Chānga Mānga in Lahore District contains a plantation of 8,872 acres fully stocked with *shīsham* and mulberry, and there are smaller *shīsham* plantations at Shāhdara in the same District, and at Jullundur, Ludhiāna, and Jagādhri. Efforts have been made for many years past to increase the stock of *deodār* in the hill forests by artificial sowings and plantings, which have been to a certain extent successful. Plantations.

The wants of the people are fully provided for by the various forest settlements, which record their rights to timber, fuel, grazing, &c., in the Government forests; and in some places the inhabitants have the first option of taking grazing leases, and buying the grass from the adjoining forests. The relations of the department with the people are satisfactory, and offences against the forest laws are usually trivial and are becoming less numerous. Relations with the people.

Attempts are made to protect all the more valuable forests from fire. Fortunately the valuable *deodār* forests are but little exposed to this danger, but the *chīl* forests become highly inflammable in the hot season. The local population at first resented the restrictions imposed by fire conservancy, and many cases of wilful firing of forests used to occur; but such occurrences are now happily less frequent, and the people often give willing help in extinguishing fires in Government forests. Fire protection.

The financial results of the working of the department are shown below:— Financial results.

	1880–1 to 1889–90 (average).	1890–1 to 1899–1900. (average).	1900–1.	1903–4.
	Rs.	Rs.	Rs.	Rs.
Revenue . . .	7,74,362	10,06,412	12,60,234	16,51,077
Expenditure . .	5,49,045	7,08,100	8,35,299	9,55,918
Surplus . . .	2,25,317	2,98,312	4,24,935	6,95,159

Forest revenue is principally realized from the sale of *deodār* timber, which produces about 6 lakhs annually, sales of other timber amounting to only Rs. 60,000. The other chief items are sale of fuel (Rs. 4,60,000), and grazing and grass (Rs. 1,64,000).

The Punjab is not rich in minerals; and nearly all its mineral wealth is found in the hills, the only products of the alluvium being *kankar* or nodular limestone, saltpetre, carbonate of soda, and sal-ammoniac. Mines and minerals.

Saltpetre is found on the sites of used and disused habitations, generally associated with the chlorides of sodium, Saltpetre.

magnesium, or potassium, and the sulphates of sodium, potassium, or calcium. The initial process of manufacture, which consists in allowing water to percolate slowly through the nitrous earth, results in a solution not merely of nitre but of all the associated salts. The separation of the nitre from the rest is the work of the refiner. Refineries exist all over the Province and pay an annual licence fee of Rs. 50, while for the initial process the fee is Rs. 2. Saltpetre is exported to Europe, and is also largely used in India in the manufacture of fireworks and gunpowder for blasting. In 1903–4 there were 35 refineries in the Punjab. These produced 73,917 cwt. of refined saltpetre, the out-turn being nearly 41 per cent. of the crude substance. Impure salt (*sitta*) to the amount of 58,322 cwt. was also educed, the out-turn being over 32 per cent. of the saltpetre so utilized. Of this amount only 4,091 cwt. were excised at Rs. 1–5–9 per cwt. (R. 1 a maund), 54,496 cwt. being destroyed. Pure salt is not educed. An important saltpetre refinery exists at Okāra in Montgomery District.

Kankar. The only other important mineral product of the plains is *kankar*, or conglomerated nodules of limestone, used for metalling roads, which is found in most parts.

Carbonate of soda. Carbonate of soda (barilla) is made from the ashes of various wild plants, chiefly in the west and south-west of the Province.

Sal-ammoniac. Sal-ammoniac is manufactured in Karnāl, by burning bricks made of the clay found in ponds and heating the greyish substance which exudes from them in closed retorts.

Salt and gypsum. The most valuable mineral is rock-salt, which, with gypsum, forms immense beds in the Salt Range. It is worked in that range at KHEWRA and NŪRPUR in Jhelum District, at KĀLĀBĀGH in Miānwāli, and at WĀRCHA in Shāhpur. Salt is also manufactured at Sultānpur, in Gurgaon District, by evaporation of the saline subsoil water. Salt, dark in colour and containing a large proportion of earth and other impurities, is quarried at Drang and Guma in the State of Mandī. The total amount of salt made and sold in the Punjab rose from 79,295 tons in 1880–1 to 84,338 tons in 1890–1, 94,824 tons in 1900–1, and 105,163 tons in 1903–4. The average output of the Salt Range and Mandī mines in the six years 1898–1903 was 93,698 tons, of which 89,023 came from the Salt Range; the output of the Salt Range in 1904 was 99,192 tons. Large deposits of gypsum occur in Spiti and Kanāwār, but too inaccessible to be at present of any economic value.

Coal. Although the existence of coal at numerous points throughout the Salt Range had long been recognized, no attempts

were made to work it until recently, except at the large colliery near Dandot in Jhelum District. Within the last few years, however, prospecting licences have been taken out at Kālābāgh on the Indus in Miānwāli District, a few other places in Jhelum, and Sandral in Shāhpur; and great hopes are entertained that the coal will prove to be of a paying quality. The Dandot Mines have been worked since 1884 by the North-Western Railway. There is only one seam of coal, which outcrops at various points along the hill-side at a mean distance of 300 feet below the limestone scarp, which here rises 2,300 feet above sea-level. The seam averages 2 feet 9 inches in thickness, and is worked on the long-wall system, all the coal being taken out in one operation. The mines are entered by level or inclined tunnels from the hill-side, the longest stretching 900 yards under the hill. From the mouth of each tunnel the coal is conveyed on an inclined tramway to the edge of the hill, whence a funicular railway runs down the cliff to the North-Western terminus at Dandot. The coal is classed as a bituminous lignite, and, though low in fixed carbon, has a relatively high calorific value. About 1,500 men are employed on the mines, at a daily wage of 8 annas for a miner and $3\frac{1}{2}$ or $4\frac{1}{2}$ annas for a cooly. The workers are chiefly agriculturists, who leave the mines when their fields claim all their time, to return to them again when the crops need less attention. Very few can really be called miners. Makrānis were at one time imported from Karāchi, but the experiment was not a success. In 1891 the out-turn was 60,703 tons, in 1901 67,730, and in 1904 45,594 tons. In 1901 it was estimated that three million tons remained to be worked.

There are no gold-mines in the Punjab, but gold-washing is carried on at various places in the upper reaches of most of the rivers. The industry is not remunerative, a hard day's work producing gold to the value of only 2 or 4 annas[1]. The total recorded output in 1904 was 370 oz. Gold.

Iron is found in Kāngra District at several points along the Dhaola Dhār, in the form of crystals of magnetic oxide of iron imbedded in decomposed and friable mica schists. The supply is practically inexhaustible, and the quality of the ore is equal to the best Swedish iron. The remoteness of the tract, combined with difficulties of carriage and absence of fuel, have hitherto prevented smelting on a large scale. Besides iron, antimony ore is found. Iron mines are also worked at Kot Khai in Simla, and in the Hill States of Jubbal, Bashahr, Iron.

[1] *Punjab Products*, by Baden Powell, pp. 12, 13.

Mandī, and Suket. Sirmūr State possesses several iron mines, but they are not worked owing to their inaccessibility and the poor quality of the ore.

Other metals.

Copper was formerly smelted in considerable quantities in various parts of the Outer Himālayas in Kulū, where a killas-like rock persists along the whole range, and is known to be copper-bearing. Veins of galena and of copper pyrites occur in the Lower Himālayas, in Kulū, and in the Simla Hill States; and stibnite is found at Shigri in the valley of the Chandra river in Lāhul.

Slate.

There are quarries at Bākhli in the State of Mandī, near Kanhiāra in Kāngra District, and throughout Kulū, which turn out a good quality of slate. A quarry at Kund in the Rewāri *tahsīl* of Gurgaon is worked under European management, but the slate and flake are not of good quality.

Petroleum.

Petroleum springs occur in Attock District, and in the hills to the south-east, but the average recorded output during the six years (1898–1903) was only 1,674 gallons. In 1904 the output was 1,658 gallons.

Alum.

Near Kālābāgh in Miānwāli District, on the Indus, considerable quantities of a pyritous shale are extracted for the production of alum, but the mining is carried on in an irregular and fitful way. The output was estimated in 1898 to amount to 750 tons, and to only 129 tons in 1904.

Arts and manufactures.

Cotton.

Cotton-spinning is the great domestic industry of the Province, coarse cotton cloth being woven by hand in nearly every village. In 1901 the number of persons returned as supported by cotton-weaving in British territory was 778,947, of whom 322,944 were actual workers and 456,003 dependents. The coarse country cloth is strongly woven and wears well, and is not likely to be entirely displaced by the machine-made article for some time to come. Finer qualities are also manufactured, but these include only longcloths and damasks, white or coloured, with woven patterns. Muslin (*tanzeb*) is made in small quantities at Delhi and Rohtak. The longcloths, when checked and of thick material, are called *khes*, and when striped are termed *sūsī*, the latter being made of machine-spun yarn with sometimes a few silk threads in the warp. The *lungī* or *pagrī* is a long narrow strip of cloth worn by men round the head as a turban or as a band round the waist. Beautiful *khes* are made in the South-West and Central Punjab. The *gabrūns* of Ludhiāna closely resemble similar goods made in Europe, and its *lungīs*, imitations of those made in Peshāwar, are famous. The *lungīs* of Shāhpur and