INDIA'S COAL RESERVES.[1]

By M. S. KRISHNAN, *M.A., Ph.D., F.N.I., Geological Survey of India.*

INTRODUCTION.

When the Coalfields Committee reported in 1920, it was keenly felt that the country should be in possession of facts regarding her resources in coal, though a rough idea was available at that time, as will be seen from the report on the Coal Resources of the World issued by the XIIth International Geological Congress of 1913 (Toronto session). This question was taken up by the Geological Survey of India, which constituted a party working under the direction of Dr. C. S. Fox. The greater part of the work was done by 1930 and the results published in a series of memoirs—one dealing with the Jharia field[2] by Dr. Fox, a second on the Raniganj field[3] by Mr. E. R. Gee and a third on the Gondwana fields[4] by Dr. Fox. A fourth memoir on the Tertiary coalfields is now understood to be nearing completion. The available data were presented, four years ago, by Sir L. L. Fermor, in a paper entitled 'India's coal resources'.[5] Since then no new data have come to hand though the Coal Mining Committee of 1936-37 had occasion to review this question in its report.[6]

Total and Workable Reserves.

The total coal reserves of all the Gondwana areas, to a depth of 1,000 ft., have been calculated as 60,000 million long tons, as shown in column 1 of Table I. This would include all coal, good and bad, and all seams down to a foot in thickness. These quantities become considerably reduced if only workable seams are taken into account, *i.e.* those having a thickness of 4 ft. or more and containing not more than 25 per cent ash on the moisture-free basis. The results are given in column 2 of the same Table.

---

[1] Published by permission of the Director, Geological Survey of India.

[2] Fox, C. S.—The Jharia Coalfield, *Mem. Geol. Surv. Ind.*, LVI (1930).

[3] Gee, E. R.—The Geology and Coal Resources of the Raniganj Coalfield, *op. cit.*, LXI (1932).

[4] Fox, C. S.—The Lower Gondwana Coalfields of India, *op. cit.*, LIX (1935).

[5] Fermor, L. L.—India's Coal Resources. *Bull. Indian Indus. and Labour*, No. 54; *Rec. Geol. Surv. Ind.*, LXIX, pp. 336–352 (1935).

[6] Report of the Coal Mining Committee, Chapter VI, (1937).

TABLE 1.

Total and workable reserves.

Coal-bearing area.	Million tons.	
	1	2
Darjeeling foothills and E. Himalaya	150	20
Giridih, Deogarh and Rajmahal Hills	350	130
Raniganj, Jharia, Bokaro and Karanpura	25,000	10,000
Son valley—Auranga to Umaria-Sohagpur	10,000	2,000
Chhattisgarh and Mahanadi valley	5,000	1,200
Mohpani to Kanhan and Pench valleys	1,500	250
Wardha-Godavari valley	18,000	6,400
TOTAL ..	60,000	20,000

Coal of good quality.

Coal containing not more than 16 per cent ash on a moisture-free basis and occurring in seams 4 ft. and over in thickness within a depth of 2,000 ft. from the surface, will come under this category. The estimates of such coal, according to Dr. Fox, are:—

TABLE 2.

Good quality coal.

Area.	Million tons.
Giridih and Jainti	40
Raniganj	1,800
Jharia	1,250
Bokaro	800
Karanpura (North and South)	750
Hutar, Johilla, Burhar	50
Kurasia, Jhilmili, etc.	30
Talcher to Korba	200
Kanhan-Pench valleys	30
Ballarpur-Singareni	50
TOTAL ..	5,000

Of this amount, 3,500 million tons occur within a depth of 1,000 ft., and the rest between 1,000 and 2,000 ft. Sir Lewis Fermor has modified the figures for Bokaro and Karanpura and as a result gives a smaller total of 4,500 tons.

It may be remarked, in passing, that some of the coalfields—*e.g.* those of Bengal, Bihar, Pench valley and Talcher—are being exploited intensively, and our knowledge of these is therefore more detailed and reliable than that of other fields. Should it be possible to explore the less known fields fully by detailed geological mapping and by bore-holes, it is quite likely that the figures given above will be modified to an appreciable extent. This applies particularly to the Wardha-Godavari valley and to the Satpura area. Dr. Fox has summarised the available knowledge on the various areas in his memoir

on the Lower Gondwana Coalfields and indicated where the data are meagre and where they are sufficiently satisfactory. In any case, the estimates are well on the conservative side and any extension of our knowledge is almost certain to bring to light more reserves.

Reserves of Coking Coal.

A question which has been agitating the people interested in the metallurgical industries is that concerning the reserves of coking coal in India. So far as our knowledge goes, coking coal of Lower Gondwana age is more or less confined to the Bengal and Bihar fields, especially Jharia, Raniganj, Giridih and Bokaro. In Table 3 are given Dr. Fox's estimates of good quality coking coal to a depth of 2,000 ft. and Sir L. Fermor's modification thereof.

TABLE 3.

Reserves of Coking Coal.

Field.	Reserves (Million tons).			
	(Fox)	(Fermor)	(*a*)	(*b*)
Raniganj	250	241	(73 +	168)
Jharia	900	900	(737 +	163)
Giridih	30	38	(38 +	0)
Bokaro	320	515	(270 +	245)
TOTAL ..	1,500	1,694		

(*a*) Down to 1,000 ft. depth. (*b*) 1,000–2,000 ft. depth.

On the basis of information supplied by Dr. E. Spencer of Messrs. Bird & Co., Sir Lewis Fermor has included about 350 million tons of the reserves of Karanpura under semi-coking coal which, when properly blended, may yield a suitable coke for metallurgical purposes.

TABLE 4.

Good quality coal and coking coal reserves at the end of 1936.

Area.	All good quality coal.	Good quality coking coal.
Giridih and Jainti	22	20
Raniganj	1,763	230
Jharia	1,210	860
Bokaro	795	315
Karanpura (North and South)	750	..
Hutar, Johilla, Burhar	50	..
Kurasia, Jhilmili, etc.	27	..
Talchir to Korba	198	..
Mohpani, Kanhan-Pench	30	..
Ballarpur-Singareni	45	..
TOTAL ..	4,890	1,425

The Coal Mining Committee of 1937 had the opportunity of bringing these figures up to date (*i.e.* to the end of 1936), using Dr. Fox's estimates as the basis (see p. 62 of the Report). These are given in Table 4. Allowing for the depletion of the reserves during 1937 and 1938, the above figures will be reduced roughly to 4,850 and 1,400 million tons respectively.

There are no published figures of the reserves of Tertiary coal, but according to Dr. Fox the approximate figures are as follows:—

	Million tons.
Upper Assam	1,000
Khasi and Garo Hills	1,000
Punjab, Kashmir, N.W.F.P. and Baluchistan	200
Bikaner	100
TOTAL ..	2,300

Having briefly reviewed our resources, it will be interesting to give a résumé of the knowledge of the coal resources of the world. The International Geological Congress Report gave the total as 7,397,550,000,000 tons of which 69% was in North America, 17% in Asia, 11% in Europe, 2% in Oceania and barely 1% in South Africa and South America. Table 5 is reproduced from 'The World Coal Mining Industry' (p. 39) issued by the International Labour Office in 1938, which is itself a reproduction from the Statistical Year Book for 1933-34 of the World Power Conference. As foot-notes to this table I have given the latest figures available for a few countries, the greatest divergence being noticeable especially in the case of China.

TABLE 5.

World resources of coal and lignite.

From I.L.O. Report on World Coal Mining Industry, 1938, p. 39, as quoted from Statistical Year Book for 1933-34 of the World Power Conference.

(In millions of metric tons.)

	Date of report.	Coal.		Brown coal and Lignite.	
		Proved.	Probable.	Proved.	Probable.
Europe.					
Austria ..	1930	13	19	611	2,337
Belgium ..	1913	*11,000 a*	..	..	..
Bulgaria ..	1934	1	1	500	1,000
Czechoslovakia ..	1932	6,450	25,000	12,500	..
France ..	1935	6,000	17,000	1,600	1,600
Germany (A) ..	1922	80,440	279,500	28,837	56,758
Hungary ..	1932	200	200	1,550	1,550
Ireland ..	1934	107	..	..	..
Italy ..	1913	1	146	51	100
Netherlands ..	1913	212	4,474 *b*	..	..
Norway ..	1933	..	8,000 *c*	..	..
Poland ..	1934	14,000	47,790	1,500	5,000
Spain ..	1913	4,500 *d*	5,500 *d*	..	..
Sweden ..	1933	97	105	..	..
U.S.S.R. (B) ..	1933	295,900	998,000	12,890	202,000
United Kingdom ..	1933	129,500	176,000	..	..
Yugoslavia ..	1913	2	33	58	250

TABLE 5.—*contd.*

	Date of report.	Coal.		Brown coal and Lignite.	
		Proved.	Probable.	Proved.	Probable.
North America.					
Canada ..	1913	30,319	242,400	391,260	572,686
United States ..	1928	..	2,040,640	..	852,128
Alaska ..	1913	..	3,554	..	16,560
South America.					
Argentine ..	1933	0	50	..	..
Chile ..	1913	2,116	..	..	..
Peru ..	1919	..	1,000	..	..
Africa.					
S. Rhodesia ..	1913	420	570	..	..
S. Africa ..	1927	7,914	205,682 *e*	..	..
Belgian Congo ..	1913	..	100	..	..
Nigeria (*g*) ..	1934	114	3,360	..	11,856
Tanganyika ..	1934	800	U	..	..
Fr. Morocco ..	1934	30	..	..	..
Asia (D)					
China (C) ..	1913	..	10,112,000	..	..
Manchuria ..	1913	..	1,129	..	..
India ..	1932	5,000	20,600	..	..
Brit. Borneo ..	1934	0	0	3	13
Japan ..	1932	5,895	16,218	66	473
Chosen ..	1913	..	5,585	..	27
Australasia.					
Australia ..	1927	20,900	139,400 *f*	10,620	U
New Zealand ..	1934	480	1,400	80	600

U—Not available. (*a*) Within a depth of 1,500 metres. (*b*) 'Actual, probable and possible reserves'. (*c*) In Spitzbergen. (*d*) Includes lignite. (*e*) 'Proved, estimated and undetermined resources' of which 'proved and estimated' amount to 21,524 million metric tons. (*f*) Large areas still remain unprospected and the figures do not include them. (*g*) Includes Cameroons under British Mandate.

(A) 288,720 million metric tons of coal down to 2,000 metres (*Third World Power Conference*, 1936).

(B) Coal and Lignite in European U.S.S.R. 113,864 million metric tons; in Asiatic part 1,503,997 million metric tons (*17th International Geological Congress*, Moscow, 1937).

(C) 250,000 million metric tons (*Third World Power Conference*, 1936).

(D) Indo-China 12,000 million metric tons (*Min. Met.*, p. 333, July 1939).