CHAPTER-VII

Mining And Environment.

A. Introduction

The Lish-Gish Basin in the Eastern Himalayas is a region of a wide variety of renewable and non-renewable resources. Of late this repository of natural wealth has been subject to a virtual plunder. In consequence, the local eco-systems are fast losing their resilience and regenerative capacity, undermining the economic and cultural development of this extremely sensitive area.

This chapter calls for attention to the effects of the unscientific quarrying operations in the coal-fields of the Lish and the Gish Basins (Fig7.1) which have continued intermittently since 1896. Moreover, the sudden abandonment

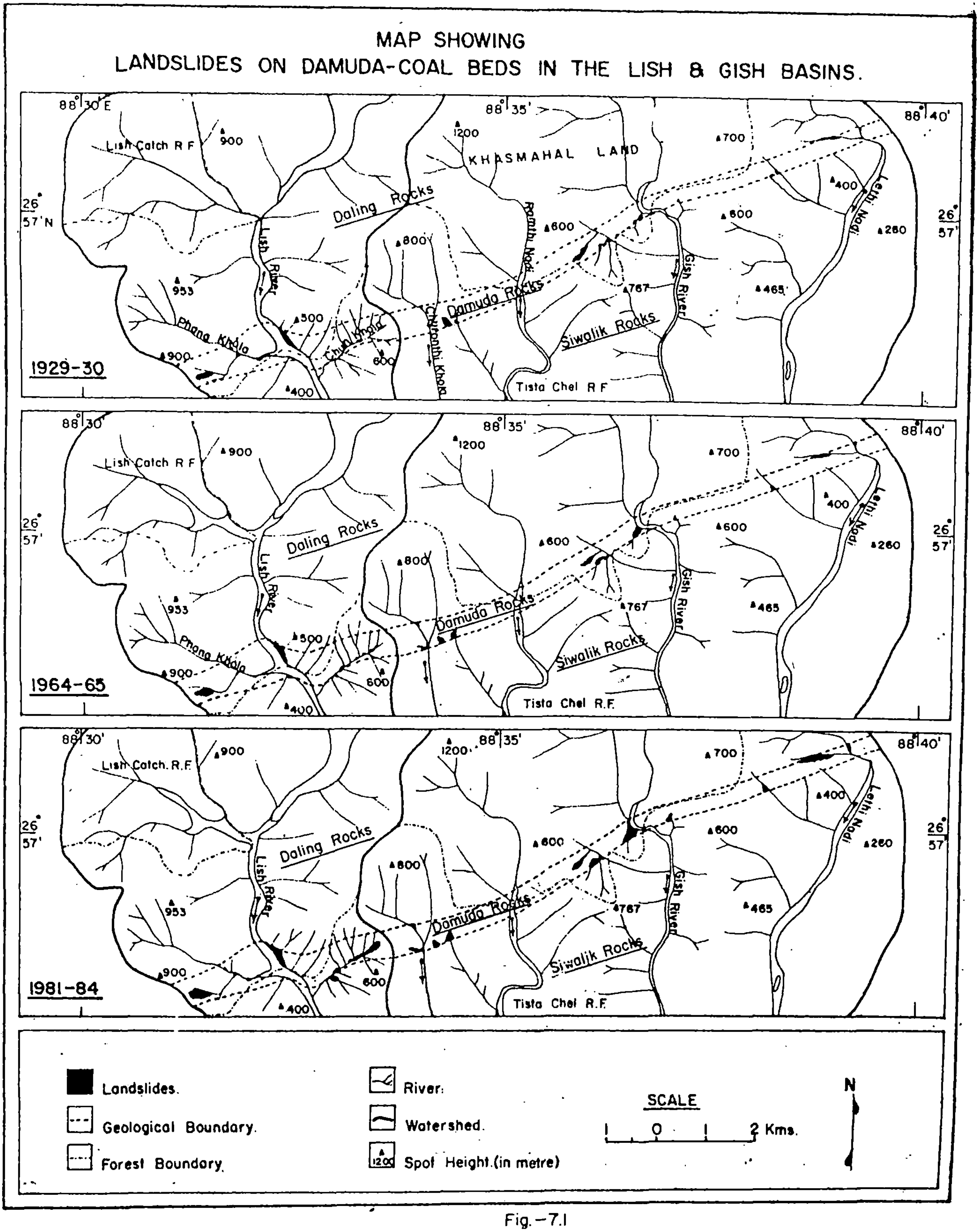
MAP SHOWING
LANDSLIDES ON DAMUDA-COAL BEDS IN THE LISH & GISH BASINS.
1929-30
1964-65
1981-84
88°30'E
88°35'
88°40'
26° 57'N
Lish Catch R F
KHASMAHAL LAND
Daling Rocks
Damuda Rocks
Siwalik Rocks
Lish River
Gish River
Phang Khola
Chel Khola
Ramthi Nadi
Chyamthi Khola
Lethi Nadi
Tista Chel R F
Landslides.
Geological Boundary.
Forest Boundary.
River.
Watershed.
Spot Height (in metre)
SCALE
0 1 2 Kms.
N

Fig. -7.1

Pl.22: Remains of the up-rooted tree carried with the high-velocity water of the Lish during rains.

Pl.23 : The bed of the Lish characterised by sediments of various sizes and shapes. Note the ankle-deep water with moderately high velocity during the early winter months.

of the mining operation in 1965, taking least concern of the scars formed due to the extraction of coal have disturbed the natural equilibrium in slopes. This has already taken its toll in the form of disastrous landslips. All these, in turn, incapacitate the rivers pouring in too much detritus which raise the river-beds alarmingly (about 50 cm. per year) and aggravate the flood situation in times of high rainfall.

Immediate steps should therefore, be taken to prevent such unhealthy and destructive processes and specially, in view of the recent attempt by the Govt. of West Bengal, to re-start the quarry operations in near future in order to cope with the long-standing fuel demand of the local inhabitants.

B. <u>Exploration of Darjeeling Coal</u>

In March, 1849, Sir Joseph Hooker[3] noticed near Pankhabari (Lat. 26°50'N. & Long. 88°16'E) some coal seams, six to twelve inches thick, very confused and distorted. No notice was taken of these coal - bearing rocks until 1873, when Mr. F.R. Mallet[4] was deputed by the Geological Survey to examine the coal and other minerals of the Darjeeling hill tertiary. Mr. Mallet's survey brought to light a narrow band of coal bearing rocks in the sub-Himalayan range stretching from Pankhabari to Dalingkot (Lat. 27°0'N. & Long 88°42'30"E.). But due to its flakiness, the coal could not be recommended in its natural state for utilization. So the Darjeeling coal was given up as hopeless. It is due to the unstinted efforts of Mr. P.N.Bose[1], the then Deputy Superintendent of the Geological Survey of India, that the immense economic importance of the Darjeeling coal was ultimately established in 1900, through a detailed survey of the Lish and the Ramthi valleys and the workable coal reserve down to a depth of 300 m. was estimated to the tune of 30 million tons.

C. Geological Background of Coal

In the Lish valley, the coal bearing Damuda rocks (Table- 7.1) occur as a thin belt extending almost in an E-W direction and are sandwiched in between two thrusts, namely, the Daling thrust on the north and the Main Boundary Fault on the south. As a result of thrusting, Damuda rocks are overriden by the older Daling rocks (Precambrian) and are underlain by younger Tertiaries. All the formations,occurring here, dip generally towards the north; older rocks occur in the down-dip direction. The different lithologic units of sediments appear to be in normal order. The various rock types found in Damuda sub-group are sandstone, quartzitic sandstone, carbonaceous shale and coal. As a consequence of the disturbance which the beds have undergone, the rocks have been greatly crushed, the crushing effect being specially noticeable in the shales and the coal. The former have been converted into extremely fragile, splintary slates, which break in all conceivable directions; and a flakiness has been induced in

Pl. 24. Indurated coal seam (jhama) showing columnar joints and sandwitched between periioditic sills

Table - 7.1

Areal Extension of Damuda Rocks

Basins	Total area (sq. km.)	Area of Damuda rocks (sq. km.)	Percentage (%)
Lish	70	3.15	4.5
Gish	201	5.86	2.92
Lish & Gish	271	9.01	3.32

the coal, so that with the least violence it is as a rule reduced to small bits, if not to absolute dust. The coal seams are also profoundly affected by igneous intrusives which are mainly lamprophyric in nature. Mostly, these intrusives occur as sills but occasionally thin veins branch out from the main mass showing discordant relationship with the coal seams. At places the coal has turned into coke-like Jhama due to the heat induced by the intrusive peridotitic sills which vary from a few centimetres to approximately seven metres in width. Such sandwiched and half burnt coal-seams show conspicuous development of columner polygonal joints which run-across the seam and span the walls. Chemical analysis of the natural coke shows that the percentages of volatile matter (1.00 to 7.60) and moisture content (1.10 to 3.82) increase away from the igneous contact. The percentage of fixed carbon in natural coke is over 70 whereas the percentage of ash is around 20. Apart from natural coke, the coal-seams found in the Lish valley are flaky semi-anthracitic and often graphitic[5]. It is low in volatiles (9.20 - 22.94%) and ash (17.42 - 20.14%) but the percentage of fixed carbon in quite high (59-56 - 70.66). Coal-seams vary in width from 1 to 10 metres.

D. History of Coal-Mining

During the period from 1896 to 1900, extraction of coal was made from certain exposures about 10 kms. North of Bagrakot Rly. Station, where the Lish and the Churanthi rivers approach one another through the forest. This was the first attempt by a Calcutta firm to work coal on a commercial basis and 7,231 tons were raised before the attempt was abandoned in 1900[6]. Mr. M.K. Roy, a U.K. trained Geologist, obtained a lease of 30 years in 1943 from the British Govt. to start the quarrying operations at the collieries in the Chunkola which is a right bank tributary of the Lish river. His firm Messrs. Himalayan Coal and Mineral Industries Private Ltd. extracted on an average 30,000 tons of coal per year up to 1961 from open-cast quarries (workable only during non-monsoon months of a year) on out-crops of large and small lenticular seams occurring on hill-slopes and in valleys and the entire production, specially the dust-coal, was consumed by local brick-manufactures. The natural-coke has sometimes been successfully marketed to far-off places in Punjab, Rajasthan, Uttar Pradesh and Bihar besides the northern part of West Bengal by the same management. Since 1965 there has been no production of coal from Chunkola collieries. Labour-troubles coupled with the availability of better quality coal from Jharia and Raniganj because of improved transport facilities are reasons which may be assigned for such closures.*

E. <u>Quarry Operations and their Effects</u>

In order to exploit coal to the best advantage, it is expected that the management of the colliery should know precisely where there is coal beneath the surface and it is only possible with the help of a large scale Geological Map which depicts the underground structure accurately. But this very vital step in mining had always been side-tracked by the mining authority since its inception because of the cost involved. Moreover, as the coal-seams were available in plenty, just at the bed level of the Chunkola with thin overburden and the others could be seen along the entire side walls, the management was in a hurry to exploit the available resource and was reluctant in wasting time in scientific exploration. Most of the pits were dug on the river bed down to a depth of about 10-12 metres to extract coal with pick-axe and shovels and the coals came out in the form of small chips or dust because of the highly crushed and sheared nature of the seams. Due either to the exhaustion of reserves or on account of the increased cost of working out coal from deeper

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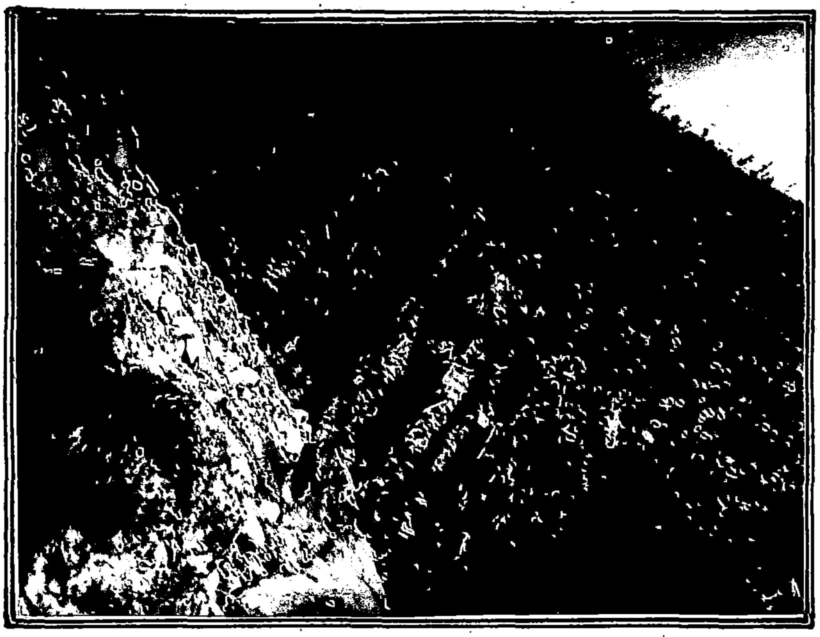
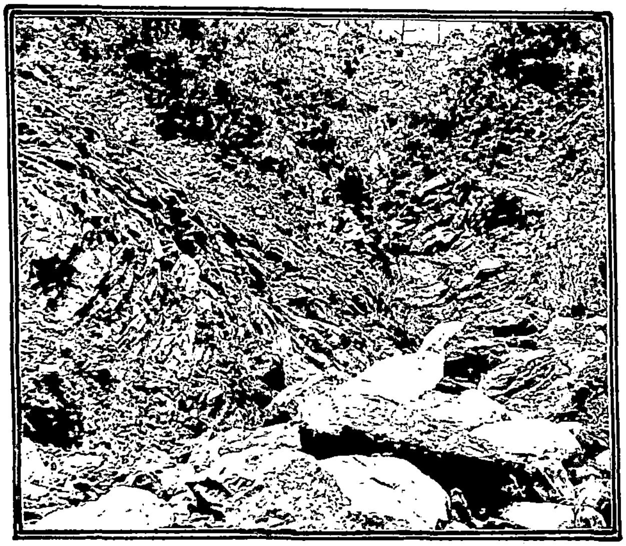
*Information regarding the Chunkola Colliery have been collected by the author during field studies in November 1985.

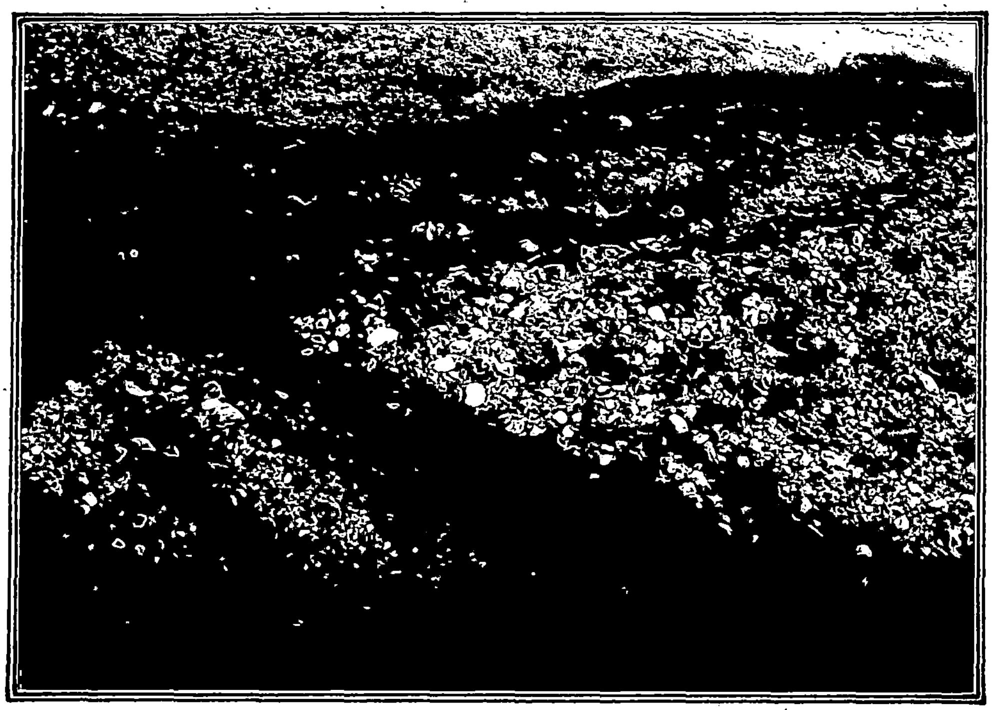


Pl.25 : The exposed coal-beds on the valley-sides of the Chun-Khola.



Pl.26 : The unscientific mining activities in the Chun-Khola given rise to huge landslides.

levels, the company often shifted the working from the old to the new spot. But the old diggings were never treated with any soil-conservation method. The nearly vertical coal seams which appeared on valley walls (Photo-24) were too weak and shattered to permit easy timbering and as such a good deal of over-hanging portion of the wall-rock had been backcut to attain a stable slope. This process has no doubt resulted in some amount of deforestation. Moreover, the coal-working were never restricted to really thick seams on the side-walls, so that the damage to hill-slopes might be commensurate with the quantities of coal extracted. On the other hand, to obtain a few tons of coal the entire hill-face had been punctured with diggings which had eventually led to the formation of inumerable gullies (Photo- 25) during rains and caused disastrous slips involving quite friable and soft Gandwana sandstones and shales. Such crude methods of handworking on the bottom and sides of the channel of Chunkola continued unabated for well over 20 years, and the accumulated overburden and muck disposal not only rendered the coal deposits useless for future working but also left enormous waste materials (Photo-26) to run down the very steep gradient of the tributary during rains and thereby add considerably to the bed-load of the parent stream, the Lish. Any one visiting the Chunkola now-a-days would be overwhelmed by observing the vicious cycle of soil erosion and land-slips which have been in progress (Table- 7.3) since the abandonment of the quarry



Pl.27 : The highly tinged discharge of the Lish at Bridge Point due to the addition of coal-dust by the tributary, the Chun-Khola.

Pl.28 : The confluence of the river Chun-Khola. Note the enormous amount of silts added by the Chun-Khola to the parent river Lish.

operations since 1965. Moreover, the northern slopes of the valley under consideration, consisting of soft, fissible and micaceous Daling phyllites and highly pressurised by agricultural activities on deforested tracts (Table- 7.2) having thin

Table - 7.2

Areal Extension of Forest Cover

Basins	Total area of Damuda Rocks (sq. km.)	Total Forest (sq. km.)	Percentage (%)
Lish	3.15	1.27	40.34
Gish	5.86	4.08	69.69
Lish & Gish	9.01	5.35	59.42

Table - 7.3

Areal Extension of Landslips on Damuda Rocks (Year Wise)

Year	Lish Basin			Gish Basin			Lish & Gish Basins		
	Total area of Da-muda rocks (sq. km.)	Total area of Land slips (sq. km.)	Per-centage (%)	Total area of Da-muda rocks (sq. km.)	Total area of Land-slips (sq. km.)	Per-centage (%)	Total area of Da-muda rocks (sq. km.)	Total area of land-slips	Per-centage (%)
1929-30	3.15	0.1212	3.85	5.86	0.2050	3.50	9.01	0.3262	3.62
1964-65	3.15	0.1346	4.27	5.86	0.2300	3.93	9.01	0.3646	4.05
1981-84	3.15	0.1431	4.54	5.86	0.2502	4.27	9.01	0.3933	4.37

veener of soils are in the habit of slumping in huge blocks, obscuring the channel of the Chunkola, specially in its upper course.

Thus, it is quite evident that the unscientific modes of quarry-operations in the coal-mine of the Chunkola, introduced by a group of short-sighted and profiteering miners, have not only upset the critical conditions of stability of hillslopes but have also provided the tributary with enormous loads which, in turn, has incapacitated the parent river, the Lish and thus causing it to overflow the banks in plains. The disastrous flood of 1968, damaging the Lish Road Bridge, (N.H. 31), may be sighted as a remarkable example in this regard.

Comparable situations can also be found in cases of defunct coal-quarries in Ramthi and Lethi valleys to the further east involving the same Damuda coal bearing rocks.

F. Concluding Remarks

Since the existing physical conditions in the coal-quarries are acute and nothing tangible has so far been done to improve it, cautious steps should be taken by the Govt. of West Bengal before starting the mining operation in the Chunkola Colliery. However, it is encouraging to note that the initial work to prepare a large scale Geological Map of the Chunkola Colliery has recently been taken up by the Geological Survey Unit. Similar mapping should simultaneously be done for the collieries in the Ramthi and the

Lethi valleys and such attempt may possibly unearth vast reserve of coal, hither to unknown. Side by side, the future quarrying of coal should be carried out in a scientific and planned manner, so that the waste materials do not run down into the river in huge quantities during rains and thereby add to the bed-load of the stream. A certain amount of soil conservation to stabilise the existing slips on the Daling as well as the Gondwana rocks on both sides of the Chunkola, produced due to desultory diggings, should immediately be stepped up. Moreover, coal seams of appreciable thickness and length be only extracted leaving aside the disjointed and fragmentary inferior varieties which induce haphazard activities here and there.

Finally, it should be borne in mind that the utterly neglected collieries of Darjeeling Himalayas if scientifically explored and properly managed, may, in all probability, provide a very useful solution to the energy crisis in the industrial situation of North Bengal.

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