

# GOVT. GRAMYA BHARTI COLLEGE

HARDIBAZAR

AMARKANTAK, NEWSA HILLS,  
HANUMAN GARHI, MAINPAT BAUXITE MINES  
CHHATTISGARH

## GEOLOGICAL FIELD WORK

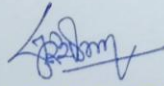
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We are thankful to our head of department Prof.S.K.CHANDRAKAR for his co-operation & guidance during field work.

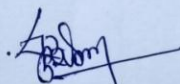
We are indebted to our principal Dr. T.D. VAISHNAV for his moral support & encouragement during our study period.

CERTIFICATE-I

Certified that the geological excursion tour around Hardibazar, Amarkantak, Newsa Hills, Hanuman Garhi & Mainpat region of Chhattisgarh state. A comprehensive report is submitted in partial fulfillment of M.Sc. Previous (Geology) as per new UGC Syllabus.

Place : Hardi Bazar

Date : 10/02/2016



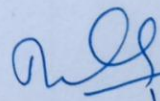
Professor In Charge

Prof. S.K. Chandrakar

CERTIFICATE-II

This is to certify that shri/Ku..... Sande Mahant..... has submitted the report entitled "GEOLOGICAL EXCURSIONS" around Hardibazar, Amarkantak, Newsa Hills, Hanuman Garhi & Mainpat region of Chhattisgarh state. A comprehensive report is submitted in partial fulfillment of M.Sc. Previous(Geology) as per new UGC Syllabus.

Place : Hardi Bazar

  
15/2/16  
External Examiner

Date :

Professor in charge :

Head of Department : Prof. S.K.Chandrakar

Principal : Dr.T.D. Vaishnav



# GEOLOGICAL STUDY OF AMARKANTAK

## INTRODUCTION

The present investigation was undertaken with a view to assess the mineral potentialities of this district, where a variety of minerals have been known to occur from a long time, and which include fire-clay, felspar, mica, ochre, gypsum, quartz iron-ore and marble. The Director of Geology and Mines, Vindhya Pradesh had very kindly furnished the list of localities from where the aboveminerals have been reported. This survey was carried out under the superintendence of Dr. A.G.Jhingran, Superintending Geologist-in-Charge, Northern Circle, Geological Survey of India, during the months of December, January, and February, 1956. During the latter part of this investigation Mr. S.K. Srivastava, Assistant Geologist, Geological Survey of India, was also associated with me, and helped me in carrying out the detail investigation-'of', fire-clay occurrences near Dola. The minerals enumerated above occur in Umaria, Beohari, Sohagpur and Pashpra garh Tahsil of Shahdol district.

## PHYSICAL FEATURES

The district as a whole is comprised of flat and undulating, plane. The Amarkatak plateau forms, the southern boundary of this district. The river Sone, one of the important rivers of Central India has its origin from the above plateau and flows through the central part of this district. Mahanadi, Banas, Johilla are the other important rivers that drain this district.

## GENERAL GEOLOGY

The following is the general sequence of rock types in this districts:-

### **Deccan Trap along with Intertrappean beds**

- |                       |  |
|-----------------------|--|
| Lower Gondwana System | - Supra-Barakars Talchirs (unconformity)                                 |
| Bijawars Series       | - Phyllites, quartzite, etc.   |
| Metamorphics          | - Mica-schists, Granite-gneisses, Granulite,<br>Hornblende-schists, etc. |

The gneisses and the associated bands of schists and marbles which constitute the oldest rock of the area are exposed south of Umaria in a narrow strip surrounded on all sides by the Gondwanas. The next succeeding group of rocks is that of the Bijawars or the Transitions, comprising mainly of phyllites and quartz-schists which are exposed north of Beohari. Overlying the Bijawars unconformably occur the rocks of the Lower Gondwana system which occupy by far a very large portion of the District. The Deccan trap and intertrappean beds which constitute the youngest suite of rocks in this area are exposed in the southern part of the district forming the Amarkantak plateau.

### **Brief Account of the Rock types**

**Metamorphics:-** The metamorphics, exposed in the south-western portion of Umaria, consist predominantly of granite-gneisses, with which are associated a number of rock types that occur as lenticular masses and probably form the remnants of older rocks, that were caught up in the granitic intrusion.

**Granite-gneisses:-** The granite-gneisses are coarse to medium grained in texture, and pink to greyish white in colour. Gneissose structures is not well exhibited in them, but at times porphyritic texture is quite distinct. Under the microscope they consist of quartz, feldspars (both oligoclase and albite) with biotite and sphene as accessories. In an exposure near Karimathi, hornblende diopside and garnet were developed and the rocks approached more or less a granulite

**Bijawars:-** Next in order of succession are a group of partially metamorphosed sediments consist of phyllites and quartz-schists occurring to the north of Beohari. Here they consist predominantly of purple coloured phyllites, intruded profusely by basic rocks that are now more or less completely altered.

**Gondwanas:-** The rocks of the Gondwana System in this area have been classified into the following series:-

Supra-Barakars.

Barakars.

Talchirs.

Of these only the Barakars and Supra-Barakars were encountered during the course of the present investigation. A brief account of these is given below:



**Barakars:-** The Barakars are exposed, near Umaria and Dola. The dominant rock in this series here is massively bedded yellow grey, felspathic and silicious sandstone, with which are intercalated beds of shales, fire-clays and coals. The rocks usually occur dipping at low angles.

## MINERAL DEPOSITS

### FELSPAR

Felspar occurs as an important constituent of some of the dykes and pegmatite veins in the mica-schist to the south of Lorha railway station. The following two are the most important ones:

(1) A dyke almost exclusively made up of felspar is exposed in the nala at about 1½ miles to the south south-west of Lorha village. It is about 15 feet wide and is imperisistently traced for more than 1½ furlongs. It strikes NNW-SSE, and is inclined at an angle of about 45° from the vertical plane.

This deposit has been intermittently worked by the Oriental Pottaries Ltd., Chandia in., in the past, the material being used by them in their own Pottery Works at Chandia.

(2) An important pegmatite carrying felspar was recorded in the stream at about 3 furlongs to the west south-west to Tagra Tola. This pegmatite is about 30 feet wide and occurs exposed for about 100 feet, beyond which it is underlain by a thick covering of soil.

Besides, felspar has also been noted in a number of pegmatites as an important constituent to the west and south of Majhgawan.

### MICA

**General:** A number of trial pits have been made in the part in the neighbourhood of Tagra Tola and Majhgawan. These pits have now got completely filled up with debris and only a few mica flakes seen scattered in the adjoining dumps indicate the existence of this mineral. The country rock is mica-schist which is injected profusely with Pegmatite veins. Most of these veins run along the schistosity of the country rock. The strike of the rocks is ENE-WSW and the dip is to NNW at

angles varying from  $50^{\circ}$  to  $75^{\circ}$ . Quartz, constituents of the pegmatites; tourmaline and garnet are important accessories.

**Tagra Tola:** A trench measuring 30 x 10 x 5 feet exists to the west of above village. It was stated by the local villagers that the original depth of this trench was 50 feet, and when it was initially started in the early thirties of this century, mica flakes measuring one foot in length and 6 inches in width approx. were recovered from here. But subsequently working was abandoned as the overall production was not much and the operations were unremunerative. An examination of the debris indicated that the quality of mica must not have been good enough to warrant further exploitation.

**Majhgawan:** A number of trial pits have been made in past about a mile to the south of Majhgawan. All the pits are located at a distance of about half-a-mile from the foot of the local hillock.

The country rock here also is mica-schist, which at times is garnetiferous. The dip is to the NNW at varying angles.

The pegmatites are of homogeneous nature, and also do not bear the quartz-core. The various constituents include quartz, felspar and mica. The books of the mica are small and heavily stained.

The exposure of the mica-schist is confined within an area of about  $2\frac{1}{2}$  sq. miles, and the prospects of wining good quality of mica from this field appear to be meagre.

### MARBLE

**Majhgawan:** A lenticular band of marble is exposed at about half-a-mile to the north of this village. The strike is ENE-WSW and the dip is about  $50^{\circ}$  to NNW. The band is traceable for about  $1\frac{1}{2}$  miles. Its width in the central portion is about 2 furlongs, but it tapers out on either side. The rock is quite massive and the individual bed varies in thickness from 2 to 2 feet. The country rock is medium grained granite-gneiss intruded with hornblende-schist. Near the western margin the crystalline limestone is also intruded with a basic rock, consequent to which secondary minerals have also been developed. Although much inferior in quality to that of the celebrated Makrana marble, this can be employed for structural purposes in large edifices. It can also be used in sugar industry.

### IRON-ORES





**VESICULAR STRUCTURE**



**TENSION JOINT**



**NARMADA KUND**

A small lens of magnetite striking in an E-W direction occurs at about half-a-mile to the west of the village Karimathi. The pure material, which constitutes the core, is confined to a narrow zone measuring about 20 feet in width, and is traceable intermittently over a length of about 100 ft. Proceeding away from the core the following three distinct zones of rocks are recognisable:

1. **Biotite-schist:** The main constituents of this zone are magnetite, quartz and biotite. This zone is about 50 feet wide.
2. **Hornblende-schist:** In this zone the magnetite crystals are very sparingly distributed. Hornblende quartz, biotite and plagioclase feldspars are the principal constituents with sphene and apatite as important-accessories. This zone is only 10 feet wide towards north and 100 feet towards south.
3. **Granulite:** This constitutes the outermost zone, and is more prominent towards north than towards south. The various minerals present in it are diopside, garnet, and feldspars. Magnetite is completely missing from this zone.

From the nature of occurrence it is evident that the mineral is genetically connected with some -basic rock which has how, been completely altered to hornblende and biotite-schists. The country rocks here are mica-schists and porphyritic gneisses, intruded profusely with pegmatites.

Dumps of magnetite occur both near the deposit as well as near Umaria, y station, which is about a mile from here. From this it appears that an endeavour was made in the past to win this mineral, but finding it not of much economic value, the project had been abandoned. The present survey also shows that it is a very small deposit and is not of much economic value.

## GYPSUM

Gypsum was located on the northern scarp of Amarkantak near the village of Barhar and Aurhera during the early thirties of the present century. Subsequent to its discovery it has been visited and investigated by- Late Sir C.S. Fox, Dr. P.K. Ghosh and Mr. G.V. Rao of this department, at different times. The above villages are 4 miles apart and the Anuppur-Amarkantak fair-weathered road passes midway between the two, Feeder cart tracks, branching off near Milestone 10 run upto the two villages.



The various rock formations present in this area are as follows:-

Trap

Deccan trap (Flow No. II).  
Inter trappean Chert bed.  
Deccan Trap (Flow No. II).  
Clay bed bearing gypsum.  
Deccan trap (Flow No. I).

-----  
unconformity-----

Lametas

Sandstone  
Ferruginous clay  
Calcareous sandstone

-----  
unconformity-----

Granite

Granite, which constitutes the basement rock of the area, is well exposed to the north of Kirar and Barhar. It is a coarse grained pink porphyritic rock. The overlying lametas predominantly consist of calcareous sandstone which passes upwards into sandstone, there being an intervening bed of red clay between the two. The calcareous sandstone is red to purple and carries veins and streaks of calcite and chert. The red colour in many places is mottled with a slight green colour. The dip is to the south and varies between  $10^{\circ}$  and  $15^{\circ}$ .

The youngest formation in the area consists of trap in which three flows are recognisable. The rock is fine grained and vesicular at many places. The latter are mostly filled with quartz agate and or conchoidal. A clay bed occurs between the lower two trap flows. It is about 50 foot thick, and bears lenses and veins of gypsum.

A bed of chert occurs between the upper two lava flows. It is quite persistent and is prominently noticeable, on the hill slopes. The chert is blue, green and red in colour and breaks with a conchoidal fracture. Occasionally lenses and stringers of sandstone are also noticeable in the chert bed.

**Mode of occurrence of Gypsum:** Gypsum occurs in small lenses or in a network of veins, ranging in thickness from a few inches to as much as 6 to 3 inches. Sometimes both clay and gypsum are intercalated with each other.