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[PART A.

by various shares of the produce. The prevalence of any particular form of rent is largely a matter of custom, but a cash rental commends itself to non-resident landlords such as the Mandal *jagirdars* and the wealthy *mahajans* of Panipat, or to incompetent owners such as the Syeds of the Karnal Khadir, who, though resident, are anxious to avoid the trouble of *batai* collections. In Kaithal, Thanesar and Indri the rent-receiving classes are chiefly village money-lenders who are able to supervise the division of the produce themselves.

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II. B.
Rents and
Wages.
Development
of tenures.

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

The following is taken from a note prepared for a Preliminary Survey of Wages for the Punjab in 1909 :—

Wages for adult unskilled labour hired by the day at ordinary times of the year excluding the harvest season are practically never paid entirely in grain. The customary rates in the villages are a simple cash wage of Re. 0-5-0 to Re. 0-4-0 or a cash wage of Re. 0-2-0 supplemented by a meal, and from Re. 0-4-0 to Re. 0-5-0 cash in towns like Panipat, Karnal, Kaithal and Thanesar. A wage less than Re. 0-3-0 on its equivalent in cash and food is only recorded at one very backward centre in the Panipat Khadar where Re. 0-2-0 in cash is reported.

Wages tend to increase as one goes westwards and northwards. The lowest wage is paid in the Khadar tracts where a Re. 0-3-0 cash rate is common, especially in the Thanesar and Indri Khadar, a payment corresponding with that recorded as prevalent in the adjoining districts across the Jamna, Saharanpur, Muzaffarnagar and Meerut. Outside the Khadar the common wage is Re. 0-2-0 in cash with a meal and tobacco valued at Re. 0-1-6. But in the villages west of Thanesar, and in the northern part of the Kaithal tahsil, Re. 0-3-0 in cash is supplemented by a meal and tobacco, or tobacco or gram is given in addition to Re. 0-4-0 in cash.

The complaints of a dwindling population in the decaying Khadar tracts of Thanesar and Indri would lead one to expect a higher rate in these villages. But the influence of the United Provinces no doubt tends to keep the rate lower than elsewhere. The higher rates in the rest of the district are due to the demand for labour caused by the extension of canal irrigation, by want of

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hands in Thanesar and Guhla, and possibly by the small proportion of Kamins in the north of Kaithal. The *samindar* even when paying true wages gets his work done at a cheaper rate than the non-agriculturist who has frequently to pay Re. 0-5-0 a day even in purely rural tracts.

Former Gazetteers and Settlement Reports contain little information on the subject of wages. From the short paragraph in Sir Denzil Ibbetson's Karnal Settlement Report (421) it would appear that 30 years ago in the south of the district the ordinary day labourer was paid about Re. 0-2-6 worth of grain and his midday meal, which then cost perhaps half an anna. If this is true there must have been a sudden change in the general custom, for it is generally reported that twenty years ago the wage was Re. 0-2-0 or Re. 0-2-6 in cash, sometimes but by no means always supplemented by a meal. After the famine of 1896-97 it became customary to add a meal to the cash payment, which in many cases has also been increased until the rates recorded above have been reached. The tables appended to the last edition of the Karnal Gazetteer show the wages for unskilled labour in 1889 as ranging from Re. 0-2-6 to Re. 0-3-0, but Mr. Douie considered these figures of doubtful value, and as no details are given, it is impossible to draw any conclusions.

Labourers in cotton factories get about Re. 0-8-0 a day. These are generally Chamars.

Wages for skilled labour naturally depend on the distance from which the artisan is called. Thus a carpenter or mason called in for a job in his own village will sometimes get only Re. 0-4-0 with one meal and tobacco, though the common rate is Re. 0-4-0 with two meals and tobacco, which may be considered as equivalent to the fairly common cash wage of Re. 0-8-0 a day. Wages in towns are as high as Re. 0-10-0. Practically no difference is recorded between the wages of a carpenter and those of a mason. The blacksmith's work is not carried on under the same conditions as that of the carpenter or mason. That is to say he cannot transport his forge and tools to the village or house where work is to be done. For the ploughshares and other iron agricultural implements required by the village he receives his customary due in grain but few, if any, occasions arise in this district where he would ordinarily be employed for the day on any iron work.

Reports as to wages formerly paid are conflicting. In some centres no change is reported except what has naturally taken

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place in the value of the meals. In others it is said that the Re. 0-4-0 cash wage has now been supplemented by two meals which would make the wage about twice as high as it was 20 years ago.

Custom varies as to the wages of ploughmen, who are paid sometimes in grain by the year, and sometimes in cash and board by the month. When paid by the year they get 18 maunds and generally a meal, and a blanket and shoes, a rate which corresponds with that recorded 30 years ago in paragraph 421 of the Karnal Settlement Report. Like other grain payments this wage has remained practically unchanged. When paid by the month the ploughman gets a wage varying from Rs. 4 in cash and one meal, the equivalent of Rs. 7 a month, and Rs. 4 and two meals or Rs. 9 a month. In the Thanesar tahsil wages are higher and are estimated in cash and grain at about Rs. 12 a month. The rate of Rs. 3 per month or annas 8 a month and board recorded in paragraph 421 of the Karnal Settlement Report has therefore been more than doubled.

The statistics for the Karnal District in the Report of the First Regular Wages Survey of the Punjab taken in December 1912 show only a slight rise in the rate of wages.

Section C.—Arts and Manufactures.

The census returns of 1901 show that the menials who supply the industrial wants of the village communities amount to 15 per cent. of the total population of the district. The Chamars are concerned with the tanning of hides, and manufacture all the leather articles required for agriculture and well irrigation. The Julahas weave the coarse country cloth used for the clothing of the agriculturists. The Lohars provide rough iron work; the Tarkhans or Bhadis the wood work. Baskets and *chatais* are made by the Jhinwars, pottery and bricks of the small old fashioned type by the Kumhars, oil-pressing is carried on by the Telis, while Sunars provide the villagers with such articles of rough jewellery as they can afford. These village industries are described by Mr. Ibbetson in detail in paragraphs 496 to 502 of his Settlement Report. They are indissolubly bound up with the village community. Payment for work done is usually in kind, and prescribed by custom. At present there are few signs of the village handcraftsmen being drawn away to industrial centres, but with the spread of factories and the demand for labour, this difficulty is likely to appear in the near future.

Eighteen per cent. of the total population in 1901 was engaged in special industries, the most important being cotton

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II. C.

Arts and
Manufactures.

Cotton-gin-
ning factories.

ginning; brass and copper manufacture, glass blowing, blankets and *darri*-weaving, dyeing and calico-printing and the leather industry.

The cotton-ginning industry dates only from 1897 when the first ginning factory was started at Panipat. In 1899 another was erected at Samalka. The number of these concerns increased largely after 1902. There are now 11 factories and pressing machines in the district, of which 3 ginning factories and 1 press are in Panipat, 1 ginning factory at Samalka, 3 at Kaithal, 2 at Karnal, and one at Dhatrat near Jind. As elsewhere the erection of factories has been overdone, and it is rare to find all working in one season. When working full time the average factory employs about 70 hands. The working season begins in October and ends in March. The actual drain on the labour supply of the district is small, but the establishment of factories has undoubtedly affected economic conditions. It has greatly stimulated the cultivation of cotton. Owing to competition in the district and elsewhere it is to the interest of every factory owner to provide itself with a sufficient supply of cotton to be cleaned and pressed. This he does either by entering into forward contracts with the *zamindar* to supply so much cotton as early in the season as possible, or by outbidding the neighbouring factory by the prices offered for raw cotton brought to the factory gate. There are no spinning or weaving mills in the district, and the cleaned and pressed cotton is exported to Bombay, Delhi or Cawnpore. The drain of raw cotton from the village to the factory has brought about other changes in the village life. The old hand mill (*charkhi*) worked by the members of the household is now almost extinct, and the *zamindar* has now to buy back his cotton seed from the trader. The large double-stringed bow (*pinan*), used to clean the ginned cotton, is now rarely seen. The weaver carries on his work with yarn imported from the Bombay or Manchester mills. The raw cotton for factories, when not arranged for by forward contract, is collected by Bannias acting as agents for the various factories, though occasionally a prosperous *zamindar* will himself take cotton to Panipat or Kaithal in order to secure the best possible prices. The price of cleaned cotton has risen from 4 seers a rupee to $1\frac{1}{2}$ seer a rupee and there have been few setbacks. The price of cotton seed has in late years increased from 40 seers to 18 seers a rupee.

Other steam
mills.

Some corn mills and rice-husking machines worked by steam are to be found in the principal towns of the district.

The town of Panipat is noted for its brass and copper wares, the business being carried on in some 60 shops. The manufacture includes not only cooking utensils and drinking vessels of all forms and shapes but also ornamented *hukkas* and *sarotas* (betel-cutters). For the plainer forms of ware the brass and copper sheet is hammered into the required shape, but for more elaborate articles the brass is melted, a certain proportion of zinc or lead is added and the whole is fashioned in a mould. The ware is exported to all parts of the Punjab and United Provinces. The names of the principal manufacturers, known as *thatheras*, are Haji Khuda Bakhsh, Maula Bakhsh and Ghasita, son of Nathu. The following firms of Mahajans are interested in the wholesale export trade:—Sant Lal Mustaddi Lal, Himat Singh, Jagan Nath, Hargolal, Ajudhia Parshad.

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Brass and
copper ware.

For the manufacture of his rough agricultural implements the ordinary Lohar uses iron plates received from Bombay and sold in the town bazar. So long as he remains in the village he is not very adaptable, and repairs to the iron sugar press (*betna*) are carried out not by him but by a special workman from Delhi or Ambala. A few shops in Panipat, notably those of Qamar-ud-din, Muhammad Umar, Jiwan and Abdul Rahman, manufacture scissors and betel-cutters (*sarota*) after the fashion of similar articles made in Meerut.

Iron and
steel work.

Three glass-blowing factories are worked in Panipat during the cold weather and even then chiefly at night as the heat of furnace is intense. The operations, which have probably not varied for centuries, are described in full in Mr. Powell's Hand Book on Arts and Manufactures of the Punjab (see page 237). The only articles produced are globes, the insides of which are silvered with quicksilver and tinfoil. Smaller ones are used as ornaments and the larger ones broken up and used to decorate the *Phulkaris* of the village women. The present workmen seem incapable of developing the process so as to produce other articles of general use. The factories are owned by Muhammad Umar, son of Baha-ud-din, and Qamar-ud-din, son of Alla-ud-din. The ware is exported to Multan and Hyderabad-Deccan. The large pear-shaped retorts used in the manufacture of sal-ammoniac are also made in these glass factories.

Glass blowing.

There are three factories in Panipat,—two owned by men from Ferozabad and one by a local man formerly an *attari*. They have each 7 or 8 workmen. The work is done by contract, *i. e.*, 4,000 *churis* for one rupee or 3,000 if they are faceted. The

Churi manu-
facture.

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*Churi manu-
facture.*

skilled workman earns about 8 or 9 annas per day. His art consists in taking the proper quantity of molten glass on a pointed iron rod and making it into a small ring. This is handed over to his assistant who gets 4 annas or 5 annas a day and is provided by the proprietor. He then works it up in to a *churi* on a cone shaped earthen contrivance fitted to a thin bar which he revolves.

The *churis* are sold at the rate of 24 for a pice to the Maniar who sells them to the public at 6 for a pice.

The glass is got from the Ambala factory at Rs. 5-8-0 a maund. Broken imported *churis* are also purchased at Rs. 8 or 9 per maund.

The wearing of *churis* is absolutely indispensable amongst all women, except widows and the very old. They wear as many as 24 on each arm. The *churis* on the other arm must correspond, but there is no restriction as to colour or design which each wearer is at liberty to select.

The "Maniar" alone can put on *churis*, as he alone has the skill to do so without breaking them. He goes about from village to village. (He is entitled to Re. 1-8 at each marriage.)

New *churis* are worn by a bride's relatives and at festivals. The old ones are taken away by the Maniar to be broken up or passed off as new.

About 75 maunds of glass is consumed in Karnal every month. Each factory turns out about a lac of *churis* a month.

Blankets and
darris.

About 150 looms in Panipat are worked by Kamblis (blanket-makers). The wool is bought from Kasais and Gadaryas who keep large flocks of sheep, especially in the Nardak villages. The blankets are of excellent quality and are exported to Lahore, Amritsar, and even to Peshawar, as well as to Delhi, Agra and Simla. Prices range from Rs. 3 to Rs. 15 per blanket according to the quality. The trade is considerable and capable of development.

Darris of good quality are made in Karnal, some 10 looms being employed. The price is from Re. 1-2 to Re. 1-6 a square yard. Ghulam Ali and Hussain Bakhsh are the principal dealers.

Only one stocking machine is working in the district. It is owned by Maharaj Kanwar, merchant of Karnal. Stockings are sold from Rs. 2 to Rs. 4 a dozen.

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Curtains and cloths of all kinds are printed with various designs in Panipat, about 60 shops being employed in the business. The goods are exported to Lahore and as far as Bombay and the Central Provinces. The ordinary cloth bought in the bazar is used, and the dyes are of European manufacture. The chief persons engaged with the business are Hafiz Allah Dia, Karim-ud-din, Karim-ullah, Alahi Bakhsh and Muhammad Bakhsh.

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Dyeing and
calico print-
ing.

The Chamars of Karnal carry on a considerable trade in boot and shoe making, the industry being a relic of the old cantonment. The boots are exported to all parts of the Punjab and North-West Frontier Province. The leather used is partly ordinary country leather tanned by village Chamars, and partly leather imported from Cawnpore. The retail price varies from Rs. 2 to Rs. 10 a pair. Attempts have been made to organize this industry, and it would probably be to the benefit of the Chamars as a class if they were properly controlled. At present they are extravagant and thriftless and addicted to liquor.

Leather in-
dustry.

Ordinary vessels for village use, including the *tinds* or earthen buckets for Persian wheels, and small bricks are made by the Kumhars. Their methods are too well known to need description. The large bricks used for Government buildings and houses of modern type are made in brick kilns owned by contractors and worked by special workmen from Delhi and Ambala. Special kinds of glazed art pottery, such as tea pots, cups, and other fancy articles, are made by *Kuzigars* or *Sanauris* in Panipat and find a ready sale at fairs and festivals. The quality of these goods is very fair and the industry deserves encouragement. Tiles and flower pots are made by some Purbia potters in the sadr bazar, Karnal.

Pottery mak-
ing.

Besides the ordinary Badhis, carpenters having considerable skill in making furniture, carriages, etc., are to be found in Karnal. The principal men are Inait-ullah and Rahmat-ullah. Lacquered warework, such as is described on page 212 of Mr. Baden Powell's Punjab Manufactures, is made in Kaithal, the quality being very fair indeed. The process is described by Mr. Baden Powell and need not be repeated here.

Carpentry and
woodwork.

The district is noted for the manufacture of refined saltpetre, as much as 4,000 maunds being sometimes exported in a year. The process of manufacture is as follows:—

Saltpetre.

Nitrous earth or *kallar* is collected after the rainy season is over and the earth is sufficiently dried. The nitrous earth is

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petre.

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Crude salt-
petre.

filtered in a tank made roughly of masonry plastered over. The earth is thrown on to a mat of grass stretched on sticks. Water is poured over this and taking with it the nitre is deposited in the tank in the shape of crude brine. From this crude brine, crude saltpetre is made in two different ways:—

(a) by solar heat.

(b) by artificial heat.

(a).—The former means can only be resorted to in the summer months of April, May and June. A pucca cistern, about 40 feet square and 6 inches deep, is made in a level piece of ground; below is another tank in which the crude brine is contained. It is divided into partitions and the crude brine is allowed to flow into them. When these partitions are full of the crude brine, they are left alone for a week or ten days, depending on the heat of the season for evaporation. The brine becomes thicker every day, until it crystallizes at night. It is then collected from the pan and stored in a deeply dug pit.

(b).—The latter process may be followed at any time throughout the year, if fuel can be conveniently obtained. A large oven is made and a large iron pan (*karrak*) is placed over it. The crude brine is put into it and boiled till it reaches the concentration point, when it is taken out of the pan and set in flat but deep earthen vessels (*kumals*). The cool of the night crystallizes the crude saltpetre, which is removed and stored in a pit.

The price of the crude saltpetre is reckoned according to the amount of refined saltpetre obtainable from it. Crude saltpetre contains a large percentage of salt, earth and nitrate of potash and other minor salts in small proportion. Ordinarily 100 parts of crude saltpetre will contain—

40	parts of nitrate of potash (refined saltpetre).
30	do. salt (sodium chloride).
20	do. earth or other insolubles.
10	do. moisture, &c.

The price of a maund of crude saltpetre containing 16 seers of nitrate of potash will be Rs. 2.

The crude saltpetre manufactured in different villages is of no use unless it has undergone a process of refinement. Crude saltpetre is taken to the refineries at Karnal, Panipat and

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Kaithal, where the crude saltpetre is dissolved in a large quantity of boiling water in an iron pan larger than that used in crude saltpetre factories. The extreme heat of the water causes the nitrous qualities of the crude saltpetre to dissolve and other parts (salt, insoluble to a certain extent, and earth insoluble) to settle down in the pan. When thoroughly mixed up, the brine is removed from the boiler and allowed to set for a couple of hours in a wooden vat. The settling process allows all the insoluble matter to settle down in the vat, leaving the clear brine on the top. When the brine is thus cleared it is removed from the settling vessel and deposited to cool in wooden crystallizing pans. In winter the crystallization process takes 6 or 7 days, and in summer from 8 to 10 days. The refined saltpetre thus crystallized is removed from the vats and stored on mattresses. Ordinarily the proportion of its contents in 100 parts is:—

95	parts of nitrate of potash
3	do. salt
2	do. moisture and other insolubles.

Calcutta and Bombay are the chief markets, whence it is exported for use in the medicine and drug trade.

Sal ammoniac or *nausadar* is, and has been for ages manufactured by the Kumhars or potters of the Kaithal and Guhla Ilagas of Karnal. The villages in which the industry is carried on are as follows:—Manas, Gumthala, Karrah, Siyana Saiyadan, Barna, and Bundrana. About 2,300 maunds (84 tons), valued at Rs. 34,500, are produced annually. It is sold by the potters at 8 annas per maund to the Mahajans, who export it to Bhiwani Delhi, Farrukhabad, Mirzapur in the United Provinces, and to Ferozepore and Amritsar in the Punjab, and who also sell it on an average at Rs. 15 per maund.

The salt is produced by submitting refuse matter to sublimation in closed vessels, in the manner described below, which is similar to the Egyptian method. The process is as follows:—From 15 to 20,000 bricks, made of the dirty clay or mire to be found in certain ponds, are put all round the outside of each brick kiln, which is then heated. When the bricks are burnt, there exudes and adheres to them the substance from which *nausadar* is made. This deposit, which is of a greyish colour, is produced by the heat of the kiln in the hot weather in three days, in the cold weather in six. In the rains no *nausadar* is made. The bricks on which this deposit forms are removed from the kilns,

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and the deposit is scraped off. The deposit is of two qualities. The first, which is the commoner and inferior quality, is known as *mitti kham*. The yield per kiln containing 15 to 20,000 bricks is about 20 or 30 maunds, and sells at 8 annas per maund. The superior kind of sal ammonia is called *papri*. The yield of it per kiln containing 15 to 20,000 bricks is not more than 1 or 2 maunds and is sold at the rate of Rs. 2 or 2½ per maund. The Mahajans, who deal in *nusadar*, buy both qualities. Both require special treatment to fit them for the market. The *kham mitti* is first passed through a sieve, and then dissolved in water and allowed to crystallize. This process is repeated four times to clear away all impurities. The pure substance that remains is boiled for nine hours. By this time the liquid has evaporated, and the resulting salt has the appearance of raw sugar. The *papri* is next taken and pounded fine after which it is mixed with first preparation, and the whole is put into a large glass vessel made expressly for the purpose. This vessel is pear-shaped, and has a neck 2½ feet long and 9 inches round, the end of which is closed.

The composition to be treated is inserted into this vessel by breaking a hole in the body of the vessel, at the lower end of the neck. This hole is closed by placing a piece of glass over it. The whole vessel (which is thin black coloured glass) is smeared over with seven successive coatings of clay. The whole is then placed in a large earthen pan filled with *nausadar* refuse to keep it firm, the neck of the vessel is further enveloped in a glass cover and plastered with fourteen different coatings of clay to exclude all air, and the vessel is then placed over a furnace kept lighted for three days and three nights, the cover being removed once every twelve hours in order to insert fresh *nausadar* as sublimation takes place. After three days and three nights the vessel is taken off the furnace, and when cool, the neck of it is broken off, and the rest of the vessel becomes calcined. Ten or twelve seers of sublimated salt, according to the size of the neck of the vessel containing the *nausadar*, are thus obtained. This product is known as *phali*, and results from the sublimation of the salt in the body of the vessel and its condensation in the neck. There are two kinds of *phali*; the superior kind is that produced after the *nausadar* has been on the fire for only two days and two nights, in which case the neck is only partially filled with the substance, and the yield is only 5 or 6 seers. This is sold at the rate of Rs. 16 per maund. To produce the inferior kind the *nausadar* is left on the fire three days and three nights,

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the neck of the vessel being completely filled with *phali*. The yield is then 10 or 12 seers, and the salt is sold at Rs. 13 per maund. That portion of the sublimated *nausadur*, which is formed in the mouth and not in the neck of the vessel, is distinctively called *phal*, and not *phali*. It is used in the preparation of *surma*, and is highly esteemed, selling at Rs. 40 per maund. Each furnace is ordinarily of a size to heat at once seven of the large glass vessels containing *nausadur*. *Nausadur* is used medicinally and as a freezing mixture with nitre and water ; also, in the arts, in tinning and soldering metals and in forging the iron used for making gun barrels by native smiths.

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II. D.

Trade.

Sal ammoniac.

Ghi is manufactured by the villagers throughout the district and sold to the Bannias in the towns, who export large quantities to all parts of the Punjab specially Amritsar and Lahore. Railway exports alone are valued at Rs. 50,000 but this represents only a small part of the total export. Since 1905 a Military Grass and Dairy Farm has been established in Karnal. The milk is bought from the zamindars in various parts of the Karnal tahsil, small separating machines being established in about 10 villages.

Dairying.

The cream is separated on the spot and sent into Karnal to be sterilized in the large machines working in the Grass Farm. A supply of cream sufficient for the butter daily required in the Ambala Cantonment and Simla Hill Stations is sent in by train to Ambala every night. Milk is also supplied to regiments on the march and manœuvres. The skim milk either goes to feed the pigs, of which a number are kept in the Grass Farm, or is sold in the city and villages. The *zamindars* are glad enough to deal with the Grass Farm on the basis of cash payment which they prefer to the mysterious accounts of the Bannia.

Although employing very few hands, one of the most important industries in Karnal is the distillery. The old Government distillery was handed over to Lala Kundan Lal Kishori Lal and Sons in 1900 to be worked as a central distillery. The latest machinery and plant have been introduced, and the business has steadily expanded. In 1900 the liquor issued paid a still head duty of only Rs. 37,328. In 1908-09 the issue was 51,951 gallons, and Rs. 1,99,162 were paid as still head only. Besides the ordinary country spirit the firm is noted for several special brands of liquor of peculiar excellence and quality.

The Karnal
distillery.

Section D.—Trade.

The chief exports are wheat, cotton, gram, fine rice and *ghi*. The manufactures of brass vessels glass, sal ammoniac

and saltpetre have already been described. These articles are also exported. The chief imports are salt, oil and oil-seeds, iron and piece-goods. Cotton and wheat go chiefly to Delhi and Ambala, some qualities of wheat from the Panipat tahsil having a high reputation in the Delhi market. *Ghi*, in the past too often adulterated, and hides find their way to Delhi. The oil and oil-seeds come from the Punjab and the Doab, timber from Ambala; iron and piece-goods from Delhi; and salt from Bhiwani, Delhi and Ambala. Karnal town and Panipat on the Dehli-Ambala-Kalka-Railway are the chief marts, and a good deal of trade comes by way of Kaithal, through which runs the railway from Narwana to Thanesar. Panipat is now connected by railway with Jind on the Southern Punjab line, and its importance as a trade centre is likely to increase.

The local trade is principally conducted through village dealers, but a very considerable traffic is carried on by the cultivators themselves, especially by Jats from Kohtak, who in the hot season earn a good deal by plying their carts for hire. On the old road through Jind to Sambalka and thence across the Jumna to the great sugar marts of the United Provinces strings of camels may still be seen engaged in traffic between the rich lands of the Doab and deserts of Bikaner.

Section E.—Communications.

Twenty years ago, the Grand road running north and south along the western edge of the Khadir was the only metalled road in the district and the North-Western Railway only skirts the fringe of the (Pipli) Thanesar tahsil. The opening of the Dehli-Ambala-Kalka Railway in 1892 and the extension of the Southern Punjab Railway to Kaithal in 1899 have given considerable stimulus to trade. In the last 10 years cotton-ginning factories have sprung up at Samalka, Panipat and Karnal near the Railway Stations of the Delhi-Kalka Railway, and there is a considerable movement in all kinds of staples at these centres, as well as at Gharounda and Shahabad. Cotton-ginning factories have also been built at Kaithal, and the extension of the Dehli-Kalka Line from Thanesar to Kaithal may increase the trade in that part of the district. The railway from Jind to Panipat should open up a very prosperous part of the country. Metalled roads connect Kaithal and Karnal, Pehowa and Thanesar, Thanesar and Ladwa, and Karnal and Indri. Tracks along the side of the main canals are of assistance to village traffic and a good unmetalled road runs from Karnal to the river, and another from Pehowa to Guhla. Although some routes, notably in the Khadir, have been somewhat neglected by

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the District Board the general communications of this large district have been improved out of all knowledge since the last settlements were made.

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Famine.

Section F.—Famine.

Including the *chalisa* famine of 1783 the district has been visited by famine thirteen times in 120 years, one of the most terrible perhaps being that of 1833. Relief works seem first to have been established in the famine of 1861, when 22,237 persons were relieved in one month. In 1869 the famine was more severe in Karnal than in any other part of the Punjab, and hundreds of people were reduced to semi-starvation. The expenditure was 1.7 lakhs, and the highest daily average of persons relieved was 13,934. Cattle to the number of 65,000 died. From 1875 to 1877 there was not a single good harvest, and though the scarcity hardly assumed the proportions of a famine the cattle suffered terribly. There was another grass famine in 1883-84. In 1896-97 the highest daily average relieved was 12,361, and the expenditure barely 2 lakhs. The areas affected were the Nardak tracts of Karnal and Kaithal, and the Naili tract of Kaithal. In 1899-1900 the Nardak in Karnal, and part of that in Kaithal were protected by the Nardak Branch of the Western Jamna Canal. The tracts affected were chiefly the Naili and Bangar tracts of the Kaithal tahsil, and parts of the Thanesar tahsil. The highest daily average relieved was 14,075, and the expenditure was 2.6 lakhs. On the whole the district itself may be classed as fairly secure thanks to the extensions of canal irrigation in the last quarter of a century. The worst tract is undoubtedly the Naili, and difficulty may arise there in times of drought. Otherwise the emigration of destitute persons is likely to be the chief cause for anxiety.