Mineral Resources of Ajmer

Introduction

Ajmer-Merwara was an isolated province during British Kingdom in Rajasthan and the ancient name of the city was 'Ajaymeru'. In Sanskrit 'Meru' means hill and the 'Ajay' is qualifying adjective for invincible and hence the name derived for the city.

Ajmer district is located in the heart of Rajasthan state and bounded by latitude 25^0 30' to 27^0 0' and longitude 73^0 55' to 75^0 21'. It occupies about 8479 sq. km. area which is about 2.5% of the total area of Rajasthan and the district headquarter is at Ajmer. It is connected by two meter-gauge sections i.e. Delhi-Ahmedabad and Ajmer-Khandwa of western railway. National Highway No. 8 connecting Delhi-Ahmedabad, state highway no. 4 connecting Ajmer-Chittorgarh, state highway no. 18 connecting Ajmer-Nagaur are passing through Ajmer city. The other important roads of the district are S.H.-5, S.H.-26, etc.

Regarding the mineral potential, the district is the prime producer of quartz and magnesite and leading producer of felsper. The other minerals mined out in the district are asbestos (amphibole variet), limestone, marble, garnet, emerald, soapstone, mica and building stones. It is second largest district in the state for the production of asbestos.

A number of grinding units of felspar, quartz, asbestos and processing units of marble, chips and powder are located in the district particularly at Kishangarh, Beawar, Ajmer, Kekri and Nasirabad. A large number of cement pipe making industries are located at Beawar, Ajmer and Kishangarh. Besides these several lime kilns are located in the district. A big cement plant of 1.12 MT. capacity has been established near Beawar and two mini cement plants of 40 TPD are located at Kishangarh and Ajmer.

To search for new minerals and to evaluate the known minerals deposits in the district, the department has been carrying out geological investigations since second five-year plan by way of annual field programme. To expedite the investigations in the district, office of Senior Geologist was established at Ajmer in the year 1975 and after that continuous efforts are being made for geological investigations. This has resulted in locating the new mineral occurrences such as soapstone, barites fluorite, chalk, high-grade limestone, chrysotile asbestos, marble, wollostonite, kyanite, garnet and scheelite bearing skarns and limestone. The other prospecting agencies working in the district are G.S.I., I.B.M. for mineral administration and granting the mineral concessions an office of Mining Engineer of this, of department is located at Ajmer. Besides this, Office of Director Mines Safety and Indian Bureau of Mines (Govt. of India) are also located at Ajmer.

2. Physical Features

The distinguishing feature of the district is the Aravalli range trending in NE-SW direction for about 140 km. length with 25 to 30 km. width and it occupies the western part of the district forming the high steep hills and valleys. The highest peak of the Aravalli range is at Nag Pahar (885 mt.) and which is the dividing point of watershed of India between Arabian Sea and Bay of Bengal.

Other high peaks are Taragarh (865 mts.) in Ajmer city, Savitri Pahar (728 mts.) near Puskar, Magat hills (846 mts.) near Todgarh. These peaks are made up of quartzites and soft rocks such as blotite schist and gneisses form valleys. The Ana-sagar velley is most prominent negative landform rimmed by structurally controlled lofity hill ridges. The western part of the area around Pushkar is characterized by well-developed sand dunes. Eastern part near Sawar in Kekri tehsil is occupied by an isolated oval shaped hill range formed by quartzite attaining the height of 583 mts. at Kontola Dungar near Sawar.

Ajmer city is practically situated on trijunction water shed. To the northeast water flow is to wards Sambhar Lake, Ajmer valley drains eastward and Pushkar valley drains westward by tributaries of Luni River. There are mainly six seasonal torrent rivers in the district. These are Khari, Dai, Banas, Sarasmati and Luni. Anax Sagar, Foy Sagar and Pushkar are the well-known lakes in the district.

As a whole, vegetation is poor in the district. Small forests exist in Srinagar-Kishangarh area, Pushkar valley, Mangat-Ka-Pahar area, Sarwar area, east of Beawer but these are not dense.

Pegmatite and granites are notably barren, the mica schist give rise to poorest soil, which is less fertile than the soil yielded by other rocks.

The commonest and characteristic trees are 'Khejra' and 'Babul'. In the sandy soil common bush is 'Kankara'. In many clays there is 'Khair'. Perhaps the most conspicuous plant of the sand part is the 'Munj' or 'Sirkanda' grass. On the stoney hills 'Ber', 'Dhao', 'Thor' are characteristics. In the villages 'Neem' is a favoured shade tree. Most villages possess at least one Banyan tree and somewhere 'Pipal' are seen.

3. Geology

The geology of the district is represented by ancient rock formations from Pre-Aravalli's to Delhis. The geological investigation was first carried out in the 1881 when C.A. Hecket reconnoitered and reported the brief geology of the area. The detailed account could be available in Heron's memoir (1953), he has carried out the systematic geological mapping in the area during the third decade of the century. In the memoir geological formation of the area were correlated with those in northeastern Rajasthan. Since then many geologists from G.S.I. and Universities have worked on the various geological aspects of the area. The G.S.I. has carried out systematic mapping of Aravalli region and re-classified the geology of the region and released a map in the year 1981.

The eastern part of the district is occupied by banded geneissic complex of pre-Aravalli in age and as per new classification by G.S.I. the rock formations of this area belong to Sandmata-Complex and Mangalwar Complex of Bhilwara Supergroup. The rock units of Mangalwar Complex formed the easternmost part of area with outlier of rocks of Sawar group. The area west of Mangalwar Complex is occupied by rock types of Sandmata Complex. Western part of the area comprises the rocks units belonging to Alwar and Ajmer and Ajabgarh groups now named as Srinagar and Ajmer formations along with acidic intrusions such as Erinpura granite, pegmatites, quartz veins and basic and ultrabasic intrusions of Delhi Super Group.

The geological sequence worked out by Heron and G.S.I. is given as under: -

Stratigarphy of Ajmer district

Recent and Subrecent		Alluvium and blown sand
	Intrusions	Sendra-Ambajigranite, gneisses and migmatite.
	(Erinpura granites)	(800-1500 MY)
Delhi Super Group	A. Kumbhalgarh	A. Calc-schist, gneiss, marble, garnet-boitite schist, quartzite and migmatities.
	B. Ajabgarh Group	B. Quartzite, calc-gneisses, micaschist and marble.
Alwar Group		Meta-conglomerate, quartzite and mica schist.
	-Unconformity-	
Sawar Group		Dolomite, dolomitic marble, quartzite, garnetiferous mica schist.
	-Unconformity-	
	Mangalwar Complex	Migmatite, gneisses, felsathised mica schist, sillimanite-mica schist, para amphibolites
Bhilwara Super Group (B.G.C.)		
	-Unconformity-	
	Sand Mata Complex	Paragneisses, mignatite, pyroxene-granite, amphibolite, biotite-schist, dolonitic-marble, quartrzite and ultramfics.
Intrusives	Mafic and ultramafic	Bodies and granites (Untala and Gingla granites) Acidic, mific and ultramafic bodies.

4. Mineral Resources

(A) Non-metallic Minerals

1. Asbestos

Asbestos is a commercial term applied to a group of minerals that separate readily into fibres. They can be broadly placed into two varieties-serpentine and amphibole. The former includes chrysotile and the latter anthophyllite, crocidolite, amosite, tremolite and actinolite. The use of asbestos depends on spinning and non-spining fibres, the spun fibres must possess strength and flexibility.

In Ajmer, asbestos occurs as mass fibre, thin veins and stringers in altered ultrabasic rocks, mostly peridotites intrusives in Ajabgarh rocks. The important asbestos deposits are as follow: -

(a) Kanwalai area

The occurrence of chrysolite asbestos is located about 1.6 km. northwest of Kanwalai village Teh. Ajmer. Asbestos has been developed in the form of thin veinlets in serpentinize dolomitic marble but it does not seem to be a significant deposit.

(b) Kotra-Kundal-Asan area

Asbestos of tremolite and actionolite variety are found as vein and lenses in tremolite-actinolite schist in contact with cal-schist. The lenses of tremolite schist (mass fibre) are nearly 2 mts. thick. Near village Naikhurd the width of the fibre asbestos veins developed in the altered ultrabasic rocks varies from 2 cms. to 15 cms. The asbestos is of amphibole variety. The trend of the formation is N 40^0E with steep dips towards west.

(C) Arjunpura-Rajgarh

The area falling SSW of Garhi-Arjunpura is mostly covered with alluvium. There are four isolated hillocks consisting of ultrabasic intrusives. In the northern most hill a vein of mass fibre asbestos of tremolits variety of 2 to 3 mts. thick and very thin long veins of fibre asbestos, again tremolite variety are developed in erratic manner.

About 1 km SSW of Garhi-Arjunpura, (teh. Ajmer) two hillocks of ultrabasic rock (peridotite) stand out. In the eastern hill about 1 mt. thick ven of mass fibre asbestos is for med in a criss-cross manner. Within these veins 2 to 5 cms. thick fibre veins have also been developed. At places 15 cms. thick fibre veins have also been developed.

Tremolite asbestos is also developed in ultrabasics lying about 3 km. north of village Pura Gujaran. The area near village Bhimpura shows exposures of ultrabasic and schists. In an altered ultrabasic hillock on the eastern slop a 5 mts. thick mass fibre asbestos vein trending N-S and dipping vertical is found. At the top of the hillock a small lensoid of the same is also seen. On its western slope nearly 7 to 10 cm. thick of fibre asbestos is also developed.

About 2 km. west of village Arjunpura, rock exposures are confined to three hillocks in the area. The country rocks are biotite schists and dolomitic limestone intruded by ultrabasic and pegmatities. Occurrences of fibre asbestos and magnesite are seen all along the periphery of the hillock where ultrabasic rocks are altered to tremolite-chlorite schist. One vein of asbestos of thickness 2.5 cm is developed trending northeast-southwest. The fibre veins occur in criss cross manner along the joints and fractures and varies in width from 1 cm to 5 cm.

The area about 1.5 km west of Makrera is mostly alluvium covered except four hillocks of ultrabasic rocks that crop out. Mass fibre asbestos of tremolite variety is worked out in the area. The fibrous asbestos veins are very little and forms 15 to 20% of the total asbestos rock won. In the southern hill three small mass fibre in the form of lensoids are seen. Similar type of mass fibre of asbestos are also developed in other hills. The area is workable for mass fibre asbestos of tremolite variety.

Besides above, occurrences of asbestos finding are also reported from northeast of Ranela and northwest of Bemanhera, Lachhipura and Gudas villages. The thickness of mass fibre veins is 0.5 mts to 1 mt. Depth persistence was observed to be up to 2 mts. The asbestos is of actinolite-tremolite variety. There are only two independent leases of asbestos in the distict and several leases ae there in which asbestos is associated with other minerals. A productiono f 3014 tonnes was obtained during 1986 and State has earned a revenue of Rs. 1,03,200 as a royalty and deaadrent from this mineral in the district. There are several industries located at Ajmer, Beawar for manufacturing asbestos cement pipes, boards, jalies, etc.

2. Barytes

The barites occurrences were not reported from the district so far but during the year 1988-89 barytes occurrences were located by the department near villages Tilora and Rewat near Pushkar Teh. Ajmer. It occurs in the form of veins of 10 to 20 mts strike length with 0.50 to 5 mts width at the contact of basic rocks and quartzite. It is coarse grained and buff in colour. Investigations in this area are continued to locate other new occurrences of barites and to find out the extend of already located deposit. Analysis of barites samples indicated to contain 48.36% to 57% BaO and 25.80% to 35.80% SO_3.

3. Calcite

In Ajmer district occurrences of calcite are limited to three places from where it can be mined out for commercial use.

(a) Siliberi-Garad Ka Bariya

Around village Garad-Ka-Bariya the area comprises calc-schist, quartz-hornblende biotite schist and granite. In calc-schist a calcite vein of nearly 1/2 mts thickness is found from which calcite has been excavated. Further 1/2 km east of above occurrence, calcite veins have been developed in calc-schist.

(b) Mundoti

About 1 kms of Mundoti, Teh. Ajmer calcite vein of 0.5 to 8.0 mts have been formed in granite gneisses. It is also associated with crystal quartz. Calcite have also been reported at Bassi, Karla, Lachhipura, Kundal, Kansia and pisagan.

4. Chalk

The department has located chalk occurrences near village Kothi, Nand, Kishangarh and Nagelav. Near Kothi it's occurrences were observed in about 400 x 200 mts area below a soil cover of 10 to 15 cms thick. Near Kishangarh also it is likely to occur in large area. Analysis of chalk in Nand area indicated to contain 29.68% CaO, 26.26% SiO_2 and 10.25% AI O_3 and chalk of Kothi village contains 13.16% CaO, 49.28% SiO_2 and 1.42% AI_2O_3. In Kishangarh area it has 41.15% CaO, 19.44 SiO_2 and 2.83% AI_2O_3.

5. Emerald

Rajasthan is the only state, which produces emerald in India. The occurrence of emald is found to occur along the belt which is extending from Gamgudha (Udaipur) in the south to Bubani (Ajmer) in the north for a strike length of about 200 km. Important location are Kalaguman, Tikhi, Rajgarh and Bubani, of which Bubani and rajgarh are in Ajmer district.

(a) Bubani

The Bubani emerald mine lies between village Muhani and Bubani about 22 kms. from Ajmer. The country rocks are mica schist and amphibolite being intruded by ultrabasic (peridotite) and pegmatites. The metamorphism of the rocks have given rise to talc-tremolite schist, actinolite-tremolite schist and some separate zones of biotite pegmatities. Emerald occurs in schistose ultrabasics or in biotite pegmatites in the form of isolaged shoots or pockets adjacent to main pegmatite-bodies.

(b) Rajgarh

It is located about 15 km southwest of Rajgarh village and about 20 km from Ajmer. The area is occupied by steeply dipping rocks of Delhi Super Group represented by mica schist, quartzite, amphibolite and calc-silicate rocks intruded by ultrabasics, granite and pegmatites. The ultrabasics have been completely metamorphosed into schistos rocks having mineral assemblage serpentine/talc, tremolite, chlorite, etc. Coarse-grained quart rich composit pegmatites are emplaced in garnetiferous mica schist and schistose ultraasics along their foliation and are more or less parallel to schistosity with xenoliths of recrystallised biotite schist. Emerald occurs in isolated shoots and pockets as sporadic crystals of varying size in crystallized biotite schist or schistose ultrabasics only where the pegmatites are emplaced in close vicinity or in thin ultrabasic. At present only Bubani mine is in operation.

6. Quartz and Felspar

Rajasthan is the main producing state of felspar in India and in the state Ajmer is the most important producing district. Quality of felspar produced in Ajmer district can stand in the world market because it is of best quality. It is being exported in powder form.

Rajasthan is the second producing state of quartz in India and quartz is produced mainly in Ajmer district. It is used as refractory, ceramic minerals. Both felspar and quartz are essential consituent minerals of granites and pegmatites. The commercial deposits of quartz and felspar are confined to pegmatites only. Quartz is generally of white colour but at places it is of rosy colour also. Felspar is of buff white and pink colour sand it is mostly perthite microcline variety.

Important deposits of quartz and felspar are new villages, Jawaja, Makreda, Mundoti, Ranisagar, Bhandra sindri, Jalipa Rupa, Jalipa Durga, Kharwe, Tilona, Loharwada, Nasirabad, etc.

7. Garnet

The garnet occurrences in Ajmer district are located in Nad-Sarsari, Sawar, Chaursiyawas and Bandanwara area. In Nad-Sarsari area skain gneisses, amphibolite, pegmatite and garnet-pyroxene schist are exposed. The garnet is grossularite and abrasive type only.

Garnet in Sawar area is found in gneisses and schist spread over 23 sq. km. area around Sawar. The garnet is mostly of almandine variety. The size of crystals vary in size from 1 cm to 6 cm. Garnet occurrences are also reported around chaursiyawas-Makarwali area. It is found to occur in biotite schist. Quality of garnet is most abrasive type. Almandine garnet is also found in schist and gneisses around village Satholiya, Sathavora and Jamoli in Bandawara area. Garnet is mostly abrasive type. Gem variety is also found in the area, which is mostly confined, to thin band of garnet-chlorite schist.

Grossularite has also been noted near Saradhana in Beawar Tehsil, which are mostly abrasive type.

8. Graphite

Graphite occurrences are found near village Dumara-Amba tehsil Ajmer and Lotiyana, Khera Danti tehsil Beawar in Ajmer district Dumara-Amba area is about 12 km southeast in Ajmer. The area comprises quartzite, schist, dolomite ferruginous limestone and calcgneisses belonging to Delhi Super Group. The rocks are further intruded by granite, pegmatite, quartz veins and basic (amphibolites and epidiorites) bodies. Quartz, biotite has been found to be the lithological guide for the occurrence of graphite veins. The thickness of the veins varies from traces to few cms and length reaup the ches 6 mts. The department carried out geological investigation in the year 1960-61, estimated a reserve of 339600 tones of graphite ore with an average of 15% fixed carbon assuming the mineralization to persist up to a depth of 60 mts.

Lotiyana-Khera, Danti area is about 32 kms south of Beawar, which is mostly occupied by schist and quartzites of Delhi Super Group. The reserve in Lotiyana hill up to 90 mts depth was reported to be the order of 1,49,100 tones having 10% carbon content.

Graphite occurrences have also been noted 2 km northeast of Rajore in limestone and about 1.5 km east of Kishangarh in mica schist.

9. Limestone-Dolomite-Marble

There are three belts of limestone and dolomite in the district named as eastern, central and western belts. The eastern belt comprises two dolomite bands occurring near Sawar, Bajta, etc. villages in Kekri tehsil. These bands are folded whose hinge point is at Sawar. The bands extend 10 to 12 kms in strike length and 300 to 500 mts width. The dolomite bands of this belt belong to Sawar Group of Bhilwara Super Group. The analysis of few samples indicated to contain 17.56% to 20.74% MgO, 31.36% to 33.88% CaO and 0.36% to 1.68% SiO_2. It is medium to coarse grained, crystalline and of buff-white colour. At places it is suitable for marble mining. Near villages Umaria, Ghatiali, Ganeshpura, etc. block mining is

done. To explore the possibilities of finding the B.F. grade dolomite investigations are being carried out by the department in this area.

In central belt the limestone bands extend in about 15 km strike length through Sivpura, Kesherpura and Lulwa villages in Beawar tehsil with up to 800 width. Limestone deposit of this belt belongs to Kumbhalgarh Group of Delhi Super Group and forms the high hills. There are two zones of limestone named eastern and western zone separated by calc-schist. There are many bands of cement grade limestone separated by low-grade limestone. The limestone is fine to medium grained, micaceous at places and of bluish gray colour having white bands. Cement grade limestone contains (average) 42.6% CaO, 10% SiO_2 and less than 3% MgO. A big cement plant of 1.2 MT perannum capacity owned by M/s Shree Cements Ltd. has been established near this limestone belt but the present productive capacity of this cement plan is 0.6 MT. About 100 MT reserves of cement grade limestone have been assessed by the lessee so far in the leasehold area. At places micaceous limestone is quarried as slab stones. Towards north limestone of this belt occurs intermittently up to west of Srinagar.

The western belt stretches in about 140 kms strike length from Rupnagar in south to Jhak (Sambar Lake) in north. The limestone occurs intermittently in the form of small outcrops near villages Rupnagar, Saradhan, Govindgarh, Odas, Karnos, Baktawarpura, Kalesara, Sarsari, Kanwalai, Gegal, kayampura, Narwar, Salemabad, Jhak, etc. The limestone is fine grained of pink, cream colours and high grade. At places it is being quarried to be used as sweetener in cement manufacturing. Dolomitic limestone/dolomite are medium to coarse grained, crystalline and of buff, white gray colour. Near Kanwalai white dolomite bands are quarried to be used for imparting white colour in manufacture of white cement. In Kishangarh tehsil at several places it is quarried for lime manufacturing. At few places fine to medium grained, buff coloured limestone having gray bands is also of high grade. At several places in this belt marble mining is being carried out in pink, cream, high grade limestone, white coarse grained dolomite and dolomitic limestone, buff limestone having gray bands and at few places in green limestone also.

Geological investigations are continued in this belt. In Akhri Gegal area whit coarse-grained dolomite is being quarried for making chips and lime. The marble processing units are located at Kishangarh, Ajmer and Kekri. Chips making plants are also located at Kishangarh.

10. Magnesite

In Ajmer district magnesite occurs at Govindgarh, Pisangan, Kotra, Naikalan, Nai Khurd, Samberdanti, Sarupa, Bhilan, Nagalao, Kalidungri and Gadi-Arjanpura of which workable deposits are at Kali Dungri, Negalao and Sarupa area.

(a) Sarupa-Chhaja-Gafa area

The area comprises mica schist, quartzites, calc schist with intercalations of impure limestone belonging to Delhi Super Group. The rocks are further intruded by amphibolites, ultrabasics, granite, pegmatites and quartz veins.

Magnesite occurs in the form of more less uniform parallel veins and remifying veins showing thickening and thinning in peridotite. Thickness of veins varies from hair thin size to a maximum of 10 cms. total reserve available in the area is nearly 148899 tones.

(b) Kali Dungri area

The magnesite bearing rocks lie just west of Kali Dungri village and the area has been granted under lease to Shri Jaidev Prasad Sharma (ML 13/75). Biotite schist calc gneisses and dolomite limestone belonging to Ajabgarh group of Delhi Super Group are exposed. Intrusion of periodite is seen just west of village Kali Dungri and mineralization of magnesite occur in peridotite along joints and fractures.

The magnesite veinlets are 0.2 cm to 5 cm thick, which increase gradually with depth up to 10 cm. The total reserve of magnestite up to 10 mts depth may be inferred to be of the order of 0.29 million tones with average ratio of magnesite of host rock taken as 1:15.

(C) Negalao Area

The area is nearly 2 km SW of Nagalao. The area comprises calc-gneisses, schist of Delhi Super Group intruded by peridotites. Magnesite is developed in criss-cross manner along joints and fractures along with amphibole asbestos in altered pericotite. Approximate reserve in the area is of the order of 3.15 M. Tones.

Magnesite occurrence has also been located near village Kundal, it is found at a depth of 1 to 8 mts below surface and continues up to 7 mts in a lenticular body of altered ultrabasic rock within mica schist. Magnesite constituent about 10% in the host rock. The other minor occurrences are at Gadi-Arjunpura.

11. Mica

Mica bearing pegmatites occur at Arain, Dadiya in Kishangarh tehsil, Bagsuri, Ramsar, Tiyari in Ajmer tehsil, Bagera-Tunia, Para in Kekri tehsil and Kesarpura in Beawar tehsil. Bagsuri mica area is the important deposit.

12. Soapstone

In Ajmer district all the known occurrences of soapstone are in ultrabasic rocks. The soapstone is mostly of insecticide grade. Near village Guda soapstone is found to occur in ultrabasic altered to talc-antigorite-chlorite schist. The width of soapstone band varies from 5 to 8 mts. Further NNE of Guda soapstone of the similar nature is found in altered ultrabasic rocks.

About 1 km southwest of village Lachipura the ultrabasic rocks have been metamorphosed to talc-antigorite schist, which yield soapstone of low grade. During the year 1988-89 the department have located soapstone occurrences near village Hokarn Bari in Pushkar valley. The investigations are continued in the area.

13. Vermiculite

Vermiculite is known to occur in Bhoraj and Hatundi-Lachipura area in Ajmer district. In Hatundi-Lachipura area vermiculite is associated with a series of highly folded and contorted rocks consisting of altered peridotites, talc schist tremolite serpentine rock, mica schist, hornblende schist and garnet-biotite schist intruded by vein quartz and pegmatites along their foliation planes. Vermiculite occurs in along the foliation plane in form of irregular aggregates and show considerable variation in length and width. The reserve in the area is approximately 5700 tones up to 10 mts depth. Vermiculite expands 5 to 8 times and it's quality may be improved according to the tests conducted by Indian Institute of Science, Bangalore after exfoliation.

14. Wollastonite

During the year 1988-89 departments has found the indications of wollastonite in Dandiya, Gola-Gigalpura, Alipur-golav area and the investigations are continued to know the extent of mineralisation along with quality.

15. Building Stones

Micaceous quartzite is being quarried near Kishangarh, Srinagar, Liri villages to be used as roofing stone Nepheline syenite occur near Kishangarh, Harmada and Buharu villages. The mining leases are granted int eh name of granite for Buharu and Harmada syenite deposits. In Dewas area of Beawar tehsil pink and gray aplite occurs intruded within charnokites.

16. Other Minerals

Occurrences of china clay have been reported near village Nagi-Mayla tehsil Beawar. In Ajmer district kyanite has been reported near Nandaoria, Gudas, Srinagar, Gaddi, Arjunpura in tehsil Ajmer and also near Kishangar. Kyanite occurrences has also reported near Kalidanti-Mayla tehsil Beawar associated with biotite schist. Occurrences of fluorite have been located by the department near village Mundoti and Tilora. Fluorite of violet colour occurs intermittently in the pegmatites and granites. Detail investigations are being carried out.

(b) Metallic Minerals

Though there are no workable deposits of metallic minerals in the district but there are some occurrences of iron, lead, zinc, copper and their old working different places.

1. Iron

Iron mineral i.e. hematite occurs in quartzite near village Manjevala tehsil Ajmer. Old mining pits are observed in the mineralized zone. Old workings are also seen near Nand.

2. Lead-Zinc

Old working for lead have been reported at the base of Taragarh hill in Ajmer city associated with Alwar quartzite near Satana in ultrabasic rocks and

Sawar in dolomites belonging to Bhilwara Super Group. Investigations for lead mineralisation are being carried out by G.S.I. near Ghoogra village and substantial reserves are likely to be assessed.

3. Copper

Indications of copper mineralisation in the form of malachite coating are observed near Jail, Rajori and Sawar villages. In Sawar area investigation for copper are being carried out by G.S.I.

Gossan and scattered heaps of slag were found near village Gafa. Two gossanised zone were seen near Gafa occurring in amphibolite with wall rock alteration. Old pits are also there in gossan. Samples of gossan and slag for analysis have been collected by the department. After analysis further investigations will be carried out. Occurrences of skarn rock with minor grains of scheelite have been located near Sarsari, Nagalao tehsil Ajmer. Detailed investigations are being carried out. Minor occurrences of lithium metal has been reported from lepidolite, spodumene, amblygonite near Rajgarh.