a comparatively narrow channel, in consequence of which the flood waters are deeper and the soil emerges

less early than in Sirsa where the spread of water is much greater and the flood shallower, in consequence of which *kharif* crops can be grown on some of the flooded area.

Soils.

Of the hard *sotar* clay there are three varieties, depending not on their intrinsic qualities, but on their relative levels with reference to the flood water.

The soil which is situated lowest is called *dabar*, and is found in low-lying depressions at a greater or less distance from the main stream with which it is connected by natural channels (*phats*), or very often by artificial water-courses or *nalas*; these depressions are generally utilized as *kunds* or rice beds, the supply of water to them being regulated by artificial embankments. The land which is slightly higher than this is generally devoted to gram sowings, as the large amount of *dubh* grass and weeds found in it render it unfit for wheat cultivation.

The land at a higher level still, including the highest land touched by the floods, is comparatively free from grass and weeds, and is called *mahra*. It is devoted, if possible, to the cultivation of wheat, or wheat and gram, or barley. Being the highest flooded land it of course emerges soonest and dries quickest, so that when the floods fall early the moisture (*al* or *vattar*) left evaporates before the time for wheat sowing in November and December: in this case gram will be sown as in the lower levels. In fact in the latter a fairly good crop of gram sown in September will be obtained in any year in which the floods are not extraordinarily early in time and small in amount. Wheat is sown in the lower levels also, if sufficiently free of weeds and if the floods are suitable in point of time.

Season and rain fall.

The amount of rainfall is a matter of primary importance in a district in which over 85 per cent. of the cultivation is unirrigated; and, given the amount, much depends on its distribution over the various seasons. The summer rain should begin towards the middle of July, and the maximum rainfall should occur in that month and in August; there should also be fairly heavy showers at the beginning of September. The ideal rainfall for the district would perhaps be as follows. A very heavy fall in Har (June and July) and fairly heavy ones at intervals throughout Sawan and Bhadon (middle of July to middle of September). There should also be some rain in Assuj (September—October).

On the rainfall of June and July depend the sowings of all the *kharif* crops, and that of August and September is no less important, for on it are dependent the ripening of

CHAP. II. A.

Agriculture including Irrigation.

Season and rainfall.

the *kharif* and the sowing of the *rabi* in unirrigated and unflooded tracts.

If the rainfall has been good in September the *rabi* crops will require no further rain till near the end of January, the heavy dews of the winter season supplying sufficient moisture to keep the crops from withering. If, however, the September rains have been light, or if the falls have ceased early in the month, an earlier winter fall is necessary and the crops will dry up if there is no rain about Christmas.

The *zamindars* estimate the rainfall by the number of finger breadths (*ungal*) to which the moisture (*al*) penetrates into the sub-soil. A rainfall of 100 *ungals* in the summer and autumn is supposed to supply all the moisture which is requisite for the husbandry both of the *kharif* and *rabi*. A striking peculiarity of the rainfall of the district is its partial distribution locally; in some cases certain villages will have rain sufficient for sowing, while the land of contiguous villages will lie untilled.

The year is divided into three seasons: the hot weather (*garmiyan*) from Phagan (February—March) to Jeth (May—June): the rains (*Chaumasa*) from Har (June—July) to Assuj (September—October): and the cold weather (*Siyal*) from Katik (October—November) to Mah (January—February).

Agricultural year.

Preparations for the new agricultural year are made in Jeth (May—June): *lanas*, or agricultural partnerships, are formed and land is then taken on rent for the year; but the commoner practice in unirrigated lands is for the latter to be delayed till the nature of the seasonal rainfall is known. Plough cattle are purchased prior to this at the fairs in Chait (March—April).

When there is canal irrigation agricultural operations commence in Chait with the preparation of the soil for the cotton (*bari*) crop by watering and ploughing, and by the subsequent sowing of the crop. In irrigated lands *jowar* for fodder (*charri*) is also sown about this time or a little later. If there is a good fall in March an earlier *bajra* crop will be sown in *barani* lands and cotton will also be sown in unirrigated lands. On the first fairly heavy fall of rain in the latter end of Har (June—July) ploughing and the sowing of *kharif* crops is commenced with the utmost vigour in *barani* lands. If there have been fairly good rains in the previous winter a large area will have already received a preliminary ploughing for the *kharif*; otherwise the seed is poughed into the ground with a drill, sowing and ploughing being a single operation.

If the rain comes fairly early in the last half of June, *bajra* (spiked millet) and *mung* will be the crops first sown. If the rain continues *jowar* (great millet) and other pulses, such as *moth* and *mash*, will be sown in Sawan (July—August). If the rains are delayed till the end of June or beginning of July *bajra* and the pulses *moth*, *mung* and *mash* will be sown intermingled and probably also *jowar* and perhaps *til*. If the rains are very late and it is certain that if the first sowings fail there will be no time for further ones, all the unirrigated *kharif* crops, both millet and pulses, will be sown intermingled in the hope that some at least will ripen. In canal-irrigated lands the *zamindar* will sow a little *jowar* during July as fodder for his cattle. When the *kharif* crops have been sown the *zamindar* in *barani* tracts will, if there is a promise of rain for sowing, turn his attention to the preparation of some portion of his holding for *rabi* crops; in irrigated lands this is of course being carried on daily. In the flooded lands the cultivator at this time, Sawan (July—August), is engaged in sowing his rice crop supposing that the floods are favourable. If there is a good shower in Sawan—Bhadon (August or early days of September) *jowar* and *moth* mixed will be sown in *barani* tracts, especially if the rain has not been favourable for the earlier *kharif* crops. In Bhadon (August—September) the *kharif* crops have to be weeded and guarded by day against the depredations of birds and at night against those of animals.

If there is a fairly good fall in the early days of Asauj (September—October) a large *barani* area will be sown with gram (*chana*) and *sarson* (mustard seed) mixed; if the fall comes later in the end of Asauj, or the beginning of Katik, corresponding to the end of October, they will be sown mixed with unirrigated barley. In the flooded tracts in places where the soil dries up quickly, gram is sown during the first half of the month, and gram and barley mixed (*bejhar*) towards the end: while if the moisture is retained well up till Katik (October) *gochani* (gram and wheat) is sown. Meanwhile on lands irrigated either from the canal or from wells the *zamindar* has been diligently preparing his land by ploughing and watering for the *rabi* wheat crop; but little barley is sown on such lands.

By this time the *kharif* crops should have ripened if the sowing rains were fairly up to time. On the canal the *charri* (fodder) is out from the middle of Asauj to Katik, corresponding to the end of September or beginning of October. The cotton picking begins in Katik (October—

CHAP. II. A.

Agriculture including Irrigation.

Agricultural year.

November) and continues at intervals up to the middle of Poh, *i.e.*, the end of December, both in irrigated and unirrigated lands. All the unirrigated *kharif* crops and the rice in the flooded lands ripen in Katik unless the season is an unusually late one. They are then cut and, if the *zamindars* have no *rabi* crops to sow, are threshed and winnowed at once. Often, however, under a press of work the crops are cut and stacked in the fields and threshed at leisure afterwards.

Meanwhile the cultivator of canal or well-irrigated land begins to put in his wheat crop. From the end of Katik, corresponding to the first ten days of November, sowings continue as the preparation of the fields is successively completed up to the end of Mangsir, corresponding to the middle of December. The cotton pickings are in the interval being completed and some land prepared for the tobacco crop in irrigated tracts. In Mangsir (November—December) the threshing of the *kharif* crops is completed, if this has not been done before, and in Poh (December—January) and Mah (January—February) tobacco is sown and transplanted in the irrigated tracts and the wheat crop is watered.

If the winter rains come seasonably at this time or little later a certain area of *barani* land, that which has been newly broken up, is often sown with late barley: and the land in which the next *kharif* is to be sown receives a preliminary ploughing. After this point the *zamindar*, especially in the *barani* tracts, has more leisure, but he has to protect his *rabi*, if any, from the attacks of birds and wild animals, and on the canal he has to water his wheat crop.

The first of the *rabi* crops to ripen is *sarson*, and it is ready for cutting at the end of Phagan (February—March) or beginning of Chet (March—April). The gram is ready for cutting in Chet and the other crops, barley and wheat, ripen soon afterwards towards the end of Chet and in Baisakh (April—May), barley being a little before wheat. In these months the *zamindars*, especially of the canal and the flooded tracts, have their hands full, and there is often a great demand for labour. The *rabi* crops are all threshed and stored by the end of Baisakh (May 15th).

The area under well-irrigation in this district is insignificant, the reason being that, except in the neighbourhood of the canal and the Ghaggar, the depth of water is a hundred feet and more below the level of the ground. What few wells there are are meant primarily for drinking purposes. They are generally near the village site or round the

village tank, and sometimes a little *rabi* is grown on the land attached to them, especially when the *kharif* crop has been a failure.

Construction of wells.

The operation of constructing a *pakka* well is somewhat as follows. A small *kachha* well (*kui*) is dug and the quality of the water ascertained as far as possible. A *nim chak* or round wooden ring either of *dhak*, *kiker* or *jand*, from six to nine inches thick and securely fastened with iron bolts, is made. Its diameter is equal to that of the intended well cylinder. The well is then dug to some depth and the *nim chak* is lowered and fitted on to a ledge of earth at the bottom of the excavation. The masonry well cylinder (*nal*) is then built upon this, the materials being lowered from above in baskets as required : when the *nal* has reached a sufficient height the ledge of earth at its base is dug away except at four points where the *nim chak* and superincumbent cylinder are still supported. When required these are cut away and the *nim chak* with the cylinder sink down by their own weight to a lower ledge of earth. The operation is repeated as often as necessary until the well cylinder has been built down to below level of the water. The portion of the masonry cylinder under the water is called "*kothi*" and the part above is called *nal*. A masonry platform "*man*" or "*mankanda*" is erected round the mouth of the well, and tanks (*kota*) for washing in and drinking troughs for cattle (*khal*) are also provided if the well is near the village site and not intended solely for irrigation.

Wells are invariably worked with the *lao* (rope) and *charsa* (leather bucket), round the rim of which is fixed an iron ring called *mandal*, to which are attached iron bars, to the ends of which again the *lao* is attached. A *charsa* costs from Rs. 5 to Rs. 6 and a *lao*, if made of hemp, Rs. 4, and if of skin Rs. 14 to Rs. 16. The rope runs on a wheel (*chakli*), the axle (*kanna*) of which is supported on bearings (*gudi*) built into pillars. The revolutions of the wheels are sometimes regulated by a brake called *lappa*. In the case of wells used for irrigation, the water is emptied from the *charsa* into a reservoir called *parcha* whence it runs into the *dhori* or water channel.

The cost of building a *pakka* well in the parts where water is at a depth of 80 to 100 feet or more varies from Rs. 1,000 to Rs. 2,000.

Working of wells.

To work a well with one *lao* at least four pairs of bullocks are required, with a driver to each pair. The bullocks raise the *charsa* by pulling the *lao* down the "*gaun*" or

CHAP. II. A.
Agriculture including Irrigation.

Workin of wells.

inclined slope adjoining the well; two pairs (*joris* or *gatas*) of bullocks work at one and the same time; while one pair walks down the *gaun* and thus raises the *charsa*, the other pair is walking up, and by the time it reaches the top the *charsa*, having been emptied into the *parcha* or water reservoir, has fallen again by its own weight. The bullocks are then attached to the *lao*, the bucket is filled by a peculiar jerk given to the rope by the man (*baria*) who stands at the wheel, and the bullocks start down the *gaun* again: the first pair meanwhile have started on their upward journey. Two pairs work in this way for six hours or two *pahras*; if irrigation is to be carried on all day, four pairs at least are needed. The wells are generally worked under the system of *lanas* already described, so that if the number of pairs of bullocks is more than four per *lao*, the share of each member of the *lana* in the produce per *lao*, which is of course limited, is reduced.

The bullock drivers are called *kilia* from the *kili*, the peg which fastens the bullock harness to the *lao*. Another man is required to arrange the flow of the water from the *dhora* or water channel into the *kiaris* or beds into which the field is divided. He is termed the *panyara* or *paniuala*.

Canal irrigation.

By far the most important means of irrigation in the district are the canals. There are three distinct systems which serve the district, namely (1) the Western Jumna system which irrigates parts of all five tahsils, but the bulk of the irrigation from which is confined to the Hansi, Hissar and Fatehabad Tahsils; (2) the Sirhind system which irrigates a few villages to the north of the Sirsa Tahsil and the out-lying Budhlada *ilaqa*; and (3) the Ghaggar Canal system, irrigation from which is confined to the Sirsa Tahsil. The Western Jumna Canal was first constructed as far as Hansi by Feroz Shah in 1355 A. D., and was carried on to Hissar in the next year in order to supply the water to the city which he had recently built there. It appears that he took ten per cent. on the yield of irrigation as *sharb* or water rate. Timur makes no mention of the canal, so that it probably ceased to flow soon after it was opened. In Akbar's time it was repaired and Shahjahan improved it and carried it on to Delhi. It was in full flow at the time of Nadar Shah's invasion, but it must have ceased to flow soon after. In 1805, when the territory came under the British Rule, it had long since silted up entirely. The canal was re-opened in 1826-27, but the fear of an enhancement of land revenue consequent on increase in the irrigation acted as a check on its extensive

use by the *zamindars*. It was not till the famine of 1832-33 that the feeling was overcome, and since then irrigation has increased largely.

The canal after crossing the Karnal Bangar follows the line of the old Chautang *nala* across the Jind State and Tahsils Hansi and Hissar.

Till 1893 years ago no attempt was made to alter the original channel or to develop the irrigation on modern scientific lines so far as the Hissar District was concerned. The result was that the area irrigated was never as extensive as it might have been, while there was much waste of water, and in parts the irrigation was so intensive that the level of the sub-soil was raised considerably, the soil damaged, and the health of the people injured. Thus while some villages were suffering from over-irrigation, the people in adjacent villages would have paid almost any price for canal water, which they could not get owing to a slight difference in levels. This state of affairs led to the construction of the Sirsa Branch in 1895 and the Petwar Rajbaha in 1899, and as a direct consequence of these improvements to the remodelling of the openings on the old canal. This remodelling has caused a great reduction in the size of the openings on the old canal, with a consequent saving of water for use in the newly-constructed channels. The Sirsa Branch enters the district near the boundary of the Hissar and Fatehabad Tahsils, and, passing across Fatehabad, ends just outside the Sirsa Tahsil. From here a minor carries on the irrigation to a point some three miles west of the town of Sirsa passing though a portion of the rich Sotar valley. Just before the branch enters the district it throws off the Pabra system of distributaries, the total length of which is 67 miles and the authorised full supply 223 cusecs. The Pabra system enters the district close to the Sirsa Branch. The distributary system given off within the Hissar District from the Branch is shown in the margin. The Petwar Rajbaha has its head in the Hansi Branch, which enters the district not far from Jind. The Hansi Branch, which is part of the old canal, throws off three distributaries at Rajthal—the Narnaund, Petwar and Hissar Majors.

Name.	Length in miles.	Supply in cusecs.
Hansiwala Minor ..	0·10	6
Gorakhpur system ..	22	55
Bahuna Minor ..	2	13
Mohammadpur Minor	6	32
Adampur system ..	14	46
Fatehabad Minor ..	3	8
Fatehabad system ..	61	177
Ding Minor ..	6	7
Banawali Minor ..	0·2	6

CHAP. II. A.

Agriculture including Irrigation.

Canal irrigation.

There is a lock at Rajthal and navigation is possible from Hansi upwards. The marginal table gives the lengths of the distributaries fed by the Hansi Branch.

Name.	Total length, major and minor, in miles.	Authorized full supply.
Mahsudpur ..	31	124
Petwar ..	108	433
Narnaund ..	7	30
Hissar Major ..	95	300

Further large developments of irrigation in the district are under consideration, the proposal being to divert into the Western Jumna Canal much of the water now running into the Eastern Jumna Canal in the United Provinces. In consequence of the improvements already made coupled with the prohibition against the cultivation of rice on the old canal, the health of the people in the Hansi Tahsil has improved considerably, while in the areas to which the canal has been newly extended the increase in the amount of sickness is not very great. Some increase in sickness is perhaps unavoidable when a canal is newly extended to a village, owing to the increase in the number of breeding grounds for mosquitoes and malaria which results from the bites of these insects.

The Sirhind Canal.

The Sirhind Canal is of far more modern origin than the Western Jumna. It was only extended to the Sirsa Tahsil in 1888, and to the Budhlada *ilaqa* about the same time. Except in Budhlada the area irrigated is insignificant.

The Ghaggar Canal.

The Ghaggar Canals were constructed in the famine of 1896-97. A dam and weir have been built across the Ghaggar river just below the village of Otu : these hold up the floods which come down the river in the rainy season, and two canals, one on each side of the river, carry away the water far into Bikaner and distribute it over the adjacent fields. Irrigation from these canals is far more precarious than irrigation from either the Western Jumna or the Sirhind, because the canals are wholly dependent for their supply on the river floods : but it is less precarious than direct irrigation from the river, because the water of heavy floods can be stored up and used when required instead of passing into useless swamps. As yet the irrigation from the Ghaggar Canals has not been fully developed, chiefly owing to the want of enterprise of the cultivators of the tract who have failed to make the water-courses required. A scheme to

raise the level of the lake at Otu three feet is under consideration. Its effect would be—

(*a*) to provide more water for the Ghaggar Canals ; and

(*b*) to considerably increase the flooded area above the weir,

and thereby greatly increase the area under *rabi* irrigation.

The Rangoi Canal.

The Rangoi Canal is another irrigation channel dependent for its supply on the Ghaggar river. It has a chequered history.

It appears to have been originally dug, at the beginning of the nineteenth century, if not earlier, to carry water from the Ghaggar into the Joiya, the head of which stream was silting up. The channel gradually fell into disrepair : and in 1863, 1874 and 1895 large sums were subscribed by the villagers on its banks, under the advice of the District authorities, towards cleaning the bed, repairing the banks and widening the channel.

In the famine of 1896-97 the breadth of the channel was increased, and it was also deepened, as a famine work. Subsequent experience has shown that this was a mistake. What had been originally merely, as said above, a channel to carry spill water from the Ghaggar into the Joiya, was made into a canal which is too deep to irrigate with the small supply of water ordinarily available, and which carries away to very little use not only such of the Ghaggar spill as comes through its head, but also the rain water drainage of the cultivated land through which it passes.

In 1899-1900 occurred a second and severer famine : and work had to be found for many hungry Muhammadan peasants. So the canal was straightened and regraded down to its entry into the Joiya ; and below that the Joiya itself was canalized. A masonry stop-dam was placed at the head of the Rangoi, with two intermediate stop-dams lower down its course. The whole canal was placed under the Irrigation Department, and light water rates imposed on the irrigation done from it, to pay for the expenses of working it.

The Irrigation Department have since had control of the canal. It has, however, since 1912 been made over to the District Board for management, Government making to that body for some years a grant to cover the expenses

CHAP. II. A. Agriculture including Irrigation.

of working it. No water rates are now charged on irrigation done from it. The masonry stop-dams are not now used at all.

Method of Canal irrigation.

Canal irrigation is carried on in two methods, the flow system (*tor*) in which the canal water is delivered at a level not lower than that of the land to be irrigated, and the lift system (*dal*) in which the water is delivered at a lower level and has to be raised by the cultivator on to his land. By far the greater part of the irrigation done in the district however is effected by the flow system.

The distributaries are divided into major and minor, the former being usually called Rajbahas, and supply water to two or more minors. These are all the property of the Government. The cultivators are given heads (*kulaba*) in these distributaries, and from these construct water-courses to their own fields. To each head a certain area is assigned and all owners of land within that area take their share of the water flowing into the water-courses. As a rule the method of calculating shares in each water-course is left to the people themselves and they arrange the matter amicably. If, however, a dispute occurs the shares and turns are settled by the Canal Officers.

Flow irrigation.

The method of irrigation by flow (*tor*) is, according to the *zamindar's* idea, a simple matter enough. He has merely to knock a hole in the side of his water-course or in the field ridge and wait till the whole of his field from end to end is flooded.

Kiaris.

The rule requiring the division of a field into *kiaris* or small beds, has so far been a dead letter. Its obvious advantages are that it economizes water in the case of sloping fields in order to irrigate which completely without *kiaris* a great depth of water is required at the lower end is order to ensure the water reaching the higher level.

The cultivators' objections are that under the system of *kiaris* it takes much longer to irrigate a given area that without them, and that this is a weighty consideration where, under the *warbandi* system, irrigation is only available for certain periods. Again if *kiaris* are insisted upon in the case of the *paleo* or preliminary watering, they have to be broken up for subsequent ploughing, and then made again after sowing, thus entailing additional labour and trouble to the cultivator. In the case, however, of

well irrigation or canal irrigation by lift, where water is not ready to hand, the *zamindar* himself generally sees that the advantages of the *kiaris* system outweighs its disadvantages.

Lift irrigation.

Lift irrigation on the canal is carried on in two ways: either by wells called *sundiyas*, built on the banks of the water-courses (*khal* or *kand*), and worked with the *lao* and a *charsa* of peculiar pattern, or, where the surface to which the water has to be raised is not more than a foot or two above the level at which it is delivered, by the *dal* or scoop.

Kund irrigation.

Below the Otu dam in the Sirsa Tahsil a peculiar system of irrigation is carried on in the river bed. Here the difficulty was to keep out excess of water. To do this the river bed was divided into a large number of areas, each surrounded by a high and strong earth embankment. These keep the water out; and whenever any moisture is required for the crop within the embankment it is only necessary to make a hole in the dam through which the surrounding water flows on to the land to be irrigated. Often in high floods the whole village watches day and night strengthening the embankment with fascines to keep out the water; for once a breach is made the whole of the crop inside is certain to be drowned. Such embanked areas are known locally as *kunds*. The cost of constructing and maintaining these *kunds* was often considerable and formed a large part of the expenses of rice cultivation; but the necessity for them is now to a large extent obviated, because the dam at Otu holds up the floods, and there is not the danger now that there was in former years of the crops below the dam being drowned.

Cattle.

Table 22, Part B, gives statistics of the live-stock of the district at various periods. Hariana has always been famous for its cattle, and it has been already shown what an important part they played in the pastoral life of its former inhabitants.

The famines which have from time to time visited the district have been certainly more fatal to cattle than human beings; but in spite of this and the decrease of the grazing area in consequence of the spread of cultivation the breed has not deteriorated to any noticeable extent, and the decrease in numbers owing to famines is now being made up. As would be expected, the least developed part of the district, the Nali of Fatehabad, is proportionately the richest in cattle.

CHAP. II. A. Agriculture including Irrigation.

Cattle-disease of some kind is always present in the district, but is rarely very widespread or fatal.

Cattle disease.

The most fatal disease is *sitla* or cow pox, which occurs at all seasons of the year, and from which the animal attacked seldom recovers. The sick animal is put in a closed stable and protected from the cold, and is sometimes given balls of pounded *bhang*. Foot-and-mouth disease (*munhkhur*) is common but seldom fatal. Sores form in the bullock's mouth and on its feet, and it loses its appetite and gets very thin and miserable. By way of remedy a pound of molasses (*gur*) is put in its mouth which is tied for some hours so as to keep it shut. *Vilaya* or *vil* seems to be a kind of rheumatism and is rarely fatal; the animal affected gets stiff and unable to walk. It is said to be caused by eating a small black insect covered with a spittle like secretion which appears in the rains; the treatment is to give the bullock half a pound of onions and to tie a wisp of dry grass in its mouth. *Goli ki sot* is fatal and there is no remedy for it; it seems to be anthrax fever, and the swellings which appear on the animal's body are ascribed to coagulation of the blood. When *juan* or maggots appear in the skin, the part affected is rubbed with a solution of tobacco. Buffaloes are subject to *dha* or *taku*, which seems to be rheumatism, as the legs stiffen, and the animal is unable to walk and loses its appetite. It is ascribed to wallowing in water heated too much by the sun, and is treated by shutting the sick buffalo in a warm stable, bleeding it at the ear and giving it dried dates as medicine. *Galghuta* or malignant sorethroat is often fatal: the neck swells and the animal has difficulty in breathing. One remedy is to scorch the neck by applying burning grass to it; and another is to get a holy man to exorcise the disease by making mesmeric passes (*jharna*) over the part affected. Little care is taken to guard against contagion by segregating diseased animals, and the wonder is that cattle disease does not spread more rapidly than it does. It is generally thought sufficient to tie a charm over the village gateway so that the cattle may pass under it on their way to and from the pasture-ground. There are Veterinary Assistants and Hospitals at the head-quarters of each tahsil. There is in addition one intinerating Veterinary Assistant who tours through the whole district. The popularity of these men and of their hospitals is daily increasing.

Bullocks of the so-called Hariana breed are famous

throughout India. A good specimen of a bull stands about six feet high. The colour is almost invariably white or grey with black points. The tail is short and thin. The head and forehead are very massive, and the chest and back of great depth and breadth.

Ungelt steers (*bhara*) under two years of age are sold in considerable numbers in the spring to *banjaras* from the United Provinces both at the Hissar Fair and in the villages. The *zamindar*, however, though not so much a cattle-breeder as formerly, generally prefers to keep his young stock, as when there is a fair supply of fodder their keep does not involve much additional expense. In times of scarcity young stock are of course sold off if purchasers can be found. Steers undergo the operation of gelding (*badya*) when they are about two years of age and are then trained for the plough and become more valuable. If, however, the grazing area decreases much more, it will probably become the practice, as it already has to some extent, to sell young stock, as to do so will be more profitable than to rear it and then sell it. Heifers (*bahri*) are generally kept for milk. A good pair of plough bullocks will fetch Rs. 200. The average price is Rs. 125 and the lowest about Rs. 50. An ungelt steer will fetch from Rs. 20 to Rs. 50 and a heifer Rs. 5 to Rs. 10. A cow will calve (*byahna*) six, seven and in some cases eight times, and is pregnant (*gyabhan*) for nine months. A cow will give milk for six months after calving.

Buffaloes.

In this district buffaloes (*bhains*) are seldom worked in ploughs or for draught. Male calves (*jhota*) are sold to people from the Manjha country where they are extensively used as plough cattle. The female calves (*jhoti*) are all kept for milk: and the buffalo cow (*bhains*) is a most indispensable member of the *zamindar's* household, for it is in exchange for *ghi* made from her milk that he gets his small supply of grain in times of scarcity. A buffalo cow will calve 12 or 15 times and will give milk for one year after calving. The period of pregnancy is ten months.

In times of scarcity when fodder is hardly procurable every effort is made to keep the family buffalo in milk, and the other cattle will to some extent be sacrificed to this consideration. A good buffalo cow will cost from Rs. 80 to Rs. 150, but inferior animals may be had for Rs. 50.

Ghi has of late years risen considerably in price and its proceeds are now a not inconsiderable item in the *zamindar's* miscellaneous income.

CHAP. II. A.

Agriculture including Irrigation.

Cattle-breeding.

Cattle-breeding is, in face of the spread of cultivation, on the wane, certainly in the southern part of the district. The *zamindars* of the Nali tract of Fatehabad do not buy much, but sell their home-bred (*ghar jam*) cattle, and are thus to a considerable extent cattle-breeders. But in the other portions of the four southern tahsils cattle are largely bought in March for agricultural operations, and sold again in October, when these are over and little breeding is done.

In many villages, especially in the Sirsa and Fatehabad Tahsils, grazing fees are levied on animals using the common waste of the village, but owing to the decrease of pasturage many villages have given up the custom, and it is generally falling into disuse.

The village cattle find their way of their own accord to the *gorah deh* in the morning; thence they are driven in separate herd (*chauna*) with one or more herd boys (*pali*) to each herd to the village waste. Late in the afternoon they are driven back to the *gorah* and thence dispersed to the houses of their owners where they are secured in the *deorhi* or entrance for the night. They are fastened in the enclosures round the village site during the rains in the Nali tracts to avoid mosquito bites.

If there is good rainfall in the west, cattle are driven in large numbers to the prairies of Bikaner, which in such a case supply excellent pasturage; when the rains have failed they are taken to the Kaithal side. The expression used in describing that the village cattle have been driven away to other parts to find pasturage is *gol jana* : and *gol baithna* is the expression used for denoting that outside cattle have been allowed to use the grazing grounds of the village on payment of fees.

A very considerable portion of the agricultural capital of the district is locked up in the form of cattle. The principal drawback to this is that in times of scarcity when fodder is short, cattle can only be sold with difficulty even if they are not altogether unsaleable, and the *zamindars* can only convert his cattle into grain or hard cash at a heavy, sometimes ruinous, loss.

Cattle Fairs.

Cattle fairs are held in the district twice a year (spring and autumn) at Sirsa and Hissar, and once a year (autumn) at Fatehabad and Bhiwani.

Cattle Fairs.

Each fair lasts for about a fortnight. The income consists of a percentage of a quarter anna per rupee on all purchases, the proceeds being credited to the District Fund. Each purchaser receives a certificate of sale at the time of paying the percentage. The management of the fairs is in the hands of the District Board to which, together with all profits and expenses, it has been transferred by the Local Government in consideration of an annual contribution of Rs. 13,000 made to Provincial revenues.

At these fairs the greatest majority of the animals sold are bullocks, many of them young stock. The number of cattle for sale and the average prices realized depend of course to a large extent on the nature of the season. If there is an anticipated scarcity of fodder, the number will be large and the prices realized correspondingly low. Again, if there is drought in the United Provinces, the demand from that quarter, which is an important factor in the success of these fairs, is reduced. In addition to the local supply available for sale at these fairs large numbers of bullocks are brought from the Rajputana States on the west and sold. The latter include many of the excellent Nagor breed. These are largely used by the wealthier classes for drawing *raths*, as they trot very well. The Hariana cattle are largely brought up by dealers from the Punjab, and, as already noticed, from the United Provinces.

It is estimated that at the two fairs at Hissar some five lakhs of rupees come into the district on an average, and at the autumn Sirsa Fair about one-and-half lakhs.

Private bulls.

In the villages, a promising young steer is often kept and reared by the *zamindars*. When a full-grown bull (*khagar*) he is considered the common village property. He is allowed to wander about at leisure and does no work. He covers the village cows and what fodder is required for him is provided out of the village *malba*. The District Board also distributes a certain number of bulls every year.

Sheep and goats.

Sheep and goats, especially the former, have, during late years, increased largely and are now kept in very considerable numbers by the *zamindars*. In many cases the rearing of sheep has become a regular industry with the Chamars and Dhanaks of the villages. A man will take a few sheep from a town butcher (*kassab*) or trader (*byopari*) and will rear them for him, pasturing them on the com-

CHAP. II. A.

Agriculture including Irrigation.

Sheep and goats.

mon village waste. In return for his trouble he keeps half the lambs born, the other half going to the trader. Goats are greedy feeders and eat much of the *pala* on the waste besides doing damage to trees. The proprietors in many villages object to their presence, and there is now a general wish to raise the grazing fees levied for them which have hitherto been one or two annas per annum. The usual price of a sheep is from Rs. 2 to Rs. 3.

Horses and mules.

The local breed of horses is of very poor quality and good animals are seldom available.

The District Board keeps up a certain number of horse and donkey stallions, but horse and mule breeding is not popular in the district.

Donkeys.

The donkeys of the district are miserably small animals, but can carry considerable loads for their size. They belong entirely to the village Kumhars who, partly in consequence of the supposed unclean nature of the animals, are of low caste.

Camels.

The camel is a most useful and important animal in this district. He is employed in all parts for riding and carrying loads, and, where there is lighter soil, he does a large portion of the ploughing. The Rahbaris keep large numbers of camels with which they carry for hire.

A camel begins to work at four years of age, and a female gives her first young in her fifth year, after 13 months gestation, and bears five or six times at intervals of two years. Camel's milk is often drunk and the hair (*jat*) is shorn and made into ropes and sacks. The camel is fed on *pala* and the straw of *moth* and gram when available, but in any case he can find grazing where no other domestic animal could.

Pigs and poultry.

Domestic pigs are rarely seen in the district and fowls can usually be obtained only in large villages.

The Cattle Farm.

The Hissar Government Cattle Farm or Bir was instituted by Major Livingstone in 1813 A.D., when the country had not yet recovered from the disastrous famine of Sambat 1840 (corresponding to 1783 A.D.). Of the 19 villages included in the Bir, 15 were then waste and uninhabited, and the Stud Department took possession without payment of compensation, and since 1813 Government has held the land in full proprietary right. The four other villages, Rajpura, Sali, Daudpur and Ludas, were at that time inhabited and were acquired after payment of compensation

CHAP. II. A.

Agriculture including Irrigation.

The Cattle Farm.

in 1824 or 1825. The Farm lands lie east, north and west of the town of Hissar. The boundary is marked by masonry pillars, and part of it runs through the town itself. There are five farms, the Home, the Sali, and the Chaoni, the Mudianwala and the Kherwan. The Home Farm lies east of the town about 200 yards from the Mori gate, and is the oldest of the Farm buildings, having been erected at the time of the original institution of the Farm. The Sali Farm is about 5½ miles to the north-west and the Chaoni Farm about two miles to the south-west of the town. Mudianwala also adjoins the town on the south-west, and Kherwan lies about 10 miles to the north-east.

The locality is, on the whole, well chosen, as a considerable area can be irrigated from the canal, but the fact of its close proximity to the town, which has grown considerably since the Farm was first instituted, is productive of some inconvenience to the public not less than to the Farm itself. To obviate this a large area of grazing land has been made over to the Local Government for the use of the town cattle.

The area within the limits of the Farm is some 40,000 acres. Of this all with the exception of one or two small plots is the property of Government. About 4,000 acres are so situated as to be capable of cultivation and the greatest part of this is regularly cultivated by the Farm authorities. The balance is let to tenants on high rents. In ordinary years the uncultivated land affords excellent pasturage for cattle up till the end of May, after which date they are kept on stored fodder till the rains break. In dry years, however, the grazing in the Bir fails and considerable difficulty is felt in providing for the cattle, but of recent years the Farm has grown sufficient fodder to form a reserve against years of drought.

Up to the 1st April 1899, the Farm was managed by the Commissariat Department. It was then made over to the Civil Veterinary Department under whose management it now is. The head of the Farm is a commissioned officer of the department, and he has under him a Deputy Superintendent, a Farm Overseer, and a Civilian Farm Bailiff. There are some hundreds of farm hands employed when reaping operations are in progress. All the Farm cultivation is carried on on strictly modern and scientific lines, adapted to the necessities of the country and climate. Good English and American ploughs and reaping machines are used, and all the threshing, hay-elevating, and straw

CHAP. II. A.

Agriculture including Irrigation.

The Cattle Farm.

chopping is also done by machinery. There is a small steam engine at the Home Farm which is used to work all the threshing and cutting machines. The rest of the machinery is worked by Farm bullocks.

Originally horses and camels, as well as bullocks, were bred, but in 1847, or thereabouts, the breeding of horses was given up, and that of camels about the time of the mutiny. The objects of the Farm now are to breed bullocks and mules of superior size and quality for Ordnance purposes, and to provide and distribute generally high class bulls and donkey stallions for breeding purposes. Experiments with the object of improving country wool are also being carried out, Australian merino rams being crossed on white Bikaner ewes. The cross bred wool is an undoubted advance on the pure Bikaner wool. Practically all the bulls and bullocks are bred on the Farm, but of the mules the majority are brought as yearlings in the open market and well fed and cared for so as to ensure their developing into Mountain Battery mules.

Most of the bulls and cows kept belong to the Hariana breed. There are also a few Gujrati and Nagor cows which are crossed with Hariana bulls. The bulls produced are of the finest quality. The best are kept by the Farm, and from the remainder the Superintendent of the Civil Veterinary Department, Punjab, selects animals to draft to various districts for the use of District Boards. The experiments made with donkeys prove that it is possible to obtain almost pure bred Panjabi donkey stallions equal to the best of the imported Cyprian and Italian donkeys at about one quarter of the cost.

The present strength of cattle in the Farm is given in the margin. A certain number of bull calves are reserved for breeding purposes, some to recruit the Farm stock and others for distributing to districts and Native States. The rest are castrated and kept separately from the other cattle. When they are four years old a careful selection is made, and those that are fit for the purpose of artillery

Herd bulls	24
Supernumerary bulls for distribution to districts, &c.	140
Cows	1,253
Plough bullocks	267
Ordnance bullocks for service	129
Young male stock	924
Young female stock	971
Mares for mule-breeding	59
Camels	8
Donkey stallions	5
Mules	154
Cultivation bullocks	267
Donkey mares	99
Young donkey stock	149
Rams	9
Ewes	419
Lambs	303
Goats	27

draught are made over to the Commissariat Department for distribution to the various Commands.

The Cattle Farm.

The heifer calves are reserved at the Farm for breeding purposes. As many as are considered unfit for such, whether by age or by natural faults, are cast and sold by public auction.

The Bir is the resort of hundreds of black buck and chinkara. It also contains a few *nilghai*. Small game, such as hares, partridges and sand grouse, are very common, and in the winter large numbers of the small bustard are to be seen. Shooting is strictly prohibited except with the permission of the Superintendent of the Farm. Such permission is never granted between the 15th March and the 1st October.

Agricultural implements.

The cultivator s most important implement is of course the plough (*hal* or *munna*). The two latter words refer primarily to the piece of wood shaped like a boot, into the top of which the pole (*hal*) and to the bottom of which a small piece of wood (*chou*) is fastened, the latter in its turn carries the *pali* or iron ploughshare. The *hal* is perhaps the most important part of the plough, as upon its weight and size depends the adaptability of the plough for ploughing various kinds of soil. In the case of sandy soils it is light and is called *hal*, whereas in the case of the firmer soils it is made heavier and called *munna*.

In the light soil towards the west it is not uncommon to plough with camels. The pole of the plough is fastened with a leather thong to a curved piece of wood called *pinjni*, which again is strapped on to the back of the camel by the *tangar*, a sort of camel harness which is kept in its place by the *palan*, a small saddle on the camel's back.

The other implements commonly used by the cultivator with their prices are somewhat as follows :—The *por*, *orna* or *nali* is a seed drill made of strips of bamboo and held together by a long narrow piece of leather (*badi*) wrapped carefully round them. It is secured to the *hatha* or upright handle of the plough with its lower extremity just above the ground behind the *hal* and has a wide mouth into which the seed is put, and so drops through the *por* into the plough furrow. The *kassi* is a spade costing Re. 1 to Re. 1-4-0 ; the *kuhari*, an axe for cutting brushwood and *pala*, costs Re. 1 ; the *gandasa* or *gandasi* are choppers of different sizes, costing 4 annas to 6 annas ; the *jheli* is two-

CHAP. II. A.

Agriculture including Irrigation.

Agricultural implements.

pronged pitchfork, its cost is from 4 to 5 annas. The fork is called *sangar* and the handle *nala*. It is used for lifting *pala* crops, &c. The *tangli* is a three-pronged pitchfork. *Kasola* is a hoe with a long handle (*binda*), cost 8 annas, and is used for weeding the *kharif* crops which have long stalks. *Dantri* or *dranti*, costing 4 to 5 annas, is a sickle with teeth, used for reaping and cutting grass. *Khurpa* is a short-handled spade or hoe for digging up grass by the roots; it costs 4 annas. *Sohaga* is a flat board and is used for harrowing by drawing it over the ground; it costs from 2 to 3 annas. The *dandeli* is a rake with 6 or 8 teeth used for collecting cowdung and for making the ridges of *kiaris*: it costs 4 to 10 annas. The winnowing basket is called *chaj* and costs 2 annas. The *gopya* is a sling made of rope with which stones are thrown in order to scare away the birds which do damage to the crops when ripening: it costs 2 annas. Carts are not much used in the district, as most of the carrying is done by camels. In the Bagar a light kind of cart with smaller but solid wooden wheels is used. A short low two-wheeled truck called *rehru* is also employed for carrying water and fodder.

Agricultural operations.

The breaking-up of waste land and bringing it under cultivation is called locally *nautor*. Where, as in this district, there are no very heavy soils; it is a comparatively simple operation. The *jal* and *kair* bushes are cut down and uprooted, and the long grass is burnt; the ashes have a manuring effect on the ground. New land is generally broken up and prepared for cultivation in the winter if there are good rains at that time.

Ploughing and sowing.

Ploughing, harrowing and sowing are comparatively simple operations in the *barani* lands. On the first fall of rain in June or July the cultivator turns out with his bullock or camel plough and ploughs up as much land as he can. If the first rainfall is fairly heavy, and especially if it is late, the seed is sown at the same time as the first ploughing is given. The ploughing is often done in haste and is in consequence frequently not of good quality. The furrows are called *kud* and the ridges *oli*. There should of course be no space left between the furrow and the ridge; if there is it is called *para*.

The following rhyme expresses the disastrous consequences following on such careless husbandry:—

Kúd men pára,
Gáon men ghára,

Bhint men ála,
Ghar men sála,
A space left at the side of your furrow,
A band of robbers in your village,
A hole in your house-wall,
Your brother-in-law staying in your house,

are four equally great calamities.

The plough furrows should be not more than three or four finger breadths (*ungals*) deep. In order to keep sufficient moisture around the seed to allow of germination, the *barani kharif* crops are all sown with the drill and are thus at once covered with earth, which falls into the furrow from the ridge as the plough passes on: a certain amount of moisture is thus assured. Sowing by scattering with the hand can only be employed where there is a certainty of sufficient supply of moisture, and this of course cannot be the case in *barani* land.

More trouble is taken with the *rabi* crops sown on *barani* land, the principal of which is gram. There are one or two preliminary ploughings, and the ground is harrowed with the *sohaga* after each ploughing. The seed is sown with the *por* as the supply of moisture is even less assured than in the case of *kharif* crops. Where there is apprehension that this will be short, the field is worked over with the *sohaga* which levels the ridges and tends to retain the moisture about the seed by covering it over with some depth of earth. If after the *rabi* has been sown in *barani* land, and before it has germinated, a shower of rain falls so slight that the moisture can penetrate only a very short distance, the surface stiffens and cakes (*papri lagti*), and germination is hindered; in such a case the ground is again harrowed with the *sohaga* in order to break up the surface.

On canal-irrigated lands the tillage is of course of a higher character. A *paleo*, or preliminary watering, is given in the case of nearly, if not quite all, *kharif* crops, and the ground is ploughed once or twice. The first ploughing is called *par* and the second *dohar*. In the latter the ridges are transverse in direction to those in the first ploughing. As the supply of moisture in the case of *kharif* crops in canal lands is assured, the seed is sown by scattering with the hand; and the ground is then ploughed again in order

CHAP. II. A.

Agriculture including Irrigation.

Ploughing and sowing.

to mix the seed, and worked over with the *sohaga* in order that the seed may be covered with some depth of earth. Far more trouble is of course taken with the tillage for wheat and the minor *rabi* crops in canal lands. The ground is carefully prepared by a preliminary watering, and is ploughed several times and harrowed after each ploughing in order to secure a fine seed bed. After sowing the ground is levelled with the *sohaga* in order to retain the maximum of moisture.

On the flooded *sotar* land, in which *rabi* crops are for the most part sown, ploughing and sowing are done in much the same way as in the *barani* tracts of the district, though the work of ploughing is of course considerably harder.

In the case of very lowlying flooded land ploughing is not possible because the land does not dry quickly enough, and the seed is scattered broadcast over the surface, and afterwards swept into the cracks which appear in the thick silt deposited as the moisture evaporates. The river brings down fresh deposits of silt annually and these replenish the soil and prevent it from being exhausted. This method is usually employed in the shallow depressions above the Otu dam.

Weeding.

After the rains, weeds of various kinds spring up freely in cultivated lands and all the *kharif* crops are weeded more or less. The operation is called *nilan* or *landhan*. It is generally done by the women and girls with the *kasola*, if the crop is one with long straw, or with the *khurpi* in the case of shorter crops. The more effective tillage for the *rabi* and the cessation of the rains soon after it is sown, keeps the ground in which it grows clear of weeds, and, as a rule, there is no need to weed it. Some one has to watch the crops by day and night while they are ripening.

Reaping.

Reaping is called *launi* and sometimes *katwara* or *katai*. It is done, generally speaking, with the *dantri* or toothed sickle. When the time for the *kharif* harvesting has arrived, the family go in a body daily to the fields, or in some cases even sleep there. The millets, *jowar* and *bajra* are reaped by cutting the ears (*sita*) off. The stalks (*karbi*) are cut separately and tied into bundles or *pulis* which are stored in stacks surrounded with a thorn hedge (*cheor*). The ears are threshed upon the threshing floor, *pir* or *klai*, by bullocks. *Gwar* and *moth* are cut from the root, but the pods (*phali*) are separated by being threshed by hand (*kutna*) with the *jheli*, and only the pods are threshed by bullocks

on the *pir* or threshing floor. In the case of gram, the cut crop is threshed by hand with the *jheli* used as a flail and the pods (*tent*) are thus separated from the straw and leaves (*khar*); the pods only are heaped on the threshing floor, and then threshed. A crop when cut and lying on the ground is called *lan*, the straw and grain being both included in the term.

Reaping.

When the crop has been cut, such part of it as is to be threshed (*gahna*) by bullocks is arranged in a heap round a stake (*med*), fixed in the centre of the threshing floor (*pir* or *kali*). Two, four or more bullocks are then ranged abreast in a line *daim* and being fastened to the *med* walk in a circle (*gat*) round it through the grain or straw, or both, lying on the *pir*. In this way the ears or pods in which the grain is contained, and also the straw, if any, are broken up, and the grain is mixed with them. The mixture is called *pairi*. At this stage if straw has been threshed, as well as grain, the mixture is tossed in the air with a *jeli* or *tangli* while a wind is blowing, and the straw and light particles are carried to a distance, while the grain and broken ears fall almost perpendicularly. The grain is still at this stage to a large extent within the broken ears, and they are again heaped on the *kali* or *pir* and threshed, and the grain is thus finally separated from the ears.

Threshing.

The mixed grain, husk, &c., are then placed in the *chaj* or winnowing basket, which is lifted up and slowly inverted when, as before, the heavier grain and the lighter particles are separated. Where no straw is threshed only the one winnowing with the *chaj* takes place, after the grain has been separated from the ears or pods.

The dividing of the prepared grain is not a very important operation in this district, where *batai* is comparatively rarely taken. Where necessary the division is made by filling an earthen *jar* (*matka*) called *máp* for this purpose, with the grain, and assuming the quantity contained as the unit of measurement for the purpose of division. From the common heap (*sanjhi dheri*), which has to be divided, a little is left over, and out of this the *kamins* take their dues. The balance, if any, is divided between the landlord and his tenant. Before the division little bits of mud (*tappas*) are put on the grain heap to serve as seals, with the object of preventing depredations.

Measuring.

Manure (*khat* or *khad*) is very little used in the district, as by far the larger proportion of the cultivation is unirri-

Manure.

CHAP. II. A.

Agriculture including Irrigation.

gated and to use it in such land would only result in withering up the crops.

Manure.

In the area irrigated by the canal and in the small area dependent on wells, manure is used, especially in the former; but even so the proportion of irrigated land which is manured is very small. In the Hansi Canal villages it is given to land in which sugarcane, tobacco and vegetable, such as onions (*pyaz*) and pepper (*mirch*), are to be sown, as it is essential for them. If procurable, it is also applied to land in which wheat is to be sown. It is given, if possible, to land off which two harvests are taken successively. Manure is much more extensively used round Hissar town, where there is a large demand for land, and much of the canal-irrigated land is cropped harvest after harvest. Under such circumstances manure must be used for practically all crops, if the soil is not to be exhausted.

The manure usually used consists of sweepings and refuse from inhabited sites, and in the case of tobacco, *rehi*, a saline earth is applied to the soil after the crop has been planted. On the more heavily manured lands near Hissar town from 350 to 500 maunds per acre are applied. In other parts much less than this.

Rotation of crops.

On the unirrigated *barani* lands as a general rule but little attention is paid to rotation of crops and fallows. The enforced fallows arising from failure or shortness of rainfall are so frequent that these matters practically settle themselves. However in Tahsils Hansi, Hissar and the eastern parts of Bhiwani, where the soil is loamy, it is not unusual for the cultivator to keep some portion of his holding for the *rabi*, or rather to sow *rabi* in some portion of the land in which he has not sown *kharif*. The *rabi* crop sown is gram alone, or mixed with *sarson* (mustard seed) and barley. In such a case the land sown with *rabi* is called "*umra*," and is almost invariably sown in the next *kharif*, as the more thorough tillage given for the *rabi* fully prepares the soil for the next harvest and the full value of the extra tillage is thus obtained. The nitrogenous gram roots of course also benefit the soil as increasing the supply of the nitrogen in the ground, and the rotation will begin again with the *rabi*. But the uncertainty of the rainfall, of course, frequently disturbs the arrangement. In any case land cropped with *rabi* will always be sown for the next *kharif*. As between *rabi* crops in *barani* land, there is no particular rotation observed, but as between *kharif*

crops it is considered inadvisable to sow *jowar* (great millet) into successive *kharifs*, especially if the soil is at all light, as it has a tendency to exhaust it. A field which has borne *kharif* one year should certainly receive a winter ploughing, if it is to bear a good crop next *kharif*.

It is the exception for *barani* land to be cropped *dofasli*, and it can be done only under very exceptional circumstances, *e.g.*, when *bajra* has been sown in Jeth it ripens and is cut in Sawan, and, if there is rain, then gram for the *rabi* is sown in the same land. Or when *kharif* sowings have failed, but there is fair rain for *rabi* sowings, the *kharif* is ploughed up and gram sown.

In the unirrigated but flooded lands no rotation is observed : all depends on the floods. The lowest, or rice lands, are always sown with rice so far as the volume of flood water will permit. The lands on the next higher level, if sufficiently free from weeds, will be sown with wheat, if not with gram ; the lands still higher, which are generally clearer than those in the lower level, will be sown with wheat if the floods have continued long enough to permit retention of sufficient moisture up to the season for sowing the crop ; otherwise they also will be sown with gram. All depends on the volume and time of the floods : little or nothing on the crop previously sown.

On the lands irrigated from the canal greater attention is paid to rotation of crops and fallows than in the *barani* tracts, as the course of cultivation is less liable to disturbance from the want of moisture in the former than in the latter.

The principal *kharif* crops grown on canal lands are cotton (*bari*), *charri* for fodder and *jowar*. Of these cotton is by far the most important, and is yearly increasing in importance. In the *rabi* the chief crops are wheat (*gehun*) and wheat and gram mixed (*gochani*). Barley is not much sown, as it is not a paying crop and is confined to light soils on the west. *Methi* and vegetables are also grown.

In regard to fallows the chief principle as in *barani* land is that land cropped with *rabi*, called " *umra*," should never lie fallow in the succeeding *kharif* ; a crop will always be sown in that harvest in order not to lose the advantage of the superior tillage of the previous *rabi*. Fallows when given are given after the *kharif* crop, either in the succeeding *rabi* alone or in both the succeeding *rabi* and *kharif*.

CHAP. II. A.

Agriculture including Irrigation.

Rotation of crops.

The question of whether a fallow shall be given or not depends of course largely on the crop taken in the previous harvest, so that fallows and rotation of crops are largely inter-dependent.

The rotation starts with wheat, or wheat and gram mixed in the *rabi*. After this a *kharif* crop will be taken, probably cotton. Cotton is an exhausting crop and is not off the ground in sufficient time to allow of a crop being sown for the next *rabi*. The land will lie fallow in that harvest, and probably in the next *kharif* also, especially if the cultivator has a fairly large holding. It will be sown in the following *rabi*, as before with wheat, or wheat and gram mixed. If the wheat in the first *rabi* is followed by *charri* the land will in that case also lie fallow in the next *rabi* certainly, and probably also in the next *kharif*, as *charri* is, like cotton, an exhausting crop. If after cotton or *charri* in one *kharif*, no fallow is given in the next *kharif*, the land should receive a preliminary winter ploughing, and probably *gwar* will be sown.

The *rabi* crop following *gwar* will be wheat, or wheat and gram mixed, and after this in the next *kharif* cotton or *charri* will be taken again, and the rotation recommences. In some cases after cotton in one *kharif* and a fallow in the next *rabi* an unirrigated *kharif* crop will be taken, such as *jowar, bajra, moth*, &c., If a *rabi* is to be taken after irrigated *charri* in the *kharif*, it must be barley, as wheat will not grow on *charri*.

Area cultivated per plough or well.

The area which can be cultivated per plough depends of course to a great extent on the nature of the soil. Again the *rabi* tillage is much more thorough than that for the *kharif*, and in consequence a smaller area can be cultivated for the former than for the latter harvest with the same labour. In the light soil of the Bagar a plough worked by two bullocks or one camel can prepare for the *kharif* some 30 to 35 acres. In the firmer unirrigated soil of Hariana the area falls to 20 or 35 acres for the *kharif*, and to 6 or 7 for the *rabi*. In the irrigated canal tract it is less than this again. In the flooded *sotar* lands the area of hard rice land which a plough can cultivate for the *kharif* rice is only about 2 acres, while the area for flooded gram and wheat lands is probably not much more than 4 or 5 acres.

The area which can be irrigated by a well is not a factor of much importance in this district since, as has been often remarked, the area of well-irrigation is remarkably small

In the Bagar wells in Bhiwani a *lao* well will irrigate between 4 and 5 acres. A well in the Hariana tract, which is not too deep to allow of *rab* irrigation from it will water about 2½ to 3½ acres, while a well near the canal tract, where the water is comparatively near the surface, will irrigate 4 or 5 acres.

Area cultivated per plough or well.

It is impossible to form anything like a satisfactory estimate of the cost of cultivation; and the result, even if any was arrived at, would be somewhat meaningless. A great deal of the labour of cultivation is borne by the cultivator's family, his bullocks are in many cases home-bred, and it is difficult to estimate the cost of their keep. The cost of cultivation again varies largely, with the nature of the crop and of the soil to be cultivated.

Cost of cultivation.

The principal food staple of the district is *bajra*. It is sown on the first heavy rain in Har (June and July), the seed often being put in at the first ploughing; two ploughings are given at the most, and 4 to 5 *sers* of seed per acre are sown. Rain is needed for it in Bhadon (August—September). In Asauj westerly winds (*pachwa*) help the ripening of the crop. When the grain begins to form the ears assume a brown tinge, and as they ripen they gradually become of a dark colour. If the stalks and ears become yellow, or if the pollen (*bur*) is knocked off by too late rain, no grain will form. When the crop is ripe, generally in Katik before other *kharif* crops, the ears are broken off and threshed, the stalks (*karbi*) are cut and tied into bundles (*pulis*), and then stacked. They supply inferior fodder for cattle. The husks of the *bajra* grain are called *tuntra*. They are separated by winnowing, but are quite useless as fodder.

Unirrigated *kharif* crops—*Bajra*.

Jowar is cultivated in much the same way as *bajra*; not more than two ploughings are given and the seed is sown with the drill, some 8 to 10 *sers* per acre. The sowing of *jowar* as a rule takes place a little after that of *bajra*. It is weeded once about a month after sowing, and ripens a little later than *bajra* in Katik and Mangsar, *i.e.*, end of November. It requires a somewhat more stiff and loamy soil than *bajra*. As in the case of *bajra* the ears (*sittas*) are only threshed. The husks are called *turi* or *boda*, and when mixed with *pala*, make good fodder for cattle.

The pulses *moth* and *mung* are generally sown mixed with *bajra* or *jowar* and in the same method as the latter crops. About 4 or 5 *sers* of seed per acre is used if they are sown alone; if, as is usual, they are mixed with other crops,

Moth and Mung.

CHAP. II. A.

Agriculture including Irrigation.

Unirrigated *kharif* crops—*Moth* and *Mung*.

then from ¾ to 1 *ser* of each kind of seed is sown per acre. If the rainfall is well distributed at the beginning of the season for sowing, the above four crops can be sown separately; as in that case, if one fails, a second crop can be sown in its place. Where, however, the sowing rain does not come till late in the season all the crops will be sown together in order to save time and to make sure of obtaining some outturn from one or other of grains sown.

The broken straw of these grains, *guna*, and the broken pods, *palosi*, are good fodder for cattle.

Gwar.

Gwar is grown as fodder, the green stalks and also the grain are considered very good for cattle. After being reaped the pods are separated from the stalks and threshed. The broken pods (*phali*) are, as in the case of *moth*, called *palosi* and are good fodder. About 5 *sers* of seed to the acre are used. It is often sown on a late rainfall in August and September, and is reaped in November.

Flooded crops—Rice.

The only flooded *kharif* crop in Tahsil Fatehabad and the principal one in Sirsa is rice (*dhan*). The successful cultivation of rice is a laborious and difficult operation. The great desideratum for the crop is a continuous but equable supply of water. The crop is grown in *kunds*. The different varieties of rice are *chun*, *munji*, *khersu*, and *santhi*. *Munji* is the commonest.

On the first flood in Har (June—July) enough water is admitted into the rice *kund* to moisten the soil thoroughly and to leave a depth of water of some two inches. The soil is then ploughed and harrowed with the *sohaga*, which is fitted with sharp points to stir up the mud and silt. In Sirsa the soil is occasionally manured with goat droppings. The crop is grown either by seed being scattered by the hand broadcast or by transplanting. In the former case the seed is moistened, and placed in earthen vessels (*chaties*). It is then spread out and covered with a blanket till it germinates. The germinating seed is thrown broadcast over the field which has been prepared for it in the manner already described. In the latter case the seed is sown very thickly in a small nursery bed, and the seedlings are transplanted to the field in which they are to grow by hand. The field has been thoroughly worked up till it resembles a puddle and the seedlings are placed about a foot apart. This second method is far more laborious than the first, but the outturn of grain is usually much heavier.

The sowing or planting should be completed by the end of Sawan, *i.e.*, middle of August. Some 20 *sers* of seed per acre are used. The crop must grow in water, but care must be taken that it be not submerged.

Flooded crops—Rice.

While the crop is growing it requires frequent weeding, and at this time a plentiful supply of water is absolutely necessary, because, unless the soil is quite moist and soft, it is impossible to pull up the weeds. The crop must stand in water for a hundred days after which the water is allowed to dry gradually, and the grain ripens. If the water-supply fails, the crop will produce no grain. In this state it is known as *marain*, and is an excellent fodder.

Late floods coming down the Ghaggar frequently destroy the rice crop in Tahsils Fatehabad and Sirsa. The crop is reaped in November. The straw (*paral*) is not of much use as fodder.

Irrigated crops—Cotton.

The principal irrigated *kharif* staple in canal lands is cotton (*bari*). In Chait (March—April) land on which cotton is to be sown is ploughed two or three times after a *paleo*, or preliminary watering. The seed (*binaula*), mixed with *gobar* (cowdung), is scattered by the hand; about 6 *sers* per acre are used. The soil is sometimes ploughed again in order to mix the seed with soil, and the *sohaga* is then applied. Sowings are completed by the middle of May. The crop has to be watered several times, and to be carefully weeded twice or thrice. Cotton is picked 10 or 12 times from Katik to the end of Mangsir. The produce of the first picking is not of much use and after the last pickings the cold of Poh (December—January) kills the crop, and nothing more can be got from it.

Charri.

For irrigated *charri* or *jowar* sown thickly as fodder, a preliminary *paleo* is given, and the ground is tilled two or three times. About 20 or 25 *sers* of seed per acre are scattered over the ground and this is ploughed in. The *sohaga* is then applied. Ploughing and sowing take place from the beginning of Chait (15th March) to the end of Har (15th July). The crop receives two or three waterings unless it is sown *barani* in the vicinity of a block of irrigated fields. The crop is not generally manured.

Pepper.

Pepper (*mirch*) is the most important vegetable crop in the *kharif*. It is only grown on canal-irrigated land. The soil has to be prepared by a *paleo* and several ploughings. The land is then divided into *kiaris* or beds, and

CHAP. II. A. Agriculture including Irrigation.

seedlings are transplanted into them. They are then watered and manured. This is done from the middle of March to the beginning of July, and the crop ripens from the beginning of October to December. The manuring and watering have to be repeated frequently.

Irrigated crops—Pepper.

Unirrigated *rabi* crops—Gram.

The chief unirrigated *rabi* crop of the district is gram. The land is ploughed twice, or at the most thrice, and the seed is sown with the drill in Asuj (September and October). The soil is often not harrowed, as the presence of large clods is supposed to promote the growth of the crop by giving more space between the plants, and thus affording them more air. Some 18 or 20 *sers* of seed per acre are used. If there has been good rain for sowing it will require only a good shower in Mangsir (November — December) and another in Poh or Magh (December to February). Like other *rabi* crops it is not weeded. The pods are threshed by bullocks in the same way as for *kharif* crops. The straw and leaves of gram are called *bhusa*, and make an inferior fodder which is given to camels.

Barley.

Unirrigated barley is often sown mixed with gram, especially in the lighter soils. Two ploughings are given and the soil harrowed in order to break up clods. Seed is then sown with the *por*, about 20 to 25 *sers* per acre. The soil is then levelled with the *sohaga* in order to promote the retention of moisture. Sowings take place in Katik (October—November). A species of barley called *kanauji* is sometimes sown on a good fall of rain in January, especially in soils which have been lately broken up. Barley is reaped in Chait and Baisakh (March, April and May). The whole of the crop is cut and threshed by the bullocks: and the grain and straw are separated in the manner already described. The broken straw, &c., is called *turi* and is used as fodder.

Sarson.

Sarson or *sarsaf* (mustard seed) is sown in small quantities, mixed with gram, or gram and barley, about 1 *ser* of seed going to the acre. It is sown in Asauj or beginning of Katik. Some of the standing crop is from time to time gathered and eaten as a vegetable (*sag*) with food. After reaping, the pods and seed are separated by threshing and sold to *telis* who extract the oil. The stalks are of no use. Some of this crop is cut green as fodder.

Rabi on flooded lands.

... On the flooded *sotar* lands the principal crops are wheat and gram, singly, or a mixture of them known as *gochanhi* Some barley is also sown.

For wheat two ploughings are given and the soil is harrowed. The seed is sown with the *por* about 20 *sers* per acre. The soil is then levelled with the *sohaga*, and winter showers are needed in order to bring the crop to maturity. The whole of the crop is cut, both grain and straw, and both are threshed by bullocks. The harvesting takes place in the latter half of Chait and Baisakh (April and May). Gram is cultivated in flooded lands in much the same way as in *barani* soils. Where gram and wheat are sown mixed, the two crops are cut and threshed together and the grains are not separated. The broken straw, &c., of the mixed wheat and gram is called *missa*, and makes very good fodder.

Rabi on flooded lands.

The principal *rabi* staples on lands irrigated from the canal are wheat, and wheat and gram mixed.

Irrigated canal lands.

For wheat a preliminary watering is given in most cases, certainly if the rains have been deficient. The land is then ploughed 4 or 5 times and harrowed with the *sohaga* after each ploughing. The soil is thus worked up into fine seed bed, and the seed is then sown with the *por* and the ground levelled with the *sohaga*.

Wheat is watered three or four times after sowing at intervals of 20 days. The irrigated wheat is cut in Baisakh and threshed and winnowed as already described. The broken straw and ears of wheat are called *turi*, and are used as fodder for cattle. *Kangni* (rust) is a disease which attacks wheat and is due to want of sunshine in cloudy weather. *Sundi* is an insect which attacks the grain.

Barley is not much sown on canal lands, as it does not repay the cost of irrigation. It requires less ploughing than wheat. It is grown mostly in the canal villages with light soil to the west of Hissar. It is sown and harvested about the same time as wheat. It is prepared in the same way as wheat after being cut and its *turi* is also used for fodder.

Tobacco.

For tobacco a preliminary watering is given, and the land is then ploughed and manured. It is then ploughed and harrowed several times. Seed is sown in Katik, about $1\frac{1}{4}$ *sers* to the acre. In Phagan (February—March) trenches (*kattas*) about a foot wide are dug and the seedlings transplanted on the side of these. After this the crop is frequently watered and weeded twice.

Sales and mortgages of land.

Up to 1895-96 the alienation of land by agriculturists to non-agriculturists was not important. From that year

CHAP. II. A.

Agriculture including Irrigation.

Sales and mortgages of land.

onward till the passing of the Land Alienation Act in 1901, sales and mortgages increased by about three-fold. The reason of this was of course the fact that the harvests were peculiarly bad, and large numbers of persons, including even the thrifty Jats, had to migrate to other districts temporarily to obtain food and work. In many cases such persons mortgaged their lands, before going, to provide the wherewithal for their journey. There was a glut of land in the market and consequently a fall in value which necessitated still further mortgages to enable owners to get the sum necessary for their maintenance. Unfortunately the prevailing form of mortgage in the district is that which contains a condition of sale. The mortgagees were able to exact such hard terms from mortgagors that in practice a mortgage always meant a subsequent sale. Just when matters were at their worst the Land Alienation Act came before the Legislative Council. This caused many mortgagees to issue notices of foreclosure at once. Fortunately the year 1900-01 was a very good one, and consequently the damage done was less than it might have been. Even so, however, large numbers of good agriculturists must have been compelled to part with their land. This accounts for the enormous number of alienations in 1900-01. In 1901-02 the effects of the Act began to be seen and since then there has been a great falling off in sales and ordinary mortgages. On the whole the Act has been of the greatest possible benefit in this district. All who are worthy of credit can still get it and it is not to be regretted if those who are unworthy of it are driven to other means of life than agriculture. Probably the Jat will eventually oust the Rajput in great measure and the latter will take to military service in an increasing extent. Even where non-agriculturists have taken the place of agriculturists as landlords the evil done is not so great as it would be in the more densely-populated tracts of the Punjab, because as a rule the expropriated landlord becomes the tenant of the new purchaser and settles down to much the same life as he led before, with this difference that he has to pay considerably more as rent than he was accustomed to pay as land revenue.

Indebtedness.

Apart from the secured debt there is a vast amount of unsecured debt due from agriculturists to the village *baniya*. As a rule these debts vary from Rs. 10 to Rs. 100, and, so long as the debtor's credit remains good, he is charged

interest at a fair rate (Re. 1 per cent. per mensem), and no harm is done. If, however, owing to bad harvest or for any other reason, the debtor's credit fails, the account is closed, and the debtor is made to execute a bond for the whole amount of debt due. It is customary to enter a very high rate of interest in this bond (usually 2 or 2½ per cent. per mensem compound interest). In nine cases out of ten, however, if the debtor makes an honest effort to act fairly by his creditor, he is allowed a very large discount of the interest stated in the bond. The tenth case is the one which usually appears before our Civil Courts. The debtor repudiates his debt and the creditor endeavours to get all the interest he is allowed by the strict letter of the bond.

Loans under the Land Improvement Loans and Agriculturists' Loans Acts.

Up till 1895-96 loans to agriculturists were of comparatively rare occurrence. With the beginning of the dry years, however, it became necessary to help the people whose credit had been very badly shaken. Consequently loans were given very freely to all who asked for them. The culminating point was reached in the agricultural year 1899-1900, when over ten lakhs of rupees were advanced under the Agriculturists' Loans Act. Unfortunately, with the exception of 1900-01, the years continued bad, and collections could only be sparingly made. Eventually in 1902 and 1903 Government remitted nearly nine lakhs of rupees of outstanding loans. In 1902-03 and 1903-04 large advances of *taccavi* were again made. The harvests in 1903-04 were on the whole good and it was possible, therefore, to collect a considerable portion of the outstanding debt. Since then advances have frequently been made to help the poorer agriculturists to sow their land, but never to the extent found necessary in 1899-1900, and the advances made have generally been punctually repaid.

There is very little scope for the grant of loans under the Land Improvement Loans Act, because the only improvement that is necessary in most cases is the provision of means of irrigation and owing to the depth to subsoil water this is usually impossible. An attempt was made in 1899-1900 to provide money for the digging of *kacha* wells, and a few wells were dug. It was found impossible, however, to use them for irrigation in all but a few cases.

In 1902-03 money was advanced under this Act for the digging or improvement of ponds. Many villages' ponds were improved in this way, and this seems to be undoubt-

CHAP. II. B.

Rents, Wages and Prices.

Loans under the Land Improvement Loans and Agriculturists' Loans Acts.

edly one of the best ways in which loans under the Act should be spent, especially when there is scarcity in the district not amounting to famine.

B.—Rents, Wages and Prices.

Rents.

Hissar differs from every other district in the Punjab in the fact that the vast majority of the rents are cash rents. *Batai* rents are usually only found in the case of canal-irrigated and flooded crops. The rent rates vary greatly from village to village and are generally higher in the four southern tahsils than in Sirsa. On *barani* lands there is very little variation from year to year, though there is a tendency to rise if the rents over a large period of years are considered. In the canal-irrigated tracts rents have risen rapidly in the past few years. In the four southern tahsils 8 annas per acre is a fair rent for the sandy soil of the Bagar tracts, while Re. 1-4-0 per acre is the normal rent for the harder and more productive loam of the Hariana Circles. These are, of course, rents for unirrigated lands. If the land is canal irrigated the rent is determined largely by the distance from large towns or villages where manure is easily procurable, and which afford a good market for the produce. In the neighbourhood of Hissar good flow land has been leased by the Superintendent of the Cattle Farm for Rs. 30 to Rs. 40 per acre, the tenant paying all the canal dues. Near Hansi also Rs. 20 per acre can often be obtained. In the outlying villages the rent varies from Rs. 8 to Rs. 10 per acre. Inferior canal lands can let easily for Rs. 4 per acre. In every case the tenant pays all the canal dues, including the so-called owner's rate and cesses. In the Sirsa Tahsil cash rents are in most cases levied only in the case of dry lands. The exceptions are a few villages belonging to the Skinner family in which the owners find it more convenient to levy cash rents even on irrigated land. The rent rate in Sirsa seldom exceeds Re. 1 per acre, and 8 annas per acre is more common. All rents below annas eight per acre are usually found to be customary rents. The usual *batai* rent rates are one-third and one-fourth. The water rates and land revenue are not infrequently shared by the owner and tenant in the same proportion.

The rents paid by occupancy tenants are almost all fixed in terms of the land revenue, and can only be varied by regular suit, or, when the tract is re-settled, by executive order of the Settlement Officer.

Prices.

Statement 26, Part B, shews the retail prices of the principal staples at head-quarters on the 1st January in each year. The improved communications with the outside world have had the effect of steadying prices to a remarkable degree. The difference between the lowest harvest price and the highest price in the year is not now nearly as great as it used to be. Moreover, in the district itself, prices are almost independent of the local condition of the crops. This fact was strikingly exemplified in 1901-02 when, in spite of the fact that the crops on *barani* lands failed completely throughout the district, prices remained normal.

Agricultural labourers.

Hired field labourers are generally employed in weeding the *kharif* crops where the work is not done by the women of the family; but the time when there is the greatest demand for hired labour is at the reaping of the *kharif* and *rabi* harvests. The labourers are in nearly all cases village menials such as Chamars, Chuhras, Aheris and Dhanaks. When the harvest is a good one and work plentiful they get comparatively high wages, two and sometimes three or four annas per day, and one if not two meals of *roti*. They are by no means dependent on field labour alone, but practise other handicrafts in the village, such as weaving, curing skins, &c., and many of them cultivate land on their own account.

In seasons where the rainfall is partial tenants and even proprietors of villages in which there has been rain insufficient for sowing earn very fair wages by taking their ploughs and bullocks to adjacent villages where there has been rain, and ploughing for hire, which in some cases under favourable circumstances amounts to Re. 1 per day and meals. In seasons of scarcity the first pinch of distress is of course felt by the labourer, but he is less tied to his village than are the proprietors and tenants, and does not hesitate to leave it and seek labour elsewhere.

Petty village grantees.

There are a considerable number of village grants free of rent, especially in *bhayachara* villages. These grants are most commonly made to village menials and watchmen on condition of, or in payment of, service, to attendants at temples, mosques, shrines or village rest-houses, so long as they perform the duties of the post, and for maintenance of monasteries, holy men, teachers at religious schools and the like. The grants take various

CHAP. II. B.

Rents, Wages and Prices.

forms; when the land is held free of either revenue or rent it is called a *dholi* if given with a religious object, and a *bhond* if given for village services.

Village menials—

The village menials most commonly found in the district are as follows in the order of their social rank :—

Khati.

The Khati is the village carpenter who does all the wood-work required by the villagers. His customary dues are a fixed amount of grain, varying from 30 to 50 *sers* per annum per plough, payable at harvest time, or a cash payment of 8 annas or Re. 1 per plough per annum together with fees at weddings, especially Re. 1 for making the *toran*. For these dues the Khati does all ordinary repairs, the wood being supplied by the owner. For new articles such as a plough (*hal*) or a charpoy (*munji*), two annas is received as wages.

Nai.

The Nai combines the occupation of village barber and gossip-monger. He takes a leading part in all family ceremonies. He will shave all but the lowest castes, such as Chuhras and Dhanaks. He is the bearer of good tidings, but never of bad, which are entrusted to the *daura*. The Nai gets no fixed remuneration, but he is fed at weddings and such like.

Lohar.

The Lohar is the village blacksmith and is distinctly lower in the social scale than the Khati. He does all repairs to iron work, the material being supplied by the owner. His dues are generally much the same as the Khatis.

Kumhar.

The Kumhar is the village potter and manufactures the household utensils required. In addition to this he keeps donkeys, a reason for his low caste, and also carries grain from the threshing floor to the village.

Chamar.

The Chamar is priminarily the leather-worker of the village and supplies the *nari* or throng for the yoke, binds the seed drill and fastens the prongs of the pitchfork with leather. In addition to this he generally performs the *begar* work of the village and also sometimes works in the fields. His remuneration consists of grain; either a small share of the produce or one maund, more or less, of grain per house per annum, together with the skins of all cloven-hoofed cattle who die in the village. The owners, however, sometimes retain the skin of full-grown buffaloes, which are valuable, and pay the Chamar 2 annas (*nikalwai*) for removing them. If the Chamar gets the skin he has to supply a pair of shoes in return. The Chamar sometimes shares the flesh of dead cattle with the Chuhras or Dhanaks.

The Chuhras and Dhaneks are both on a level at the bottom of the village social scale. They are chiefly employed as the village *dauras* or messengers, whose duty it is to show the road to travellers, to summon the villagers together when required, and to carry messages and letters. The *daura* receives a fixed sum, generally Rs. 12 per annum, raised by a contribution levied on all the residents of the village, and also the skins of camels, horses and donkeys, and sometimes a share of the flesh of dead cattle. Many of the menials, and especially the Chamars, are also agriculturists, and not a few are inferior proprietors (*kadim kirsan*) and occupancy tenants.

Village menials—Chuhras and Dhanaks.

The village *baniya*, though a much and often a very deservedly abused individual, plays a part of cardinal importance in the village economy. He is the village banker with whom most of the brotherhood have a drawing account, which generally from the first shows a balance in favour of the banker. Payments to the credit of the *zamindar's* account are often made by him in kind by delivery of grain or cattle, and the price at which they are credited is one not unfavourable to the *baniya*. However in a good year in a prosperous Jat village, many of these village accounts will be cleared up. Without the village banker, on whom to draw in times of scarcity, the *zamindars* would often be in extreme difficulties, and there is perhaps much more good faith in his transactions with them than he is often given credit for. He is generally a person of importance in the village, and often holds land as an occupancy tenant or as a *kadim kirsan*, and he almost invariably has a lofty masonry house (*haveli*), which not inappropriately overtops the other buildings of the village.

Village *baniya*.

Table 25, Part B, shews the wages paid for labour, skilled and unskilled, and for the hire of carts, camels and donkeys. The table does not bring out the salient fact that the wages of labour are subject to far greater fluctuations than the prices of foodgrains or other commodities. In dry years labourers can usually be obtained for three annas per diem plus one good meal a day, while, if there have been good harvests, the wages of labour rise to 8 annas to Re. 1 per diem plus one meal a day. These high wages are of course only obtainable at harvest time. The great increase in cotton cultivation in recent years has caused an increase in the wages paid to field labourers.

Wages.

CHAP. II. B.

Rents, Wages and Prices.

Measures of length, area, weights and volume.

The unit of length for measuring distances on the ground is the *kadam* or double pace, and the term as employed by the *zamindar* does not signify any definite number of feet or inches. The recognised official unit of length at the settlement of the Sirsa District in 1852 and that of the Hissar District in 1863 was the *gatha* of 99 inches. In the revised settlement of Sirsa the unit adopted was a *kadam* or *gatha* of 66 inches, while that employed in the recent settlement of the four southern tahsils was one of 57 inches.

The cloth measure in common use is as follows :—

3 *angals*	=	1 *girah*.
16 *girahs*	=	1 *gaz*.

This *gaz* is equal to 32 inches.

Among the *zamindars* the measures of length other than for the ground are as follows :—

2 *balisht*	=	1 *hath* = 18 inches.
2 *haths*	=	1 *gaz* = 36 „
12 *gaz*	=	1 *pachosi*.
8 *pachosis*	=	1 *adha*.

The *hath* is in reality an indefinite length. The *murwa hath* is the most common, and is measured from the projecting bone of the elbow round the end of the fingers held out straight back to the knuckles or sometimes to the wrist.

The *zamindar* has no peculiar area unit of his own. In the former settlements the *pakka bigha*, equivalent to $\frac{5}{8}$ acre, was taken as the unit of area, and to this the *zamindar* has now become accustomed. The side of one square *pakka bigha* is equal to 20 *gathas* (*kadams*), each 99 inches long.

20 *biswansis*	=	1 *biswa*.
20 *biswas*	=	1 *bigha*.

In the revised settlement of the Sirsa District a *bigha* was taken to be equal to 20 *biswas*, a *biswa* being equivalent to 45 square *kadams*, each 66 inches long. This *bigha* was thus the same as the *pakka bigha*. The area unit employed in the recent settlement of the four southern tahsils of the district is the *kacha bigha*, which is $\frac{1}{3}$ of the *pakka bigha* or $\frac{5}{24}$ of an acre. The side of a square *kacha bigha* is 20 *kadams*, each 57 inches in length. The sub-divisions of the *kacha bigha* are the same as those of the *pakka bigha*. Grain is almost invariably measured by weight units, and not by capacity units.

Measures of length, area, weights and volume.

The higher weight measures are as follows :—

2 *chhatanks*	=	1 *adhpao* = ½ seer.
2 *adhpaos*	=	1 *paobhar* = ¼ seer.
2 *paos*	=	1 *adhser*.
2 *adhsers*	=	1 *ser*.
5 *sers*	=	1 *pansers* or 1 *dhari*.
20 *sers*	=	4 *dharis* or 1 *dhaun*.
40 *sers*	=	2 *dhauns* or 1 *man* or 82⅔ pounds.

Practically no measures of capacity are used : grain is almost invariably measured by weight units.

C.—Forests.

Hissar Bir.

The greater portion of the Hissar Bir has been gazetted as a Reserved Forest under the Forest Act, but it does not contain any timber of value. The unclassed forests consist of the Bir at Hansi and portions of the Birs at Hissar and Sirsa.

Arboriculture.

Arboriculture is a matter of considerable difficulty in a tract where there is such a deficiency of water as in Hissar. The only places where it can be carried on with any hope of success are near the canal. Along the banks of the latter is a fringe of very fine trees which have been nearly all planted.

Arboricultural operations with the aid of canal water are being carried out by the District Board on various roads throughout the district.

D.—Mines and Mineral Resources.

Kankar

The only minerals found in the district are *kankar*, or argillaceous limestone in nodules, and *shora* or saline earth. Theoretically all the *kankar* is the property of Government, but in practice anyone can quarry for it who applies formally for permission to do so. The only fee charged is the eight annas court fee stamp which has to be affixed to every application. *Kankar* is extensively used for metalling roads, and the softer varieties are burnt for lime for buildings.

Shora.

Shora is usually found in deserted villages sites. In this case the only fee charged is Rs. 2 on the license issued by the Salt Department, but the proprietors of every village exact a royalty from all contractors extracting *shora* within the areas of the village. In some cases these royalties amount to a considerable sum. All profits derived by the proprietary body from these royalties have been taken into account in fixing the land revenue of the village.

E.—Arts and Manufactures.

Hand industries.

Practically the only hand industry of importance is the weaving of coarse cotton cloth. This is done by Dhanaks, Chamars and Julahas, the customary price being 80 *haths* for the rupee. The Jat and Bishnoi women usually embroider their own *chaddars*, using wool instead of silk.

Factory industries.

The main factory industry is the cleaning and pressing of cotton. There are at present 22 factories in the district of which 13 are at Hansi, 5 at Bhiwani, 2 at Hissar, 1 at Narnaund in the Hansi Tahsil and 1 at Uklana in the Hissar Tahsil. Details regarding the hands employed are given in Table 28, Part B. About 400,000 maunds of cotton are cleaned and pressed annually, the combined profits of the companies amounting to about a lakh and half of rupees. The cotton cleaning industry is of comparatively recent origin. It has led to a great increase in the area under cotton, and if only care is taken to select the seed distributed to *zamindars* carefully, there is every reason to hope for further developments.

A spinning and weaving mill was opened in 1913 at Bhiwani. It is managed by a Bombay firm, and is on a fairly large scale. So far it has had a fairly prosperous career. It deals more with yarn than cloth.

Miscellaneous manufactures.

Bhiwani is the centre of a fairly important brass and bell metal (*kansi*) trade. The articles manufactured are the ordinary cups and platters required in an Indian household. These are fairly well finished but quite without ornament. The brass used is chiefly old broken brass (*puht*).

The embroidered woollen *orhans* or *chaddars* of the district are worthy of mention, for though nothing could be more homely than the materials, or more simple than the design, they are thoroughly good and characteristic in effect. Two breadths of narrow woollen cloth are joined and covered with archaic ornaments in wool and cotton thread of different colours, needle wrought in a sampler stitch. The cloth is a fine red, though somewhat harsh and coarse in texture and all the designs are in straight lines. The price of these *chaddars* was originally about Rs. 4, but since a demand has arisen among amateurs interested in Indian fabrics, the rate has doubled. It is scarcely likely that the woollen *phulkari* will grow, like the silk and cotton one, from a domestic manufacture for local use into a regular production for export trade.

F.—Commerce and Trade.

Commercial classes.

The commerical classes are principally of the Baniya caste and include every gradation of the trader or shop-keeper, from the petty village *baniya* who sells salt and oil (*nun tel*) to the substantial banker and grain-dealer who has transactions with all parts of India. Towards the north a few Khatris and Aroras are met with. Some of the commercial houses in Bhiwani and Sirsa are very wealthy and have branches in many other large cities.

Of the larger traders not a few are men of energy and ability with a capacity for organization which enables them to conduct commercial enterprises of no mean order.

The Sunars do a considerable amount of business as bankers but not on a very large scale.

The *zamindar* commonly takes his own grain to market, and thus obtains the benefit of the higher prices ruling in the trade centres, but in time of scarcity it is of course to a considerable extent made over to the *baniya* in settlement of accounts.

Trade centres.

Before the construction of the Rewari-Bhatinda Railway all trade between the west and the districts round Delhi went along the Delhi-Sirsa road which passed through the towns of Hansi, Hissar, Fatehabad and Sirsa : and all these towns were to some extent centres of this through trade, while Bhiwani with Sirsa shared the export trade to the States of Rajputana. The construction of the Rewari-Bhatinda Railway altered all this. The trade between east and west passed along this railway, while Hansi and Hissar ceased to be of such importance as centres as they were before, and became simply markets for the collection and export of the local produce, especially cotton at Hansi, and for the import and distribution of such commodities as are required by the surrounding agricultural population. Bhiwani, however, was able to maintain its position. Sirsa is rapidly degenerating into a place of merely local importance, its place as a collecting centre being taken by Dabwali on the Jodhpore-Bikanir-Bhatinda Railway, and various stations in Patiala territory on the Southern Punjab Railway. On the other hand Budhlada and Tohana, which were formerly of little importance, are rapidly developing into important collecting centres. From the district as a whole the most important articles of export are cotton, grain and rapeseed, while cotton piece

CHAP. II. G. Means of Communication.

goods and salt appear to be the most important of the articles imported.

G.—Means of Communication.

Railways.

The Hissar District is peculiarly well served by railways. The oldest is the Rewari-Bhatinda metre-gauge railway which runs through the district for 122 miles. It forms part of the Bombay, Baroda and Central India Railway Company. There are stations at Bhiwani, Bawani Khera, Hansi, Satrod, Hissar, Jakhod, Adampur, Bhattu, Ding, Suchan, Kotli, Sirsa, Gudha and Kalanwali. The line does a large carrying trade from the tracts north of Sirsa towards Delhi and Bombay. The passenger traffic is of minor importance.

The Jodhpur-Bikaner Railway was extended to Bhatinda in 1902. It has stations at Chautala Road, just outside the district, and Dabwali. The Digana-Churu Branch of the same railway has also been recently opened to Hissar.

The Southern Punjab Railway passes through the Fatehabad and a portion of the Hansi Tahsils. It has stations at Budhlada, Jakhal and Tohana in the district. Up to date it has been most successful in diverting traffic towards Karachi. The North-Western Railway has recently opened a branch from Jakhal to Hissar, 52 miles long: which opens up the central part of the district. The most important result of the railways is the steadying of prices which has been already alluded to. Now unless there is scarcity over the greater part of India prices rise but little; they are hardly affected at all by local conditions. Another great advantage is the facility afforded to the famine-stricken to escape from the district. On the first approach of famine many of the poorer classes pack up their small bundles and make for Lyallpur or the Jhelum Colony. Frequently also contractors for digging on various canals come to Hissar to recruit coolies for the work. The result is that we can now view without serious misgiving a failure of crops which would have meant serious famine accompanied by loss of life in days before the railways were made.

There is a metalled road from Bhiwani to Rohtak which is maintained by the Hissar and Rohtak District Boards, and the road from Bhattu to Fatehabad has also been metalled recently. The unmetalled roads are for the most part in very bad condition. In parts of Sirsa the

road has been completely covered with drifting hillocks of sand, so that the wayfarer finds it easier to trudge across the neighbouring fields. It is difficult to suggest any improvement which would not involve the District Board in a greater expediture than it can bear. As a consequence of the bad state of the roads wheeled traffic is confined to the large towns and the ordinary means of transport is the camel.

Railways.

There are no navigable rivers in the district, and only two miles of the Hansi Branch of the Western Jumna Canal and a portion of the Hissar Major Distributary above Rajthal are navigable. The traffic is not of any importance. There are 11 ferries in the district on the Ghaggar river, namely :—

Navigable canals and waterways : ferries.

1. Khaireki.
2. Jiwrar.
3. Bansidhar.
4. Panihari.
5. Ratya.
6. Kalotha.
7. Alawalwas.
8. Jakhal.
9. Sadahanwas.
10. Bira Badhi.
11. Bubhanpur.

As the Ghaggar river is no more than a name for the greater part of the year, these ferries are seldom used. In the rains when the river is in flood the approaches to the ferries become almost impassable for camels, and the ferries are therefore hardly used except by villagers wishing to get to their lands on the opposite side of the river. The right to levy fees at ferries according to the prescribed scale is auctioned annually and the proceeds credited to the district funds. The income from this source is insignificant.

Postal arrangements.

Statement 32 of Part B gives details regarding the extent of postal transactions in the district. It shows that postal business is steadily increasing. Of all the departments of Government the Post Office is the one which appears to have earned in the fullest measure the confidence of the people. The only bar to further progress is the illiteracy of the people which makes letter-writing the business of a particular class.

Besides the telegraph offices mentioned in Statement 31 there are telegraph offices at all stations on the railway which are open to the public. There is also a telegraph line on the canal from Badopal to Delhi *vid* Hissar. This line is not open to the public. There is direct telegraphic communication between Bhiwani and Rohtak.

CHAP. II. H. Famine. Postal arrangements.

Table 29 of Part B gives a complete list of all rest-houses and dâk bungalows in the district, and Table 30 (polymetrical) of Part B gives the distances between the more important places.

H.—Famine.

Famines.

The part of the Punjab to the south of the river Sutlej has perhaps more than any other portion of the province suffered from the famines which have from time to time scourged Northern India, and within the tract in question the Hissar District has borne not only the first burst but experienced the acutest stages of the distress. The district borders on the sandy deserts of Rajputana, and has to receive the first rush of starving immigrants therefrom. Though the opening of communications has obviated any danger of absolute and extended starvation, still the question of famine—the more appropriate term is now scarcity—must from the above considerations occupy a position of much importance in the administration of the district.

San Chalisa.

The first famine of which we have any authentic account is that of A. D. 1783, the *chalisa kal* or famine of *san chalis* (Samat 1840) by which the whole country was depopulated. The preceding year had been dry and the harvest poor, but in 1783 it entirely failed. The country was depopulated, the peasants abandoning their villages and dying by thousands of disease and want. Only in the neighbourhood of Hansi did the inhabitants hold their own, but even here the smaller villages were deserted by their inhabitants who took refuge in the larger villages, until the severity of the famine should be passed. In other parts of the district none remained who had strength to fly. No reliable statistics of the mortality are extant, but there can be no doubt that the people suffered terribly. Some died helplessly in their villages, others fell exhausted on the way towards the south and east, where they thronged in search of food and employment. Nor was the mortality confined to the inhabitants of the district, for thousands of fugitives from Bikaner flocking into Hariana perished in the vain endeavour to reach Delhi and the Jumna. The price of the commonest food-grains rose to five and six *sers* per rupee. Fodder for cattle failed utterly, and the greater part of the agricultural stock of the district perished. But for the berries found in the wild brushwood the distress would have been even

greater. Stories are told of parents devouring their children, and it is beyond a doubt that children were during this fatal year gladly sold to any one who would offer a few handfuls of grain as their price. The heat of the summer was intense, and all through July and August the people looked in vain for relief. At last in the month of Asuj (the latter part of September and beginning of October) copious rain fell here and throughout the province. There were not many left to turn the opportunity to account, and the few who were found in the district were, for the most part, immigrants from Bikaner, who had been unable, after crossing the border, to penetrate further eastward. These, however, seized upon the deserted fields and cultivated patches here and there. The result was a spring harvest in 1784 of more than ordinary excellence. The country gradually became repeopled, but principally from the west, comparatively few of the original inhabitants returning to seek their old homes. Many who did return, found their fields cultivated by recent immigrants. In some cases the immigrants were ousted; in others they submitted to pay a quit rent to the former proprietors. The district has been re-colonized, but it cannot be said that the traces of the famine have yet all disappeared. The present parched and dried appearance of the country is popularly said to date from the disastrous effects of the drought of 1783; that fatal year is the era from which every social relation of the people dates. Few villages have a history which goes back uninterruptedly to a period before the famine, and there probably is not one which does not date its present form of tenure from the time when cultivation was resumed.

San Chalisa.

Famine of 1860-61.

In common with the whole of the tract between the Jumna and Sutlej the districts of Hissar and Sirsa were visited with severe famine in 1860-61.

The harvests of 1859-60 appear to have been poor so that the local stock of grain had been much depleted before the year 1860-61. The summer, autumn and winter rains of that year were more scanty—even in the previous year, and as a consequence both the *kharif* and *rabi* harvests failed.

Large numbers of cattle died, and many left the district in quest of places where fodder sufficient to preserve life might be found. Within the limits of the old Hissar District

CHAP. II. H. Famine.

it is estimated that 192 persons and 38,000 cattle died of absolute starvation, while 21,400 souls and 47,500 cattle left the district.

Famine of 1860-61.

Measures of relief were started in February 1861, when the *kharif* had failed and there were no prospects of a *rabi*. The relief given took the form of payment by way of wages for work done mostly out of public funds, and by way of charity to old and infirm persons, for the most part out of sums raised by private subscriptions.

In the week ending February 16, the daily totals of persons employed on works in the Hissar District amounted to 11,021, and of those relieved gratuitously to 10,252; a month later the figures were 8,680 and 14,818 respectively; and for the last fortnight of April 12,123 and 40,377; the similar figures at the end of May were 18,985 and 60,161 the highest point reached.

In the early days of June rain fell and a demand for plough labourers at once sprang up. A pair of bullocks and a ploughman earned not less than Re. 1-1-0 to Re. 1-4-0 per diem.

The scarcity of plough cattle prevented full advantage being taken of the rainfall. The repletion of the village tanks at once stopped the relief work which their excavation had supplied and this and other causes reduced the daily totals of persons who received wages in the last fortnight of June from 10,585, the figure in the previous fortnight, to 8,451. The total cases gratuitously relieved in the same period were however 62,509 which rose to 75,139 for the first fortnight of July. The summer and autumn rains were good, and relief operations gradually decreased in amount more or less continuously after July up to the end of September, in the last fortnight of which month only 3,040 persons were gratuitously relieved. During the first fortnight of October the daily total of persons receiving wages amounted to only 3,719: after this date relief operations ceased altogether. The daily total of persons who received wages during the period of relief operations in the Hissar District alone amounted to 190,369, while the similar figures for the recipients of gratuitous relief were 658,870.

Famine of 1869-70.

The districts of Hissar and Sirsa again suffered, more perhaps than any other district in the Cis-Sutlej tract, in the famine of 1869-70. The harvests of 1867 had been below average, the winter rains of 1867-68 were

unusually heavy, and appear to have had a prejudicial effect on those which should have come in the summer and autumn of 1868. On July 18th in the latter year there was a fairly general rainfall throughout the district, except in the Bhiwani Tahsil. Ploughing operations at once commenced and the *kharif* was sown, but no more rain fell, and in September it became clear that there would be no *kharif* harvest, while the season for *rabi* sowings was fast slipping away; at the same time the difficulties of the situation were aggravated by the great scarcity of fodder. A considerable export of grain, chiefly *bajra*, was going on at the same time into Bikaner territory, where the prospects of famine were greater even than in Hissar.

The distress took tangible shape in the incursion in August of numbers of hungry immigrants from Bikaner on their way eastward in search of food and work. During the month of September relief operations began by the opening in various localities of poor-houses supported by voluntary subscriptions. In October famine relief works in the shape of tank excavation and road raising paid for from public funds were sanctioned and commenced, for the most part in the Barwala Tahsil. By this time prospects were gloomy in the extreme. Both the *kharif* harvest and the grass crop had failed entirely, the latter more completely even than in 1860-61, and all hopes of a *rabi* had faded away. The tanks had all dried up, and wells in many places had become brackish, and the inhabitants had no alternative but to leave their villages, and seek food and pasture elsewhere, while the numbers flocking in from Rajputana, where prospects were even more gloomy, added to the complications.

Famine relief works were extended, and the metalled road from Hissar to Hansi and the raising of the *kacha* road from Hansi to Bhiwani were taken in hand in January 1869.

The winter rains though giving a small and very temporary supply of fodder, were too scanty to raise any hopes for the *rabi* of 1869 which failed entirely. Up to the 20th February Rs. 11,990 had been collected as subscriptions, and with an equivalent grant from Government this was found sufficient to carry on the charitable relief operations. In Hissar District up to this date 46 poor-houses had been opened for the distribution of food, and 106,808 men and

CHAP. II. H.
Famine.
Famine of 1869-70.

126,970 women and children had been relieved, the majority of these men being those who were too old and infirm to work. *Takkavi* advances were also given for the construction of *pacca* and *kacha* wells, by means of which cultivators were enabled to raise a small area of *rabi* crops in some parts of the district. Meanwhile cattle had died in large numbers, and those that remained eked out the miserably scanty stores of fodder with chopped *kikar* leaves and other equally innutritious food, which frequently brought on disease and increased the already excessive mortality. In March 1869, inspite of all the measures which had been taken to arrest the progress of the distress, it continued to increase. The daily total of destitute persons who received gratuitous relief from the Local Committee in Hissar amounted to 132,739, while the similar number of those employed on public works during the month was 61,399. This average was maintained in the subsequent month; but during May the distress increased rapidly. The great heat withered up the grass and cattle began to die in numbers.

Many immigrants from Bikaner again came into the district, and the poor who were unable to buy grain supported themselves on the fruit of the *karil*, which is unwholesome when eaten in any quantities, and on the leaves of the *jal* or *pilu*.

But whether the jungle fruits were wholesome or not, they were the means of saving many lives; for in this year of famine the crop of wild fruit was larger than had been ever before remembered, and during the month of June gave food to many thousand people.

During June and July no improvement took place on the situation. The Bikaner immigrants began to pass back through this district on their homewards after a fruitless search for labour in the east, and on their way back they halted in large numbers in and around the town of Hissar.

The rainfall in June and July north of the Sutlej did not extend to the districts of Hissar and Sirsa; a few scanty showers fell in the latter half of July in Tahsils Hansi and Bhiwani, but were of no use for ploughing operations. The number of persons gratuitously relieved in Hissar during the month of July amounted to 169,189, and those employed on famine works numbered 54,423. So great was the scarcity of fodder that up to the 30th June 1869, 152,801 head

of cattle had died, of which no less than 44,061 were plough bullocks. These figures apply to the Hissar District. In Sirsa the Sikh Jats at great expense and trouble managed to keep the cattle alive. The Muhammadan Bhattis, on the other hand, slew and ate them, while the Bagri Jats let theirs loose on the countryside.

During the first fortnight of August the state of matters was such as to give rise to the gravest apprehensions. In place of seasonable rain for *kharif* sowings and *rabi* ploughings, hot burning winds daily swept across the district, which, more especially in the southern part, withered up the small area of *kharif* crops which had been sown on the scanty rains of July. It became clearly apparent that if, as appeared probable, the *kharif* harvest again failed totally as it had in 1868, the district would be plunged into a calamity, the direful consequences of which it was impossible to exaggerate. With a district in which thriftless Ranghars and Pachhadas abounded it was estimated that three-quarters of the total population would require relief.

But on the 22nd and 23rd August rain fell over a considerable portion of the southern half of the Hissar District and enabled agricultural operations to be begun ; distress, however, still continued to increase and during the whole month the daily totals of persons receiving gratuitous relief amounted to 272,116, while the number of those employed on famine works was 53,666.

Early in September a little rain fell, but prices still rose, wheat selling at 8½ *sers* to the rupee. During the last week in August and the first week in September the daily totals of persons relieved amounted to 125,710 in the Hissar District, but about September 7th the long deplayed rain came at last, and the district, in common with the rest of the Punjab, and especially the Cis-Sutlej portion thereof, was saved from a famine in which it is hard to see how the starving population could have been in any way adequately provided for. Owing however more especially to the presence of the Bikaner immigrants who remained in the district relief operations had to be continued some time longer. In the month of September the number of persons employed on works fell to 38,099 and that of those relieved gratuitously to 242,028. These figures of course represent the sum of the daily totals.

CHAP. II. H.
Famine.

Famine of 1869-70.

The subsequent gradations of scarcity can be judged from the marginal figures. In the Sirsa District alone it is estimated that 148,590 head of cattle perished in the famine, and an equal number undoubtedly died in Hissar. On the whole the two districts lost altogether 300,000 cattle in 1868-69. The marginal figures show the amounts expended in the Hissar and Sirsa Districts in gratuitous relief. Of these sums Rs. 16,000 and Rs. 649, respectively, were spent in giving pecuniary assistance and the balance in feeding destitute persons. In addition to these sums Rs. 88,820 was expended in the Hissar District in the prosecution of famine relief works.

	Persons employed on works.	Received gratuitous relief.
October 1869 ..	32,886	190,402
November 1869 ..	764	18,456

District.	Private subscriptions.	Donation.	Government equivalent.	Other Government grants	Received from C. R. F.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Hissar ..	16,642	..	16,642	9,229	35,500	78,013
Sirsa ..	533	8,742	6,013	583	18,500	34,373

The balances of land revenue which accrued in the districts of Hissar and Sirsa for the agricultural year 1868-69 amounted to Rs. 48,958 and Rs. 52,969 respectively, of which Rs. 7,698 and Rs. 12,383 were remitted. The famine has been dealt with at some length as the question is one which intimately concerns the administration of the district. Two points appear to stand out with great clearness, namely, that the first shock of famine will bring in a crowd of starving immigrants from Bikaner, and at the same time the greater scarcity which will prevail there will induce export of grain from this district. The question of fodder supply is only second in importance to that of food supply in this district in case of prolonged drought and consequent famine and it is one with which it is far more difficult to cope. The introduction of railway communication through the length of the district has made a vast difference in the facilities for suddenly increasing the food stocks of the district, but unfortunately no scheme has as yet been elaborated for the

wholesale importation of fodder; though the concessions first devised in 1909, by which fodder is imported by rail into districts in which a scarcity of that commodity is imminent at one quarter the usual rates, the difference being made good to the Railway authorities by the Central Famine Relief Fund, has proved of the greatest benefit to the district.

Famine of 1869-70.

Scarcity prevailed in the district in 1877-78. The autumn rains of the former year failed. The total average fall all over the district for the months of June and July was 4·5 inches, against a decennial average of 7·6 inches, and the similar figures for the months August, September and October were 1·5 inches and 6·8. The *kharif* of 1877 in consequence failed and there was little *rabi* in 1878.

No relief works were opened either in Hissar or Sirsa, but a considerable number of persons left their homes to obtain work on the branches of the Sirhind Canal which were being newly excavated in Ferozepore.

The revenue demand in Hissar was fully collected in the years 1877-78 and 1878-79; in Sirsa, however, a sum of Rs. 3,799 was remitted in the former year, and one of Rs. 6,328 suspended in the latter. *Takkavi* advances for the purchase of seed grain and bullocks were given to the extent of Rs. 17,000 and Rs. 10,000 in the two districts respectively.

Cattle as usual suffered severely from scarcity of fodder; no less than 55,532 are said to have died in the Sirsa District alone in 1877-78.

Famine of 1896-97.

From 1879 to 1895 the agricultural history of the district was normal. The *rabi* harvest of 1895 was poor, and this was followed by a poor *kharif* in 1895 and a very bad *rabi* in 1896. The monsoon of 1896 failed almost completely. There were only 3½ inches of rain between the 1st May and the 15th October. The result was that the *barani* crops were a total failure. Prices, which had been rising steadily since April 1895, reached their highest point in November 1896, when they were as follows:—

	Seers per rupee.
Wheat	8
Jowar	9
Bajra	8·4
Gram	9·2

Famine relief works were opened in each tahsil on the 9th November 1896. The daily average by the second

CHAP. II. H. Famine.

Famine of 1896-97.

week of December was 1,731 and by the end of the month 8,290. In the beginning of February over 40,000 persons were employed. This rate of increase was maintained till June, when the weekly average of the persons employed rose to over 78,000 per diem. The highest daily total was reached on the 25th June when 98,312 were in receipt of assistance. Rain fell on the 12th July, and this first fall was followed by a good monsoon. The numbers relieved diminished very rapidly, and relief operations came to a close in September 1897. Thanks to the efforts made by the local authorities there were only three deaths from starvation and four deaths from thirst. The death rate rose considerably however, for the people were as a rule enfeebled by want of food before they accepted relief, and had not sufficient strength to bear up even against simple ailments. The loss of life among cattle was very great. It was estimated that by the end of famine the *barani* tracts of the district were left with only 15 per cent. of their requirements in plough cattle.

Rupees 3,25,741 was suspended out of the *kharif* instalment for 1896 and Rs. 69,343 out of the *rabi* instalment for 1897. Rupees 4,41,290 were advanced to the people under the Agriculturists' Loans Act, and Rs. 2,35,375 was given to the poorer landowners and tenants from the charitable fund which had been collected chiefly in England. Besides this the actual cost on famine relief operations was Rs. 11,80,062. As a set off against this expenditure the Ghaggar canals were dug, the Hansi Branch of the Western Jumna Canal was partially re-aligned, the Rangoi channel was cleared out and extended, and 589 tanks were excavated. A full account of the famine will be found in Captain Dunlop Smith's Final Report on the Famine.

Famine of 1899-1900.

Only two years elapsed and the district was again visited by famine. The year 1897-98 was a good one and Rs. 1,44,849 of arrears of suspended revenue were collected. The *kharif* of 1898 was bad, and was followed by bad *rabi* in 1899, and this necessitated the suspension of Rs. 3,84,753 out of the demand for the year, and then came one of the worst monsoons on record. Except for good falls of rain in June, the year was practically rainless, the falls for the period from July to the end of December varying from a total of 2·47 inches at Bhiwani to ·13 inch at Sirsa. Ninety-nine per cent. of the *barani* area sown failed completely, and Rs. 5,09,590 out of the revenue was suspended.

Famine of 1899-1900.

The winter months were practically rainless, and the *rabi* crops sown on *barani* lands amounted to 1,200 acres only, of which 132 acres are recorded as having matured. Rupees 90,254 out of the demand for this harvest had to be suspended.

In September 1899 the prices of wheat, barley, maize, *bejhar* and gram all stood at 11 *sers* per rupee. Relief works were started on the 11th September 1899. By the middle of October over 50,000 persons were employed, and the numbers rose rapidly, till the 3rd of March, when 161,561 persons were in receipt of relief. After this, numbers decreased gradually till the 2nd June, when 96,524 persons were being relieved. They then rose again to 111,573 on the 14th July, after which they decreased rapidly till the end of September when famine relief operations came to an end. The monsoon broke on the 27th July 1900, and was a good one, resulting in a good *kharif* followed by a good *rabi*. Rupees 9,08,048 was distributed to the people in loans under the Agriculturists' Loans Act and Rs. 5,18,698 was given to the poorer classes as a free gift from charitable funds. Besides this the total cost of relief operations was Rs. 25,85,457. A full account of the famine will be found in Volume IV of the Punjab Famine Report, 1899 and 1900.

The *rabi* of 1901 was one of the best on record, and went a long way towards setting the people on their legs again, but this was followed by a bad *kharif* in 1901 and a very bad *rabi* in 1902. The *kharif* and *rabi* of 1902-03 were also very bad, and it was thought at one time that relief operations would have to be started on a large scale again. Fortunately this was not necessary because the prices of all the staple food-grains continued very low owing to good harvests in other parts of India. The *kharif* and *rabi* of 1903-04 were good, and they have been followed by a succession of fairly good years on the whole, though the *kharif* crops of 1905, 1907 and 1911 were notorious exceptions.

During the seven years between 1897 and 1903 Government spent Rs. 37,65,519 on famine relief and remitted revenue to the amount of Rs. 11,47,719 and agriculturists' loans to the amount of Rs. 8,99,866 : in addition a sum of Rs. 8,09,566 was given to the people from charitable relief funds. In return for this vast expenditure there is the satisfaction of knowing that, in spite of the fact that many persons in the last degrees of starvation reached the district from surrounding Native States, there were only seven recorded cases of death from hunger or thirst.