Trans. Inst. Indian Geographers
Vol. 4, No. 2, July 1982

EVOLUTION AND GROWTH OF INDUSTRIAL LANDSCAPE IN THE DAMODAR VALLEY, BIHAR

U. P. SINGH, Bhagalpur

ABSTRACT : Man, the natural resources and the technological resources are the primary bases for indutrial evolution. Each of them contributes in its own way to the genesis, growth and protrayal of an industrial landseape. An analysis of the extent, character and utilisation of various resources defines the stages of industrial development. It is, therefore, significent to study systematically the resource base anatomy and profile of an industrial landscape. In fact Industrial landscape is a function of resource anatomy, process of conversion, integration and expression and phases of evolution '. ' The trio of industrial landscape is anatomy, process and stage corresponding to the structure, process and stage of the functions of landscape. Thus, the evolution of industrial landscape in the Damodar Valley is, therefore. analysed in respect of the above dictum.

Study Area Profile

The area under study is the Damodar Valley which extends between latitudes 23°30'E and 86°55'E. It lies in the heart of Chotanagpur and covers a geographical area of 22,144 Km^2 with a total population of 50,16,159 persons in 1971. The region comprises the district of Hazaribagh, Giridih and Dhanbad of North Chotanagpur division, Ranchi and Palamau of South Chotanagpur and Santal Paraganas of Bhaglpure Division which are drained out by the Damodar and its tributaries. The valley is encircled by the, dense settled Gangetic Plain in the north and east and the metalliferrous mineral belt in the south and west. It is very rich in coal resources. Thus, a happy combination of coal and metalliferrous mineral lying within an economic distance and abundant labour supply played tremendous role in the industrial development of the valley. This paper aims at analysing the spatio-temporal growth of industries.

Resource Anatomy

Resources like soils, minerals, water, vegetation, animals, agriculture, technology and man are fabrics of industrial landscape. Resource location, limitation and utilisation determine the dynamic nature of industrial landscape.

The Damodar Valley is a store-house of power and mineral resources. It is also endowed with forest resources. Man has cleared the forest for agriculture. The agricultural landscape provides food to the industrial population besides supplying raw materials to agro-based industries. The changing landscape of the valley defines various chapters of its phases of development to explain the present cultural make-up of the region. Its diversified relief and the eroding rivers have removed plenty of its coal and other minerals but they have also

exposed them for exploitation and utilization.

Man who subsisted on forestland resorted to agriculture. He works as labourer in mines and factories wich seem to dot the valley in response to availability of power and various mineral resources. Thus, man is a great resource who tills, mines and works in factories. He assimilates, utilises and erects plants to outline the industrial zones, strips, belts or pockets.

The valley is endowed with plenty of mineral resources. Their alignment, concentration, quality and quantity determined the extent, dimension and complexity of the lay-out of the industrial landscape. Coal, the prime source of energy and raw materials of many chemical products, is aligned in an east-west direction along the courses of the river Damodar and the Barakar (Fig.1). It is the basis of industrial development in the Valley. The use and development of coking coal of every grade and quality gave a great fillip to the establishment of thermal power stations, coal washeries, iron and steel, machine building, chemical and other industries at different places in the Valley as well as in the country. One hundred and ninty seven coal mines of the region have changed the landscape while mining settlement of varying sizes have grown and have invited several industries particularly in the eastern section (Sinha, 1972). The coalfields of the region lie within an economic distance from the iron-ore belt of Singbbhum and its adjoining areas. The district of Singhbhum is the abode of variety of minerals and raw materials for industries like the iron and steel, copper, uranium, chemical processing etc. Each mineral forms a base of more than one industry and many minerals aggregate to provide base for mono and multi facted industrial plantscapes.

The Mica-belt from Hazaribagh to Bha-

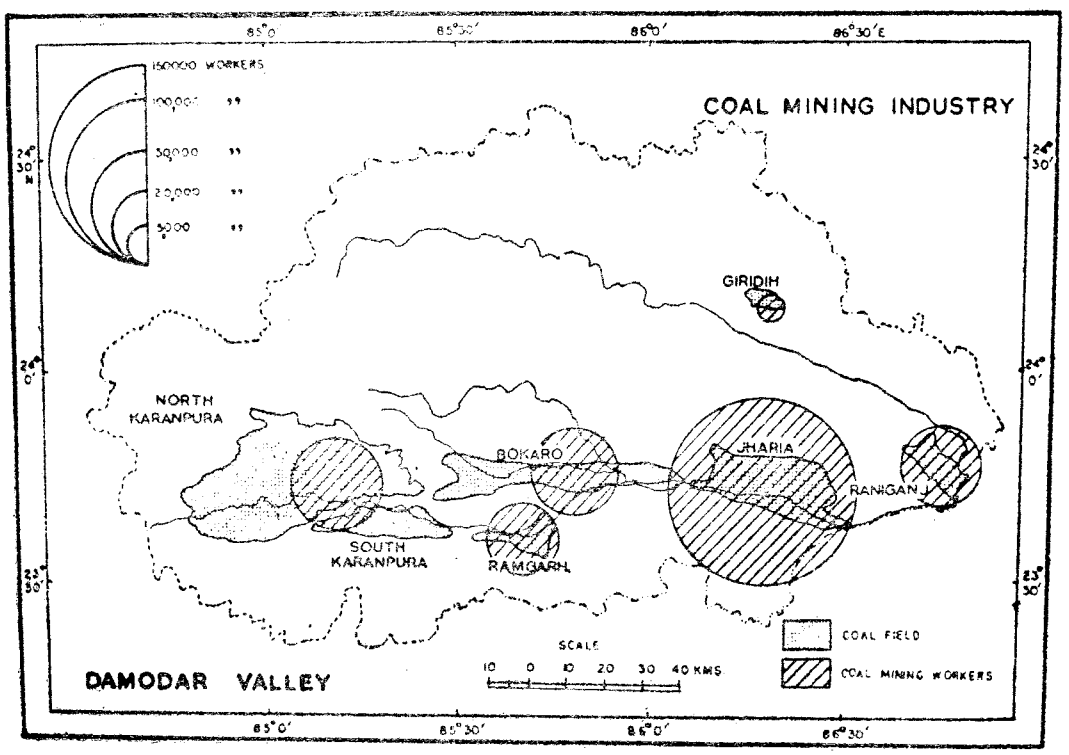

FIG. 1

galpur via Gaya and Giridih forms a unique base for mica industry in the world. Around Kodarma and Giridih mica industry developed on a very large to supply mica into both internal and external markets. Labour has guided the mica splitting centres at Giridih Kodarma and Jhumri Tilaiya.

The industrial plants, therefore, shape according to the resource utilisation and capital investment. They range from tiny tolls like the Shalimar Tar Products to giant size complex and intricate machines of the Bokaro Steel Plant and F. C. I., Sindri. It inscribes simple, complex and composite profiles of industrial landscape.

Raw materials - bulky, perishable, brittle, fragile, and costly either centralised or decentralised may disrupt the continuity of agricultural landscape by adding a black dot with a chimney vomitting smoke ceaselessly to polute atmosphere (Sinha, 1969). It is essential too, for people to recognise precisely the true reality of the natural conditions that form the setting of their lives, and to know always what precise geographical facts they will have to face (Basu, 1968).

The character of raw materials controls the location of industries. Every capacity of industrial plantscape finds expression in the theory of location of industries. An iudustry develops either in raw material area or in market limit or anywhere between two. Sometimes other factors also guide its location, This genesis of industrial location, therefors, finds meaning in the evolution of suitable transport system and means of communication to determine cost factor. There is hardly any doubt that neither varied raw materials can aggregate nor multi-manufactured goods can move to consumption areas without efficient, quick and competitive transport system. Damodar valley has carved out industrial landscape of every pattern in harmony with the iocation, character of market and means of communication and transport system.

Basic raw materials flow to aggregate at points of advantage to make an industrial plantscape. The intensity of manifold usage of various raw materials determine the complexity of industrial landscape. The evolving plantscape at Bokaro indicates not only major well planned industrial but also partrays multi-industrial dots varying in size, character and function.

Process

Processes, that explain the evolution of industrial landscape, mean the mechanism in the utilisation of raw materials to manufacture diversified goods. man with his knowledge of advanced technology, accomplishment might shape his resources to carve out industrial landscape. Man, machines and mechanism are blended in a manner as to inscribe industry-oriented landscape attributed as industrial landscape. Many plus factors of industrial landscape may seem to be potent player in industrial landscape but a microscopic analysis might portray, a dissimilar process of its evolution. Industrial landscape might evolve as a part of an urban landscape or might have its separate lay-out. The processes leading to industrial scape or townscape may look alike but the base of an industrial scape is a location of industry or industries. At times, the urban complex itself becomes a process to paint industrial landscape. Ranchi exerted some influence in selection of the site for industrial complex where as Bokaro has primarily an industrial base to portray industrial landscape. Subsequent industrial dots grow around the major hubs to change the agricultural-cum-forest landscape into a complex industrial landscape with defined function and morphology. Such types of tiny initial industrial make up are bound to grow into complex industrial landscape through mechanisation and processing to portray a morphology similar to Ural-Mach-Plant industrial landscape (Sinha, 1969).

Stage

Like landscape evolution, industrial

landscape has also three stages- initial, sequential and ultimate. There may reoccur punctuation at any stage of its evolution. Time element in its evolution is not as long as it operates in landscape analysis. Rather it is too short for millions are reduced to continue in its chronology. The story of industrial landscape evolution consists of several chapters of setting, planning, construction, expansion, intensification, specification and stagnation.

The Damodar Valley has registered more or less all the stages (except old) of industrial development. Most of the industries of Jhumri- Tilaiya- Domchanch industrial pocket, Patratu-Ramgarh and GumiaBermo area are in the infancy stage (Hamilton,1967) of development. The Dhanbad-Jharia—Sindri, and Nirsa-Kumardube-Chirkunda (Particularly Kumardubi area) industrial belts have reached the stage of maturity. Till now there is no example of infant mortality in the valley, but it is yet to come in Jharia coalfield area because coal mining works in this coalfield has been done for last one hundred of years and in many areas coal seams have completely exhausted. With the establishment of the Bokaro Steel Plant the Gumia-Bermo-B.S. City industrial belt has been rejuvenated because the iron and steel industry is the ' location leader ' round which major industrial agglomeration tends to grow. It is also the pattern former of the general distribution of industry and the industrial population. The establishment of the Bihar Alloy Steels Ltd., Patratu has achieved the stage of ' adolescence ' while many of the parts of the Karanpura coalfield show the infancy stage of development.

Growth of Industries

Fig. 2 clearly indicates that the spatio-temporal growth of industries is not uniform all over the valley. The growth of

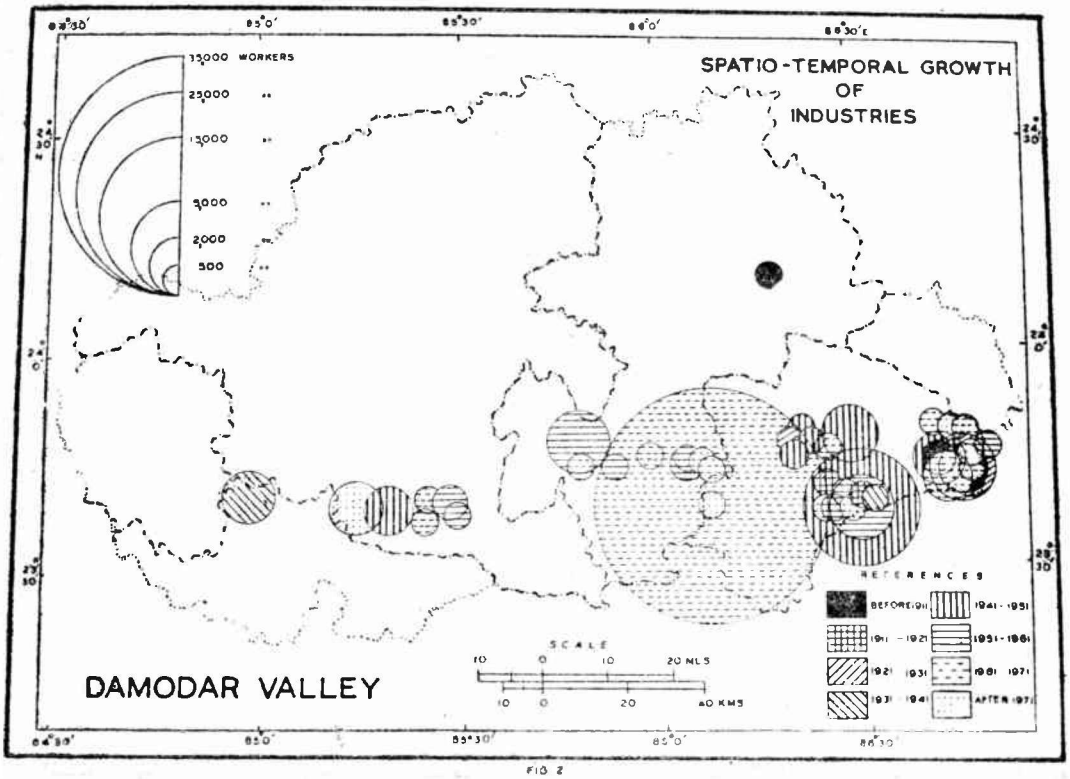

FIG 2

industries on temporal scale may be outlined as :

(i) World War I Period (1914--18)
(ii) Post--World War I Period (1919-38)
(iii) World War II Period (1939--45)
(iv) Post--World War II period(1945--47)
(v) Pre-Plan Period (1947–50)
(vi) Plan Periods (Since 1950–51)

World War I Period (1914-18)

This period not only marks the beginning of the 20th century but also traces the beginning of the framework of industrial landscape. Iron-ore, manganese, coal, mica, copper and many other minerals were known by this time and gave sufficient incentives for the location of some industries by making use of money of these materials.

The Damodar Valley, till this period, was dominated by mining landscape of coal and mica. The mineral wealth got momemtum for export, and some mining industrial landscape were developed (Roy choudhary, 1964). Manufacturing industries was confined to cottage and small scale industries. The Refractories industry came to be started in the Valley in the last part of 19th century and practically all its important units were located in the district of Dhanbad. A small works at Golfarbary near Mugma within the district of Dhanbad is the oldest unit in Bihar. In the early part of the 20th century in 1907 M S Kumardubi Fireclay and Silica works Ltd. commenced manufacturing of firebricks on a very modest scale in order to fulfil the demands created by the small engineering works and foundaries established by that time in the eastern parts of the country. The establishment of a large scale steel complex at Jamshedpur in the first decade of the century gave an impetus to the refactories industry and a number of other works gradually came up.

By this time the Grand Chord railway line and Main line, many branches and loops in the jharia coalfield and Giridih link railway line were opened up and joined interior places with the biggest commercial hub of the country, i. e., Calcutta. The development of railways accelerated the mining works in the Jharia coalfield and Ciridih began to develop as an administrative headquarter. In 1909, the Eastern Railway established a coke-oven and by-product plant at Baniadih near Giridih to feed its own needs. This was the period when mica splitting works developed also. This helped Girdlh to emerge as the second populous urban centre after Hazaribagh.

The First World War (1914-18)

During the First War temporary hopes of faster industrial progress were raised but it is well known that beyond affording temporary gains to a few established industries, it did nothing, to set the country firmly on the road to industrialization (Munshi, 1973). The Damodar Valley also gained nothing like industrial establishments during this period.

Post World War I Period (1919-1938)

It was a period of depression. Not much could be expected in this period, but plentiful minerals and search for many minerals ever provided favourable ground for development of certain industries.

The lower part of the Valley registered proper development of railways during this period which accelerated the coal mining works in Jharia, Bokaro, Ramgarh, Karanpura and Raniganj coalfields. It is a well known fact that India remained under British rule for hundreds of years resulted in economic polarization. Industrial concentrations were purposely done in few pockets (particularly in coastal area) which suited their interest best. Manufacturing industries remained neglected and mining industries developed on a large scale in the Damodar Valley. To meet the requirement of mining equipments in the coalfields a small engineering works was established at Kumardubi. The development of small and medium engineering works in and around Calcutta and Bombay increased the demand of coal particularly coke. Consequently four coke oven and by-prod-

uct plants were established at Kusunda (1920), Bhowrah (1920), Lodna (1920) and Bansjora (1924). In the district of Dhanbad coal was the main raw material which was available from local coal mines. Further the establishment of Iron and Steel Works at Kulti in 1921 gave an impetus to the development of this industry. The coke oven plants encouraged the development of chemical industry and the Shalimar Tar products was established in 1934 at Lodna.

The first cement plant of the Valley was established in 1936 at Khelari in the district of Ranchi. The factory was primarily raw material oriented but in course of time it is being exercise through market due to growth of Hatia, Ramgarh-Patratu industrial complex etc.

The Kumardubi Engineering Works was established in 1926 to repair electric drills, coal cutting machines, haulages, pumps, steam plates etc. The industry undertakes fabrication works also like headgears, steel trusses, transmission posts and others. The plant has the local maket and raw materials like scrap are received from Chittaranjan and Jamalpur and Sand from the Damodar river.

World War II Period (1939-45)

Overall progress of large and medium scale industries during this period was very slow. In 1942, a lead smelting and refining industry was established at Tundoo near Katruas in the district of Dhanbad. This plant emerged to occupy a position of pride as the pioneer and only producer of virgin lead and fine silver in purity with international specifications in the country.

The rapid development during this period was marked in refractory industry. During the war years, the demand of refractories, especially of firebricks increased considerably (Roy Choudhari, 1964) and apart from the Kumaredubi works several other plants came into existence to meet those demands. Mention may be made here of the Bharat Refractories, Jharia, Jharia Fire Bricks and Potteries Ltd., Dhansar, Bengal-Bihar Fire Bricks Co., Mugma and Jawahar Firebricks, Mugma. Besides, the forestbased industries such as timber, furniture etc. grew at different places to meet war time accelerated demand.

Post-World War II Period (1945-47)

This period begins from the end of the the Second World War and continues to the creation of the Republic of India. Though the subcontinent was divided after Independence, but the inertia gained by the Second World War led to the industrial development. Like other parts of the country many new industrial plants were erected in the lower part of the valley. The Fertilizer Corporation of India, Sindri Unit was established in 1945. The idea of starting such a plant can be traced to the troubled years of the War and to the grim tragedy of the disastrous Bengal famine of 1943 which involved the death of three million people of starvation and brought home to the Govern ment of India the urgency of undertaking a long term measures to increase food production in the country (Roy Choudhari, 1964).The Hindustan Malleable and Forging Plant was established at Bhuli in the district of Dhanbad in the same year. This period was also marked by one of the biggest glass works in the country that is the Indo-Ashai Glass Works at Bhadaninagar in the district of Hazaribagh in 1946.

Pre-Plan Period (1947-1950)

The Damodar Valley has not registered any remarkable industrial progress during this period. But the appearance of the Damodar Valley Corporation with all round development schemes has become the basis for rapid development of industries in subsequent years. It was set up in 1948 to implement two phases programmes-the first phase covering four dams with connected hydro-electric stations namely Tilaiya, Konar, Maithon and Panchet and in addition, a Thermal Power Station at Bokaro and the second phase with four dams namely Balpahari, Aiyar, Bokaro

and Bermo. The first phase of development has already been completed which provides not only electricity as motive force for industries but also fire fighting and drinking water for the plantscape and townscape.

During this period the Sindri Fertilizer Plant was expanded with the addition of a coke oven and a thermal power plant. Some refractory plants as the Reliance Firebricks and Pottery Co. Ltd., Chand Pottery, and the Behar Firebricks and Potteries Ltd., Mugma were established in 1950 to meet the growing requirement of firebricks and other bricks in the Valley.

Plan Periods (Since 1950-51)

The pattern and growth of industries in over 25 years has been governed by the Industrial Policy Resoutilon of 1956. It envisaged speedy industrialization with particular emphasis on the development of heavy and machine building industries and a predominant role to the public sector. Several other objectives were also maintained such as balanced regional growth, dispersal of industries, a rapidly expanding public sector and the extension of power, water and transport facilities to areas which are at present lagging behind industrially or where there is greater need for providing for employment, provided the location is otherwise suitable (Munshi, 1973).

An important feature of industrial growth in the country may be understood from 1951. There were only five non-departmental public undertakings with an investment of 29 crores. On 31st March, 1977 they numbercd 145 with an investment of Rs. 11097 crores (Govt-of India, 1979). These enterprises produce diverse products such as steel, coal, aluminium, copper, heavy and light engineering produts, fertilizers, basic chemicals, drugs, minerals, petroleum products, locomotives, aircrafts and ships. The Damodar Valley joined hands with other industrial regions and marked a steady progress during plan periods which is clear from out of total number of factories under public sector twelve fall into the Valley.

The Damodar Valley has made an astonishing progress in coal mining and coal products industries particularly coai washing, iron and steel, chemical and refractories industries. Out of the total number (48) of large and medium industrial units 33 are established after 1951. Such a large industrial development may be attributed to the rapid development in power generation, means of communication, licensing policy, allocation of resources and development of some public sector industries.

The region was mining 30 million tonnes of coal in 1965 which increased to 39 million tonnes in 1978 (Basu, 1978). It employed 2, 42, 482 workers in coal mines in 1975. There are twelve coal washeries namely West Bokaro (1951), Jamadoba (1952), Lodna (1955), Kargali (1958), Dugda I (1962), Bhojidih (1962), patherdih (1965), Chasnalla (1968), Dugda II (1968), Kathara (1969), Swang (1970), and Gidi (1970). It may be linked with the development of iron and steel industry in the eastern region. These coal washeries have been established aiming the improvement of quality and quantity of steel production by removing some of the impurities found in raw coal. The iron and steel industry is the largest consumer of washed coal in India. The Central Coking Coalfield Ltd. is planning to establish a big coal washery near Ramgarh to utilize raw coal mined in the Ramgarh coalfield.

India has made a remarkable progress in the production of Iron and steel with the establishment of two phased Iron and Steel Works at Bokaro in 1965. All the works of the lst stage (1.7 million tonnes) have been completed and the woks of 2nd stage are underway. A mini steel plant namely M/s Bihar Alloy Steels Ltd. has been established in private sector at Patratu in 1972 under the scheme of balanced regional development.

With the development of coal washeries, hard & soft coke plants, Iron and Steel

plant in the Eastern region has increased tremendously the demand of refractories which became the basis for rapid progress in the establishment and production of refractory plants from Dhanbad to Chirkunda have been established along the G. T. Road. Some of them are Kharkari Firebricks, Kharkari (1957), Allied Refractories, Govindpur (1974), Allied Refractories, Govindpur (1974), Valley Refractories, Kumardubi (1970),Maithan ceramics, Kumardubi (1971). Besides Patratu--Ramgarh industrial belt has also made a remarkable progress in the production of bricks with the establishment of the Hindustan Steel Refractories, Marar (1960), India Fire Bricks and Insulation P. Ltd., Ranchi Road (1960) the Karanpura Development Co. Ltd., Sirka (1970).

The chemical and chemical products industries have also made rapid strides with the modernisation and rationalisation of Sindri Fertilizer Plant and the establishment of a Superphosphate Factory (1960). The Associated Cement Company of India has established in 1956 a cement plant very close to the Fertilizer plant with an agreement of twenty-five years to use the by-product sludge. In 1958, the Government of India established an Explosive factory at Gumia taking into consideration of large demand of blasting materials to be used in mines of the Valley. An engineering industry namely the Mc Nally Bharat Engineering Works has been commissioned in 1963 at Kumardubi to manufacture mining equipments. The Mahalaxmi Fibre Works, Ormanjhi, started to manufactyre thread in 1962 to supply in the local markets.

The above discussion may be summed up as follows :

1. The Damodar Valley is specialized in mineral based industries like iron and steel, coal, explosives, refractories etc.
2. Most of the plants are raw material oriented. Very few are guided by other factors like market, labour and electricity.
3. The Valley has marked a rapid change in its industrial landscape within a short span of plan periods. Most of the industrial complexes have emerged during this period.
4. The industrial landscape has been guided by mining landscape. Most of the industrial centres are located within the coal belts.
5. The lower Damodar Valley particularly Dhanbad District records the highest growth in comparison to other parts of the country.
6. Iron and Steel Industry in the metallic mineral based industries, coal washeries and coke oven plants in coal based industries, and refractories in non-metallic mineral based industries dominate the landscape. The eastern part of the lower Damodar Valley specializes in refractories whereas middle part in coal based industries and the western in metallic mineral based industries.
7. It will not be exaggerated to say that the Damodar Valley Corporation contributed much in the development of industrial landscape. The power plants worked as core of the nucleus which may be seen in the upper as well as lower Damodar Valley.

Thus we find that industries are becoming younger in age from east to west along the River Damodar. It may be said that like grade industrialization is introduced from the mouth and it is moving upward and a time will come when entire valley will be industrialized heavily like the Ruhr Valley in Germany or the Donetz basin in European Russia.

References

Basu, H. N. (*1978*) : '*Coal Statistics*' Coal Controllers Organisation, Vol. 8, p. 6,

Basu, S. R. (*1968*) : 'Landscape Evolution – A Methodology' *Geographical Review of India*, Vol. XXX, No. 4, p. 11.

Hamilton, F. E. I. (*1967*) : '*Models in Geography*' Chorley, R. J. and Haggett, P. (Editors), Methuen and Co. Ltd., London, p. 402.

Munshi, M. C. (*1973*) : 'Location of Industry : Evolution of a Policy', *Industrial Develapment of India – Policy and Problems*, Vakil C. N. (Editor). Longman Orient Publishing, New Delhi, 248.

Publication Division, Government of India (*1979*) : 'India : A Reference Annual 1979' Ministry of Information and Broadriasting, Government of India, New Delhi, p. 286.

Sinha, R. P. (*1969*) : 'Industrial Landscape of the Highlands of Chotanagpur' *Ph. D. Thesis* (U/P) Bhagalpur University, Bhagalpur Vol. I, p. 63.

_____ (*1972*) : 'Industrial Landscape of the Highlands of Chotanagpur,' *Natioal Geographical Journal of India*, Vol. XVIII, Part 3 & 4, p. 169.

Roy Choudhary, P. C. (*1964*) : District Gazetter of Dhanbad, Secretariat Press, Patna, P. 209.

Address of the author

Dr. U. P. Singh Dept. of Geography, Bhagalpur University, Bhagalpur.