HISTORY OF COAL MINING IN INDIA.

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India, in so far as the interests of those directly connected with her coal industry are concerned, is perhaps fortunate in being relatively free from the more complex problems of the world coal trade such as have existed and continue to exist in the European zone. Being more or less a self-supporter in the matter of coal and, as a result of her location geographically, being in a position to resist any large invasion of her internal markets by imports from foreign countries, her coal industry has been allowed to develop steadily hand-in-hand with her general industrial expansion. Whether this has been entirely to the country's advantage, and to the advantage of her coal industry in particular, is debatable, but this does not concern us at the moment.

The coal-mining industry of India is a relatively recent development as compared with that of many European countries. The first published reference to the mining of coal in India dates back to the year 1774, during the time of Warren Hastings, when permission to work coal mines in Bengal was accorded to John Sumner and Suetonius Grant Heatly. As a result, mines, doubtless as open or incline workings, were reported to have been developed in the Raniganj field; at Aitura (Ethora) possibly in the Dishergarh seam, at Chinakuri near the Damodar river, doubtless in one of the middle Raniganj seams; and at Damulia, also near the Damodar, apparently in the Nega-Raniganj seam. At least several thousand maunds[1] of coal were raised, of which some 2,500 maunds were delivered to Government in 1775. The latter reported it to be of poor quality. As a result of various vicissitudes, this original adventure apparently ended in failure.

No further attempt was made to exploit coal in India for nearly 40 years, until 1814, when mining was commenced near Egara (Raniganj). Although this effort was again temporarily unsuccessful, sufficient interest was aroused to encourage further exploration and between 1820 and 1825 a number of mines were opened. Most of these were situated at no great distance from the Damodar river and exploited the seams of the Raniganj coal measures, particularly between Sitarampur and Chinakuri and near Raniganj. Quarrying was also carried out in the upper Barakar seams near Chanch, to the west of the Barakar river.

The first systematic geological survey of the field was made during 1845-46 by Mr. D. H. Williams who was appointed Geological Surveyor to the East India Company, and a more detailed examination on the one-inch to one-mile scale by Dr. W. T. Blanford during 1858–60 added greatly to our knowledge of the coalfield. By that time, some 50 collieries were already in existence

[1] One maund = 82 pounds (approx.).

and during that period (1858–60) there was an annual average production of some 282,000 tons.

In those early days, much of this coal was shipped to Calcutta in country boats which plied down the Damodar. Since certain stretches of that river were navigable only during periods of high water, the journey was somewhat precarious and often took several months, whilst in many cases the boats were lost.

One can, therefore, well imagine the encouragement given to the industry by the opening of the East Indian Railway from Calcutta to Raniganj early in 1855 and by its extension, during the next 10 years, westwards to Barakar and north-westwards *via* Sitarampur to link up with the system that was being developed over parts of the Gangetic plain.

By 1868, the following five principal companies were engaged in winning coal in the Raniganj field and together they produced about 88 per cent of the total output of some 492,700 tons:—Beerbhoom Coal Co., Ltd.; Bengal Coal Co., Ltd.; East Indian Coal Co., Ltd.; Equitable Coal Co., Ltd.; and Gobind Pundit, Siresol (Siarsol).

The detailed history of the development of mining in the field is, however, by no means a happy one and is typical of what happened elsewhere in India. Government had not claimed the rights to the mineral wealth of the area and, therefore, would-be producers had to establish agreements on a royalty basis with the local land-owners. Anyone acquainted with the question of the ownership of land in this country will realise only too well the complexities involved, and it is not surprising to find that many enterprises failed as a result of the expensive legal disputes which incessantly arose.

During the earliest stages of coal mining in India, a certain number of miners had been brought from England. These were, however, soon replaced by local labour working under European supervision.

During the early stages of progress, exploitation was mainly from inclines and quarries but, as the years advanced, the number of pits of a depth of several hundred feet naturally increased, and with the extension of branch railway lines across the field, other areas were opened up.

For the first century following the commencement of coal mining in India, the Raniganj field was the only, or at least the most important, producer. But towards the end of the 19th century, the large reserves of good quality coal of the Barakar measures in the Jharia field became increasingly realised. That area had been geologically examined by Mr. T. W. H. Hughes of the Geological Survey of India in 1865, but mining development was not seriously taken up for a number of years.

The 'rise' of the Jharia field has been dealt with by Dr. Fox in a paper submitted to the Mining and Geological Institute of India in 1929 [see *Trans. Min. Geol. Inst. Ind.*, Vol. XXIV, pp. 97–105, (1929)] and, as he points out, 'the whole future of the field in those days depended on railway communication'. Following an examination of the area in 1890, by Mr. T. H. Ward,

Mining Engineer, East Indian Railway Company, the Grand Chord line was extended *via* Dhanbad to Katrasgarh by 1894 and during the following year the branch line to Patherdih was opened. As a result, during the next decade, mining developed rapidly in Jharia and the output for 1906 exceeded the figure of 3,650,563 tons of the Raniganj field, and from that time to the present day Jharia has easily remained the principal producing field of India.

Meanwhile, the relatively small, though important, Giridih or Karharbari field lying north of Jharia and some 23 miles west of the East Indian Railway main line had been receiving attention and mining had actually commenced as early as 1857. With the establishment of railway connection with the main line in 1871, the output of the good quality coking coal of this field increased rapidly, the East Indian Railway Company having the largest interest, a small production being derived from Bengal Coal Company mines. By 1890, the total tonnage from the field had exceeded the ½-million mark and during the early years of the present century some ¾ million tons of coal were produced annually.

Other coalfields in Bengal and Bihar, which were exploited during the latter half of the 19th century, included a small output totalling some 7,200 tons from the crushed Barakar measures of the Daling area in the outer Himalayas of the Darjeeling district, Bengal, between 1896 and 1900, and on a somewhat larger scale in the Rajmahal and Daltonganj areas of Bihar.

Regarding these Bihar fields, coal was apparently mined at Rajhara in the Daltonganj coalfield as far back as 1842 and continued intermittently in a small way until 1931. In 1901, railway communication was established with the East Indian Railway main line *via* the Son Valley, prior to which date the coal had been despatched in boats down the North Koel river. With the construction of the railway, the output increased in the early years of the present century to some 70 to 80 thousand tons annually.

From the Rajmahal hills, an output of about 8,000 tons is recorded for as far back as the year 1858, and of some 28,000 tons and 45,600 tons respectively during the following two years. After that, the output fell rapidly and ceased in 1863 for about a quarter of a century. From 1890 onwards, small tonnages are recorded.

The coal-bearing areas of central and southern India had been surveyed and reported on by the Geological Survey of India, principally by Hughes, William King and E. J. Jones, between 1860 and 1880 and, with the development of railways, attention was naturally paid to the possibilities of mining coal. In Central India, mining was commenced at Umaria in Rewah State in 1884 and a small production was raised from the Johilla field between 1898 and 1902. With railway facilities, the Umaria output expanded to nearly 200,000 tons in 1903.

In the Central Provinces, the earliest development of coal mining was, apparently, at Mohpani where a colliery was opened in 1862 by the Narbada Coal and Iron Co., Ltd. With the construction of a railway connection about

1870, the output appreciably increased to some 40,000 tons in 1900. The collieries were purchased by the Great Indian Peninsula Railway Company in 1904.

Further south at Warora, production commenced in 1874 and rose to a maximum of 153,336 tons in 1902. In 1906, the mines were abandoned as a result of underground fires.

In Hyderabad State, the Singareni field was discovered by Dr. William King in 1872, and the first raising took place some 15 years later. Steady progress was made during the remainder of the century so that an output of 469,291 tons was reached by 1900.

In north-eastern India, following earlier mining operations on a small scale, extensive developments took place in the Namdang and Ledo areas in Assam from 1881 onwards when a mining concession was obtained by the Assam Railways and Trading Company. Communication with the Assam-Bengal railway was soon established and during the following 25 years the output of these Tertiary seams rose steadily to a quarter of a million tons annually.

In the north-west, near Quetta, the mining of the relatively thin Tertiary seams was taken up on a small scale during the final decade of the last century, and was continued by the North-Western Railway Company for a number of years. In the Punjab Salt Range, at Baghanwala, the working of a Tertiary seam, up to a few feet in thickness, was commenced by the same Company in 1893 and a maximum output of some 13,000 tons was raised in 1897. On account of the poor quality of the coal, the mines were closed down in 1899-1900. Other mines had previously been started (in 1884) in the adjoining Dandot area by this Company and a maximum production of 81,218 tons was raised in 1899. Since then the production declined and the collieries were handed over to contractors about 1911.

In the year 1900, the total production of these Punjab mines was only 74,083 tons.

At Palana, near Bikanir in Rajputana, the mining of Tertiary lignites commenced on a small scale in 1898 and production rose to some 45,078 tons in 1904 since when it has declined.

At the beginning of the present century the coal production of India had reached a total of about 6·1 million tons of which nearly 5 million tons were obtained from the Raniganj, Jharia and Giridih fields. Blast furnaces had been in existence at Kulti in the Raniganj field for a number of years.

Continued progress was made in Indian coal mining during the following pre-War period, a total output of nearly 16·5 million tons being produced in 1914, including about 9·15 million tons from Jharia and nearly 5 millions from the Raniganj field.

During this pre-War period, the Bokaro (1908), Rampur (Ib River) (1913) fields in the north-east were opened up. In the Central Provinces the Pench Valley (and Kanhan) fields commenced production in 1903 when the branch

line running from Chhindwara was opened, and production rose to 95,679 tons in 1914. Still further south the Ballalpur field in Berar, also opened in 1903, increased its annual production to about 90,000 tons during the same period.

Regarding the Tertiary fields, the production of Assam had risen from 216,736 to 305,160 tons during the same pre-War period, whilst in north-western India, including Rajputana, Kashmir, Punjab and Baluchistan, the total had risen from about 106,600 to a little less than 120,000 tons. In the Trans-Indus Range of the Mianwali district, at Makarwal, small incline-workings were commenced in 1903 in the outcropping Eocene seam, but production was limited to a maximum of some 2,500 tons annually.

During the War and in the year following, the demand for coal was naturally acute and a number of new collieries were opened up to meet the increased internal demand. The total production rose to 22·6 million tons in 1919. The demand for coking coals was, about this time, appreciably enhanced by the construction of the iron and steel works at Tatanagar immediately preceding the War and the blast furnaces at Hirapur during 1922.

During or immediately following this wave of increased prosperity a number of new fields were opened up including Jainti (1915) and Ramgarh (1920) in Bihar, Sohagpur (1921) in Central India, Ghugus (1920) and Shahpur (1921) in the Central Provinces and Sasti (1920) in Hyderabad State, whilst in northern India the output of Makarwal coal improved appreciably. Prospecting work was being carried out in the Karanpura fields in Bihar and the Talchir field in Orissa, and production commenced during the 1923-24 period.

The acute variations in the economic thermometer during the subsequent 15 years have, in India, as in the world as a whole, been reflected in the coal-mining industry of this country.

The marked trade depression of the 1920-21 period badly hit the coal-mining industry and a number of mines, particularly those exploiting inferior grade seams, were forced to close down, though during that period the deepest shafts of Indian coal mining—of a depth of 1,480 feet to the Dishergarh seam at Parbeliya—were completed. During the year 1920, production fell to below 18 million tons and although it improved gradually during the following decade, yet prices continued to fall to a low level. Conditions during the 1921 to 1923 period were further adversely affected by an adverse foreign trade balance in coal amounting to some 1,143,500 tons in 1922. At Mohpani, in the Central Provinces, production ceased in 1926. Another trade depression during the early part of the present decade, with still lower prices prevailing, further restricted enterprise, and resulted in the closing down of mining activities in certain of the smaller fields including the Rajmahal area, Hutar and Daltonganj.

Subsequent to 1933 an increased internal demand and a rapid rise of the foreign trade balance in India's favour, to a total of 808,460 tons in 1937, together with a decided improvement in the prices attainable at the pit's mouth

since 1936, have brought more prosperous conditions to the coal-mining industry of India and the total output for 1938 reached the record of 28·3 million tons.

Largely on account of the fact that the majority of the seams worked in India are relatively thick, rarely less than 5 feet except in the case of certain of the Tertiary seams of north-western India, the pillar and stall method of working has been almost wholly in vogue. In the case of the very thick coal seams, quarrying has of course been adopted at the outcrop.

As has been stressed in recent years by a number of writers, the fact that at least in the two major fields the mineral rights of the very numerous surface land-owners have not been questioned, has often resulted in the working of certain of the most valuable seams from a very large number of small isolated mines in contrast to larger and more economically run collieries. It is admitted that in a number of instances this has led to relatively inefficient methods of exploitation and to a much greater wastage in barriers separating the various concessions than would otherwise have been the case.

Also, during the process of mining—until recent years—only in a very few cases was attention given to stowing. Large reserves of coal were therefore left in pillars and as a result of subsequent fires originating from spontaneous combustion, a considerable proportion of this coal has been irretrievably lost. It is unnecessary for me to go into this question in detail; the subject has been brought to our notice repeatedly in recent years and you are all aware of the relevant literature that has been published. Suffice it to say, that there appears to be good prospects of a marked increase in stowing in the not distant future.

Since the War, machine-mining has increased appreciably in India, but a very large proportion of the output is still won by hand.

One cannot conclude a discussion of the history of coal mining in India without a reference to the associated bodies—the Department of Mines and the Mines Board of Health. The former was established in 1893 with its head-quarters at Dhanbad. A Circle headquarters exists in the Raniganj field.

In a discussion on this subject, it is, I think, relevant to compare briefly the condition of the coal-mining industry in this country with that of the larger producing countries of the world. Particularly in the case of western Europe, we have seen that severe internal and international competition has forced the industry to adopt measures of regulation and amalgamation that have led to greater efficiency and economy in the methods of exploitation, whilst the necessity of reaching agreement on the question of minimum prices and quotas has been increasingly realised. Though the difficulties impeding the adoption of similar measures in India are undoubtedly great yet they cannot be regarded as insuperable and it is to be hoped that, in the interests of the industry, a solution of these problems will be found in the near future.