

## CHAPTER IX

### THE RANIGANJ COAL FIELD

#### EARLY DISCOVERIES

THE first Englishman to discover the existence of coal in Bengal was probably Mr. Suetonius Grant Heatly who, in 1774, was the Collector of Chota Nagpur and Palamau. In that year he and a Mr. John Sumner obtained from Warren Hastings a license empowering them to work coal mines in "Pachete and Birbhum." A Mr. Redferne subsequently joined the firm which as Summer, Heatly and Redferne applied for and obtained the exclusive right, for a period of 18 years, to work and sell coal in Bengal and its dependencies. In addition to paying a Government royalty of one-fifth of the value of all the coal raised by them, they also agreed to supply Government with ten thousand maunds of coal a year for a period of five years. Under this agreement the firm in 1775 announced the arrival of 2,500 maunds or  $19\frac{1}{2}$  tons of Panchet coal, and asked that it should be taken over. This appears to be the first occasion on which Bengal coal in any large quantity was brought into the market. The coal however was not taken over until 1777 when upon a second application from the firm the Commissary of Stores was directed to examine and report upon it.

In 1777 about the same time Farquhar and Motte asked permission "to bore cannon and to cast shot and shell in the district of Jherria, lying between the rivers Dammuda and Barakar." They gave as their reason for the selection of that locality that it "abounds in iron ore and is contiguous to the coal mine of Messrs. Sumner and Heatly." Unfortunately the coal Heatly produced was reported as being much inferior to that of England. In fact the Commissary of Stores, as the result of a series of

experiments, came to the conclusion that it was only half as good as English coal and it was returned to the firm. This circumstance, together with the indifference of Lord Cornwallis to measures calculated to develop the internal resources or promote the external commerce of India, led to the neglect and apathy that characterised the first few years of coal mining in India. Mr. Heatly was afterwards transferred and it is doubtful whether any more of the coal was actually brought into the market. The mines first worked by him are said to have been six in number, three of which were at Aituria, Chinakuri, and Damulia, and the others further west near the Barakar. In his *Wild Sports in the East* (1808), Williamson alludes to Indian coal, but says that the Company "finds it easier to send coal from England, as ballast, to their arsenals abroad where quantities are occasionally used in fusing metals for casting ordnances." But none of the early European travellers in India make any mention of coal, prior to the first decade of the 19th century. This is abundantly exemplified by the silence of Milburn (*Or. Comm.*, 1813) and of Macpherson (*Hist. Europ. Comm. Ind.*, 1812), two authors who ever certain to have had chapters on Indian coal and India's requirements in coal had these been questions of public importance at the time in which they wrote.

In 1808 the Indian Directors of the East India Company actually complained of the heavy charges involved by the indents for coal made by their Indian representatives, and they accordingly recommended an enquiry whether charcoal could not be substituted; and if not, they further recommended the transference of the ordnance works to England. The Earl of Minto, who was at the time Governor-General of India, directed that Indian coal should be submitted to actual tests by the military authorities in India, and further experiments were accordingly made by Colonel Hardwicke. His report however, was again very unfavourable, and the subject of coal for a time dropped out of notice. But in 1814 the Marquis of Hastings once more urged on the Military Board the desirability of ascertaining beyond doubt "whether the coal of India was of a quality calculated

for the purpose of the forge." He also announced that a fully qualified person would be appointed to examine the mines, who would be furnished with the necessary apparatus to make borings and who would, for experimental purposes, procure a supply of coal from such a depth as to ensure that it would represent the average quality. Previous experiments were thus discredited owing to the coal used having been obtained from the surface and therefore much deteriorated.

By this time apparently coal was being regularly conveyed by boat down the Damodar river to Calcutta, and we hear of a Calcutta merchant having commenced to use Bengal coal notwithstanding the unfavourable reports published by the Military Board.<sup>1</sup>

The expert deputed by Government was a Mr. Rupert Jones who was sent from England on purpose to examine the Bengal coal fields, and his report (written in 1815) will be found in the *Asiatic Researches* (1833, XVIII). Mr. Jones rediscovered Mr. Heatly's workings and also found the seam at Raniganj which later in 1815 or 1816 he began to work on his own account. His report was on the whole favourable, and showed that Bengal coal might very well be used for many of the purposes for which English coal was being imported. But he did not himself realise the full value of his investigations. He foretold increased prosperity to Calcutta, through the coal he had discovered being a better and more economical fuel for burning the Sylhet limestone than the firewood then in use, but apparently he knew little of the great revolution steam was destined to effect, not of the imperative necessity of an abundant and cheap supply of coal for commercial and industrial prosperity.

#### FIRST INDIAN COMPANY

Mr. Jones received an advance from Government of Rs. 40,000, on easy terms, to enable him to work the seam

1. *The Commercial Products of India* : Sir George Watt, John Murray, London, 1908.

discovered at Raniganj, but in 1820 he came utterly to grief. Failing in other undertakings he was unable to repay the loan and his securities, Messrs. Alexander and Company, an agency house, were required to make it good. They accordingly paid the demand and in return took over the leases of the ground on which the mine was situated and became the owners of the colliery. This the Raniganj mine, the first regularly constituted Indian mine under European supervision and capital in Bengal, was opened in 1820.

#### FORMATION OF THE BENGAL COAL COMPANY

Other mines under European management were opened in quick succession. In 1823 the Chinakuri colliery was started by Mr. Betts on the site of Mr. Heatly's old workings. In 1824 Messrs. Jessop and Company opened the Damulia mine, and in 1830 Mr. Homfray of that firm opened the Chanch and Nuchibad mines. In 1835 Messrs. Alexander and Company failed and the Raniganj mine with all the land and buildings passed into the hands of Babu Dwarkanath Tagore. The mine was then worked by the firm of Carr, Tagore and Company who in 1837 purchased the Chinakuri mine. In the same year Narayankuri, Chanch, and Nuchibad passed into the hands of Messrs. Gilmore, Homfray and Company, and in 1843 the concerns of Carr, Tagore and Company and of Gilmore, Homfray and Company were amalgamated into the Bengal Coal Company, which has retained the property ever since and which still owns many of the most extensive collieries in the Raniganj field.

#### SUBSEQUENT DEVELOPMENT

In 1839 the output was 36,000 tons, and by 1846 this had risen to 91,000 tons. Still little progress was made till the construction of the East Indian Railway in 1854 tapped the coal-fields. But even then the progress was but slow until the jute mills and factories of Calcutta created a demand for the coal. In 1857-58 which was apparently the first year of especially recorded production, 293,000 tons were taken

from the Indian mines and 92,000 tons imported. From that date the prosperity of the Bengal coal-field was assured. The demand for the coal which has aptly been termed "the direct expression of a rapidly expanding modern commerce" has increased by leaps and bounds. In 1868 the output was 459,000 tons ; in 1878, 925,000 tons ; in 1898, 4,608,000 tons ; in 1904, 8,348,000 tons ; in 1906, 9,783,000 tons ; and in 1908, 12,149,000 tons, of which amount the Bengal mines supplied 11,559,000 or 95.15 per cent. In 1885 there were 95 mines, of which 90 were in Bengal ; in 1900 there were 286 in operation, of which 271 were in Bengal ; in 1906 there were 307 of which 274 were in Bengal ; and in 1908 there were 583 of which 529 were in Bengal. The greatest development has taken place in the Raniganj and Jherria fields, where the collieries are only 120 to 160 miles from Calcutta. For 1902 the output for the Raniganj field totalled over three million tons from 155 mines employing 41,000 persons daily and by 1906 this had risen to 3,650,000 tons. The total output of coal from the mines in the district in 1909 was 3,414,000 tons and the number of work people employed in the industry was 51,000.<sup>1</sup>

The railways consume one-third of the total output of Indian coal ; and as Calcutta is the only important distributing port, the state of the Calcutta market is a true index to the state of the Indian coal trade. It can now be affirmed that India is rapidly approaching the state of being able to meet all her own wants for fuel. The imports of foreign coal into Calcutta were 70,000 tons in 1880, but by 1901 had dwindled down to 2,000 tons. The exports to foreign parts amounted to 8 tons in 1880, 26,000 tons in 1890, a quarter of a million in 1897, and more than half a million in 1901. English coal still competes with Indian coal at Bombay ; for, although Indian coal can be bought in Calcutta for Rs. 7 per ton, the steamer freight and other charges raise its price to Rs. 15 at Bombay, and English coal of better quality can be bought for Rs. 17 per ton. Indian coal reaches Suez on

1. (Report of the Chief Inspector of Mines for 1908.)

the west and Singapore on the east, where it competes with Japanese coal. The imports into India generally have been shrinking steadily for years and in 1903-04 were one-fourth of the quantity taken nine years previously. And of these imports Bombay—a province remote from the Indian mines—consumes by far the major portion, viz., 148,311 tons out of the total of 179,935 tons in 1905-06. England, Australia and Japan are the supplying countries. But a new trade has arisen, namely in coal exported to Indian Ocean ports—a traffic that it would seem is instantly stimulated and permanently strengthened by the strikes and other accidental causes which in Europe and Japan tend to raise the price of coal. A vivid conception of the present magnitude and importance of the Indian coal industry may be had from the circumstance that in 1908 the output came to over 12 million tons, while the outputs of both Canada and Australia were each under 9 million tons. But a still more significant fact may be added in conclusion, namely that Indian coal is the cheapest in the world.

### THE RANIGANJ FIELD

The average pitmouth price was in 1902, Rs. 2-12 (3s. 8d.) and in 1906, Rs. 2-15 (3s. 11d.) per ton, while in the United States the corresponding average price was 5s. 8½d., in Australia 7s. 9d., in the United Kingdom 8s. 2¾d., in Germany 8s. 10¼d. in Canada 9s. 3d., and in New Zealand 10s.¹

The most valuable of the coal fields in Bengal are patches of Gondwana strata faulted into the Archaean schists and gneisses, and arranged as a band roughly east to west along the valley of the Damodar river. The eastern most of these fields, known as the Raniganj field, being the nearest to Calcutta, and consequently the earliest to be connected by railway with the chief market for coal, was the first to be opened up, and is still the chief producer. Coal was worked in this field more than a century ago, but its output

1. The Commercial Products of India: Sir George Watt, John Murray, London 1908.

merely supplied local requirements until the East Indian Railway entered the field in 1854. The Gondwana system is represented in the Raniganj field by beds ranging from the Talcher series to the Panchets, the strata being so disposed, with a general southerly dip, that the oldest rocks are found resting on the Archaean gneisses on the northern boundary of the field, while the younger series follow in order as bands, with outcrops tending roughly east and west until in the south the Panchets are found as irregularly shaped outliers. The coal is confined to the Damodar series, which in this field is divided into :

	Ft.
1. Barakar stage	... 2,000
2. Iron-stone shales about	... 1,400
3. Raniganj stage about	... 5,000

### COMPOSITION OF RANIGANJ AND BARAKAR COALS

Coal seams occur in the Barakar and Raniganj stages, and in this field about 69 per cent. of the total output is obtained from the younger or Raniganj seams. The formation lying between is worked for its clay iron-stone nodules, which are used in the blast furnaces at the Barakar iron-works. Coal from the older Barakar seams differs from that raised from the Raniganj stage in containing a smaller percentage of moisture and volatile hydrocarbons, with a larger proportion of fixed carbon. The distinction is specially constant in regard to the included moisture. Barakar coals yield very nearly 1 per cent. of moisture, while the average amount in a series of assays of samples from the lower seams of the Raniganj stage is 3.81, and from the upper seam of the stage 6.86 per cent.

### METHODS OF WORKING

The seams vary up to 95 feet in thickness, and the portions worked vary from 2 feet 6 inches to 45 feet thick. The systems of work differ, though all are of the pillar and stall type. As a rule a quarry is commenced at the outcrop; and as it pays to remove a large overburden from thick seams,

a number of huge open excavations have been formed. When the cover overlying a seam is too thick to be economically removed, or when the seam is thin, galleries from 8 to 12 feet wide are driven both on the dip and along the strike of the seam leaving pillars of coal, which vary according to the caprice of the manager of the colliery, from 12 to 40 and occasionally 100 feet square, the larger pillars being left in the case of thick seams or thick cover. A system which provides for 12 feet galleries and 12 feet pillars yields at once three-fourths of the coal but the remaining one-fourth, which is left in pillars, can seldom be won. A system, allowing 12 feet galleries and 60 feet pillars, yields 30 per cent. of coal in the first working and 70 per cent. is left in pillars, but unless the seam be more than 20 feet thick a large proportion of this 70 per cent. can be obtained in the second working ("pillar working" or "broken working"). Pillar working is mainly attempted in European-managed mines. There is always danger of a fire breaking out in large areas of pillars.

In driving galleries it is usual to start in the top of the seam with a height of 6 feet, and after this drive has advanced some distance, to deepen it to the full height of the seam by cutting out the remainder of the coal in successive steps. At a few mines the galleries are commenced in the lower portion of the seam, and are heightened by dropping the coal left above. In the East Indian Railway collieries in the Giridih coal-field a whole "side of work" is extracted by a combination of the pillar and long wall methods. The lower portion of the seam is cut up into pillars 6 feet in height, and the latter are thinned down till they are only just able to carry the weight of the overlying coal. These thinned pillars are then blown down by dynamite, and the top coal (17 feet thick), which comes away readily from a strong sandstone roof, falls on the floor. When a large area of coal has been extracted, a fib of coal is left against the worked out portion of goaf, and a new set of workings formed from the goaf.

The systems of raising the coal to the surface vary from the primitive method of manual labour (i.e., in baskets

carried on the heads of coolie women) to hauling-sets of five or ten tubs on inclines provided with rails set to gauges varying from 1 foot 9 inches to 2 feet, or winding out of well-fitted shaft up to 640 feet in depth by direct acting engines. At one colliery double-decked cages with four tubs have been introduced. All three methods are in vogue in the chief coal fields.

### LABOUR

A large number of the colliers are aboriginals, Santals, Mundas, Oraons or Kols, and the rest are semi-Hinduized low castes among whom communities of Bauris, who are nominally *pulki* bearers and cultivators, have been cutting coal for so many generations that they now regard it as the special function of their caste. The average output of coal per labourer is very low and in 1908 was only 101 tons as compared with 290 tons in the United Kingdom and 596 in the United States. "Handling a miner's tools is more a matter of skill than is generally supposed, and at present the Indian coal miner is a raw recruit and clumsy with his weapons."<sup>1</sup>

The underground work is performed at a fixed price per tub of coal by families or gangs of men, women and children, who choose their own hours of labour. The men cut the coal and the women and children carry and load it into tubs. As a rule they also push the tubs to the shaft or incline, but at one colliery 110 horses and ponies are employed to "lead" the coal underground. A man can cut about  $2\frac{1}{2}$  tubs ( $1\frac{1}{4}$  tons) of coal per day of eight hours, but he seldom works more than five days in the week, and strictly observes Pujas (religious festivals), while during the marriage season no work is done. "Apparently the Indian miner has not yet reached that stage of ambition when he wishes to increase his earnings. As by filling one tub per day he can obtain quite sufficient to meet all his needs it does not dawn upon him that by filling three he might be steadily placing himself beyond the risk of want." The coal

1. (Report of the Chief Inspector of Mines for 1905.)



cutters in Bengal can earn from 8 to 12 annas a day for underground work, while unskilled labourers on the surface earn only four to five annas a day. Women may earn from 1 to 2 annas and as a result of this high total income of a family there is a general rise of labour rates around all mining centres. Electric lighting, electric blasting, and electric coal cutting are now being introduced into some of the Bengal mines. In a very few mines safety lamps are used, but in the great majority no appreciable quantities of fire damp are found. Accidents are also rare. There has been not only a very low death-rate from isolated accidents in Indian coal mines but also a general absence of those disasters which led in Europe to special legislation for the protection of the miners. During 1908, however, there was a serious falling off in this respect and the death-rate per 1,000 persons employed was 1.37 as compared with .86 in the preceeding year. In his report the Chief Inspector of Mines writes : "The desire to increase raisings, the frequent attempts to get easy coal regardless of safe conditions, particularly trespassing to rob pillars, the casual way in which work-people wander about the haulage roads in Bengal mines, and the large amount of untrained labour is responsible for much of the increase."

### INSPECTION

For purposes of inspection the district of Burdwan together with the adjoining district of Bankura is included in inspection circles Nos. 2 and 3. Circle No. 2 also includes all mines in the district of Manbhum east of Adra and Gobindpur and all mines in the district of Manbhum east of Adra and Gobindpur and all mines in the district of Hazaribagh : it also includes all mines in Baluchistan, the United Provinces, the Punjab, and Ajmer Merwara. Circle No. 3 includes the Santal Parganas, Birbhum, Bombay, the Central Provinces and Madras.

(Authorities.—The Commercial Products of India, Sir George Watt : John Murray, London, 1908. Statistical Account of Burdwan, Sir William Hunter. The Imperial Gazetteer of India, Vol. III. Report of the Chief Inspector of Mines for 1908.)