disputes can be taken into the Civil Court, few think of obeying the orders of a *panchâyat*, and no doubt our law-courts have much weakened the power and importance of the institution. In Panjábí a *panchâyat* is called *parah*, and the word is applied not only to an assembly of leading men of the same tribe, but also to a gathering of men of different tribes to discuss some question of common local interest. Among the holy tribes of the Satlaj, the Bodlas, Chishtis and Lakheke Bhattís, there is another kind of gathering called *melá*, a sort of "Cursing Committee," employed when any outsider has injured a member of the tribe. Two or three of the holy clan go to the offender and, if he refuses redress, they invoke curses on him. As they still have a reputation for sanctity this weapon often stands them in good stead. Few of the tribes have any ruling family to which they pay especial regard. The Wattus and Joiyas tell of old Nawábs belonging to their clans, and the Bhattís have a more recent recollection of the Nawáb of Rániá and showed it by voting for his representative as their zaildár. The Siddhu Barárs, especially the Maháráje branch, are proud of their connection with the Mahárája of Pattiála and other ruling chiefs, but here, as in other new countries, each colonist came depending chiefly on his own exertions to make his way and earn his livelihood ; and there is consequently more independence and less inequality of rank and position than in most older-settled countries. In short, though the family system of agnatic relationship is very strong, the tribal organisation is weak.

The villages.

121. In the Dry Tract a village was always founded at the edge of a natural hollow where the drainage water from the neighbouring high land collected in the rainy season. The hollow was deepened that it might hold more water and the clay dug out of it was used to build huts for the colonists. Sometimes the villagers are content to use unshapen clods *(dhím)* of earth dug out of the pond when the water dries up, but more often the moist clay is dug out and shaped into rough little bricks, which are dried in the sun. The huts are built round a courtyard or open space and the whole surrounded by a ditch or hedge of thorns. As cultivation and prosperity develope the huts are gradually enlarged and made into houses with flat roofs, the clay to build and repair them being still taken annually from the bottom of the pond ; new colonists settle and new courtyards are made, separated by lanes from the older enclosures, and thus by degrees the village grows until it comes to consist of a number of separate enclosures or courtyards, each with its separate entrance and its separate set of houses, usually inhabited by families related to each other; but until the village attains a considerable size it is ordinarily still surrounded by a deep ditch or a hedge of thorns, and has only one entrance (*phalsa*), which is closed by a rude gate at night as a protection against thieves. This is the ordinary type of Bágrí village in the Dry Country. Some of the dwellings are simply the rude round thatched hovels I have already described ; some are larger and more comfortable, but still built of sun-dried bricks and roofed with thatch ; but ordinarily there are one or two houses in the village belonging to

the richer peasants of a more pretentious character, high buildings with a flat roof sometimes of two stories and having a lofty gateway of red brick. Outside the village may generally be seen the hovels of a few families of the unclean castes, such as Chamárs or Chúhras, or possibly a few recent Kumhár or Thori settlers living under temporary shelters of straw, or an encampment of wandering Ods or Sánsis with their grass screens pitched on the village common. The Musalmán villages in the Dry Tract are similar to those of the Bágrís, except that they are generally more straggly and dirtier, and that the hedge and ditch round the village are not kept in such good repair; nor do they affect the round hovel so popular among the poorer Bágrís. The Sikh villages again are ordinarily neater and cleaner, more regular and more comfortable than the Bágrí villages, though some of the best Bágrí villages are very like those of the Sikhs. In an ordinary Sikh village most of the houses are of the best type of Bágrí house, oblong buildings of sun-dried clay with lofty flat roofs, and high doorways. Their lanes are often narrow, but generally kept clean. Some of the Musalmán villages on the Satlaj consist only of huts made of screens of interwoven twigs, but the better villages have a number of flat-roofed *kachcha* houses like those of the Sikhs, only not so high. The best type of village in the district is to be found on the Ghaggar, where several of the Ráins' villages consist chiefly of neat substantial houses of red burnt bricks, sometimes got out of the old mounds in the neighbourhood. Except among the Sikh Jats, few villages have developed so far as to have a guest-house (*hathái* or *chaupál*), and there is hardly in the whole district a good *pakka* guest-house, such as is often the pride of older villages further east. But often in a Musalmán village may be seen the mosque (*masít*) generally hardly to be distinguished from other buildings except by the three mud pinnacles on its roof, but sometimes a pretentious building of brick covered over with plaster whose high minarets and white domes are conspicuous from afar. And a Hindu village has often a small Thákurdwára or temple, but this is rarely more than an ordinary *kachcha* building with a flag waving over it. Outside the village or in an open space within it may sometimes be seen some of the gigantic beehive-shaped receptacles for grain (*burj*) already described. Many villages stand out bare and treeless above the prairie, but most of them have a few trees about them, making a pleasant green patch on the monotonous brown. There are almost always some *jand* trees about the pond or a small jungle of *kíkar*, *van* or *beri*—sometimes a few *pípal* trees in the courtyards of the village, or a large *pípal* or *bar* tree above the village well. Some of the villages in the Dry Tract have now a small grove of young trees, often not more than ten or twelve, which are carefully watered by the villagers or the Sádh that lives near the village-pond, and may form the nucleus of a larger grove.

The water-supply.

122. As the village grows its pond (*johar*, *tobá*, *chhappar*) gradually deepens; year by year the rain washes down some of the mud of which the houses are built,

and the clay to repair them and plaster their walls is got out of the bottom of the village pond. Thus the village-site gradually rises above the plain until in a comparatively short number of years it is considerably above the general level; and no doubt this is the chief cause of the origin of the high mounds which mark the sites of old villages in the Sotar valley. As the comfort of the village depends upon its pond and the amount of water it will hold, various expedients are resorted to in order to get it deepened. Sometimes each household supplies a man in turn every morning, whose duty it is to dig clay from the bottom of the pond and put it into baskets, and each house-wife, before she takes away her supply of water for the day, must first carry out two basket-loads of earth and throw them on the bank some distance off. Or sometimes the village combines and works for a time at deepening the pond, or subscribes to pay Ods or other labourers to enlarge it. Care must be taken however not to get below the richer upper stratum into a layer of sand which will let the water escape. While the water of the pond lasts it is used for all purposes by the people. They bathe and wash in it, their cattle wallow in it and often void excrement in it when drinking; and still, as a rule, especially in the Bágrí villages, the villagers are content to use its water for drinking and cooking purposes. In a few villages, chiefly of Sikhs and Bishnois, there are two ponds, one of them kept for the cattle and for washing, while the water of the other is used for drinking and cooking only. When the water of the pond dries up, as it does in almost every pond before the hot weather is far advanced, the villagers have to take to wells. For instance in the 157 villages of tahsíl Dabwálí there are 388 ponds of some size, besides small ponds scattered about the fields for the use of the peasants and their cattle when out at work. Of these only seven ponds ordinarily retain water all the year round, 75 have usually some water for nine months in the year, and 137 for about six months only. As a rule the water of wells all over the Dry Tract is originally so brackish as to be undrinkable, but it varies in different places, in some being quite salt (*shor*), and in others only brackish (*kaurá*), and it is found that after water has stood in the village-pond for a number of years, there is a stratum of drinkable water in wells dug at the margin of the pond. At first the villagers dig only *kachcha* wells which are made by simply excavating a hole at the edge of the pond wide enough for a man to sit in. As the digging goes on the earth is pulled up in a basket, and where the sand threatens to fall in the sides are propped up with twigs and branches. As the water-level is often more than a hundred feet below the surface, this is a work of great labour, and even of danger, and it is not uncommon for a man to die in the well probably for want of fresh air, or to be buried alive by the sand falling in on him from above. When the rains come the *kachcha* well falls in, and often the water of the pond is intentionally poured into it to sweeten the stratum of water below for next year, and thus year after year a new *kachcha* well has to be dug, and the stratum of water below the pond gets less brackish. Sometimes only the first few bucket-fuls of water drawn in the morning are drinkable, *i.e.*, only

the upper stratum (*tár ká páni*), and hence one often sees four or five *kachcha* wells on one pond. Generally speaking it is necessary to be careful not to excavate the well too deep and so get below the sweet stratum into a brackish stratum of water. When the village has developed sufficiently to bear the expense, the villagers subscribe and sink a *pakka* well with a cylinder of brick on the edge of the pond, generally leaving a hole (*mori* or *bamba*) in the side of the cylinder, so that the rainwater collected in the pond may be let into the well every year to keep the well-water sweet. This is called *bharwa ká páni*. Usually at first the water remains sweet only during the cold-weather months (*siyál siyál mitthá rahndá*), and as the stratum of rainwater which had poured into the well during the previous rainy season becomes exhausted, the water of the well gets more and more brackish (*kaurá* or *khára*) until it is hardly drinkable, or, as the peasants say, it becomes poison (*bish*) so that if a bird drinks its wings drop off and it falls down dead! But when the process has been kept up for a number of years, the stratum of water below gets extensive enough to keep the water sweet (*mitthá*) all the year round until the next rainy season; such wells are however always liable to get brackish in seasons of drought, or when the supply of rain water is not kept up. Some wells again seem to be always sweet—so sweet that their water is compared to milk (*duddh*). The people tell that long ago, in time of drought, a headman went to a *faqír* to beg him to pray for rain and agreed to give him his daughter in marriage if the prayer was successful. The rain came, but the headman would not fulfil his promise, and the *faqír* cursed the country and turned the whole well-water brackish; but on the entreaties of the people he so far relented as to declare that so long as water was given to all comers free, it would remain sweet; and it is said that in one village the well-water turned brackish when the villagers imposed a rate on outsiders using the well, and sweet again when the rate was abolished. In Síto they say that the water, formerly sweet, has been brackish ever since a man died in the well. In several villages the water is said to have become sweet at the prayer of a *faqír*, for instance in Phaggu the water became sweet at the prayer of a *guru*, on condition of the free use of the water being allowed to everybody. There is a class of men called sniffers (*súngá*) generally holy *faqírs* who are believed to be able to smell (*súngná*) sweet water below ground, and several wells have been shown me where it is said such a man sniffed out sweet water, while *kachcha* wells formerly tried in the neighbourhood had given only brackish water. It costs a large sum of money, sometimes Rs. 1,500 or more, besides labour, to make a well where the spring-level is so deep, and a village often makes one by instalments. In a good year it will make an effort and burn the necessary bricks, it will then wait for another good year before engaging the mason (*ráj*) to come and build the cylinder, and even then perhaps it will be able to build and sink only half the well, waiting for another good year before finishing it, and perhaps for another before making a platform with drinking-troughs round its mouth

In some villages there are two *pakka* wells, either because one was not enough for the wants of the village or because the Hindus have one and the Musalmáns another, or in some instances because two *pattis* have quarrelled. In one village I found the well had four separate runs for the water to be used by Hindus, Musalmáns, Chamárs and Chúhras respectively. It requires considerable labour to draw water from such deep wells, and often the villagers prefer to drink the filthy water of the pond rather than draw sweet clean water from the well close by; but when the pond dries up, the villagers take turns in drawing water by means of their bullocks, or more rarely camels or buffaloes, day by day for the cattle of the village, and sometimes a long string of women, who have come to get water for household purposes, may be seen joining to drag the long rope which brings up the bucket out of the well. When the pond has dried up and the water of the well is undrinkable, the villagers have sometimes to go long distances to neighbouring villages to get water for themselves and their cattle, and at times in the hot weather numbers of men and women may be seen bringing jars of water on their heads from neighbouring villages. Sometimes camels are used to carry jars of water, or they are placed on a rude frame which is dragged along the ground by bullocks. Even now-a-days some villagers have to go as much as five miles daily for drinking-water in the hot weather, and many have to go two or three miles to the nearest well of sweet water. Some owners of such wells allow all comers to help themselves free of charge; others, notwithstanding the curse above alluded to, charge all strangers a fee on each animal allowed to drink at their pond or well, generally something like eight annas a buffalo and four annas a cow for the season; or sometimes the village is charged a lump sum for the permission to dig a *kachcha* well at the edge of its neighbour's pond. In the early days of colonisation the trouble of getting drinkable water must have been very great, and the people often tell of the brackish water they have had to drink as one of the greatest hardships they have endured when founding villages in the desert prairie. There is now much less trouble of this sort than there formerly was, but still of the 650 villages in the district there are 117 which have no well at all and 106 in which the well-water is so salt as to be quite undrinkable. In 1838 Captain Thoresby wrote that there were not ten wells in the whole Rohi tract from which wholesome water could be got. At last Settlement (1861-63) there were in the Rohi Chak 81 *pakka* wells and 350 *kachcha* wells; there are now 177 *pakka* wells and 303 *kachcha*. As each *pakka* well in this tract costs at least Rs. 1,000, this increase of wells represents an expenditure of nearly a lakh of rupees, or considerably over a year's land-revenue of the Chak. There are still however in the Rohi 79 villages (or one in every five) with no well at all. In the Bágar Chak, south of the Ghaggar, there were at last Settlement 11 *pakka* and 176 *kachcha* wells; now there are 29 *pakka* and 114 *kachcha*. So that here too a sum equal to about a year's revenue has been spent in making wells; but one village in every six has still no well. In the Utár

Chak below the Danda water is near the surface and only two villages have no well; and while at last Settlement there were only 23 *pakka* wells there are now 86; the increase represents about two years' revenue. In the valleys of the Ghaggar and Satlaj water is generally near the surface and sweet, and there is no trouble about drinking-water; indeed many wells, especially on the Satlaj, are used for irrigation. In the Nálí Chak on the Ghaggar, some of the *pakka* wells are old ones re-opened and repaired; at last Settlement there were only 139 *pakka* wells, and now there are 203; the increase represents about half a year's revenue. In the pargana Wattu part of Chak Hitár on the Satlaj there were only two *pakka* wells in 1844; at last Settlement in the whole Chak there were 122 *pakka* and 156 *kachcha* wells, and now there are 217 *pakka* and 69 *kachcha* wells; and the increase of *pakka* wells represents an expenditure of over a year's revenue. In the whole district the number of *pakka* wells has doubled since last Settlement, and the expenditure on the 350 *pakka* wells built in the interval must considerably exceed a year's revenue of the district. There are still in the whole district 201 villages which have *kachcha* wells only, besides the 117 which have no well at all, so that little more than half the villages have *pakka* wells.

The village menials and village organisation.

123. Notwithstanding the recent date of the founding of most villages in the Sirsá district, and the different quarters from which the individual inhabitants of each village gathered together, the organisation of the village community is, as a rule, very similar to that of older villages farther east. It cannot be fully explained until I have discussed the growth of rights in land, but I may here describe the system of village menials, which forms such an important part of the machinery of village life. The peasant himself does most of the work of agriculture proper, attends to his cattle, ploughs his field, sows his grain, watches it, reaps it, winnows it and takes it to market; and his wife does the ordinary work of the household, brings water from the well, cooks the food for the family, washes their clothes, and sweeps her house. But work requiring special skill, such as iron-work, wood-work, or leather-work, weaving and dyeing; or work which is performed for the whole village community, such as running messages, fetching wood and grass for travellers, putting up tents, and sweeping the streets of the village, is performed by men of the caste whose special occupation it is and usually paid for in kind by customary fees for the service generally, and not by the job. Many cultivators secure the services of the village menials in ordinary agricultural operations, by giving them a fixed amount of grain each harvest, and in the previous description of the numerous domestic ceremonies it will have been noticed how often the Bráhman, Náí, Mirási and other ministers to the wants of the peasants receive presents or fees in money or in kind, the amount and nature of which is fixed by custom. The classes of village menials or servants who are thus paid are as follows:—

The Lohár or blacksmith does all the ordinary iron-work required by the peasant. He does not supply the iron, which the peasant

himself purchases, but he makes and mends all the iron implements. He receives at harvest one ser per maund of the total produce, sometimes limited to 25 ser per plough. On the Satlaj he gets 1½ maund per well, and on land not irrigated from wells 4 *tope* (measures) per plough.

The Tarkhán or Khátí, *i.e.*, the carpenter, makes and mends all ordinary wooden implements and furniture, but not the cart or Persian wheel. He does not supply the wood, but works it up only. He is ordinarily given at harvest one ser per maund, or on the Satlaj, three maunds per well or 4 *tope* per plough.

The Kumhár or potter makes the earthen jars and vessels for household use, and the small earthen pots for the Persian wheel. He also brings in the grain from the field to the village on his donkeys (*dhuláí* or *bhára.*) His due is a ser per maund, or on the Satlaj, three maunds per well, or 1½ *tope* per plough for potter's work, and 4 *tope* per 12 maunds or 7½ sers per *máná* for carrying the grain.

The Chamár or worker in leather does the leather-work, makes and mends the shoes of the household, and all leather straps: he also helps in the field and does the *begár* work of the village, such as fetching grass, putting up tents, carrying burdens, &c. In return for this the Chamárs get the skin and flesh of cloven-footed animals that die in the village, while those of the camel and horse go to the Chúhras. He also gets half a maund per plough, or sometimes if he does no field-work and takes payment for new shoes, he gets only five or ten sers per plough. A similar allowance is given to the Mochí who takes the Chamár's place as leather-worker in the Musalmán villages on the Satlaj.

The Chúhra or sweeper cleans the streets and sometimes the houses, and does all the dirty work of the village. He also runs messages and sometimes does the *begár* work in place of the Chamárs, or helps in the field, where his special occupation is winnowing the grain. He gets the skins and flesh of dead camels and horses, and at harvest takes a ser per maund or sometimes 4 *tope* per plough for general service, and if he winnows the grain he gets a ser per maund or ten ser per *máni* for this work.

The Dharwái or Banya, who weighs the grain and whose services are especially valuable where rent is taken in kind and the grain has thus to be weighed out and distributed between the menials, the tenant, and the landlord, gets an allowance varying from a quarter of a ser per maund, or 2½ ser per threshing-floor, or one *paropi* per maund to one ser or even 1¼ ser per maund.

The Muhassil or Thápí, the landlord's watchman, who attends on behalf of the landlord when the grain is winnowed and stamps the heap of grain with a wooden stamp on clay so that it may not be tampered with until division, and who also collects the landlord's share of the produce, gets one *topa* per threshing-floor or five sers per plough, or sometimes as much as six sers per 12 maunds.

In Hindu villages the Bráhman, and in Sikh villages the Guru, gets ten sers per plough for religious services, besides the customary fees

given on all occasions of birth, marriage and death. Similarly in Musalmán villages the Qází, Mulláh, or Masítwála gets five sers per plough, in return for which, among other services, he blesses the heap of grain after it is winnowed and before it is divided. Sometimes this blessing is given by the *faqír* or professional religious mendicant who in that case sometimes gets five sers per plough.

The Máchhí or baker who parches the grain and cooks the bread of the family, besides paying himself by retaining some of the grain or cakes brought him gets ten sers of grain per plough at harvest. And the Saqqa or water-carrier who on occasions helps in bringing water from the well for family-use, gets five sers per plough.

The Shikárí or hunter who kills the birds and animals which prey on the crops, sometimes gets five sers per plough. The Mirásí or musician who supplies the music and poetry required on festive occasions is given 15 sers per plough. The Biráhi or drummer who beats the drum in a Ráin village when the rice-embankments are in danger from a flood to call the people together to protect them, gets five sers per plough at harvest. And the *deredar* or fire-carrier whose business it is to see that the *huqqas* are always full and alight, sometimes gets five sers per plough for this service.

These allowances are not all paid in any one village; and in many parts of the district, especially in villages where rent is not paid in kind but in cash, such customary allowances are almost unknown, and the services of the village artisans are paid for commonly in cash by the job. There is no doubt that in this district owing to its recent colonisation and the abundance of land, the position of the lower classes is often very independent as compared with the older-settled and more thickly-populated districts farther east; here they often have land of their own held by them as tenants with rights of occupancy, and having their own houses, crops and cattle to look after, and the produce of their own fields to support them, they are comparatively independent of the higher classes and will work for them only by bargain and for a money wage, instead of doing customary work for them as a matter of course in return for a customary share of the produce at harvest; and I have often had complaints addressed to me by the peasants complaining that they could not get their menials to perform their customary duties. This state of things weakens the village organisation and makes it more difficult for the village as a body to get work done. But it must not be thought that, although the village system is less complete than it is in the older villages, it has been altogether superseded. On the contrary, it is astonishing how a village, founded only 40 or 50 years ago, and composed often of a haphazard congeries of individuals gathered from all quarters and having little previous connection, has grown together into an organic body of very much the same type as an archaic village community (say among the Játs of Rohtak or Karnál) with cultivators, ministers and dependants of all sorts each occupying his customary place and performing his customary duties as a member of the organism. Everywhere

instances may be seen of the ability of the village to unite for a common object, *e.g.*, the Ráíns on the Ghaggar unite to dig and clean out their water-courses and turn out together on emergency to protect their rice-embankments from high floods: the villagers in the Dry Tract unite to deepen their pond, sometimes by making each household and each housewife help in turn as already explained, sometimes by levying a regular subscription per house, or per adult male (*pagri*), or per male young or old (*tagri*), or per head of cattle; they combine to dig their *kachcha* wells, and to work them for the village-cattle, and often a large number of families combine to make a *pakka* well costing much labour and a large sum of money; the whole village sometimes unites to dig the village-ditch, to repair the village-hedge, or to put on a new gate on the entrance to the village; and lately on the Satlaj, a large number of villages combined, under official direction, to dig a long inundation-canal. It is often difficult however for a village or a number of villages to work together as a body. The social censure which is the only penalty for the laziness or indifference of individual members standing in the way of the common good, is often not sufficient to compel them to combine, and the majority will not act when they see that the lazy minority will share in the benefit of the common action without sharing in the preliminary labour and expense.

Labourers and Wages.

124. While much of the work not done by the peasants themselves is done by village-menials performing duties determined by custom and receiving customary dues, it is not uncommon to find men employed on contract as simple labourers or paid in cash for the work they do. For instance, a peasant takes one or two labourers into partnership (*síri*) for the cultivation of the land held in his own hands, supplies the seed and cattle and if necessary advances food to the labourers, and at harvest gives them a share of the produce deducting the food advanced. The shares are generally fixed according to the number of lives (*jí*), a bullock getting as much as a man. For instance, I found two proprietors who had five *síri* labourers working their six ploughs with them, two oxen to each plough; the gross produce was divided into $2+5+12=19$ shares, of which the proprietors with their oxen took $2+12=14$ nineteenths and the labourers $\frac{1}{19}$ each. Sometimes where the proprietor supplies the food (*roti*), he takes a share for that. For instance I found 4 labourers working 4 ploughs with 8 oxen and getting their food from the proprietor, who did not work himself. The crop was divided into $4+8+1=13$ shares, of which each labourer got one share, and the proprietor took eight for the oxen and one for the food. Sometimes a labourer is hired for so much a month all the year round *e.g.*, I found one man getting Rs. 7 a month for farm labour, and Sikh Mairas told me they got Rs. 4 or Rs. 6 per household every six months for carrying water. At harvest time owing to the great extent of the crops and the scantiness of the population, wages generally rise very high, often to 5 annas a man for a day, or 3 annas or 4 annas with food, which generally consists of a ser of grain per day to

each adult; and wandering bands of labourers, such as Thoris, Ods or Mens go about from village to village while the harvest lasts. Wages are apt however to fluctuate generally with the fluctuations of the harvests and of prices. In times of plenty, or after an epidemic of fever, labourers are too few for the demand and wages rise high. When the harvests are bad, work is difficult to get and food is dear; and labourers are ready to work for very little. Thus in the drought of 1837-38 able-bodied men were satisfied with 1 anna a day, and in the scarcity of 1877-78 wages of ordinary labourers fell from 3 annas to 1 anna a day, and artisans who used to get 5 annas were glad to take 4¼ annas. The condition of labourers of all kinds thus goes up and down with the fluctuations of the harvest, but on the whole work is plenty, wages high and food cheap, and the labourers are generally better off in this district than in most others.

Occupations.

125. The proportion of males over 15 years of age engaged in agriculture is larger in Sirsá than in any other district of the Panjáb; for Sirsá the proportion is 66 per cent., while for the Province it is only 55. This is of course due to the recent colonisation of the district and the manner in which the population is scattered about in villages instead of being gathered in large towns. Few industries have yet had time to develope, and agriculture is the main support of even a larger proportion of the population than the figures show; for land is so plentiful and other means of livelihood afford support to so few that many men of castes whose hereditary occupation is distinct from agriculture though connected with it, such as Kumhárs, Khátís, Lohárs, Chamárs, supplement their caste occupation by engaging in agriculture sometimes as assistant labourers only, but more often by taking land separately as tenants on a rent in cash or kind, and cultivating it independently with their own stock like ordinary peasants. Agriculture is the most respectable occupation ordinarily open to a Sirsá artisan or menial, and when a man of these menial classes is able to support himself by agriculture alone he gives up his hereditary caste occupation, and endeavours to forget it and to ignore his connection with his caste brethren who still pursue the caste occupation. This feeling may be seen among the Kumhárs, the Khátís, the Báwariyas and almost all other inferior tribes. The number of persons who still follow their caste occupation but supplement it by agriculture is also large, and the proportion of the population of the district who do not engage in any way in agriculture proper is exceedingly small. Moreover, the manufactures carried on by the artisans and menials are the simple trades by which the produce of the village is prepared to suit the simple wants of the agricultural population, and their customers are in each case a very small number of peasants whose purchases and means of paying for articles supplied cease so soon as their harvests fail. There is no outside market for articles manufactured in the district, and thus the artisans and menials are dependent on the harvests almost as directly as the peasants themselves. Land however is still so plentiful, and the people of all classes are so ac-

customed to provide against bad seasons, that the artisans, like the peasants, are generally better off in this district than in many other parts of the Panjáb.

While it is the case that many belonging to artisan castes have more or less abandoned their hereditary occupation and taken to agriculture, and that some tribes, such as the Ját, Rájput and Ráín, are wholly engaged in agriculture and pasturage, it is also true that special occupations are confined to special castes almost as much as in older parts of the country. Indeed in many cases caste and occupation are almost synonymous terms. Thus the carpenters and men engaged in working in wood are almost all of the Khátí caste. The ironsmiths belong to the Lohár caste. The shoemakers and workers in leather are in Musalmán villages generally Mochís, and in Hindú and Sikh villages generally Chamárs. The tanning is done by men of the Raigar and Khatík castes. The weaving of coarse cotton cloth is done by Páolís or Juláhás in the Musalmán villages and by Chamárs in the Hindu villages. The earthen vessels are made by Kumhárs. Oil-making and cotton-scutching are done by Telís, and the butchers also generally belong to this caste. The cloth-dyers and stampers belong to the Chhípí caste. There are few cases of a man's having given up the hereditary occupation of his caste for any other occupation save agriculture, and many of the artisan-castes engaged in agriculture still keep up some knowledge of their caste-occupation, and would turn to it in preference to any other if deprived of their land.

The number of persons in service is small and consists chiefly of the servants of Government in the various departments. Few recruits are got in Sirsá for the army. Many of the population, especially the Sikh Jats, would make excellent soldiers; but land is too plentiful and agriculture too prosperous for the peasantry to feel much inclination to take service.

Trade and carriage.

126. A considerable proportion of the trade within the district is carried on by a species of barter, without the aid of coin. I have already described the mode of paying for the services of the village menials in grain. It is not uncommon for neighbours to borrow so much grain from each other to be repaid in kind. Many of the wandering tribes take payment for their labour or for the articles they make in grain instead of in money; and a regular system of sale by barter may be seen when the vegetable seller (Kunjra) from the Ghaggar or Satlaj brings his carrots, radishes, pepper or other vegetables into the villages of the Dry Tract. He squats in the village square, and the housewives come each with her lapful of grain to exchange for the vegetables which are to give a relish to the evening meal. For instance in one Rohi village I saw two Kunjras from Hissár who had brought three bullock-loads of red pepper and were exchanging it with the villagers for double its weight of *bájra*, weighing one against the other in their scales. On another occasion I saw a Kumhár exchanging carrots for an equal weight of barley. I believe however that payment in cash, both for services rendered and

for articles sold, is much more the rule in Sirsá than in districts farther east. Not only does the peasant who takes his bullock to the fair, or sells his cow to the cattle-dealer who has come to the village, take payment in cash, but it is common here for the Sikh Jat to take his barley and gram or the Bágrí Ját his *bájra* or wool to the market-town himself and there sell it for cash down, instead of simply making it over to his Banya to be credited in his books. A good deal of trade is also done by small bodies of peasants who come with their camels from Bíkáner and Hissár and purchase grain for ready money from the peasants in the villages. All the larger operations of trade, however, and the supply of articles not actually produced in the district, such as salt, sugar, iron, and English cloth, and the distribution of flour, oil, pulse, *ghí* and other ordinary articles to persons who do not directly share in their production, are as usual in the hands of the trading classes,—in the south and east of the district the Banyas, and in the north and west the Aroras. Almost all banking transactions are in their hands, but the Sunárs sometimes engage in this branch of commerce. About 5 per cent. of the males over fifteen years of age are returned as engaged in commercial pursuits, and more than half of these are in the towns. A considerable number of villages have no shopkeeper, and it is an era in the development of a village when a Banya or Arora establishes his shop (*hát* or *hattí*) in it for the sale of flour, *ghí*, spices, cloth, &c. The position of the village Banya is much inferior in Sirsá to the place he holds in older districts such as Rohtak and Gurgáon. This is specially the case in the Rohi tract. The peasants, both owners and tenants, are many of them so well off that they seldom have a balance against them at the Banya's at harvest time, and are thus so independent that they store up large quantities of grain and wait for a favourable market, keeping themselves informed of the ruling prices at Sirsá and Fázilká, and when they see a good chance, convey their grain by cart or camel to the wholesale dealer at one or other of these places, and obtain from him there and then the fair market value in hard cash. And often, in the seasons when the field-work is light, peasants who have carriage but no grain, besides conveying the grain of Banyas and others at rates of hire which fluctuate with the demand, themselves watch the market and purchase grain in or near their villages to carry for sale to Sirsá or Fázilká, such transactions being generally cash transactions. Contrast this with the state of things in many older districts, such as Gurgáon, where owing to the poverty or improvidence of the people, almost all the grain in the country is the property of the Banyas before it leaves the field, and is allowed for by them in the accounts of the peasants at exceedingly low prices.

Besides the Biloch camel-owners and a few others who devote themselves chiefly to the carrying trade, large numbers of Sikh Jats and Ráins with their waggons drawn by fine bullocks, and of Bágrí Játs with their camels, employ themselves in the months of December and January after the kharíf harvest, and of April and May after the rabí, in conveying to market their own grain or that of others.

This labour is shared by Labánas and others with pack-bullocks and ponies, and by Kumhárs with donkeys.

The following statement shows the cost of carriage along the chief trade routes, which in this district are all unmetalled. The principal articles of merchandise carried are food-grain, wool, *ghí* and *gur*, and except that some difference is made for carrying wool on account of its bulk, the rates of carriage are much the same for all kinds of merchandise.

Trade.		Distance in miles.	Usual charge per maund in annas.
From	To		
Sirsá ...	Ellenábád ...	25	2
Sirsá ...	Fázilká or Minchinabad	90	3 to 8
Sirsá ...	Firozpur	100	8
Sirsá ...	Delhi	158	7 Road partly metalled.
Odhán ...	Sirsá	20	2
Odhán ...	Fázilká	70	8
Abulkharána ...	Fázilká	40	2½ to 6 Usually 3½
Malaut ...	Fázilká	33	3
Malaut ...	Bikáner	200	8 to 12
Malaut ...	Firozpur	60	5 or 6
Malaut ...	Ludhiána	120	8 or 9

The average rate of carriage on the unmetalled roads of the district may be taken at one anna per maund per stage of ten or twelve miles. But the rates vary very greatly with the fluctuations of trade, and especially depend on the chances of a return hire. In January and May, when no important field work is done, carriage is cheap. In July, when there has been good rain, all the bullocks and camels are busy ploughing and carriage is dear. In 1878, when Government was impressing camels for the Kábul campaign, their owners took them off to Bíkáner, and carriage rates doubled. They seem to vary from one anna per maund for six miles to one anna per maund for sixteen miles. Ordinary loads on these unmetalled roads are as follows:—

A four-bullock cart load	24	maunds.
A three-bullock cart load	18	„
A two-bullock cart load	12	„
A camel-load	6	„
A pack-bullock load	3	„
A pack-buffalo, pony or mule load ...	3	„
A donkey-load	1½	„

Communications.

127. There are no *pakka* roads in the district, except for a mile or two near Sirsá and Fázilká. A good wide *kachcha* road enters the district at Narel from Hissár and runs by Sirsá, Dabwálí and Fázilká to Muazzam on the Satlaj where there is a ferry, and so on to Okára, a station on the Sind, Panjáb and Delhi Railway in the Montgomery district. This road, which for a great part of its length runs along what was, till lately, the Customs

Line, has hitherto been kept in good order for the mail-cart which daily traversed it. Another broad road almost as good runs to the west of this nearly the whole length of the district from Sirsá by Abohar to Fázilká, and is much used by Pawindah traders from the frontier who annually pass through the district in the cold weather with their long strings of camels laden with merchandise from Kábul and Kandahár on their way from the Deráját to Delhi and Hindustán. Other broad roads kept more or less in repair run from Sirsá north-east to Rori, south-east to Darba, south to Jamál and west to Ellenábád; from Malaut south-west to Abohar and Usmán Khera, and north to Mukatsar; from Fázilká north-east towards Firozpur and south-west towards Bháwalpur. These roads were made in connection with trade centres outside the district, such as Bahádra, Nohar and Bhatner in Bíkáner, and Bhatinda in Pattiála; but after leaving British territory they dwindle into uncared-for village roads. Within the district, except where here and there they cross a sand-hill, or traverse an unusually sandy bit of country, or where sand has been blown on to the road, they for eight months in the year present a hard smooth surface along which cart or camel moves without difficulty. Indeed the same may be said of every village-road in the district, and except where impeded by the sand which forms a serious obstruction only in comparatively few places, there is no difficulty for either carts or camels in getting from any one village to any other. In the four months of the rainy season traffic is not so easy; the roads get soft and muddy and easily cut up, and rain stands on the lower parts of them for days; the Ghaggar and Satlaj spread over the country in their neighbourhood and some villages in their valleys become almost quite surrounded by water. Ferry-boats are maintained when necessary at Khaireka and Jhorar where the roads from Sirsá to Dabwálí and Abohar respectively cross the Ghaggar, and sometimes at Bansidhár between those places. On the Satlaj ferry-boats are maintained all the year round at Ghurká, Muazzam, Jhangar and Amruka, ferries all leading into the Montgomery district. On the principal roads there are camping-grounds with wells of drinkable water at regular stages, and here and there sarais for travellers. In short the communications are good for such a new and scantily-peopled country, and except during the rainy season there are no serious obstacles to traffic, though in the dry hot months great difficulty is sometimes experienced from want of water. The Rewárí-Firozpur Railway now under construction, which will enter the district from Hissár at Díng and run through Suchán to Sirsá, and thence straight north across the Ghaggar by Kálánwálí and Desu Malkána into Pattiála territory, while a branch from near Mukatsar will run by Roránwála to Fázilká, will vastly improve the communications, and bring every part of the district much nearer the rest of the world.

The ferries on the Ghaggar and Satlaj are annually sold by auction to a contractor who works them through professional boatmen (*malláh*) generally of the Jhabel caste, and levies the fees authorised by the Panjáb Government by notification in the Gazette. The three ferries

on the Ghaggar have brought in on the average of the five years ending 1882-83 only Rs. 357 ; the contract for 1882-83 was Rs. 305 and for 1883-84 Rs. 250. The four ferries on the Satlaj brought in on the average Rs. 7,385 ; the contract for 1882-83 was Rs. 5,600 and for 1883-84 Rs. 5,900. The most important ferries are those at Muazzam on the road from Fázilká to Dipálpur and Okára and at Jhangar on the road from Fázilká to Pakpattan. But most of the export trade through Fázilká goes down the Satlaj by boat. The river front of the district is small, and there are said to be only twenty-eight boats belonging to the district.

Course of trade.

128. The trade of the district centres in Sirsá at the one end and in Fázilká at the other. As a general rule the trade of the eastern part of the district passes through Sirsá and of the western part through Fázilká ; but when, as in 1877-78, there is a great demand *(máng, khich)* towards Delhi, grain goes eastwards through Sirsá from near Fázilká ; and on the other hand when the demand to the east is dull, most of the grain of the district goes through Fázilká to Sind for export, as in 1878-79, when the Fázilká grain-trade almost doubled. According to the returns of the five Municipalities, Sirsá, Rori, Rániá, Ellenábád and Fázilká, the average imports of the last eight years into those towns of grain, sugar and *ghí* have been as follows :—

Average Imports of the eight years ending 1882-83 (*in maunds*).

Town.	Grain.	Sugar.	*Ghí.*
Sirsá	282,000	57,000	2,300
Fázilká	390,000	25,000	2,600
Ellenábád	54,000	7,500	300
Rániá	32,000	2,500	125
Rori	12,000	2,500	100
TOTAL ...	770,000	94,500	5,425

According to the returns for the five years ending 1879-80, which give the estimated value of all articles imported, the average value of the imports during that period was as follows :—

Average value of imports of the five years ending 1879-80, (*in rupees*).

Town.	Articles of food.	Animals for slaughter.	Fuel, lighting and washing	Drugs and Spices	Tobacco.	Cloth.	Metals	Total value.
Sirsá	5,65,000	1,200	88,000	36,000	10,000	2,07,000	19,000	9,26,200
Fázilká ...	5,13,000	2,000	2,58,000	42,000	6,000	1,62,000	46,000	10,29,000
Ellenábád ...	1,00,000	...	12,000	7,000	2,000	29,000	3,500	1,53,500
Ránia ...	41,000	1,200	2,500	2,300	1,100	15,000	...	63,100
Rori ...	27,000	...	800	1,200	400	8,000	...	37,400
TOTAL ...	12,46,000	4,400	3,61,300	88,500	19,500	4,21,000	68,500	22,09,200

The greater part of the articles imported into these towns is again exported, and as almost the whole of the trade of the district passes through one or other of them, the average total value of these imports may be taken as representing the average value of the trade of the district. It is true that some of the trade of parts of Pattiála and Bíkáner territory passes through these towns, but on the other hand some small proportion of the trade of the district itself goes direct to places outside the district without going through a municipality, and the value of the total trade, exports and imports, may be estimated at about twenty-two lakhs of rupees, or about eight times the new land revenue assessment of the whole district. The grain, *ghí*, *sajjí* and wool are the produce of the district and the surrounding country, and are chiefly exported in exchange for sugar, fruits, drugs, spices, piece-goods, and articles of metal. Grain is chiefly exported down the Satlaj towards Karáchí, or eastwards towards Bhiwání and Delhi. *Ghí* goes in the same directions or northwards towards Ludhiána and Fírozpur. *Sajjí* and wool go chiefly through Fázilká towards Karáchí or Fírozpur and Lahore; sugar comes chiefly through Sirsá from the Jamna or the Ludhiána country. Piece-goods, drugs and spices, and articles of metal come through Sirsá from Delhi or through Fázilká from Karáchí. The trade of Sirsá and Fázilká is now approximately equal, but it is only recently that Fázilká has attained such importance owing to the opening of trade in the direction of Sind, Karáchí and the sea, partly by the Sind, Panjáb and Delhi and Indus Valley Railways, but still chiefly by the river. A very large quantity of grain and wool is put on boats at the Dárá *bandar* some five miles from Fázilká and taken down to Karáchí either all the way by the river or partly by the Indus Valley State Railway. An agent of that railway was lately stationed at Fázilká to take consignments for Karáchí from Fázilká, and small steamers now and then plied from Fírozpur and Fázilka down the river to the railway, but most of the traffic is still by country-boats (*berí*) holding from 200 to 1,000 maunds and worked by boatmen from down the river who often have their families on board. Each boat pays a pier-due of 4 annas to the owners of the village opposite which it loads. These boats take about a month to go down to Sakkar, which is said to be 600 miles off by river, and the freight (*mok*) for grain for that distance is sometimes 5 annas per maund. Several schemes have been talked of, such as a steam ferry across the river and a *pakka* road to Okára, a branch railway from Okára to the river, or a railway down the left bank of the Satlaj from Ludhiána by Fírozpur and Fázilká to Bháwalpur; but the Rewári-Fírozpur Railway now under construction, with its branch to Fázilká, will supersede some of these schemes and revolutionise the course of trade.

License Tax.

129. The principal traders in Sirsá are Banyas connected with Rájputána and Delhi, and in Fázilká are Aroras from Montgomery and from the country down the Satlaj towards Multán. The license tax, which is supposed to represent about two per cent. on the annual income of all traders whose

income exceeds Rs. 500 a year, was levied from 323 persons in 1882-83, and from 301 persons in 1883-84; in the former year it brought in Rs. 5,965, and in the latter year Rs. 5,500, the detail being—

Tahsíl.	No. of persons.	Amount of tax. Rs.
Sirsá	100	1,765
Dabwáli	48	875
Fázilká	153	2,860
TOTAL ...	301	5,500

One man pays Rs. 200, and one Rs. 150; six pay Rs. 100 and of the rest 220 pay only Rs. 10.

Rates of interest and exchange.

130. In the Sirsá district although, as in all new countries, capital is somewhat scarce, 2 per cent per month or 24 per cent. per annum is a high rate of interest; commoner rates are one *paisa* per rupee per month, or 18¾ per cent. per annum and 1½ per cent. per month or 18 per cent per annum. A respectable peasant who can give good security can borrow even at 12 per cent. per annum, and it is only the impecunious Musalmáns, from whom it is difficult to exact repayment of a debt, that have to pay so much as 36 or 37½ per cent per annum. The ordinary Musalmáns are very careless and take little trouble to check their accounts; the Sikhs and Bágris, on the other hand, calculate out the interest and weigh the grain themselves. When a grain-dealer makes an advance in grain to be repaid in kind, the usual stipulation is that 1¼ times the amount advanced is to be repaid at harvest, whether that be one month or six months off; but such bargains are comparatively rare, and few peasants are deeply in debt to their bankers, or have had to mortgage their lands.

The traders have a regular system of exchange by means of bills (*hundi*) very similar to the European system of bills of exchange. Their bills are generally made payable after a certain odd number of days (*miti*), 5 or 21 for Bhiwáni, 11 for Delhi, and 61 for Calcutta. The rates of premium or discount (*hundáwan*) vary with the state of trade and the risk (*jokham*) of bankruptcy (*díwála*) of the merchant &c., and it is not unusual to send a camel-load of silver to pay for a consignment instead of paying by bill of exchange. Even in Sirsá however it is becoming usual to employ currency notes and postal money orders as means of transmitting money.

Sirsá Town.

131. Forty-six years ago (in 1837 A. D.) when Captain Thoresby, the first Superintendent, came to the district, the only places where there was anything that could be called trade were Rániá and Rori, and perhaps Khariyál, but they were then, and indeed are still, little more than large villages with bázárs of small importance. Rániá was the seat of the Bhatti Nawáb, and Rori had been settled by the Sikhs under Nábha, and both of them seem to have been inhabited all through the time of anarchy when the rest of the country was a desert. Khariyál had been settled

by Bíkáner subjects about ten years before. Sirsá, once a flourishing town on the Sarsuti, had for years been totally deserted. I have already described how in the course of a year a large town sprang up, where had till then been an uninhabited jungle; and Sirsá has flourished ever since. Its population about 1853 was 7,242; in 1868 it had increased to 11,000, and in 1875 to 12,807; in 1881 it was 12,292, an increase of 12 per cent. on the population of 1868. More than two-thirds of the total population is Hindu; and although there are a few agriculturists who cultivate as tenants in the surrounding villages, the great majority of the population are engaged in trade, that is, in gathering and distributing the produce of the land and articles manufactured elsewhere, rather than in producing or manufacturing themselves. Most of the trade is in the hands of Hindu Banyas from Rájputána and the country to the south-east. Some of them belong to firms of considerable wealth and repute, which have established branches here. According to the Municipal returns, the imports of grain, sugar and *ghi* during the past eight years have been as follows (in maunds):—

Year.	Imports in Maunds.		
	Grain.	Sugar.	Ghi.
1875-76	247,000	56,000	1,300
1876-77	214,000	38,000	1,400
1877-78	560,000	29,000	1,700
1878-79	269,000	73,000	1,400
1879-80	241,000	72,000	2,800
1880-81	166,000	40,000	3,900
1881-82	189,000	68,000	3,000
1882-83	369,000	81,000	3,000

The sudden increase of imports of grain in 1877-78 was due to the great demand in the country farther east, caused by the drought and scarcity, which drew a large quantity of grain from the country to the west through Sirsá towards Delhi. The falling-off in 1880-81 and 1881-82 was due to the failure of the harvests in those years, as very little grain was produced in the neighbourhood of Sirsá in the four harvests from kharif 1879 to rabi 1881. The increase in the imports of grain during the past year is due to the recent good harvests, and it was estimated in August 1883 that four lakhs of maunds of grain were stored in the town. The sugar comes from the Jamna country to the east, and from Ludhiána to the north, and is sent on into the villages and towards Bíkáner; the demand varies a good deal with the nature of the harvests in the neighbourhood; thus in 1877-78 and 1880-81, when the harvests were bad, little sugar was imported. The *ghi* is made in the neighbourhood, and exported towards Delhi and

Ludhiána. Piece-goods are imported from Delhi for distribution in the neighbourhood, as well as vessels of metal, tobacco, drugs and spices; and some *sajji* from Bíkáner is exported to the east and north. The average total value of the imports for the five years ending with 1879-80 was estimated at over nine lakhs of rupees. The opening of the Rewárí-Fírozpur Railway through Sirsá will no doubt have a great effect on its trade.

Sirsá is a second class Municipality with four official members and seven non-official members appointed by nomination; five of the seven non-officials are Hindus. Hitherto a low octroi has been levied on all imports, and no refunds have been granted on exports, nor has there been a bonded warehouse. The annual income for the last four years has been—

Year.	Income.
	Rs.
1879-80	14,899
1880-81	12,489
1881-82	11,373
1882-83	16,003

and the balance on 31st March 1883 was Rs. 7,753. By far the greater part of this income is from octroi, which is collected by direct agency, and of last year's income of Rs. 16,003, Rs. 14,843 was from octroi. There is a considerable income from fees levied for grazing in the Government Bír or grazing-ground, which is administered by the committee, and the income from this source and from rents, &c., amounted last year to Rs. 844. Sirsá as the head-quarters of the district has a good kachahri and treasury, a police office and lines, a church appropriately named "St. John's in the Wilderness," a small station garden, and a few bungalows, some of which are survivals of the days before the mutiny, when a part of the Hariána local battalion was stationed here. There is also a small fort with a high mud wall and a deep ditch, prepared after the mutiny as a place of refuge for the European residents in times of danger. Inside the town wall there are a Municipal Hall, a District School, a Gurdwára supported by the Sikhs, and a large masonry building called the Katra, built by the Treasurer Fatehchand as a market-place, but not much used for that purpose. The opening of the railway, and the abolition of Sirsá as a district head-quarters, both seemingly events of the near future, will make a great difference to the town.

Ránia Rori and Ellenábád.

132. The old Bhatti village of Rániá in the valley of the Ghaggar, which was the seat of the Bhattí Nawáb and remained inhabited all through the time of anarchy, had about 1854 a population of 3,209; in 1868 it was 4,583; in 1875, 4,917; and in 1881, 4,626, or almost the same as in 1868. It has not much trade, and is simply a large village. More than two-thirds of the population are Musalmáns, chiefly Ráins, Joiyas and Bhattis, engaged in the cultivation of the rich rice and wheat lands of Rániá and the neighbouring villages. It has a small regularly-built bázár, and is a Municipality of the third class with

seven members, but the octroi income has averaged only Rs. 1,253 for the last four years and the balance at the end of 1882-83 was Rs. 751.

The old Sikh village of Rori near the Ghaggar also remained inhabited when all the country round was deserted. It was held for a time by Nábha, but was confiscated with its pargana in 1847. Its population about 1855 was 2,157; in 1868 it was 2,723; in 1875, 2,728; and in 1881 it had risen to 3,063, an increase of 13 per cent. over the population of 1868. Half the inhabitants are agriculturists, chiefly Sikh Jats, who own and cultivate the large area attached to the village. The trade is even smaller than that of Rániá; and, although it is a municipality of the third class with six members, the average income for the past four years has been only Rs. 492, and the balance at the close of 1882-83 was Rs. 350.

Khariyál was founded about 55 years ago by Bágrí Játs and Banyas from Bíkáner territory, and was reported in 1837 as a large and increasing village with 700 houses where there was a good deal of traffic and barter. In 1863 the village was inundated and made very unhealthy by the floods of the Ghaggar, and Mr. Oliver built a new town on the higher ground close by and named it after Mrs. Oliver Ellenábád. Its population about 1854 was 2,662; in 1868 it was 3,414; in 1875, 3299; and in 1881 it rose to 4,131, an increase of 21 per cent. on the population of 1868. But this includes the population of the hamlets scattered about the lands of the village, and the population of the town of Ellenábád proper is not nearly so great. Mr. Oliver laid it out in rectangular wide streets, and some of the shops built have never been occupied, so that the town wears a deserted appearance. Four-fifths of the population, including that of the hamlets, are Bágrí Hindús, chiefly Játs who cultivate the large area attached to the village. The place is said to be still feverish and unhealthy. It is a municipality of the third class with seven members, but has little trade, and its income, chiefly derived from octroi, averaged only Rs. 2,446 for the last four years, with a balance of Rs. 3,777 at the end of 1882-33. Grain from Bíkáner is exported through Ellenábád in exchange for sugar, cloth and metal vessels from the east.

Abohar.

133. Abohar appears to have been mentioned by Ibn Batuta about 1341 A. D., as the first town in Hindustán, and even then it was in a desert. There are the remains of a large fort which must have been at one time of considerable strength, and the villagers have a tradition that many centuries ago it was held by a Rájpút Rája Abramchand. They tell that his horses were one day carried off in a raid (*dhár*) made by the Saiyads of Uchán towards Multán, and as he had no son, his daughter dressed like a man, went after the raiders armed with sword and spear and gun and bow and arrow, and after various exploits brought back the spoil of Uchán which consisted chiefly of horses. The Saiyads of Uchán, being holy men, endeavoured to get back their property by threatening to curse the spoilers, and forming a *mela* or cursing committee, they came and sat *dharna*, as it were, on the sand-ridge

east of Abohar. But the Rája held out so long that the women of the Saiyads at Uchán got tired of waiting for the return of their lords, and came in a body to look for them. When the Saiyads on the ridge saw their wives approaching they called down curses on all around, and they themselves and their wives and the inhabitants of the town all died on the spot. The *pakka* tomb of the women in the cemetery, and that of the holy men (*pír*) on the sand-ridge exist unto this day "to witness if I lie." In the beginning of this century Abohar was uninhabited, and the whole country round was a desert prairie. About A.D. 1828 a body of Musalmán herdsmen, headed by Amra Sukhera from Bígar near Fathábád, came and settled here. At that time the only established villages in the neighbourhood were Bhatner, Guda, Malaut, Salemsháh and Gaurdyána to the west now in Bháwalpur, and to the south-west for several hundred miles there was not a village. Soon after the Sikhs began to extend their authority southwards, and the Sukheras have a lease granted them in A.D. 1828 by the Sikh Bháí of Kaithal authorising them to settle in Abohar. At first the three Sikh chiefs of Arnauli, Jhumba, and Kaithal had each a third share in this territory, and each had a separate fort and force at Abohar, where they were constantly quarrelling about their respective rights. Jhumba's share came into the hands of Pattiála, and the Sukheras have leases granted them in A.D. 1831 by Pattiála, under whom the large *pakka* well was made. In 1838 the tract came under British rule, and Capt. Thoresby granted leases to Amra and other Musalmán residents of the village of all the unoccupied land in the neighbourhood, which then amounted to over 300 square miles. According to tradition, which probably exaggerates, there were then 1,400 houses in Abohar, and a lakh and a quarter of cattle grazed in the prairie lands attached to it, and produced daily 60 maunds of *ghi*, which was then the chief article of trade. But when the prairie waste was gradually brought under the plough and new colonies were established in the country round, many of the Abohar traders left it for smaller villages or migrated to the new town of Fázilká, which was much more advantageously situated for the rising grain trade, and soon eclipsed Abohar, which is still only a large village. The population of Abohar about 1858 was 1,477; in 1868, it was 1,445; and in 1881, 1,823, an increase of 26 per cent. There are three separate collections of houses forming the village, one of them being a bázár with a fairly wide street, built from the bricks of the old fort under Capt. Robinson.

Fázilká Town.

134. Fázilká has sprung up almost as suddenly as Sirsá, but its history is still more recent. When in 1844 the tract of country on the Satlaj was ceded by Bháwalpur, there was no village where Fázilká now stands; but Mr. Vans Agnew, the first officer stationed there, built himself a bungalow, from which the place became known as Banglá, a name still given to the town and the tahsíl by the people. Two years later Mr. Oliver established a few shops there and gave the place the name of Fázilká from Fazil, one of the early Wattu settlers. Its favourable position near the Satlaj

has enabled it to engross almost the whole of the export trade from the great Jangal tract towards Sind, and made it very soon a flourishing mart; and its population and trade have steadily increased. In 1868 the population was 3,406; in 1875 it was 4,346; and in 1881 it had risen to 6,851, or more than double what it was in 1868. More than two-thirds of the total population are Hindus, and almost all the inhabitants are engaged in trade and operations connected with it. The greater part of the trade is in the hands of Aroras from the west and south, some of them branches of important firms of Multán, Shikárpur and other towns towards Sind. According to the Municipal Returns the imports of grain, sugar and *ghí* during the past eight years have been as follows (in maunds) :—

Year.	Imports in Maunds.		
	Grain.	Sugar.	*Ghí.*
1875-76	1,46,000	17,000	1,100
1876-77	1,80,000	34,000	1,400
1877-78	3,45,000	19,000	4,500
1878-79	6,23,000	20,000	2,600
1879-80	4,89,000	32,000	2,200
1880-81	6,33,000	29,000	4,400
1881-82	2,83,000	39,000	2,800
1882-83	4,21,000	5,000	1,600

The trade in grain consists chiefly in the export of barley, grain and oilseeds from the Dry Tract towards Multán and Karáchí, and varies with the nature of the harvests and the demand in that direction. The brisk trade of the three years 1878-81 was chiefly due to the demand created on the frontier by the Afghán War; and the falling-off in 1881-82 was chiefly due to the poor harvests of kharíf 1880 and rabí 1881. Fázilká also exports large quantities of wool and *sajjí* from the Dry Tract, and imports sugar and articles of metal in exchange. The construction of the Rewári-Firozpur Railway with a branch to Fázilká will probably make a great difference in the course and amount of trade.

Fázilká is a third-class municipality with 17 members of committee, and its income, which is principally derived from a low octroi on all imports with no system of refunds, has been as follows for the last four years :—

Year.	Income.
1879-80	Rs. 16,109
1880-81	„ 16,972
1881-82	„ 16,404
1882-83	„ 19,696

and the balance in hand at the end of 1882-83 was Rs. 27,129. The

town has been laid out with rectangular wide streets, and is rapidly extending. The municipality owns a small area in the neighbourhood kept as a grazing-ground for the cattle of the town. An Extra Assistant Commissioner is stationed here in charge of the subdivision, and besides the usual tahsíl and thána buildings, there is a small mud fort made by Mr. Oliver in the mutiny: his bungalow is still standing surrounded by a garden, some distance from the town. There are some bits of *pakka* road about the town, and some avenues and small groves of trees improve the appearance of the neighbourhood.

Distribution of population.

135. Notwithstanding the marked increase in the size of the villages since 1868, the average population per village and town is only 399, and the average rural population per village only 353, so that Sirsá in both respects stands 28th of the 32 districts in the Panjáb, the four below it being Gurdáspur, Hazára, Montgomery and Simla. In Sirsá 88 per cent. of the total population live in the villages, so that in this respect the district stands 19th of the districts of the province. There are in Sirsá 21 villages per 100 square miles, so that the average distance from village to village as calculated in the Panjáb Census Report is $2\frac{1}{3}$ miles, and the district in density of villages stands 24th of the districts of the province. The characteristics of Sirsá are a scanty but rapidly increasing population living in villages, each of which is the centre of a large township (*mauza*), and as there are few outlying hamlets or dwellings, and the increase of population takes place as a rule within the existing villages, the distance from village to village is great, and the villages are rapidly increasing in size. The difficulty of getting water, the dread of thieves, and the desire of society prevent the people from readily establishing small hamlets and out-dwellings, and the rough methods of agriculture employed make it unnecessary for them to live very near their fields.

Measures of time.

136. The Government offices date their transactions by the Christian year and months, the feasts and fasts of the Musalmáns are regulated by the Muhammadan Lunar year, and the Patwárís' papers have hitherto been dated by the Fasli year, but the peasants generally, Hindu, Sikh and Musalmán, ordinarily reckon by the Sambat or Solar year of Vikramáditya. Thus the present year A. D. 1883 corresponds to the Muhammadan Hijri year 1300-1301, to the Fasli year 1290-91, and to the Sambat year 1939-40. The Hindus divide the Sambat year into 12 months, each determined by the moon's age, and divided into the light fortnight (*sudí*) when the moon is waxing and the dark fortnight (*badí*) when she is waning; and in order to make these months coincide with the Solar year, a month is intercalated every few years by doubling one of the twelve months according to a recognised rule, so that in that year there are two months of one name and thirteen months altogether. The Sikhs reckon by the Sankránt or solar year always consisting of 12 months, and arranged in a way very similar to the European system.

The year is considered as consisting of three seasons (*rut*), each consisting of four months, as follows :—

Season.		Month.	Corresponding English month.
The dry hot season (*Unhála*) ...	1.	Phágan or Phaggan	February-March.
	2.	Chait ...	March-April.
	3.	Baisákh ...	April-May.
	4.	Jeth ...	May-June.
The rains (*Chaumása* or *Chatrmása*) ...	5.	Sárh or Hár ...	June-July.
	6	Sáwan ...	July-August.
	7.	Bhádua ...	August-September.
	8.	Asauj ...	September-October.
The cold weather (*Siyál* or *Siyála*)	9.	Káti or Kátik ...	October-November.
	10.	Mungsir ...	November-December.
	11.	Poh ...	December-January.
	12.	Máh ...	January-February.

It would be more in accordance with the actual course of the seasons in this neighbourhood to consider them as each commencing a fortnight later, *i.e.*, from the middle of the Sambat month. The rains may be taken as lasting from 1st July to 31st October, the cold weather from 1st November to 28th February, and the dry hot weather from 1st March to 30th June. The hottest part of the year is the latter part of June=the beginning of Hár, and the peasants sometimes use the word Hár to express the driest, hottest time of the year. The Sambat year begins in Chait.

I have already given the Panjábí names for the different parts of the day as it is divided by the peasants. The Bágrí and Musalmán names are very much the same, except that the Musalmáns sometimes use words taken from the names of the prayer-times prescribed by their religion. Thus *namázwela* or *fajar*=*tarká* or *parbhát*=a little before sunrise; *peshíwela* about 2 P.M.; *dígarwela*=just before sunset. The day and night (24 hours) are divided into eight *pahars* or watches, four from sunset to sunrise, and four from sunrise to sunset, and as these are determined by the sun, they vary in length at different times of the year, but at the equinox the *pahars* of the day and night are equal, each being three hours long. *Dopahar* means midday; *pahar din rahá*=3 P.M.; *pahar rát gaí*=9 P.M.; *pahar din charhá*=9 A.M. Ordinarily the peasants take no note of more minute divisions of time, but in some of the Ráin villages on the Ghaggar, they measure the time during which each sharer is to take his share of the water for irrigation purposes by a water-clock like that ordinarily used by police sentries to measure the hours. A thin brass bowl (*katori* or *chhani*) with a small hole in the bottom is floated in a large earthen vessel (*kund*) filled with water, which gradually comes through the hole into the bowl until it sinks. The weight and capacity of the bowl are so proportioned to the size of the hole in its bottom, that it

sinks exactly one *ghari* after it is first floated. The *ghari* used in Mangála, one of the largest villages, is somewhat shorter than the ordinary Hindústaní *ghari*, of which there are 64 in 24 hours; there are about 72 of their *gharis* in 24 hours, which makes each equal to about 20 minutes. In Khairpur the villagers can hear the gong struck by the police-sentries at the Treasury every hour, and regulate the division of their irrigation-water accordingly.

Measures of length.

137. The unit of length employed by the peasants in measuring their fields is the *kadam*, called also *karam* and *karu* by the Sikhs of the northern border, and *páondá* by the Bágrís of the southern border. It is the same as the Roman passus or double pace, and is measured by taking two steps or English paces as one *kadam*, so that in stepping out a boundary by *kadams*, the number is counted from right foot to right foot, or from left foot to left foot. The *kadam* however varies very much in length, being sometimes a short double pace, sometimes a long or an ordinary double pace, and there is among the people no fixed standard to which it can be referred. In the last Settlement of the district (except in pargana Bahak,) the unit measure of length employed was the *gathá* of $8\frac{1}{4}$ feet or 99 inches. This measure is not known to the people except through the Settlement measurements, and we have dropped it in the present Settlement in favour of the *kadam* which they themselves use. The *gatha* was the unit of length employed throughout the Delhi Territory at last Settlement, and has been adopted in the present Settlements of the Delhi Division and in Rohtak. It can be measured by three short steps or a *kadam* and a half, and is such that a square of 20 *gathas* by 20 equals a standard *bígha* = $\frac{5}{8}$th of an acre. This *bígha* is now well-known to the people, who, according to the length of their local *kadam*, defined the *bígha* variously as 32, 31, 30, or 28 *kadams* square. In the measurements of this Settlement, we have adopted as our measure of length in place of the *gathá*, a *kadam* of exactly 66 inches, or two ordinary English steps of 33 inches, which is thus exactly two-thirds of the *gathá* hitherto used by the patwáris, and is approximately an average of the *kadams* used by the villagers, a square of 30 such *kadams* by 30 being exactly the standard *bígha*. This was the *karam* used in the Settlement of the Montgomery district, but in the Settlement of Muktsar the *karam* was taken at 60 inches.

The unit of length employed in measuring cloth, ropes, the depth of wells, small pieces of land within the village site, and for similar purposes, is the *háth* or cubit, called by the Sikhs *hatth*. There are three kinds of *háth* in use—(1) the *sídhá háth* or straight cubit, measured from the projecting bone of the elbow to the end of one or other of the fingers; (2) the *murwa* or *morwá háth* or bent cubit, measured from the projecting bone of the elbow round the end of the fingers held out straight, and back to the knuckles, or sometimes to the wrist; (3) the *mutthí háth* or fist cubit, measured by adding to the *sídhá háth* the fist of the other hand with thumb extended. Of these the *murwa háth* is by far the most commonly used, but as the length of each man's arm varies and there is no common stan-

dard, its exact length cannot be determined. In one village I found that the *háth* of a particular shopkeeper was accepted as the standard *háth* of the village. Usually cloth is measured by applying the arm directly, but in Fázilká some of the shopkeepers use an iron rod, a *murwa háth* long, called a *hathrá* or *háthlá gaz* about 23 or 23⅓ inches long (for even this varies in length); some of them have both this *hathrá* and the *Angrezi gaz* or English yard measure, and use both in measuring cloth. In cloth measure a length of 16 *háth* is called a *soli*, and the village weavers sell their coarse cotton cloth at so many *soli* for the rupee. The *háth* is the only cubic measure known; thus, when a village pond is deepened, the quantity of earth excavated is measured as so many *háth* long, broad and deep. A usual rate for digging is 10 *murwa háth* square by one *háth* deep for one rupee; this quantity, 100 cubic *háth*, is called a *khandá* and equals nearly 800 cubic feet.

Other measures of length are the *purs* or fathom, the utmost distance a man can measure by stretching his arms at full length, considered equal to 3½ *sídhe háth* and often used by the Bágrís, for instance, in stating the length of rope required to reach the water in a well—the *chappá* or hand's-breadth, measured across the lowest joints of the fingers and nearly equal to 3 inches—the *angal* or *ungal* or finger's-breadth, equal to about ¾ inch—and the seldom-used *gith* or span, the distance between the points of the outstretched thumb and little finger. The *chappá* and *ungal* are used to measure lengths less than the *háth*; thus the amount of rain-fall is estimated by the number of *ungal*, or finger's-breadths, the moisture has penetrated into the ground. An attempt seems to have been made to obtain a fixed standard for the *ungal*, by adopting the diameter of the Jhársháhí or Bíkáneri *paisá* as the standard *ungal*; but when I sent for some of these, I found them of all sizes. The *jau* or barley-corn is used only in expressions like "*ek jau ká farq bhí nahín hai*" (="It is not out by a barley-corn"). So too the expression "*ek bál ká farq*" (a hair's-breadth) is figuratively used. The peasants have now a measure for the English foot got by clenching the fists and extending the thumbs so that their points just touch; then the distance between the outsides of the knuckles of the little fingers is almost exactly a foot.

The *kán* =3 *kadam* is hardly known. The word *jeori* or *jaríb* or chain is ordinarily applied to the chain used by Government surveyors, but sometimes a peasant has a rope or chain the length of which he knows, and which he uses in measuring his fields. The *koh* or *kos* is generally considered to be 1,360 *kadams*. This relation between the *kos* and the *kadam* is very widely known and was probably fixed by some authority. Taking the *kadam* to be 66 inches, it would make the *kos*= 1·19 mile, but taking the *kadam* at $\frac{4}{7}\frac{4}{9}$ yards, as in some villages it is said to be, would make the *kos* 1·51 mile. In this district, and so far as my experience goes, throughout the Dehli Territory, the *kos* is practically 1½ mile. On the Bíkáner border the Bíkáneri *kos* equals 2,000 *páonde* or something over two miles;

some say it is 2,000 camel's double paces which would make it much longer. Near the Satlaj the English mile is known as *munna koh* or $\frac{3}{4}$ of a *koh*, and is considered to be about 1,000 *kadam*.

Measures of area.

138. The measure of area adopted throughout the district (with the exception of Pargana Bahak) at last Settlement was the *bígha* = exactly $\frac{5}{8}$ of an acre, the same that is used throughout the Delhi Territory. Although this *bígha* was not native to the district (the *bígha* used in some parts of it being of a different size) it has, through long use in the Government records and measurements, become well-known to the people, and may now be considered to be accepted by them as a standard for general use. It has therefore been retained as the standard measure of area for this Settlement. It is divided into 20 parts called *biswas*, each of which was in last Settlement considered to equal 20 *biswánsis* or square *gathás* of 99 inches; but in the present Settlement a *biswa* is held equal to 45 square *kadams* of 66 inches to bring it into connection with the measure of length used by the people. The native *bígha* formerly used by the Bágrís and others in the south and east of the district is a square of 20 *kadams* or *páondás* each way and thus varies with the size of the *kadam*. Taking the *kadam* at 66 inches gives the native *bígha* = $\frac{1}{5}$ of the Settlement *bígha* or $\frac{5}{1\,6}$ of an acre. I found in use in a Bíkáner village a *bígha* of 24 *páondás* square. The native or *kachcha bígha* is now little used in this district. In the north and west, among the Sikhs and Panjábi Musalmáns, the native measure of area is the *ghumáo*, here generally pronounced *ghumán*. Most of the peasants, especially the Sikhs, know nothing of its subdivisions, and simply take the *ghumán* as a square of forty *karams* a side, and consider it equal to four *kachcha* or local *bíghas*. This would at 66 inches the *karam* make the *ghumán* = $\frac{1\,6}{5}$ of a Settlement *bígha*, or $\frac{1\,6}{9}$ of an acre. The *karam* must be less however, for the *ghumán* is said to be $\frac{4}{5}$ of a Settlement *bígha*, which would make it $\frac{4}{1\,8}$ of an acre. On the river Satlaj, among the Musalmáns, a different *ghumán* is used, which is calculated somewhat like the Montgomery Settlement *ghumáo* as follows:—

9 square *karams*	=	1 *marla*
20 *marlas*	=	1 *kanál*
8 *kanáls*	=	1 *ghumán*

Thus the *ghumán* at 66 inches the *karam*, would be exactly an acre as in the Montgomery Settlement. It is said however to be $\frac{8}{9}$ of an acre, as the *karam* is taken at less than 66 inches; but this too varies from village to village, and is not much used by the people, as they have the patwárí with his standard *bígha* and his chain to refer to. In the Settlement of pargana Bahak however, made while it was a part of the Fírozpur district, the *karam* was taken at 60 inches, and the area calculated as follows:—

9 square *karams*	=	1 *marla*
20 *marlas*	=	1 *kanál*

and the *ghumáo* was hardly used in the Settlement Records, the areas being recorded in *kánals*.

I append a table showing some of the many different standards given me.

Measures of length—

1 ungal or finger's-breadth = $\frac{3}{4}$ inch.
1 chappa or hand's-breadth = 4 ungal = 3 inches.
1 gith or span = $\frac{1}{2}$ sídha háth.
1 sídhá háth or straight cubit = 6 chappe = 24 ungal = 18 inches
1 morwa háth or bent cubit = 7 chappe = 28 ungal = about $23\frac{1}{3}$ inches.
1 muthi háth or fist cubit = 31 ungal or = 8 chappe.
1 kadam, karam, karu or páondá = $3\frac{1}{2}$ morwe háth or = 100 ungal or = 3 sídhe háth, or $2\frac{1}{2}$ morwe háth or = 18, 22 or 24 chappe, or = the side of a square whose area is a Settlement *bígha* divided by 28 or 30, or 31 or 32 which would make it about 71, 66, 64 or 62 inches.
1 solí=16 háth.
1 purs or fathom = $3\frac{1}{2}$ sídhe háth.
1 kán=3 karam, or 9 háth, or 8 háth.
1 gathá = $8\frac{1}{4}$ feet or 99 inches exactly.
1 mile or munna koh = 1,000 karam (this makes the karam = 63 inches.
1 kos or koh = 1,360 karam.

Measures of area—

1 square karam = 1 sirsáhí.
1 square kán = 9 sirsáhí = 1 marla.
20 marlas = 1 kanál.
8 kanál = 1 ghumán.
20×20 karam = 1 kachcha or local bígha.
40×40 karam = 1 ghumán
1 Settlement bígha = $\frac{5}{8}$ of an acre = 28[a] or 30[a] or 31[a] or 32[a] karams.
1 ghumán = 2 kachcha bíghas or $\frac{2}{3}$ Settlement bígha.

Measures adopted at last settlement—Sirsa district.	Measures adopted at last settlement—Pargana Bahak.	Measures adopted in this settlement.
99 inches = 1 gatha	60 inches = 1 karam	66 inches = 1 kadam.
1 square gatha = 1 biswánsi	9 square karams = 1 marla	45 sq kadams = 1 biswa.
20 biswánsis = 1 biswa	20 marlas = 1 kanál	20 biswas = 1 bigha.
20 biswas = 1 bígha = $\frac{1}{3}$ acre	= $\frac{100}{900}$ acre	= $\frac{5}{8}$ acre.

Measures of weight.

139. Throughout the whole district the only measures of weight in general use are the Government standard *chhatánk*, *ser* and *man* with measures connected with them as follows:—

5 *tolas* = 1 *chhatánk*
4 *chhatánks* = 1 *páya*
8 *chhatánks* = 1 *adhserí*
16 *chhatánks* = 1 *ser*
5 *sers* = 1 *dharí*.
10 *sers* = 1 *dahserí*.
20 *sers* = 1 *dhaun*.
40 *sers* = 1 *man* (maund) of 82$\frac{2}{7}$lb avoirdupois.

Standard rupees are ordinarily used as *tola* weights, and both in the towns and villages weights of the Government standard stamped in English are in common use, and even in ordinary every-day

matters these standards have quite superseded the local *man* which was until lately in use among the Sikhs. It equalled $\frac{1}{5}$ths of a standard maund, so that 1 standard *man* = $2\frac{1}{4}$ *kachche* or local *mans*. On the Bíkáner border a different *man* was used, calculated thus :—

40	*Paise*	=	1 *ser*
40	*Ser*	=	1 *man* = 29 Government *sers*.

But this too has altogether fallen out of use.

Measures of capacity.

140. Measures of capacity are used only in the Musalmán villages on the Satlaj and even there they have been to a great extent superseded by the standard measures of weight. The measures of capacity used are as follows :—

4	*Paropís*	=	1 *Topá*
16	*Topás*	=	1 *Kachcha man*
$12\frac{1}{2}$	*Mans*	=	1 *Máni*

The *topá* and *paropí* are circular wooden vessels in which the grain is measured. The measurement is not made by filling the vessel so that the grain is level with its rim, but by heaping up as much grain as the vessel will contain. Thus three *paropís* almost fill the *topá* and one more *paropí* is heaped on the top. These measures are now seldom used, except that at the division of the grain on the threshing-floor the allowances of the artisans and menials are sometimes measured in this way. The weight of a *topá* of course varies according to the grain, thus a *topá* of wheat or gram weighs about 3 standard *sers*, of barley $2\frac{1}{2}$ *sers*, of jawár $2\frac{3}{4}$ *sers*. So that a *kachcha man* of wheat so measured weighs about $1\frac{1}{4}$ standard maunds. Other rude measures of capacity are *lap*=a single handful and *boku*=a double handful. Where rent is taken in kind and the quantity of grain to be measured is large, it is common to use a large basket (*khárí*) or earthen vessel (*matká*) containing from one to three maunds of grain. The quantity of grain contained in the measure is weighed once only and the number of measures-full simply multiplied by the weight of one measure ;—but this can hardly be called a measure of capacity.

Measures of value.

141. The Government standard rupee is now in common use throughout the district, and although different kinds of native rupees still pass from hand to hand, they are not now used as a measure of value, all values being expressed in standard rupees. Wholesale prices are commonly quoted at so many rupees per maund, but the peasants and village shop-keepers generally calculate prices of grain, *ghí*, &c., at so many standard *sers* per Government rupee. The names of coins in common use are as follows :—An eight-anna bit or half a rupee is called *dhelí* ; a four-anna bit or a fourth of a rupee is *páolá* ; a fourth of an anna or *paisá* is called *dabbal* (? double pice) to distinguish it from the rude square bits of copper called *mansúrí paise* which are still common in the bázárs ; half a *paisá* or $\frac{1}{8}$ of an anna is *dhela*, and one-sixteenth of an anna is *damrí* ; two *mansúrí paise* make a *taka*. The standard subdivision of the anna into twelve *páe* or pies is seldom followed by the people who prefer to go on subdividing by two, so that a rupee = 256

damṛis. For still smaller values they use the small shells called *kaurí* (cowries) which vary in value according to supply and demand.

The most striking feature of the system of local measures of all sorts in the Sirsá district is the want of a common standard and the consequent extraordinary diversity of the measures used. Other points worthy of notice are the universal use of the double pace, the cubit, and the finger's-breadth as measures of length, the absence of all measures of capacity except on the Satlaj, and the wonderful extent to which the Government standard rupee, maund and bígha have already superseded the various local measures in the ordinary every-day transactions of a people generally considered intensely conservative.

Games and amusements.

142. The Sirsá villagers, old and young, are fond of games and sports, and have a wonderful variety of ways in which they amuse themselves, some of them very similar to games played in Scotland. They take a great interest in races, and great numbers of them gather from long distances to witness trials of speed between horses or camels or men, and enjoy immensely fancy races such as sack-races, blindfold races, or donkey-races; but these are hardly of indigenous origin. The wrestling matches which are sometimes got up excite the greatest interest in the whole country-side and the fame of a champion-wrestler (*mall*) is spread far and wide. In wrestling (*kushtí*) the two opponents come into the ring with as little clothing on as decency allows; and after some preliminary exercise of their muscles by walking on their hands, &c., and slapping of biceps by way of challenge, or imitating a bull's action by throwing sand up over their bodies with a backward stroke of the foot, they stand facing each other with bodies bent forward watching for a favourable chance to grip. When they have seized hold of each other the struggle commences, the object being to put one's opponent on his back so that both his shoulders shall touch the ground at the same time. It is allowable to seize any part of one's opponent's body or limbs in order to put him in this position, and sometimes the struggle lasts a long time, for even when one man is full length on the ground and his opponent on the top of him he is not beaten until he is turned over flat on his back. There are numerous technical terms for the different positions and grips. The spectators standing round often become greatly excited so that it is difficult to keep them from rushing in to help their respective champions, and the cries and shouts at the different points of the match show the interest they take in it. Disputes as to what is fair play are very common and passions run high over them. The Sikhs, who are great at wrestling and other games of strength, have an annoying habit of stopping their match and letting go their grip to tie up their long hair which is constantly getting loose and streaming down over their faces; but when a real match is on, the wrestlers are careful to tie up their hair more firmly. To exercise their muscles and test their strength the men have a heavy weight of stone or wood with a handle to grasp it by, which they use much like a dumbbell (*muqdar*) raising it up

over the head in different positions, and sometimes they exercise with clubs as in an English gymnasium. A favourite trial of agility is to jump (*tap* or *chhál*) over a buffalo-cow, and it is amusing to see how patiently the old buffalo stands chewing the cud while one man holds her by the horns and the others in turn leap and tumble over her broad back, and with what evident relief she waddles back to the herd when the trial is over. A game often played by boys and youths (*jawán* or *gabhrú*) is *saunchí*, which is something like wrestling. The competitors throw off all their clothes except the loin-cloth and the *pagrí* and walk round and round challenging each other, while the old men sitting in a ring round them encourage them with shouts of *taqre ho* (be strong!) Then two pair off and begin their struggle. One strikes the other with the palm of his hand on the chest and the other tries to seize and hold the striker's wrist. If the striker manages to strike three several blows without his arm being caught he has won, but if the man who is struck manages to seize the striker's arm and hold it firmly, despite his struggles to release it, he has won and retires leaping and slapping his biceps in triumph while the elders sitting around call out *shábásh* (bravo!) This *saunchí* is really a trial of strength, and in their struggles the one to hold and the other to escape, they wrestle and roll over each other on the ground.

There are numerous games played by small boys, in many of which they divide off into two equal parties in a way we used to employ in Scotland.' Two of the biggest boys are chosen as captains or skips (*sardár*), and the others pair off, each pair going apart and agreeing on fancy names, such as "the sun and the moon", "the stick and the club," "the tiger and the leopard." Then each pair comes up in turn to the captains and says, "Will you have the sun or the moon?" The captain whose turn it is to choose says one name or the other, and the boy whose fancy title he names goes to his side, while his pair-fellow (*belí*) goes to the other captain's side. They have also a way of deciding which side is to begin a game like our spinning for first serve at lawn-tennis. One captain says to his opponent, "Right or wrong" (*sidhí yá ultí?*), and after the choice is made, kicks one of his shoes up into the air, and the right of beginning the game is determined by the shoe's falling right side up or wrong side up. In arranging a game they sometimes draw lots as we used to do by each drawing one of a number of unequal straws, the boy who draws the shortest straw being 'out.' Many of their games have no practical result, except the honour of victory (*jít*) or the shame of defeat (*hár*), but some of them give the victors (*ghorá*) the right of mounting on the backs of the defeated (*ghorí*) and riding them for a certain distance or a certain time: *e. g.*, so long as they take to count from one to a hundred. Some of the methods by which they determine this privilege are very simple. For instance in the game *dasá bíse* the two parties stand one at 10 paces, and the other at 20 paces, from a heap (*todá*) of earth as goal, and at the word "one, two, three—off!" (*bhágo*) one of each party starts off, the object of the one being to run his 10 paces, slap the goal ten times

and get back his 10 paces before the other who has 20 paces to run can reach the goal and then catch him. When all have had their turn the boys of the side which has gained most times mount the backs of the other side and ride them for a bit. In *chhori chhora* one captain says to the other, "Guess whose house I am thinking of in such and such a street in which there are two boys and a girl" and according as the guess is right or wrong the boys of one party mount the backs of the others, and are carried to the house named where they ask the good-wife, "Above above or below above" (*úpar ke úpar yá níche ke úpar*) and according to her answer they remain as they are or change places and so ride back to their play-ground. The game of *lukan chhippan* is exactly our hide-and-seek, and the catcher (whom in Scotland we used to call "it") is called "black-finger" (*kálí únglí*). In some games the children join hands in a ring and dance round one in the middle. The game of *dájí* or *khuddu khundí* is exactly our hockey, each side trying to drive the ball (*khuddu* or *dari*) with clubs (*khundi* or *gediya*) through its opponents' goal (*pánd*). Sometimes the boys in the villages may be seen spinning the *lattu* which is made and spun exactly on the same principle as our top or peerie. *Ságar sidhi* is something like leap-frog; three boys stand one behind the other while other three leap on to their backs from behind. *Kavaddi* is something like prisoners' base or "Scotch-and-French;" the two parties take their places on opposite sides of a line, and one rushes across and touches an opponent and tries to get back without drawing breath, all the time shouting "*kavaddi kavaddi*" to show that he is hot drawing breath. If he gets back in one breath, the opponent he has touched is dead (*margayá*), but if he is caught and held until forced to draw breath, he counts dead and goes out until the game is ended unless there is an exchange of prisoners. *Chappa mer* is like "pitch-and-toss", being played with rounded pieces of potsherd (*táma*) each player having two which they throw alternately, the object being to get near a mark, and the winner appropriating little bits of potsherd which are used as counters. *Charak chundi* is a combination of the whirl-go-round and the see-saw; a bent stick is balanced on an upright post stuck firmly in the ground; a boy gets on each end, and they are whirled round by a third. Girls are fond of swinging in a swing (*jhúl*) suspended from a tree, and on the third of Sáwan the women swing each other as a sort of religious ceremony. Babies too are often placed in a small swing (*hílola*) by way of cradle. The old men are fond of the game of *pása* which is something like backgammon, played with bits of *kankar* for "men" (*shaine*), and 6 shells (*kauri*) for dice, the "board" having 32 places arranged in the form of a cross. If one player's piece comes on to the same place as another's the latter is dead (*margáya*) and when a piece gets all round the board it is "ripe" (*pakgáya*).

Strolling bands of players, dancers, buffoons and acrobats, usually of the Nat or Bázígar tribes, go round the villages and perform for the amusement of the peasants. Their performances are not unlike what

one sees at home. For instance, one man balances a long bamboo, while another climbs up it and balances himself in various attitudes on the top; or a performer puts bent horns on his feet and walks along a rope balancing jars of water on his head; or an acrobat turns somersaults on a high stage, or with the help of a spring-board vaults over a camel's back, or jumps through a frame-work surrounded by swords. All these performances are usually accompanied by beating of kettle-drums and singing, and humourous conversation is kept up between the performers and a clown in the same way as in an English circus. Strolling musicians usually of the Kanjar tribe play and sing and are greatly in demand among the Musalmáns, especially the Wattus, who often get so enthusiastic with their music as to load them with extravagant presents. I found a number of Sikhs sitting at their village guest-house (*dharmsála*) listening to a wandering musician of the Tarkhán tribe who played on a stringed instrument (*sarangí*) and sang to it, accompanied by a Bhangí of the village. At another time I found Bágrí villagers listening to an old blind minstrel who played on a most primitive lute made out of a bamboo and a cocoanut and, accompanied by a little boy, sang plaintive lays of Rájputána. The Mirásís are professional musicians and are greatly in demand at all festivals with their stringed instruments and kettledrums (*dhol*) which they play in the usual monotonous style but with great enthusiasm, especially when elevated on a camel's back in a marriage procession. The Bágrí villagers have a peculiar sort of music. One man takes in his left hand a large tambourine (*daph*) which he plays by striking it with the points and knuckles of the fingers of his right hand, while the fingers of his left strike a straw against its edge. At intervals he gives a swing and a kick, and then begins to shout out a verse, while several others join in, sticking their heads close to the player's behind the tambourine and dancing round and round with him in a curious crouching dance. There does not seem much music in their song and the performers themselves explain that they are only trying to make as much noise (*raulá*) as they can.

Crime.

143. In the Sirsá district, according to the Annual Police Reports, the number of cognizable cases reported and convictions obtained has been as follows for the last three years, excluding Class VI or petty cases such as cases of public nuisance:—

Year.	Cases reported.	Convictions obtained.	Percentage.	Persons apprehended	Persons convicted.
1880	505	211	41·8	493	350
1881	535	218	40·74	496	313
1882	379	171	44·82	403	247

Including Class VI the total number of cognizable offences reported was 719 in 1881 and 682 in 1882 as follows :—

Class of case.	1881.	1882.	Average of five years (1868-72.)
Murder	3	3	2
Dacoity	2	1	1
Robbery	3	7	9
House-breaking	88	56	113
Cattle-theft	150	112	456
Ordinary theft	147	102	
Bad livelihood	47	62	not available.
Public nuisance	131	238	

Thus the number of cognizable cases (excluding Class VI) reported per 10,000 of total population was 20 in 1880 and 21 in 1882, while in those years the proportion for the whole Province was 18 and 17 respectively. It would thus seem that more crimes are committed in proportion to population in the Sirsá district than in the Panjáb as a whole, but the district seems to be much less criminal than it was ten years ago. The most important class of crime is cattle-theft, and the number of cases of this class reported has been as follows :—

In 1879.	In 1880.	In 1881.	In 1882.
161	129	150	112

or about three times the average for the Panjáb in proportion to population. It is only two generations since cattle-lifting raids on a large scale were common occurrences in the district and even so late as 1839 the Superintendent complained that bands of armed robbers on horses or camels made attacks on Sirsá villages and carried off their cattle and other moveables. The man who was most successful in lifting the cattle of his enemies, either by force or fraud, was honoured most among his fellows, and there is still a lingering feeling, especially among the Musalmáns, that cattle-stealing is an honourable occupation, so that their leading men, if not ready to engage in it themselves, are always ready to wink at it and help their fellow tribesmen to avoid detection ; and men who have distinguished themselves in helping the police to track such criminals are not popular among their neighbours. Some of the leading Bodlas and Wattus on the Satlaj have lately been placed on security for good behaviour because of their conniving at cattle-theft. The long distances between villages and the great length of frontier make it comparatively easy for the thief to take stolen cattle or camels out of the district into Pattiála or Bíkáner or across the Satlaj into Montgomery, and it is no doubt partly for this reason that the percentage of convictions to offences reported is comparatively low, so that the Sirsá district in this respect generally comes among the last ten of the thirty-two districts of the Panjáb. For protection against thieves the villages, especially those of the Bágrís, are often surrounded with a thick hedge of thorns or a deep ditch and have only one gateway (*phalsa*) which is closed at night by a gate or fence of thorns and is guarded by the village watchman that no suspicious

character may come in and that no cattle may get out; and at night-fall all the cattle are brought in from the fields into the village for security. When an animal is stolen, it is usual to employ a tracker, commonly of the Báwariya tribe, but it is not often that the animal can be tracked fast enough. Many of the cases of house-breaking and theft are committed by men of the Báwariya and Chúhra tribes, some of them professional thieves living in Pattiála territory, but there are no criminal tribes in the district whose profession as a tribe it is to steal. Even the Báwariyas as a rule are well behaved, although the Bidáwatí or Bíkánerí section are said to be given to crime; and the bands of Sánsís who sometimes wander through the district do little worse then pilfer grain from the fields. No tribe in this district is registered under the Criminal Tribes Act. Crime is said to be most prevalent in July, August and September when the people are busy in the fields with their kharíf crop or too tired to keep good watch at night, and of course the number of crimes varies greatly with the nature of the seasons, being much greater in years of scarcity than in years of plenty when grain is cheap. Indeed, considering the great distance of the fields from the villages and the number of stores of grain which are hardly protected at all, it is wonderful how few are the thefts of grain; the reason probably being that the people are generally well-off and have no difficulty in obtaining sufficient labour and food at a cheap rate.

Civil litigation.

144. The amount of civil litigation in the Sirsá district is on the whole less than for the Panjáb generally. The total number of civil suits instituted in the Sirsá district during the year 1882 was 2,765 or 109 per 10,000 of population, while the proportion for the whole Panjáb was 136 per 10,000; and of those 2,765, 936 related to proprietary right or occupancy right in assessed land. This large number of land suits is exceptional and due to the Settlement operations which led every man to look to his title and brought disputes to a head, and the number of civil suits is ordinarily much less than this; but it is evidently increasing, for the average number of suits instituted during the five years, 1868 to 1872, was only 1,150. There are comparatively few disputes between money-lender and agriculturist brought into court, partly perhaps because of the distance of the courts and the primitive nature of most of their transactions, but also partly because there is comparatively little indebtedness to money lenders who are thus seldom forced to bring suits against their debtors. The Ráins and the Sikhs are said to be prone to litigation regarding rights in land, but this is probably due to their higher cultivation and development and the consequent greater value of their land. The Bishnoís and the Musalmán Jhorars and Bháneke are especially given to quarrelling in words, but perhaps do not bring their disputes into court oftener than their neighbours.

General character and economic condition of the people.

145. Upon the whole, the material prosperity of the Sirsá peasantry is greater than in many other districts, if allowance be made for the climate and the natural draw-backs of living in such a country. It is true that they often drink bad water, live in

hovels, and endure great heat and much sand and dust, but they are accustomed to such discomforts and do not mind them, and the general health of the population is above the average of Indian peasantry. They have ordinarily no difficulty in obtaining plenty of good food and comfortable clothing; those who prefer a good house to a hovel have little difficulty in making one, and an unusually large proportion of the people have means enough to procure such utensils, comforts and ornaments as take their fancy. Notwithstanding the precarious yield of the harvests there is seldom any wide-felt scarcity at all approaching famine; for the population is still scanty as compared with the area, and the yield in good years is more than sufficient to support them and provide a surplus for bad years, and the people have learned from experience to store up grain against years of drought, while their general prosperity has enabled them to do so. The peasants generally are unusually free from debt and independent of the money-lender, and sales and mortgages of land by cultivating proprietors are unusually few. In a new country like this there is always a good deal of land-speculation in the early days of colonisation, and a number of villages have changed hands; but the sales have usually been made by land-jobbers or non-cultivating proprietors to whom rights had been granted in larger tracts of land than they could manage. This has been especially the case with the original Musalmàn inhabitants whose unthrifty habits have made it difficult for them to retain the proprietary rights conferred on them, and much land has already passed out of their hands. Some of it has gone into the hands of money-lenders, often non-resident, who cultivate their lands through tenants, but much of it has been transferred to Sikhs and Bágrís, who owing to their greater thrift and industry, are much better colonists than the Musalmáns; and even the Musalmáns, notwithstanding the loss of great part of the lands they formerly held, have benefited so much from the increase in the value of land and the greater security from vicissitudes of season and of civil strife that they are much more prosperous on the whole than they were two generations ago, when a much larger share of the land nominally belonged to them.

As is natural in a newly-colonised country, the people are unusually prone to wander. Not only are wandering homeless tribes and families more numerous than in older countries, but even after having lived in a place for some years a colonist, who is not getting on so well as he had hoped, thinks it no hardship to quit the village with his family, cattle and household goods and migrate to a more favourable spot. Especially in a year of scarcity such migrations are common and they are not necessarily a sign of distress. Indeed, the colonist often pays up his rent and settles all his debts and takes away with him a considerable amount of capital with which to start life afresh in a new village. As population increases, however, and land gets more scarce and capital accumulates, the people are becoming less migratory. The Sikhs are especially reluctant to leave the fields they have cultivated and learned to love, except when pressure of population drives some members of the family to move onwards leaving the

others in possession of the family holding and often retaining their rights in it. The Bágrís too are now settling down in their villages, though such tribes as the Báwariyas and Thoris are still very much given to wander, and Ods, Nats and Bázígars never settle anywhere for any length of time. Even the Musalmáns who two generations ago lived a wandering pastoral life, have now generally settled down in particular villages, though the poorer classes of Musalmáns are also very ready to migrate at the slightest hardship. Notwithstanding this rapid development of settled habits, the population is still much more shifting than in an ordinary Panjáb district.

As might be expected in a population developed on the borders of a desert, the ideas and habits of the people are very primitive. There is practically no education in the ordinary sense of the word, but the experience of generations has taught them much, and even the Bágrís, sluggish as their intellect is, are not wanting in a shrewd common-sense in matters of everyday life. Their life is not, for their ideas of comfort, at all a hard one, and they have much leisure and many opportunities for rest and amusement. Their enjoyments are not of a very refined nature, and consist chiefly in feasting on sweet and greasy foods, looking at rough sports, or listening to rude monotonous music; but to them these are real pleasures, and their lives are as a rule contented and cheerful, with a much greater share of pleasure than of pain. They can appreciate a joke if the point is not too fine, and can enjoy a hearty laugh among themselves, although unfortunately it is not thought good manners to laugh before a sáhib. They get excited over a wrestling-match or in a quarrel and abuse each other freely in words but rarely come to blows, and intoxication with the evils to which it leads is almost unknown. Their language is coarse and often obscene, and their manners are rough, but they have some idea of politeness and especially of hospitality. They are not so cringing and obsequious as the people of Hindustán proper, and indeed the Sikhs are very manly and independent, but unfortunately they are not free from the Oriental proneness to flatter. Among themselves they show great respect to the old and great tenderness to the young, and family affection is strong. They can subordinate their own self-interest to the good of the family generally, but their ideas of duty are not very wide-reaching, and most peasants would sacrifice truth and justice to the interests of their near relatives. Yet there is a great deal of fair dealing between man and man, and but little serious injustice done, though comparatively few cases come into our Courts. Their crimes seldom show any great moral depravity. Murders are few and are usually inspired by jealousy; cattle-thefts are common, but are from their point of view very venial offences. Owing to the universal practice of marrying all women early, to the strength of family ties and the closeness of family and village life, sexual immorality is probably very rare, although from the obscene allusions which are common in their ordinary talk, immoral ideas would seem to be familiar to them. In religion they are not bigots, nor are they slaves to superstition. Their pilgrimages are rather holidays

than hardships, and their religious ideas rarely cause them to inflict much discomfort on themselves or their neighbours. They have a vague idea that it is well to be good and wrong to do evil, and this is enough to keep their lives as a rule fairly free from vice and wrong-doing. They are on the whole a wonderfully peaceable, contented and law-abiding people, very easy to manage. There is nothing to dislike in the Bágrís, but they are so dull and coarse and wanting in spirit that one cannot admire them much; the Musalmáns are likeable for their frankness and spirit, but their comparative laziness and extravagance are objectionable; and it would be hard to find anywhere a better body of peasantry than the Sikh Jats, who are frank, spirited and independent without turbulence or arrogance, thrifty and industrious but not miserly, temperate in their habits and not wanting in intelligence, so that there is much in their character to admire, respect and like, and little to despise or disapprove.

CHAPTER IV.—The Produce of the District.

Total areas.

146. The following statement shows for each assessment circle and for each tahsíl the total area in acres as returned by (1) the patwáris' measurements of last Settlement made between 1853 and 1864; (2) the Revenue Survey made between 1876 and 1879; and (3) the present Settlement Survey made by the patwáris in 1880-81, with the percentage of difference.

Assessment circle and tahsíl.	Total area in acres by measurements of			Percentage of difference from Revenue Survey area.	
	Last Settlement, 1853—64.	Revenue Survey, 1876—79.	Present Settlement, 1880-81.	Of area by last Settlement.	Of area by present Settlement.
Bágar	1,80,258	1,74,351	1,73,809	+3·4	— ·3
Nálí	3,52,379	3,40,640	3,41,689	+3·5	+ ·3
Rohi	12,74,413	12,30,494	12,31,900	+3·6	+ ·1
Utár	1,19,749	1,15,440	1,15,668	+3·8	+ ·2
Hitár	66,109	61,436	60,372	+7·6	—1·7
Total of district ...	19,92,908	19,22,361	19,23,438	+3·7	+ ·1
Tahsíl Sirsá ...	6,58,184	6,35,819	6,35,158	+3·5	— ·1
„ Dabwálí ...	5,35,618	5,21,211	5,22,765	+2·7	+ ·3
„ Fázilká ...	7,99,106	7,65,331	7,65,515	+4·4	...

The difference of 1·7 per cent. in Chak Hitár between the measurements of the Revenue Survey and the present Settlement is due chiefly

to the action of the river Satlaj, which annually causes changes in the area of the villages bordering on it. The above statement gives the figures of the patwáris' measurements after the first check in 1881. After the final fairing and check and the incorporation of the alluvion and diluvion changes of 1881-82, the total areas as given by the faired Settlement record are as follows :—

Tahsíl.	Area according to faired Settlement records.		Percentage of difference from Revenue Survey.
	In acres.	In square miles.	
Sirsá ...	6,35,181	993	— ·1
Dabwálí ...	5,22,993	817	+ ·3
Fázilká ...	7,68,851	1,201	+ ·5
Total of district ...	19,27,025	3,010	+ ·2

It will be observed that the areas of the previous Settlement Survey are everywhere from 3 to 4 per cent. in excess of the true area. This seems to be chiefly owing to the rough method then employed of calculating areas of triangular fields.

Cultivated areas.

147. The following statement shows the cultivated area in acres for each assessment circle as returned by the Revenue Survey of 1876-79 and by the Settlement Survey of 1880-81 with the difference per cent. :—

Assessment Circle and Tahsíl.	Area in acres by Revenue Survey, 1876-79.			Area in acres by Settlement Survey, 1880-81.			Difference per cent.
	Cultivated.	Lately abandoned.	Total.	Cultivated.	Lately abandoned.	Total.	
Bágar ...	1,31,795	3,596	1,35,391	1,25,607	7,596	1,33,203	— 2
Náli ...	1,81,656	18,268	1,99,924	1,85,813	9,704	1,95,517	— 2
Rohi ...	6,12,696	5,687	6,18,383	6,51,348	2,912	6,54,260	+ 6
Utár ...	49,305	935	50,240	53,818	663	54,481	+ 8
Hitár ...	23,300	4,025	27,325	25,147	4,208	29,355	+ 7
Total of district...	9,98,752	32,511	10,31,263	10,41,733	25,083	10,66,816	+ 3
Tahsíl Sirsá ...	3,88,038	22,478	4,10,516	3,86,193	18,096	4,04,289	— 2
Tahsíl Dabwálí ...	2,98,081	2,756	3,00,837	3,17,821	961	3,18,782	+ 6
Tahsíl Fázilká ...	3,12,633	7,277	3,19,910	3,37,719	6,026	3,43,745	+ 7

The definitions adopted by the Revenue Survey of "Cultivation" and "Lately thrown out of Cultivation" agree with those adopted in the Settlement, and include in the first term all land that had borne a crop during the two years preceding the survey, and in the second, all land not coming under the definition of "Cultivation," which had borne a

crop during the four years preceding the survey. Although a strict adherence to these definitions must to a great extent eliminate differences in the cultivated area due to differences of season, yet where the cultivated area fluctuates from year to year so greatly as it does in this district, and where on the one hand the sandy soil thrown out of cultivation loses in two years all signs of having been cultivated, and on the other, the hard soil once cultivated shows marks of cultivation ten years after it has been abandoned, measurements made in different seasons by different sets of officers must necessarily give somewhat different results. The patwáris' Annual Returns show that the area cultivated is on the whole increasing from year to year at the rate of something like 1 per cent. per annum, and this rate of increase was in some parts of the district greatly accelerated by the favourable seed-time, both of the rabi and kharif harvests of 1880, which encouraged the cultivators to break up much new land, and still more by the eagerness shown by many to bring new land under the plough before the Settlement measurements, in order to get it entered in the Settlement Record as held by them. The differences in the cultivated areas returned by the two surveys are therefore not greater than might have been expected, and the area under cultivation in 1881 may be taken as 10,66,816 acres or 1,667 square miles, *i.e.*, 55½ per cent. of the total area of the district.

Increase of cultivation.

148. The following statement shows the increase of cultivation since last Settlement in each tahsil and assessment circle :—

Assessment Circle and Tahsil.	Area at last Settlement (1853-54.)			Area by present Settlement (1880-81.)			Increase or decrease of cultivated area.	
	Total area.	Cultivated area.		Total area.	Cultivated area			
		Acres.	Per cent. on total area.		Acres.	Per cent. on total area.	Acres.	Per cent.
Bagar	1,80,258	1,40,617	78	1,73,809	1,25,607	72	−15,010	−11
Nali	3,52,379	1,47,486	42	3,41,689	1,85,813	54	+38,327	+26
Rohi	12,74,413	3,47,945	27	12,31,900	6,51,348	53	+3,03,403	+87
Utar	1,19,749	12,943	11	1,15,668	53,818	47	+40,875	+317
Hitar	66,109	22,299	34	60,372	25,147	41	+2,848	+13
Total of district ...	19,92,908	6,71,290	34	19,23,438	10,41,733	54	+3 70,443	+55
Tahsil Sirsa... ...	6,58,184	3,29,524	50	6,35,158	3,86,193	61	+56,669	+17
Tahsil Dabwali ...	5,35,618	2,07,866	39	5,22,765	3,17,821	61	+1,09,955	+53
Tahsil Fazilka ...	7,99,106	1,33,900	17	7,65,515	3,37,719	44	+2,03,819	+152

There has thus been a large increase of cultivation everywhere except in Chak Bágar, where there has been a decrease of 11 per cent., and in Chak Hitár, where the increase has been only 13 per cent. The greatest increase is in the Utár, where cultivation is more than four times its former area, and the increase of cultivation for the district as a whole is 55 per cent.

According to the Annual Reports the total area cultivated for each harvest during each year since 1871 has been as follows :—

Agricultural Year.	Area Cultivated (in acres)			Percentage on total of	
	Kharif.	Rabi.	Total.	Kharif.	Rabi.
1871-72	7,70,699	1,37,296	9,07,995	85	15
1872-73	7,82,051	1,58,530	9,40,581	83	17
1873-74	7,93,415	1,51,267	9,44,682	84	16
1874-75	7,79,535	2,09,136	9,88,671	79	21
1875-76	7,40,517	2,19,319	9,59,836	77	23
1876-77	7,45,436	2,21,142	9,66,578	77	23
1877-78	3,91,956	2,24,349	6,16,305	64	36
1878-79	7,26,097	2,59,579	9,85,676	74	26
1879-80	7,00,000	2,76,303	9,76,303	72	28
1880-81	7,27,200	1,52,448	8,79,648	83	17
1881-82	7,72,858	2,50,129	10,22,987	76	24
1882-83	7,15,186	3,23,146	10,38.332	69	31
Average ...	7,20,413	2,15,220	9,35,633	77	23

It appears then that while the area cultivated for each harvest fluctuates greatly with the nature of the seasons, the total area under cultivation is on the whole increasing steadily at the rate of something like one per cent. per annum, and that the proportion cultivated for the rabí crop is rapidly increasing and is now about one-fourth of the total cultivated area. I have often been told, especially in Bágrí villages, that they had just begun to cultivate rabí crops, and have seen many evidences that rabí cultivation is fast extending. The Bágrís when they first immigrated from the Bíkáner prairies knew nothing of rabí cultivation and are only now learning it by degrees from their Sikh and Musalmán neighbours, and even the latter now find they can get more out of the soil, though with greater labour, by growing a larger proportion of rabí crops than before. This gradual progress is an improvement in the condition of the district, for the rabí crop, though very precarious, seems less so than the kharíf, and a village which cultivates a large proportion of rabí is more sure of getting some produce in one or other of the harvests of the year.

Classes of soil.

149. At the previous Settlement the cultivated land had been classified according to its quality into (1) *dákar* or clay loam, (2) *rausli* or loam, and (3) *bhúr* or sandy soil; but these are Hindustáni terms and, except the last, are hardly known to the people, who practically make little distinction between the soils except distinctions relating to the source from which they get the supply of moisture necessary for cultivation. Generally for wide stretches of country the soil varies little, and even where the proportion of sand varies considerably, no difference is made in the rate of rent, the fact being that the amount of produce depends much more on the supply of moisture than on the quality of the soil. No doubt when the rainfall is good, a field of hardish loam (*rausli* or *karrá zamín*) will produce more than a field whose soil is sandy (*bhúr*); but on the other hand, when the rain fall is light, a fair crop may be got on the sandy soil, and none on the hard loam. Again while low-lying ground (*niwán*) benefits in a season of scanty rainfall from the drainage of the neighbouring higher ground (*mair*) and produces a better crop, it is found that in seasons of heavy rainfall the crop on such land is poor owing to the fact that the kankar (*ror*), which in many places in such hollows forms a layer a short distance below the surface, prevents the water from soaking through. This is especially the case in parts of the depressions made by former streams or drainages. In short, in the Rohi tract the produce of a field depends so very much on the rainfall, and the rainfall is so uncertain, that a considerable difference in the quality of the soil makes little difference in the actual value of the field, and the people themselves have hitherto made so little distinction between soils in distributing the revenue or in fixing the rents of their tenants that it was thought unnecessary to make any such distinction in the Settlement measurements; more especially as any increase in the classes of soils to be distinguished greatly increases the work of a Settlement, and this branch of the work, which must necessarily be left much to the munsarims and patwáris, is generally more or less untrustworthy. Accordingly in this Settlement the old distinctions of *dákar, rausli* and *bhúr* have been abandoned, and the only classes of soil are those determined by the nature of the irrigation from which they ordinarily benefit. Only it has been found necessary to distinguish the hard clay soil of the Sotar or Ghaggar valley from the lighter sandy loam of the uplands. Thus the classes into which the cultivated land has been distinguished in the present Settlement are as follows:—

(1.) *Cháhí*, or land ordinarily cultivated with the help of irrigation from wells, *jhaláṛs* or *túyas*.

(2.) *Rez*, or land ordinarily cultivated with the help of flood-irrigation from the Satlaj or Ghaggar, whether naturally or by means of water-cuts.

(3.) *Sotar bárání*, the hard clay alluvial soil of the Sotar or Ghaggar valley, ordinarily cultivated with the aid of the local rainfall only.

(4.) *Rohi báráni*, the lighter loam or sandy soil of the uplands, ordinarily cultivated with the aid of the local rainfall only.

The following statement shows the areas of these different classes of soil according to the present Settlement measurements.

Assesment Circle and Tahsil	Total area cultivated (in acres.)	Detail of cultivated area.			
		Irrigated from wells (cháhi).	Flooded (rez).	Unirrigated hard clay (sotar báráni).	Unirrigated light loam (rohi báráni.)
Bágar	1,25,607	.....	.....	335	1,25,272
Náli	1,85,813	892	39,915	8,051	1,36,955
Rohi	6,51,348	.....	.....	.....	6,51,348
Utár	53,818	167	.....	855	52,796
Hitár	25,147	9,389	13,868	.....	1,890
Total of district ...	10,41,733	10,448	53,783	9,241	9,68,261
Tahsil Sirsá ...	3,86,193	817	39,280	8,381	3,37,715
Tahsil Dabwáli ...	3,17,821	75	635	5	3,17,106
Tahsil Fázilká ...	3,37,719	9,556	13,868	855	3,13,440

Thus of the total cultivated area of the district only 1 per cent. is within reach of irrigation from wells, 5 per cent. is irrigated by floods from the rivers, less than 1 per cent. is unirrigated hard clay in the Sotar valley, and 93 per cent. is the unirrigated light loam of the prairie uplands.

Irrigation from Wells in the Náli and Utár Chaks.

150. Owing to the depth of water below the surface there is no irrigation from wells in the Bágar and Rohi Chaks. In 44 villages of the Náli Chak 82 *pakka* and 27 *kachcha* wells are used for purposes of irrigation, while at last Settlement only 48 *pakka* and 6 *kachcha* wells were so used. and only 260 acres were returned as irrigated from wells. In the present Settlement 892 acres are returned as ordinarily cultivated with the help of irrigation from wells, but this area is not irrigated every year. The actual irrigation for each of the seven harvests observed during Settlement was as follows in the Náli Chak :—

Agricultural Year.	Area actually irrigated from wells in		
	Kharif.	Rabi.	Total of year.
1879-80	not observed.	480	...
1880-81	184	626	810
1881-82	119	353	472
1882-83	120	296	416

The area so irrigated varies very much from year to year according to the rainfall. Thus in 1880-81 when the rainfall was scanty the area irrigated from wells was nearly double the area irrigated in the following year when the rainfall was favourable. According to the patwáris' annual papers for the years 1874 to 1879 the average area irrigated from wells during those five years was 473 acres, and the present average area actually irrigated may be estimated at 500 acres; but 892 acres are returned as within reach of irrigation from wells and nearly the whole of this area is actually irrigated when the failure of rain renders it desirable. It gives an average of about eight acres per well, which is very small for a tract where water is ordinarily sweet and within 40 feet of the surface. Although there has been an increase both of wells and of actual irrigation from wells since last Settlement, the villagers of the Ghaggar valley have not developed irrigation from wells to such an extent as they might. They say that the sandy subsoil in many places does not allow them to use *kachcha* wells, and that *pakka* wells are too expensive for them (say Rs. 500), and this would account to some extent for the fewness of the wells. But besides this they do not fully use the wells they have; and the unthrifty Musalmáns who cultivate most of the land on the Ghaggar are content to take their chance of a good flood and do not care to bestir themselves to provide by a development of well-irrigation for the failures of floods. The wells in the Ghaggar valley are almost all worked with the rope and leather bag (*láo* and *charas*), but one or two are worked with the Persian wheel (*harat*). Sometimes a rope-and-bag apparatus is erected on the high bank of the Ghaggar and used for irrigating kharíf crops; this is called a *túya*. But the Persian wheel is more commonly used in this way both for kharíf and rabí crops, a channel being dug from the stream or lake to bring the water under the wheel which is then called a *jhalár*. The best irrigation from *jhaláre* is in Chak Ráiyán and Dhanúr on the Dhanúr lake, and the best irrigation from wells is perhaps in Farwáin and the other villages on the Ghaggar before it enters the Sotar valley. In 1880-81 the crops irrigated from wells were

Kharíf 1880.

Crop.	Area in acres.
Jawár	96
Maize	2
Vegetables &c.	84
Gwár	2
Total ...	184

Rabí 1881.

Crop.	Area in acres.
Wheat	194
Barley	138
Vegetables	81
Tobacco	190
Miscellaneous	23
Total ...	626

In the Utár Chak, although water is generally within 60 feet of the surface, and in some places sweet, irrigation from wells is practised only in 9 villages of the 58 in the Chak, and only 167 acres have been returned as so cultivated. The area actually irrigated from wells in this circle was 122 acres in 1880-81, and 120 acres in 1881-82. At last Settlement 12 *pakka* wells were

used for irrigation; now 14 are so used. But owing to the river's having moved farther west fewer *jhaláṛs* are now worked on the high bank overlooking its eastern branch, and irrigation in this tract has slightly fallen off since last Settlement when it was returned at 206 acres. In some villages irrigation is practised both with the Persian wheel and with the rope and leather bag; and on one occasion I saw both kinds of apparatus at work on the same well.

Irrigation from wells in the Hitár.

151. The only part of the district in which irrigation from wells is of any importance is Chak Hitár on the Satlaj. Here water is everywhere sweet and within 40 feet of the surface—indeed near the river it is within 20 feet and *kachcha* wells can easily be made and worked—and irrigation from wells is practised in 56 out of the 62 villages of the tract. At last Settlement 122 *pakka* and 156 *kachcha* wells were used for irrigation; now 217 *pakka* and 69 *kachcha* wells are so used—an increase on *pakka* wells of 78 per cent. Many of these so-called *pakka* wells are lined with burnt bricks without mortar and cost from Rs. 200 to Rs. 250 to make; some of them are liable to be covered by the river-floods, but when the floods subside they can be cleaned out and set to work again. *Kachcha* wells are used near the river where water is within 10 or 15 feet of the surface, and cost almost nothing to make, as they are lined only with the stalk of the *sarr* grass (*kána*) or with brush-wood (*pilchi*) and are intended to last for one harvest only, a new one being made next harvest. At last Settlement the area returned as ordinarily irrigated from wells in Chak Hitár was 4,845 acres; the area returned at this Settlement is 9,389 acres or nearly double the former area, being an average of 33 acres per well. But the full area is hardly ever irrigated in any one year; this is rather the area which could be irrigated if the wells were all kept at full work, or the area which has been actually irrigated during the last two or three years. According to the patwáris' annual papers the average area irrigated from wells during the five years 1874-79 was 6,133 acres and the area so irrigated during the Settlement operations was as follows:—

Agricultural year.	Area actually irrigated from wells in		
	Kharif.	Rabí.	Total of year.
1879-80	not observed	4,766	
1880-81	1,954	5,162	7,116
1881-82	3,207	4,559	7,766
1882-83(approximately)	2,000	4,779	6,779

The area irrigated from wells varies greatly from year to year. When the floods fail the people devote all their energies to their wells, but again when the floods are favourable they sow a great deal of land with the help of the floods and then irrigate a large proportion of it from their wells; and the best crops are most easily got on land which has been

thoroughly moistened and rendered fit for sowing by the river-floods and has afterwards had its supply of moisture kept up by irrigation from a well. Thus in the good year 1875-76, the area irrigated from wells was only 4,450 acres; and in the fair year 1877-78, it was 7,635 acres. The crops irrigated in 1881-82 were as follows :—

Kharíf 1881.

Crop.	Area in acres.
Jawár ...	... 2,530
Bájra ...	... 120
Moth and Múng	... 17
Til ...	... 210
Cotton ...	... 240
Pepper ...	... 37
Sugarcane ...	... 24
Gwár, &c. ...	... 29
Total ...	... 3,207

Rabí 1882.

Crop.	Area in acres.
Wheat ...	... 3,764
Barley and Gram	... 59
Sarson and Tara	... 69
Vegetables ...	... 401
Tobacco ...	... 93
Miscellaneous ...	... 173
Total	... 4,559

Ordinarily the area under jawár is a good deal less than it was in that year and the area under wheat somewhat larger. All the wells in the Hitár are worked with the Persian wheel (*harat*), and *jhaláṛs* are often worked on the high bank of the river or one of its branches so long as there is water left within reach; and when the channel dries up the wheel is removed and set up in a more favourable place or laid by to wait for the floods of next year. Sometimes two wheels work on one well, which is than called *wán*. A Persian wheel is said to require eight men and eight pairs of oxen to keep it going night and day, as the small oxen used for this purpose cannot keep up the monotonous round for more than a few hours at a time; and the average area which can be irrigated by a well in a year is stated at 25 acres, but this depends chiefly on the supply of water. In rabí 1882 a number of wells irrigated from twenty to twenty-five acres in the one harvest, and the area irrigated in kharíf and rabí of that year averaged in some villages from 30 to 35 acres per well. The supply of water seems to vary partly with the distance from the river and partly with the nature of the strata through which the well is dug. Near the river there is always plenty of water and the supply in a *pakka* well never fails, and if a *kachcha* well falls in owing to the dripping of the water on its sides, another can be made close by with little trouble or delay. But farther off it is found in many parts of the tract that to reach an unfailing supply of water it is necessary to pierce an impermeable stratum of hard white clay (*baggí mittí*) called the *hán*, sometimes 18 feet thick, and wells which only go down to this stratum are dependent on percolation only and soon run dry. Where the *hán* has been pierced even by a hole a few inches across, a constant stream of water comes up from below; but it is often too hard and thick to be pierced by the simple boring-rod (*larí* or *súá*) used by the peasants. This is merely a long bamboo shod with iron, which is raised by several men, struck into the clay and shaken about. A number of wells in the south of the chak have been abandoned as useless because the change in the course of the river has caused the water-level to sink below the *hán*, and complaints of the *hán* are common about Salemsháh near the centre

of the tract. The best wells, those which irrigate the largest area of good crops, are about Jamálke and Ládhoke in the north of the chak. Probably the Fázilwáh Canal just opened will help to raise the water-level again in the south of the tract and enable the wells there to irrigate a larger area of land.

The floods of the Ghaggar.

152. In a country with so little rainfall the variable floods of the Ghaggar are very valuable and great efforts are made to take full advantage of them. When the land naturally flooded (*rez* or *sailáb*) by the stream in the rainy season is left sufficiently dry, it is ploughed and sown with jawár or moth for the kharíf crop or with wheat or gram for the rabí. An insignificant area of land which lies too high to be naturally flooded by the stream is irrigated by *jhaláṛs* or *túyas* erected on the bank, and when the height to which the water must be raised is not great, the peasants employ the *chambar*, an apparatus on the principle of the lever or *dhenkli* consisting of a strong beam with a leather bag fastened below one end and a weight of stones placed on the other; this beam is rested on a fulcrum so that the bag can be alternately dipped into the water and raised so as to discharge it at a higher level, the operation being assisted by a man walking alternately up and down the beam. This mode of irrigation is common on the Annakai lake. For rice-cultivation banked enclosures (*kund*) are made on the lowlying ground most subject to inundation by surrounding fifty or sixty acres of land with a bank of earth high enough to keep out ordinary floods. When the Ghaggar comes down in flood, so much water is let into the enclosure (*kund*) as will suffice to moisten the soil thoroughly, and then the entrance is closed and the ground inside allowed to dry sufficiently to allow of sowing the rice. So long as the flood outside stands higher than the level of the land inside, the cultivator can, by knocking a hole in his bank, let in as much water as the crop wants from time to time and then fill up the entrance again. Sometimes the level of the flood outside is artificially raised by a water-cut from higher up the stream, or an embankment lower down, or water is brought directly by a water-cut from one of the lakes or depressions into the *kund*; at the present Settlement measurements 146 such *kunds* were enumerated, enclosing altogether 8,957 acres, so that the average size of a *kund* is 61 acres. There are a number of *kunds* in Mangála, Rániá and other villages dependent on the Dhanúr jhíl for their supply of water, but they are most numerous about Nakaura and lower down the Sotar valley below the Annakai Chhamb, from which many of them draw their water-supply. In order to increase the area irrigated, *nálas* or water-cuts are dug from the channel of the stream or from the depressions in its bed to conduct its water through intervening high ground to flood land lying at a lower level than the stream at the point whence the water is brought. If allowed, the peasants would often artificially raise the level of the stream at the point of exit of the *nála* by erecting an earthen embankment (*band*) across the channel below that point. These *nálas* (water-cuts) and still more the *bands* (embankments) have proved a fruitful source of dispute.

Since first the country came under British rule disputes regarding the disposal of the water of the Ghaggar have been of constant occurrence, and schemes for turning it to better advantage have been over and over again put forward. The old valley of the Ghaggar, now known as the Sotar or Choya valley, which enters this district from Fathábád, no longer brings any water from the Ghaggar, which now leaves it at Phúlad some 60 miles higher up for a narrow drainage-channel joining the broad Sotar valley again at Dhanúr. After 40 years of complaining on the part of the peasants on the Choya in the Sirsá district, who ascribed the stoppage of the former water-supply to the embankments thrown across the channel by the peasants in Hissár, the Panjáb Government, in 1873, accepted the following conclusions—(1) that the bed of the Choya has silted, not only close to the head, but for some distance along its course; (2) that only a general clearance of the bed would be of any material use, and that the benefit would not last long without the aid of a dam across the main Ghaggar. The question of constructing such a dam was left undecided, but the consent of the Pattiála authorities was obtained to the construction of a permanent masonry level across the bed of the main Ghaggar at the point of bifurcation to prevent future disputes as to the silting of the Choya; and as regards the embankments on the Choya in the Hissár district the Panjáb Government, in 1874, ordered (1) that the erection of new *bands* should be strictly prohibited, (2) that several recently erected *bands* should be demolished, and (3) that the Deputy Commissioner of Hissár should be invited to get the people to agree to a code of rules regulating the time each *band* should be kept closed, to be enforced by a *panchayat*. There seems, however, to have been no flood of any importance from the direction of Fathábád down the Choya (Sotar) valley for nearly 30 years. The people say that in 1909 and 1910 Sambat (A. D. 1852 and 1853), or just before last Settlement, an unusually good flood reached this district down this valley, and that a large area of land in the villages east of Sirsá town, hardly ever again flooded, was in consequence measured and assessed as irrigated by the Choya floods. A considerable body of water came from the Fathábád direction in the rains of 1880, and covered the Sotar valley about Narel, but it appears to have been due to the heavy local rainfall only, and not to any flood from the Ghaggar, and it seems certain that unless operations of some magnitude be undertaken no floods of any importance will come down the Choya (Sotar) valley, and the villages to the east of Sirsá, if flooded at all, will be flooded only by the local rainfall. The soil of the valley is a rich hard clay, and heavy rain does not readily soak into it, but runs off into hollows, some of which are cultivated with jawár, wheat, or barley, or even rice. There are several such depressions in the Ráin villages of Kanganpur, Khairpur, Baidwála and Sikandarpur, where rice is sometimes grown, but it is not often that they are sufficiently flooded to make it worth while to sow rice, and still more seldom do they produce anything of a crop. Some of the *Sotar* land in these depressions has been returned by the patwáris as *rez* or flooded land, but the area so returned is small, and practically

the whole of the *rez* land in the Nálí circle is irrigated by the water of the Ghaggar itself.

Irrigation-works on the Ghaggar.

153. The chief irrigation-work on the Ghaggar in the Sirsá district is the Sikandarpur Nála, intended to bring water from the present channel of the Ghaggar (Nálí), where it runs uselessly along in a deep and narrow bed, back to its old Sotar valley by cutting through the intervening high ground. It takes off from the left bank of the Ghaggar near Musáhibwála in the Dabwálí tahsíl, comes out into the Sotar valley at Darbi, and runs along it past the south of Sirsá town to rejoin the Ghaggar opposite Jhorar, its total length being about 17 miles. It was first taken up in 1861 as a famine-work, but was left unfinished and silted up. Again in 1871 and 1873 much money was wasted by the people in endeavouring to construct it; and it was not until 1875, when Mr. Wakefield, then Deputy Commissioner, took the work into his own hands, that a canal from six to eight feet wide was opened for a distance of 13 miles. In 1876 it was continued for four miles, and tailed off into the Ghaggar, and in 1877 a branch cut was brought into the station of Sirsá, from a point on the main canal about three miles distant, and a number of small branch cuts were also made to the villages which had subscribed towards its construction. More than Rs. 20,000 were spent on this work, of which Rs. 16,000 were taken as a *takkávi* advance by 16 villages from Darbi to Mangála in the Sotar valley, whose lands were supposed to be likely to benefit from the canal. It was partially successful one year, and a considerable area of land was irrigated from it in some of the villages which had spent money on it; but it seems that except in high floods the canal cannot flow unless a dam is placed across the bed of the Ghaggar at the point where it takes off, and as the hard soil at this point is gradually being cut away by the action of the water the bed of the main stream will soon be lowered still further. Such dams have been forbidden, and since 1876 practically no water has come down the canal which has now silted up. In 1881 the project was admitted to have failed and Government remitted the balance of *takkávi* Rs. 6,790 due from the villages, on the ground that they had been misled by the Deputy Commissioner into spending the money on an unworkable canal.

The next system of *nálas* is between the Dhanúr lake and Fírozábád some three miles lower down. Regarding its origin the people say that some 40 years ago, and indeed at the time of last Settlement, the stream here had no well-defined channel, but flowed in a wide and shallow depression along the valley, and the position of the masonry pillars which Mr. Oliver in 1859 erected along the centre of the bed corroborates this account. But since last Settlement the stream has gradually worn a deep channel for itself, and unless artificially distributed would pass right on into the Annakai Chhamb. Accordingly between the Dhanúr lake and Fírozábád some 18 *nálas* have been dug to conduct the water to the low lands of 12 villages to the right and left of the channel; and that the water might be kept at a level high enough to make it flow down these *nálas*, a *jhám* or *chháp* was

made at a point lower down, where the channel is about 56 yards wide and eight feet deep, by driving in five rows of stakes, and interweaving them with branches. In 1877 the Bíkáner authorities complained against this obstruction, and after some correspondence and a joint report by the Deputy Commissioner and the Assistant Political Agent of Bíkáner it was ordered by the Panjáb Government that this obstruction as a new dam arresting the course of the stream must be demolished, and the site levelled to the river bed. This was accordingly done, and the stream now passes along its deep channel without obstruction, and only in high floods does any considerable part of it find its way down those *nálas*. The irrigation of Mangála, Mádho Singhána, and the other villages which were dependent upon this system of *nálas* is therefore likely to be much poorer than formerly, and had their new assessment been fixed it would have been Rs. 1,347 less than the former assessment. After the demolition of this *jhám* it was pointed out that sufficient consideration had not been given to the chief reason urged by the people for its erection, namely that at the spot where the *jhám* was made the stream had within a comparatively short time cut a deeper channel for itself than before, and if left to itself would irrigate much less land than it used to, and that the effect of the *jhám* was only to make the water spread over those lands which it used to flood naturally. The fact seems to be that the Ghaggar, which still deserves the name of Sarasvatí or "river of pools," consists of a succession of lakes like the Chánmal, Dhanúr and Annakai Chhambs connected by broad high-level channels. The stream in flowing from one of these depressions into another tends to cut away the obstruction, and the silt gradually fills up the depressions, so that the bed of the stream tends to adopt the same general slope throughout. In time the depressions will be filled up by the deposits of silt, and the higher ground between will be cut away. This process seems to be going on at the point where the Sikandarpur Nála takes off from the Ghaggar; the people say that two generations ago the bed of the Ghaggar was quite flat at that point, and now a well-defined channel has been cut by the stream. And there can be little doubt that the spill of the Dhanúr Chhamb in passing on over the intervening higher ground into the Annakai is gradually cutting a deeper channel for itself so that the level of the Dhanúr lake, on which really all these *nálas* and *kunds* about Fírozábád depend for their supply of water, is gradually getting lower. Indeed, from measurements made the bed seems, in the floods of 1880, to have cut deeper than before at the point where the Fírozábád *jhám* formerly existed. A proposal was made to erect a masonry bar at this point to prevent further erosion and maintain the bed at its present level, but after some discussion the Panjáb Government decided in 1881 that no remedial works were possible except at a prohibitive cost, and that no attempt of the kind should be made.

The road from Ellenábád to Dabwálí was constructed in 1869 under Mr. Oliver as a famine-work and carried across the Ghaggar valley on a high embankment, part of which, as lying in the bed of the stream, was destroyed by order of the Deputy Commissioner in 1874.

The Bíkáner authorities in 1877 complained of this embankment as still impeding the course of the stream, and in 1879 the Panjáb Government ordered that what was left of it should be demolished and the site levelled to the river-bed. This was accordingly done. In 1877 Mr. Wakefield, Deputy Commissioner, submitted a proposal for a masonry dam and sluice at the point where a branch of the Ghaggar turns off towards Ellenábád, to prevent more than is required from flowing in that direction, as the floods having no exit stand round Ellenábád and make it unhealthy. This scheme is objected to by the Ellenábád peasants who want as much irrigation as they can get, but as it would send down more water in the direction of Bíkáner, it was supported by the Bíkáner authorities who even agreed to defray all expenses if necessary, although the estimate was for Rs. 12,000; but no decision has yet been come to on this point.

Future prospects of irrigation on the Ghaggar.

154. The orders passed by the Panjáb Government at various times to regulate the action of the district officers and people as regards the bed of the Ghaggar, come to this, that while no objection to *kunds* or embankments of rice-fields can be admitted, the erection of new dams (*bands*) which arrest the flow of the stream, divert it entirely from its ordinary channel, and prevent floods from passing onwards, is strictly prohibited. It is obvious that without to some extent damming the stream any important extension of irrigation is impossible, and there is reason to fear that the present area of irrigation will not be kept up, as the stream is annually filling up the depressions in its bed and cutting deeper the channels joining those depressions. Thus these orders, if maintained, put an end to the hopes of improving irrigation from the Ghaggar which have been indulged in by almost every officer who has held charge of the district since the commencement of British rule, and nullify the repeated injunctions of higher authority to utilise the waters of the Ghaggar more fully. This general prohibition of dams is due to the remonstrances of the Bíkáner Darbár against the smallest obstruction to the onflow of the stream towards their boundary; and it is but natural that they should regret every drop of water that is used up before it reaches them and but just that attention should be given to their complaints against new obstructions. But if the question be considered, not as one of British villages against Bíkáner villages, but as that of the greatest good to the people generally under whatever rule, it will be seen that the present state of the case causes a serious waste of the precious means of irrigation ready to hand. The prohibition of dams entails great loss on the Sirsá villages and brings little gain to Bíkáner, for the stream, even when wholly unobstructed, seldom reaches the Bíkáner border in any volume, and it is only a very small area in Bíkáner territory that is at long intervals cultivated with the help of its floods, the greater part of its valley being left uncultivated for grazing purposes. It is for such an insignificant advantage that the Sirsá villages are prevented from extending their rice and wheat cultivation, and even perhaps from keeping up the present area so

cultivated. A large volume of water evaporates uselessly in the depressions of the Ghaggar bed, which might be employed in irrigating rich land lying uncultivated for want of moisture. But nothing can be done without damming the main stream of the Ghaggar at some point, and as the Panjáb Government has admitted the right of the Bíkáner authorities to object to the construction of new dams, the only solution of the difficulty is to purchase from Bíkáner the right to dispose of the water of the Ghaggar as seems best for the country in general, whether under British or Bíkáner rule; and however extravagant the estimate of the value of the chance of floods to Bíkáner, it would be more than counterbalanced by the increased facilities for high-class cultivation in Sirsá, and probably the increase of revenue under the system of fluctuating assessment would alone repay Government for the outlay. Levels are now (1883) being taken and plans made for diverting the stream of the Ghaggar (Nálí) back into the Sotar valley. A dam across the main Ghaggar at the head of the Sikandarpur Nála would probably suffice, if the Nála were cleared out and slightly deepened, to send down enough water to irrigate much land in the Sotar valley about Sirsá town, but a larger scheme is to bring back as nearly as possible the whole of the Ghaggar into the Sotar or Choya valley by a strong masonry dam at or near Phúlad, some 80 miles above Sirsá, where the Ghaggar leaves the Sotar. Many thousand acres of rich clay soil capable of producing rice and wheat lie untilled for want of water, and there can be little doubt that some such scheme would be possible and remunerative to Government, while it would greatly increase the prosperity of the people and the produce of the tract. A long low dam across the lower end of the Dhanúr Jake would also be a great improvement, for it would make that depression into a large reservoir from which water could be drawn off when wanted for the rice cultivation lower down. On the other hand, if the present order forbidding dams be maintained, not only must all hope of any great future increase of irrigation be abandoned, but there is reason to apprehend a contraction of the present irrigated area, and the Sikandarpur Nála which cost Government and the villages Rs. 20,000 must be considered a failure. If even the right to construct *jháms*, which are allowed almost everywhere else in the Panjáb, were conceded to the Sirsá peasants, it would be a great boon to them, and indeed would be no more than they can in justice claim, and would help greatly to maintain the present irrigation.

Area flooded by the Ghaggar and nature of the annual floods.

155. At last Settlement the area of land recorded as irrigated by the floods of the Ghaggar in the villages now in Chak Nálí was 36,735 acres or 25 per cent. of the then total cultivated area. There seems reason to believe that this area is in excess of the area at that time ordinarily flooded. In 1852, 1853 and 1856 the floods were unusually good, and Mr. Oliver, in submitting the report on the Settlement of the Rániá pargana, writes as follows:—"The year of 1856, during which Captain Robertson effected the assessment, happening to be one of

plentiful rain and high floods, this tract was more extensively cultivated than is the case in ordinary seasons. This circumstance of infrequent occurrence, it strikes me, was not taken into sufficient consideration at the time of revision of Settlement by Captain Robertson. It is however certain that since that period some estates set down in the statement as having irrigated cultivation have not had any crops so raised, and the proprietors have been paying for lands from which they have actually derived little or no return." The area returned at the present Settlement measurements as ordinarily cultivated with the help of the floods is 39,915 acres, an increase of 9 per cent. on the area returned at last Settlement, but the area actually flooded varies greatly from year to year with the extent of the annual floods, and according to the patwáris' papers the average area flooded during the five years ending 1879 was only 31,355 acres; in 1878-79 however it was 34,906 acres. The area cultivated with the help of floods has been as follows for the last seven harvests:—

Agricultural year.	Area flooded in		
	Kharíf.	Rabí.	Total year.
1879-80	Not observed	10,327	.....
1880-81	10,041	17,673	27,714
1881-82	11,053	15,129	26,182
1882-83	10,245	14,181	24,426

The area actually flooded has been unusually constant for the last three years, but the extremely uncertain nature of the Ghaggar floods is well illustrated by a comparison of the areas of 1875-76 and 1877-78. In the former year the area cultivated with the help of the floods was 44,694 acres, and in the latter year only 3,042 or less than a fourteenth of the area flooded two years before. The hard Sotar soil cannot be cultivated at all unless thoroughly saturated; nor is it enough that the land should have been well flooded to begin with and the seed-time favourable. For the cultivation of rice a continuous supply of water is necessary for a hundred days, and unless successive floods come down the Ghaggar at seasonable times, or a store of water can be drawn on when wanted, the rice crop fails; and it is for this reason that most of the rice-*kunds* are situated below the Dhanúr and Annakai Chhambs from which water can be drawn by water-cuts (*nálas*) when required. The wheat and gram crops also require seasonable showers of rain, or the outturn is poor. Excessive floods in the rainy season sometimes overtop the embankments round the *kunds* and drown the rice-crop as in 1880, and often a freshet in the cold weather destroys a large area of the gram crop in the lowlying parts of the bed. The following

statement shows how the Ghaggar floods have varied from year to year :--

Year		Nature of flood.	Remarks.
Sambat.	A. D.		
1907	1850-51	Poor ...	Heavy floods in February drowned the rabi crop.
1908	1851-52	Poor ...	Rice-crop poor for want of floods in autumn. Rabi poor and drowned by floods in February.
1909	1852-53	Excellent ...	Some rice drowned.
1910	1853-54	Fair.	
1911	1854-55	Fair ...	Some rabi crops drowned.
1912	1855-56	Fair ...	Some rabi crops drowned.
1913	1856-57	Good ...	Plentiful rain and high floods.
1914	1857-58	Fair ...	Little land cultivated owing to the Mutiny.
1915	1858-59	Fair ...	Some rabi crops drowned.
1916	1859-60	Poor ...	Rabi crops drowned.
1917	1860-61	Almost none.	
1918	1861-62	Good.	
1919	1862-63	Good ...	Rice and wheat particularly good.
1920	1863-64	Excellent ...	Some rice and some rabi crops drowned.
1921	1864-65	Poor ...	Some rabi crops drowned.
1922	1865-66	Fair.	
1923	1866-67	Poor ...	Rabi crops drowned.
1924	1867-68	Good ...	Little rice, but good rabi. Some rabi drowned.
1925	1868-69	Total failure.	
1926	1869-70	Very good.	
1927	1870-71	Fair ...	Some rabi crops drowned.
1928	1871 72	Fair ...	Some rice and some rabi crops drowned.
1929	1872-73	Poor ...	Floods high, drowned rice and rabi crops and prevented sowings.
1930	1873-74	Good.	
1931	1874-75	Fair ...	Some rabi crops drowned.
1932	1875-76	Good ...	Some rabi crops drowned.
1933	1876-77	Poor ...	Autumn floods lower than for many years. Rabi crops drowned.
1934	1877-78	Total failure.	
1935	1878-79	Good.	
1936	1879-80	Poor ...	Rabi crops drowned.
1937	1880-81	Very poor ...	Rice-crop drowned. Floods ceased too soon for rabi crop.
1938	1881-82	Good ...	Rice and wheat both good.
1939	1882-83	Good ...	Rice good.

Thus it appears that in the last 33 years the floods have been in

3	years	...	...	... Very good.
9	,,	...	...	... Good.
9	,,	...	...	... Fair.
9	,,	...	...	... Poor.
3	,,	...	...	... A total failure.

In five years excessive floods in the kharíf drowned part of the rice-crop and in seventeen years floods in the cold weather drowned some of the rabí crop. The floods are dependent more on the rain-fall on the Sub-Himálaya below Simla than on the local rain-fall. A heavy fall of rain north of Ambála brings down a sudden freshet which fills all the depressions in the bed and in some places runs ten feet deep; but usually the flood abates in a few days and either runs very low or dries up altogether until another fall of rain brings down another

freshet. Sometimes a heavy fall of rain nearer than Ambála sends the drainage of the plain country down the Ghaggar, but such floods are rare and insignificant compared with those that come down from the hills.

Crops grown on the lands flooded by the Ghaggar.

156. The crops grown on the lands flooded by the Ghaggar in 1881-82 were as follows:—

KHARIF, 1881.

Crop.	*Area in acres.*
Rice ...	6,740
Jawár ...	652
Bájra ...	3,466
Til ...	40
Gwár ...	118
Moth, Múng, &c. ...	37
Total ...	11,053

RABI, 1882.

Crop.	*Area in acres.*
Wheat ...	9,234
Gram ...	4,704
Barley and Gram ...	878
Sarson and Tara ...	63
Vegetables ...	42
Miscellaneous ...	208
Total ...	15,129

There is ordinarily a smaller area than this under bájrá and a larger area under jawár and wheat, but the staple crops are rice in the kharíf and wheat and gram in the rabí.

The 39,915 acres returned as ordinarily cultivated with the aid of the Ghaggar floods (*rez*) and the 3,316 acres of such land returned as lately thrown out of cultivation have been classified as follows according to the crop ordinarily sown:—

Class of land.	*Under cultivation.*	*Lately thrown out of cultivation.*	*Total.*
Rice-lands	8,581 ...	346 ...	8,927
Wheat-lands	20,255 ...	2,784 ...	23,039
Gram and other lands	11,079 ...	186 ...	11,265
Total rez ...	39,915 ...	3,316 ...	43,231

In the Sirsá district rice (*dhán*) is only cultivated on the rich clay soil of the Sotar valley and more than half the cultivation is in the hands of the industrious Ráins, many of whom, especially from the villages about Sirsá, where they can seldom cultivate rice in their own lands, cultivate as tenants in the villages on and below the Annakai Chhamb belonging to other proprietors. Rice requires a liberal supply of moisture, and in this district can only be cultivated in *kunds* so embanked as to retain enough and not too much water for the crop. The 146 *kunds* are situated in 26 villages chiefly below the Dhanúr and Annakai Chhambs, and some idea of the capital spent in making lands fit for rice-cultivation may be gathered from the fact that in the 20 years from 1861 to 1881, 21 of these villages took *takkávi* advances from Government amounting to Rs. 22,536 to be spent on making and repairing the embankments (*ber*) of their *kunds*. The village of Rániá alone took for this purpose Rs. 5,071 and several other villages took more than Rs. 1,000 each. Besides this *takkávi*, the rice-cultivators spend large sums of money of their own in employing labourers to make embankments and clear out water-cuts, and themselves devote much labour to such work. A *kund* of 140 acres in Amritsar

is said to have cost Rs. 1,000 to make and Rs. 400 to repair. In Mangála owing to the fall in the level of the Dhanúr Chhamb caused by the erosion of the Ghaggar bed, a whole *kund* had to be lowered a foot and a half, an operation which must have cost in digging alone at least Rs. 100 per acre. The labour of cultivating the crop is great and two or three acres are said to employ a plough fully. The ground is manured before the rains, goats' dung being especially preferred as manure for rice, and on the first flood in Asárh (June-July) enough water is admitted into the *kund* to moisten the soil thoroughly. The land is then ploughed once or twice and levelled with the *sohága*, and the rice is sown broadcast and after eight days or so appears above the ground. It is then carefully weeded, and after about 21 days bare patches are filled by transplanting from where the sprouts are too close. After about 40 days it is again weeded. But the greatest difficulty is to give the crop the proper amount of moisture. It must be kept moist until it ripens about 100 days after sowing, and if at any time it is allowed to get dry, no grain forms in the ear and the crop produces nothing but straw (*maráyan*) ; but it must not be allowed to get too wet, for if water is allowed to stand long in the field, the action of the sun ruins the crop. The Ghaggar floods are too uncertain for the rice-irrigation to depend on them directly, and rice is only grown below the Dhanúr and Annakai lakes which act as reservoirs from which water can be drawn off to the rice *kunds* when wanted. The best kind of rice (*múnji*) must be sown before the middle of Bhádua (end of August), but an inferior kind of red rice (*kharsu* or *seora*) can be sown a little later on and ripens in 60 days, but gives only about half the produce of *múnji*. The rice crop is very precarious, for not only does a failure of the Ghaggar floods make it impossible to sow or ruin the crop after it is sown, but an excessive flood overtops the embankment of the *kund* and drowns the crop. In 1880 many *kunds* were drowned and those of Mangála, it is said, were only saved by 200 men being told off to watch the embankment and keep the high flood from coming over it. Of the 8,927 acres of rice-land the area sown and the nature of the produce have been as follows during the last three years :—

Year	Area sown	Nature of produce.		
		No crop	A poor crop.	A fair crop.
1880	1,028	.....	.....	1,028
1881	6,748	1,146	954	4,648
1882	6,206	386	876	4,944

The smallness of area sown in 1880 was due to the excessively high floods in July which drowned many of the *kunds*, and the largeness of the area producing no crop or only a poor crop in 1881 was due to the

premature cessation of the floods which caused the rice in many *kunds* to dry up. As a rule land within *kunds* cannot well be cultivated with other crops, but sometimes wheat or gram is grown in an old *kund* which has not been sown with rice for some years.

The best land on the Ghaggar, if not prepared for rice-cultivation, is usually sown with wheat, after having been ploughed several times and levelled with the *sohága*. Three or four acres are said to give full employment to a plough. No trouble is taken to free it of weeds and the crop is sometimes almost choked by the camel-thorn (*janwása*). Unless the land has been thoroughly moistened it cannot be sown, and unless the winter rainfall is favourable the crop does not come to much. A good deal of wheat-land about Jagmalera is irrigated by water-cuts (*nalás*) from the Annakai Chhamb; but precautions are seldom taken to protect the wheat-crop from floods as the winter-freshets are not often so heavy as to injure it seriously. Of the 23,039 acres of wheat-land flooded by the Ghaggar the following areas have been sown with wheat in the last four harvests:—

Rabí of year.	Area sown with wheat.	Nature of produce. (Approximately.)		
		No crop.	Poor crop.	Fair crop.
1880	6,360	...	Not observed.	...
1881	10,771	...	Not observed.	...
1882	9,234	400	1,000	7,800
1883	7,571	600	1,500	5,500

But in 1878-79, 22,000 acres flooded by the Ghaggar were sown with wheat, and the area sown during the last few years seems exceptionally small. Wheat is not nearly so precarious as rice, and once sown is pretty certain to produce something of a crop.

Land flooded by the Ghaggar which is too poor to produce good wheat or which is not left dry by the floods in time is ordinarily sown with gram after one ploughing, so that a plough can sow six or seven acres of gram. The gram crop in the lower parts of the channel and round the edges of the Chhamb is especially subject to be destroyed by the winter freshets, and often a most promising crop is ruined by a flood in February. No care is taken to preserve the crop from this danger, though something might perhaps be done by a system of long low *bands* parallel to the course of the stream with short *bands* at right angles to them to keep the flood from drowning part of the crop; and now that there is a telegraph to Sirsá, two or three days' notice of the approach of a flood might be obtained from Ambála. Of the 11,265 acres of gram-land ordinarily flooded by the Ghaggar the following areas have during the last four years been sown with gram or with

barley, which is however rarely sown on these flooded lands either alone or mixed with gram :—

Rabí of year.	Area sown with gram or barley.	Nature of produce. (Approximately.)		
		No crop.	Poor crop.	Fair crop.
1880	3,923	...	Not observed.	...
1881	6,440	..	Not observed.	...
1882	5,582	500	1,000	4,000
1883	6,074	679	803	4,602

The other crops sown on lands flooded by the Ghaggar are comparatively insignificant. When land not prepared for rice-cultivation is flooded at a time favourable for kharíf sowings it is, if strong Sotar clay, sown with jawár, and if light sandy soil, like that on the Ellenábád branch, with *moth* or *bájra*. The areas flooded by the Ghaggar and sown with these crops have been as follows :—

Kharíf of year.	Area sown with		
	Jawár.	Moth.	Bájra.
1880	3,936	1,958 13	2,317
1881	652	108	3,466
1882	350		3,528

The unirrigated Sotar lands.

157. The cultivation on the Sotar lands which are out of reach of the Ghaggar floods is very similar to that on flooded lands, for the hard clay soil cannot be cultivated unless thoroughly moistened, and when it can be sown jawár and wheat are the crops commonly grown. In the Sotar villages east of Dhanúr only low-lying patches of land are cultivated, the drainage of the uncultivated land being conducted into those patches, and where necessary retained or distributed by embankments. Where there is a large depression with a considerable supply of drainage water, rice-cultivation is sometimes tried ; but the rainfall is rarely sufficient to give anything of a crop. When the rainfall is heavy, as in 1881, the low-lying fields produce very good crops of jawár and wheat, but the soil is so hard and requires so much moisture that it is seldom that the rain is sufficient to bring the crops to maturity ; and much of the land under cultivation is rarely sown, or when sown produces very little except in an unusually favourable year. Thus in 1880, these Sotar villages had hardly a grain of produce either in the kharíf or in the rabí.

The total area of the Sotar east of Dhanúr is approximately 40,000 acres, but in the whole Nálí Chak only 8,051 acres of Sotar bárání are returned as cultivated and 2,142 acres as lately thrown out of cultivation.

The Satlaj floods and irrigation-works.

158. The Satlaj appears at one time to have flowed farther to the east under the well-defined bank known as the *Danda*, but the annual inundations now extend only to about five miles east of the main stream. The soil of this narrow tract along the river (Chak Hitár) is ordinarily, except where affected by deposits of pure river sand, a rich alluvial loam, fertile when water is plentiful, but hard and unculturable when dry. Near the main stream the usual phenomena of alluvion and diluvion recur year after year. The river recedes to the west and new soil is left bare; the pure sand produces nothing, but on the alluvial soil little shoots of *pilchí* or *jháo* (Tamarix dioica) spring up in great numbers. Next year the river again rises, but its force is still diverted towards the other bank, and on this side more alluvial soil is deposited, and the *pilchí* attains a respectable height. It is cut down and the ground is scratched with the plough and a little pulse (*masúr*) thrown in; the crop is of little value, but it well repays the minimum of labour spent in sowing it. Next year the ground is firmer and when drying after the river-floods is easily ploughed up, and produces capital wheat crops. It is thus cultivated year after year with little trouble, being annually irrigated by the floods passing over it which deposit fresh soil rendering manure unnecessary, gradually raising the land higher and higher and leaving it firmer. This process may go on until the land is so high as to be beyond the reach of any but extraordinary floods, or the current of the river may again set towards this side, and either carry off the land altogether or cover it with barren sand. The general tendency of the river for the last few centuries has probably been to move towards the west like other Panjáb rivers, and those village-areas of Chak Hitár which are now out of immediate danger of losing land have all been formed in the way above described. Within the twenty years ending 1880 the changes of area in the 17 villages on or close to the river were approximately that altogether 5,323 acres were carried away, and 6,700 added to this bank, making a net increase of 1,377 acres along a bank of about 25 miles; four new villages were formed and none wholly carried away. The river seems to have perceptibly moved westward within the last thirty years, and the villages in the south-west of the Hitár Chak on the Bháwalpur border have suffered in consequence; less land has been flooded, the water-level in the wells has fallen, cultivation has decreased and a number of cultivators have migrated. The alluvial soil of the valley when irrigated either by the river-floods or by means of wells produces good crops of wheat, barley, vegetables, tobacco and sugarcane. A high flood irrigates a large area of this land sufficiently to enable the cultivators to plough and sow it for the rabí when the river falls. The tract is intersected by channels which were at various times branches of the river, and appear to have been formed in the following way. The river-flood

sets in a new direction and hollows out a new channel for itself in the soft soil, perhaps cutting off a corner round which it used to wind, and silt is deposited at the mouth of its former channel, which dries up or nearly dries up when the flood subsides, and the river when at its lowest in the cold weather flows only in the new channel, making it gradually deeper. When the flood comes down next year the great body of water flows in the new channel, and only a sluggish stream flows down the old one, depositing more silt both at the entrance to the old channel (which has now become merely a branch (*phát*) of the river), where its rapid flow is first checked, and also at the other end of it where the more rapid flow of the main stream, when the branch again rejoins it, makes a sort of still back-water. The sluggish water in spilling over both sides of the branch also deposits silt immediately on its banks, and when this process has gone on for some years the banks of such a branch become higher than the ground on both sides, and both ends silt up to such an extent that only a high flood can get into it. Thus the whole of the Hitár tract is intersected by old river-beds, each running in a sort of arc or horse-shoe with its concave side towards the river, having both ends higher than the middle (which is then called *dhan*), and its banks higher than the country farther off on both sides. So when the river rises high enough to overtop the high land at the entrance of one of these old channels, its water often finds its way far inland, and as the general slope of the country is considerable such a flood often irrigates a considerable area of land which, though higher than the river directly opposite to it, is lower than the river where the old channel leaves it. An ordinary flood however, if left to itself, usually only fills the old channel and leaves the land on either side high and dry. At different times attempts have been made by clearing away the silt from the inlet to one of these *pháts* to introduce a larger supply of water than would naturally enter it, and by damming it (*band*) farther down to stop the water from going on down the channel back into the river and to raise the level of the water in the *phát* and make it flow over the neighbouring country, or into another old channel (*phát*) which will take it farther inland to irrigate villages farther from the river. Where there is danger of the water's flowing over low ground back towards the river a long low embankment (*pasel*) is erected to keep it in. The chief work of this description is the Pádí Nála, a rude inundation canal made by joining together several of these old channels by a system of cuts and embankments. It has now been superseded by the new Fázilwáh Canal made this year, which follows the old Pádí for a great part of its course. The Pádí left the main stream at Chak Jíwa just within the border of the Fírozpur district some twelve miles above Fázilká and wound its course through the greater part of Chak Hitár, rejoining the river below Dárá. At different times operations have been undertaken by the district authorities to open and improve its head, to straighten and deepen its course, to raise dams and embankments preventing its water from getting back to the river, and to conduct it by means of

water-cuts to the land of different villages. At one place near Mahtamnagar a large embankment with a masonry sluice has been erected to control the division of its water. Here and there along both sides of the Pádí about twenty small irrigation-cuts (*chhár*) had been dug, and twenty-six villages might be said to depend for the extent of their annual floods on the water brought down by the Pádí. Hitherto the district officers have been able to attempt the improvement of this canal only in a spasmodic and haphazard way. A good deal had been done to it in Mr. Oliver's time, but it had been allowed to silt up, until in 1875 under Mr. Wakefield operations were undertaken on an extensive scale to improve its head, deepen its course and strengthen its dams, and at first proved very successful, as the villages dependent on the Pádí which, owing to the silting up of the head, had enjoyed no good floods for nine years, had their lands thoroughly well inundated in the season of 1875. In 1876 the dams were strengthened and the Pádí cleared out for thirteen miles to the benefit of many villages. But the head was again allowed to silt up, and although the villagers, aided by the tahsíldár, endeavoured to do something to open it up again, their efforts were not well directed, and for some years very little land was irrigated by the Pádí. This year (1883) under the direction of the Commissioner, Colonel Grey, to whom the great success of the Fírozpur Inundation Canals is chiefly due, the Pádí has been realigned and widened, a new head has been made for it farther up the river in the Fírozpur district, its embankments have been strengthened, and it is now a regular Inundation Canal constructed on scientific principles, and to be known henceforth as the Fázilwáh. It has been made part of the Fírozpur Canal-system and placed under the establishment specially employed in keeping up the Fírozpur Inundation Canals, so that now there is every hope that it will be kept constantly running in the inundation season and that the irrigation of the Hitár will be much more certain than heretofore. The Fázilwáh has at present a trunk-length of twenty-six miles and a mean discharge of 350 cubic feet per second. It has this year irrigated some 8,000 acres in a number of villages all down the tract to the west of Fázilká, and will when properly developed irrigate 15,000 acres by carefully aligned distributaries. Hitherto the system of clearing out these canals in the Sirsá district has been very uncertain and unsatisfactory. The clearances were effected more by rule of thumb than on any scientific principle. Sometimes a small grant was given by the District Committee, but ordinarily the villagers were left to take *takkávi* advances which they had some difficulty in repaying, or compelled to effect the clearances themselves by a sort of system of forced labour (*chher*). This system was not well regulated, and complaints were common on the part of the officials that the villagers would not turn out to work, and on the part of the villagers that harsh means were employed to compel them to work against their will. Now under the Fírozpur system, an experienced establishment will annually superintend the clearances

which will be done with ease by the villagers themselves and the cost of the establishment will, as in Fírozpur, be paid by a small rate per acre on the land actually irrigated each year; only, in the Sirsá district, Government will pay half the cost of establishment up to a limit of 1½ anna per acre on all land irrigated which is under fluctuating assessment.

The annual floods of the Satlaj bring down a large quantity of sand and mud which alter considerably the quality of the land on which they are deposited, the sand sometimes converting fertile fields into a barren waste, and the mud often acting as a manure to the land which it annually fertilises. In his Settlement Report Mr. Oliver said that the fertility of the soil of the riverain was impaired by a description of soda deposited by the floods, so that land inundated by the river often produced only half the crop given by land irrigated from wells. This seems to refer to the white salt efflorescence known as *shor* or *reh*, but although *kallar* soil impregnated with this salt is to be found in Chak Hitár as well as elsewhere in the district, there seems no reason to charge the river with increasing the evil; nor do the people accuse it of this. The constant supply of water given to crops irrigated from wells is enough to account for a crop more plentiful than on land only flooded once by the river and then left to dry up gradually as the crop approaches maturity.

Area flooded by the Satlaj and nature of the annual floods.

159. At last Settlement (1858-60) the area of land recorded as irrigated by the floods of the Satlaj in the villages of Chak Hitár was 15,450 acres or 69 per cent. of the then total cultivated area. The area now returned as ordinarily cultivated with the aid of the floods is 13,868 acres, a decrease of 10 per cent. This decrease is partly owing to the fact that some of the land formerly cultivated by the aid of floods alone is now irrigated by wells, and partly to the change in the course of the river and the silting up of the old channels which have caused a decrease in the actual extent of the floods, especially in the south-west of the tract. The area actually irrigated varies greatly in different years, and according to the patwáris' annual returns, averaged 14,100 acres for the five years ending 1879; but in 1874-75 it was 9,891 acres, and in the next year after the clearing out of the Pádí it was 20,880 acres, and again in 1877-78 it was only 7,667 acres or little more than a third of the area flooded two years before. During the last seven harvests the area actually cultivated with the aid of the Satlaj floods has been as follows:—

Agricultural year.	Area irrigated by Satlaj floods in		
	Kharíf.	Rabí.	Whole year.
1879-80	not observed	4,398	.....
1880-81	757	5,421	6,178
1881-82	1,731	4,684	6,415
1882-83 (approximately)	200	3,753	3,953

This very serious decrease of the area flooded during the last few years is owing chiefly to the neglect of the inundation canals, and now that they have again been taken in hand, no doubt a great increase in irrigation will follow. The area irrigated perhaps depends more on the arrangements made to secure the advantage of the floods than on the floods themselves, but the height to which the river rises varies greatly from year to year and depends chiefly on the melting of the snows on the far Himálaya and on the rainfall on the nearer ranges. The river ordinarily begins to rise, owing to the melting of the snows, in the beginning of May and continues in flood until September; a heavy fall of rain on the lower ranges sometimes brings down a heavier flood in July or August, lasting for a few days, after which the river again subsides, though still much above its winter-level. The difference between its flood-level in July and its cold-weather level in February is generally about eight feet. The following statement shows the nature of the floods during past years in the Sirsá Hitár:—

Year.		Floods of the Satlaj.	Remarks.
Sambat.	A. D.	Nature of Flood.	
1906	1849-50	Fair.	
1907	1850-51	Very good.	
1908	1851-52	Good.	In some villages poor.
1909	1852-53	Fair.	
1910	1853-54	Poor.	
1911	1854-55	Poor.	
1912	1855-56	Poor.	Good everywhere.
1913	1856-57	Excellent.	In some villages good, in some bad.
1914	1857-58	Fair.	
1915	1858-59	Very poor.	
1916	1859-60	Excellent.	
1917	1860-61	Fair.	
1918	1861-62	Very poor.	
1919	1862-63	Poor.	
1920	1863-64	Fair.	In many villages good, in many bad.
1921	1864-65	Fair.	
1922	1865-66	Poor.	In many villages good in many bad.
1923	1866-67	Very poor.	
1924	1867-68	Poor.	
1925	1868-69	Fair.	
1926	1869-70	Fair.	
1927	1870-71	Fair.	Since 1870 the floods have generally failed in a number of villages they used to irrigate.
1928	1871-72	Good.	
1929	1872-73	Very good.	
1930	1873-74	Fair.	
1931	1874-75	Fair.	
1932	1875-76	Good.	
1933	1876-77	Fair.	
1934	1877-78	Fair.	
1935	1878-79	Very poor.	
1936	1879-80	Very poor.	
1937	1880-81	Poor.	
1938	1881-82	Poor.	
1939	1882-83	Poor.	

Thus in the last 34 years ths floods have been in

4	...	...	Very good.
3	...	...	Good.
13	...	...	Fair.
9	...	...	Poor.
5	...	...	Very poor.

Mr. Oliver writes that during nineteen years of residence he observed five years of extensive floods sending the water to upwards of five miles inland and in other years floods so low as hardly to fill the old channels; in the former case the entire riverain tract became one sheet of cultivation, whereas in low floods nearly half the lands remained fallow. The same may still be said of the Satlaj floods.

Crops grown on lands flooded by the Satlaj.

160. The crops cultivated on flooded land in 1880-81 were as follows:—

Kharif.			Rabi.		
Crop.		*Area in acres*	*Crop.*		*Area in acres.*
Rice	...	33	Wheat	...	3,716
Jawár	...	197	Wheat and Gram	...	239
Bájra	...	197	Gram and Barley	...	434
Moth	...	48	Pulses	...	790
Másh	...	147	Vegetables	...	220
Til	...	24	Miscellaneous	...	22
Maize	...	99			
Miscellaneous	...	12	Total	...	5,421
Total	...	757			

The floods rarely subside in time to allow of much land being sown for the kharíf, and the staple crop on flooded lands is wheat. When the floods have subsided the land is ploughed up several times and levelled with the *sohága*, and then sown. Little trouble is taken to clear it of weeds which often are so thick as to greatly reduce the outturn of the crop. New land thrown up by the river is sometimes simply scratched with the plough and some pulse (*masúr* or *churál*) thrown broadcast and left to grow or die. The crop even after sowing often comes to nothing, and of the 4,684 acres of flooded land sown in rabí 1882, 572 acres produced nothing; in kharíf 1882, of 150 acres sown, 73 acres produced nothing; and in rabí 1883, of 3,821 acres sown, 498 acres gave no crop.

The hard soil of most of the Hitár cannot be cultivated unless thoroughly moistened, and the local rainfall is rarely sufficient to admit of cultivation without irrigation either from floods or wells, so that the area cultivated in this Chak by the aid of rain alone is small, and is chiefly confined to the light high lands which lie above the reach of the floods and resemble the sandy soil of the adjoining Utár tract or to the lower parts of the old river channels where the drainage of the neighbouring high lands collects. The area returned as ordinarily cultivated by the aid of rain alone is only 1,890 acres,

and the area actually cultivated without irrigation has been as follows:—

Agricultural year.	AREA CULTIVATED IN		
	Kharíf.	Rabí.	Whole year.
1879-80	not observed	...	...
1880-81	990	190	1,180
1881-82	2,078	1,235	3,313
1882-83	1,928	2,575	4,503

The large areas of the last two years are partly owing to favourable rainfall, but chiefly to the failure of floods which led to the cultivation by rain alone of a considerable area of land returned at Settlement as ordinarily inundated.

Prospects of irrigation in the Dry Tracts.

161. There is now some prospect of an extension of irrigation in the Utár Chak between the present bank of the Satlaj valley and the Danda or old bank. In 1852 Mr. Thomason, the Lieutenant-Governor of the North-West Provinces, pointed out that the whole of this tract could be irrigated by cuts from the Satlaj, if taken off high enough up in the Fírozpur district, and calculated that the increase of revenue would warrant an expenditure by the State to the amount of four lakhs in the construction of inundation canals from the river. In the two years 1879 and 1880 some 500 acres in three villages on the Fírozpur border were irrigated from the tail of the Nizámwáh Canal in Mamdot and paid water-rate of 8 annas per acre. This irrigation was then stopped, but now it is proposed to extend the Mamdot Baggewáh Canal into the Sirsá Utár so as to irrigate a number of villages east and south of Fázilká, and this canal, which is to be called the Mubárikwáh, is now being excavated (1883). Another canal to be called the Shaukatwah is to be made by the Nawáb of Mamdot, and will irrigate a number of villages in the Utár still farther east close under the Danda. These canals are being started by Colonel Grey and will be under the Fírozpur Canal establishment and will irrigate annually a considerable area in this tract, in which hitherto the only irrigation has been less than 200 acres irrigated from wells and jhaláars. In the Fázilká Rohi the Abohar branch of the Sirhind Canal, which commenced to run this year (1883), but has not yet begun to irrigate regularly, will no doubt irrigate a large area of land hitherto wholly dependent on the local rainfall, and it is possible that one or two other branches of the Sirhind Canal may in time be extended into the Sirsá Rohi farther east. In 1832 a small branch of the Western Jamna Canal was brought into a