$$k_{obs}.\ C = k_1 (C - [CpL]) + k_{ip}[CpL] \quad (1)$$

where C the stoichimetric concentration of the complex salt and [CpL] represents the ion-pair concentration; k_{ip} and k_1 are ion-pair and the uncatalysed rate constants respectively.

The values of [CpL] were calculated from (2). The method of calculation has been described previously[5].

$$[CpL]^2 - [(C + C_A - [HL^-] - [H_2L]) + K/f_2^2][CpL] + C(C_A - [HL^-] - [H_2L]) = 0 \quad (2)$$

C_A and C_B and the stoichiometric concentrations of the dicaroxylic acid and sodium hydroxide respectively while f_1 and f_2 are the activity coefficients of unti-and divalent ions. k_{ip} were calculated using (1).

The kinetic data for different experimental conditions, beside the mean values of k_{ip}/k_1 are shown in the table given, while figure 1 shows the plot of k_{ip}/k_1 against K for five different dicarboxylates (solid circles) which seems now to be mixed with the other

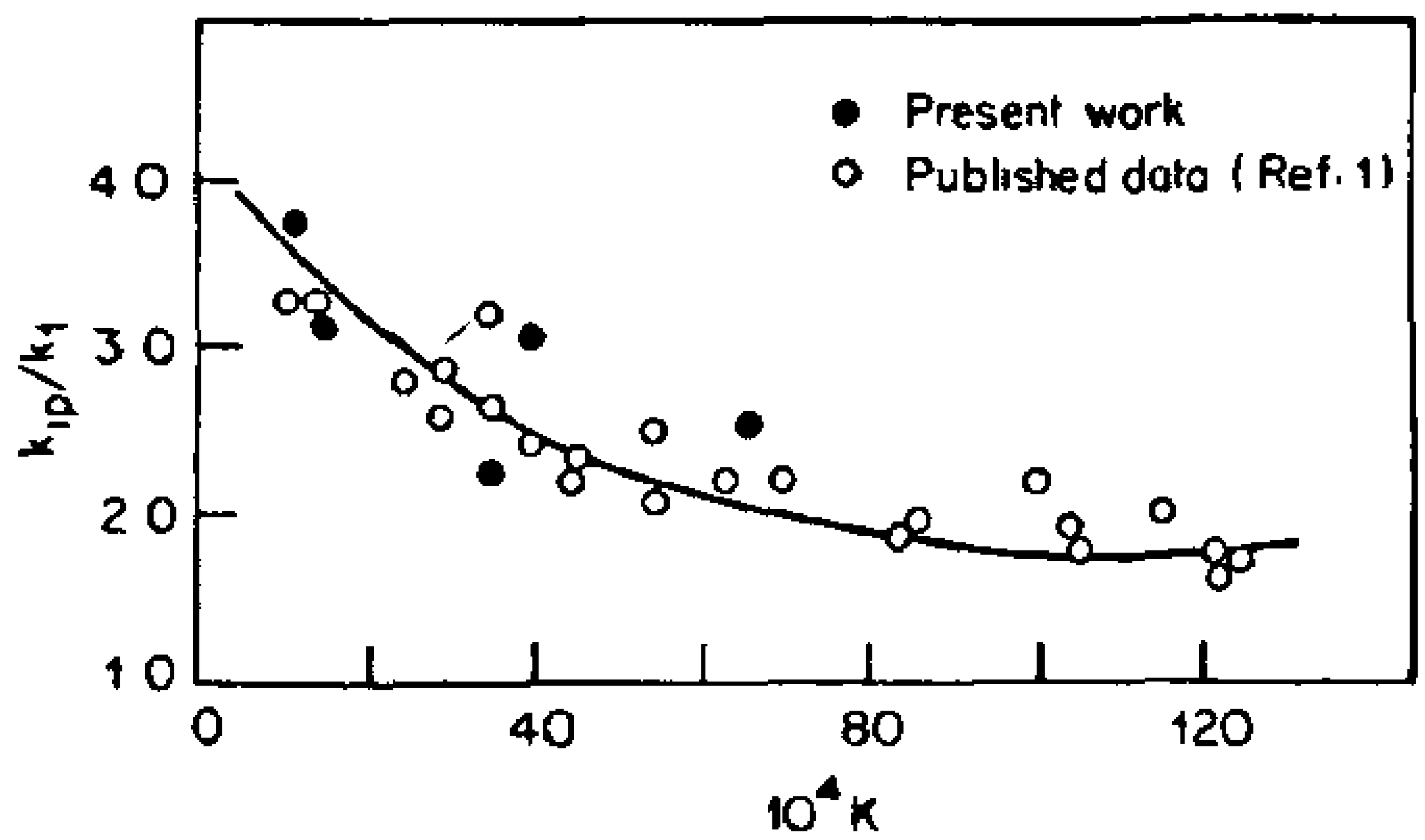

Figure 1. Plot of k_{ip}/k_1 ratios against K values.

published data[1] (open circles) and this conclusion solves the problem created before[1] as a result of the higher scattered values of k_{ip}/k_1 in the emperical correlation with K. Due to the new finding, a smooth curve could now connect the different points in figure 1 for different complexes in different dicarboxylate media.

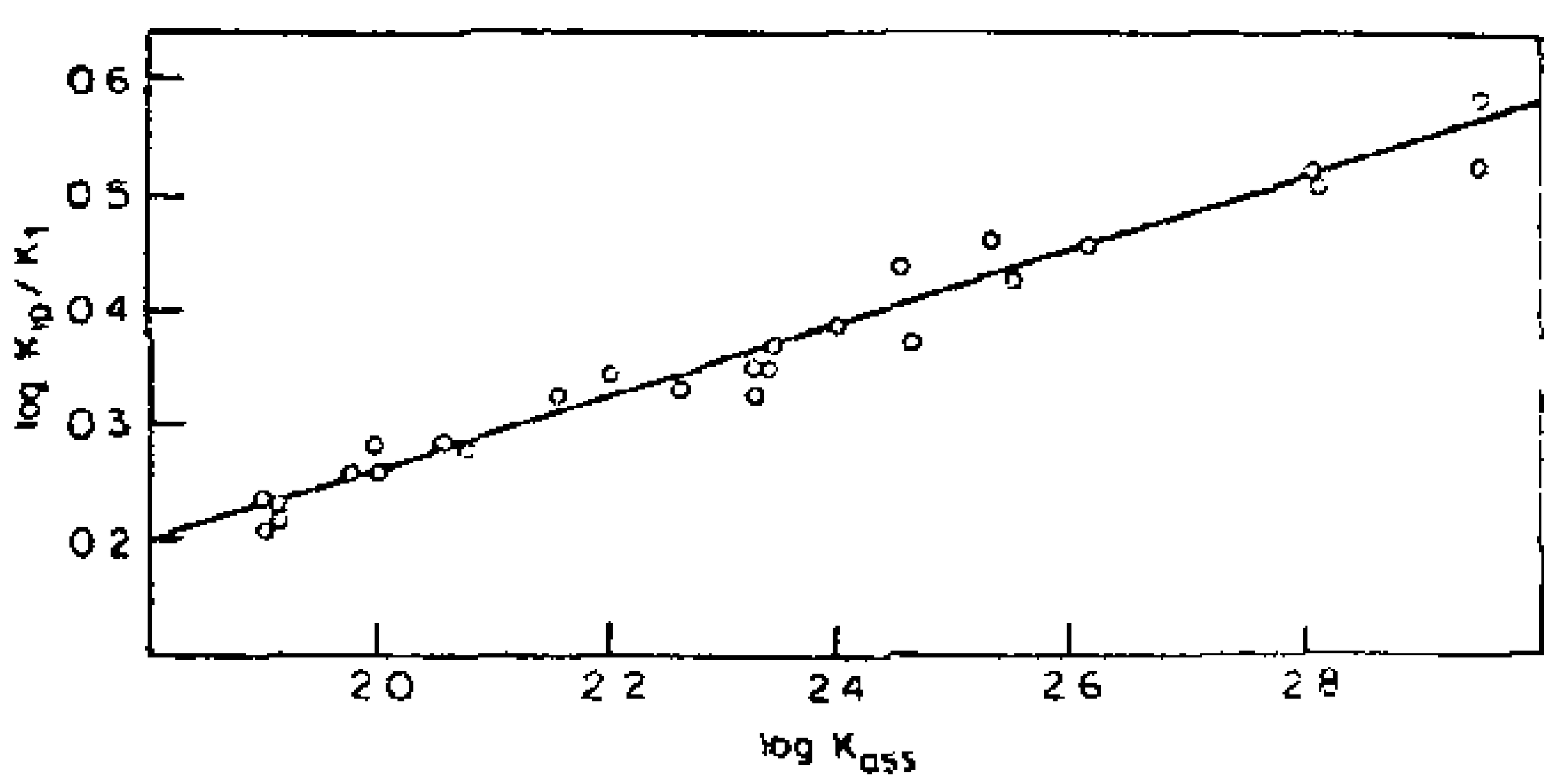

Figure 2. Dilogarithmic plot of k_{ip}/k_1 and K_{ass} for different dicarboxylate media.

A new empirical correlation between k_{ip}, k_1 and K_{ass} has been tested by analysing the data in figure 1, where the dilogarithmic plot of k_{ip}/k_1 and K_{ass} gives a straight line as shown in figure 2; the correlation coefficient being 0.981. This new correlation which fits for most of the data in figure 1, can be represented as,

$$k_{ip} = 0.502\ k_1\ K_{ass}^{0.28}.$$

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SIGNIFICANCE OF ALBITE RIMS AROUND FELSPARS IN THE MIGMATITES OF SARAHAN BUSHAIR AREA, HIMACHAL PRADESH, INDIA.

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Rims of albite (An_4-An_9) have been observed around oligoclase and the potash felspars in the migmatites around Sarahan Bushair (31° 30′ 27″: 77° 47′ 58″) in Himachal Pradesh. The migmatites belong to Jutogh Formation and have been classified into foliated-, augen-, biotite gneiss and leucocratic muscovite gneiss[1]. Petrographic features like sericitization, decalcification, antiperthitic, perthitic, albite rims around plagioclase and potash felspars and myrmekitic intergrowths, etc have been observed. The migmatites were formed by metasomatic migmatization of metapelitic, metasemipelitic and metapsammitic country rocks[1].

Megascopically, the albite rims are not clearly visible. In thin sections, these are commonly seen in augen migmatites and biotite gneisses, encircling the plagioclase felspar (An_{18}-An_{27}) (figure 1) and K-felspar and measuring in thickness from 0.07–0.16

Figure 1. Showing untwinned plagioclase developing twinned albite rim against microcline in augen migmatite (crossed nicols).

mm. The albite rims contain 4–9% anorthite content and are twinned on simple albite law. On the contrary, the oligoclase is mostly sericitized and contains inclusions of quartz, sericite, muscovite, epidote and other minor minerals. Commonly, the oligoclase, having albite rims is either partially or wholly enclosed by potash felspar (figure 2) or the latter is in direct contact with the former (figure 1). Mehta[2] made similar observations in the migmatitic gneisses of Kulu area. The content of plagioclase felspars was determined by Michel-Levy method in thin sections alongwith indices of refraction and optical sign. Optical determinations were carried out employing Leitz 4-axis universal stage.

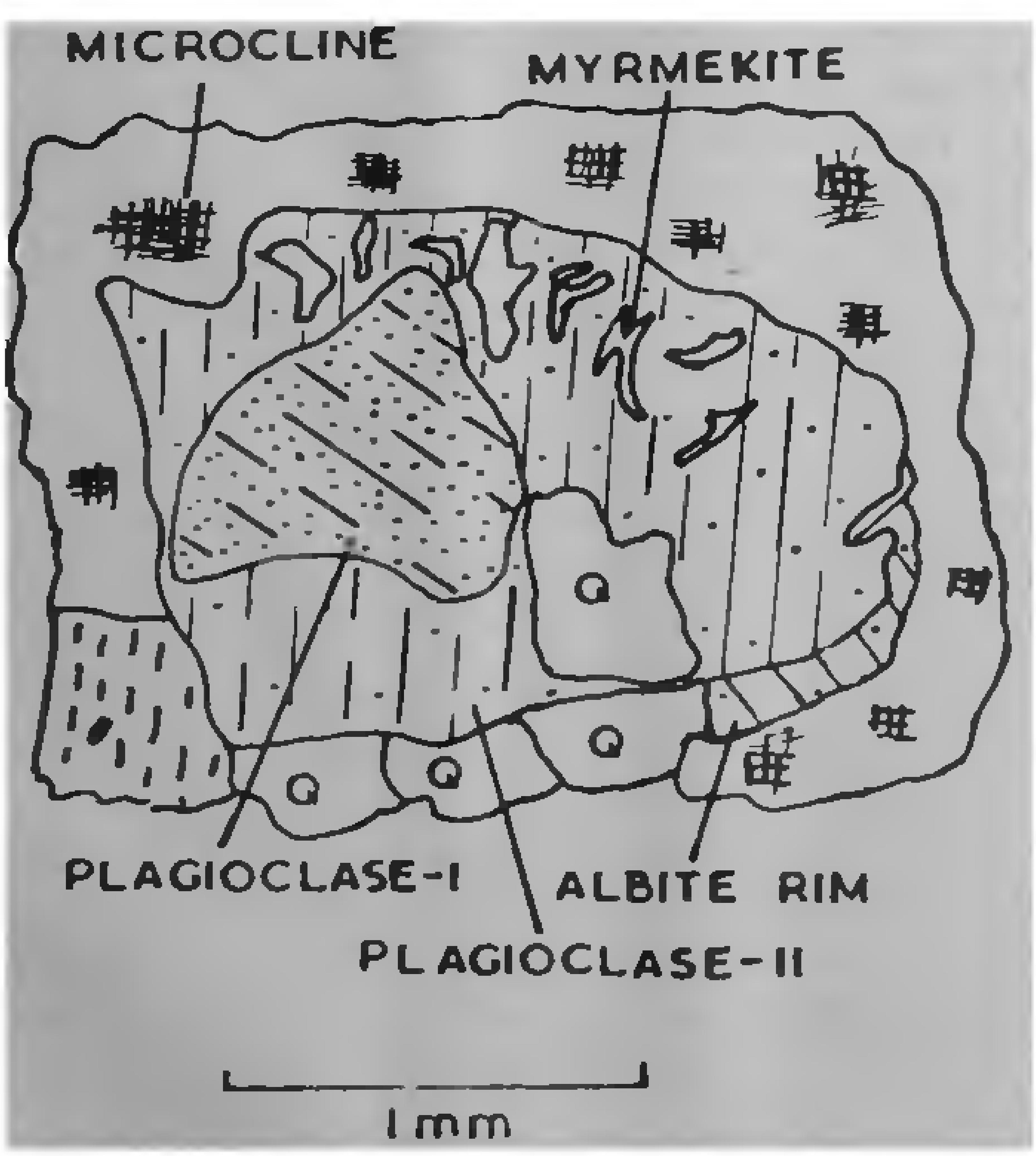

Figure 2. Showing development of albite rim around plagioclase-II formed during early soda metasomatism. Plagioclase-II is enclosed in later formed *K*-felspar (microcline) during potash metasomatism.

Practically, all albite in Sarahan migmatites occurs in the form of rims which are younger than oligoclase or as films and veins in perthite[1]; there are no independent grains of albite. There is no evidence of its being a product of late magmatic crystallization or of direct crysallization from soda influx associated with potash metasomatism as suggested by Marmo[3]. Albite of rim is clearly secondary in nature, but nothing can be said with certainty about the origin of solutions producing albite[4]. It is observed that in Sarahan migmatites, the formation of albite rims around oligoclase is linked with the general process of potash metasomatism during which soda is derived from the earlier formed plagioclase (formed during early Na-metasomatism) now being replaced by the growing potash felspar (formed during later *K*-metasomatism). The origin of sodic phase, can be explained by the following equation:

$$\underset{\text{Plagioclase}}{\underline{4(CaO.\ Al_2O_3.\ 2SiO_2.\ Na_2O.\ Al_2O_3.\ 6\,SiO_2)}} + \underset{\text{K-felspar}}{\underline{(K_2O.Al_2O_3.\ 6\ SiO_2)}}$$

$$+ Al_2O_3 + H_2O \rightarrow \underset{\text{Epidote}}{\underline{(4CaO.\ 3Al_2O_3.6SiO_2.\ H_2O)}} + \underset{\text{Sericite (Muscovite)}}{\underline{(K_2O.\ 3Al_2O_3.\ 6\,SiO_2)}}$$

$$+ \underset{\text{Albite}}{\underline{4(Na_2O.\ Al_2O_3.\ 6\,SiO_2)}} + \underset{\text{Quartz}}{\underline{2\ SiO_2}}$$

The presence of albite rims around felspars signifies repeated metasomatism the rocks have suffered. The first phase of Na-metasomatism resulted in the formation of oligoclase which underwent replacement by the potash felspars formed during the second phase of *K*-metasomatism. The plagioclase undergoing replacement gets sericitized, decalcified and epidotised. Ca released during the process goes to form epidote. Subsequently the Na, so released resulted into a released sodic phase in third phase, during which secondary albite rims around felspars and vein perthites in migmatites were formed as the potash felspars underwent replacement by the sodic solutions.

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NOTE ON THE OCCURRENCE OF DINOSAURIAN FOSSIL EGGS FROM INFRATRAPPEAN LIMESTONE IN KHEDA DISTRICT, GUJARAT

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In the course of mapping during the field season 1981-82 the author collected six spherical fossil eggs from the upper horizons of the Infratrappean Limestone (Lametas) in the area north of Balasinor in Kheda district, Gujarat (figure 1).

Figure 1. Dinosaurian fossil eggs showing outer calcitic shell

The diameter of these eggs is uniformly about 12 cm. These fossil eggs are represented by limestone with very little calcareous clay and are enveloped by thin calcitic shell cover about 1-2 mm thick. The thickness of the shell is very uniform in all the eggs. The shell is damaged and fragmented before fossilisation as evident from the nature of the shell fragments.

The shell is chocolate brown in colour without glaze. The damage inflicted on the shells due to subsequent recrystallisation and secondary silicification has obliterated most of the morphological characters. The external surface differs from the internal (mammilary) surface and is characterised by equally spaced fine isolated tubercles. These tubercles (nodes) project out as semi spherical nodes and at times the cast of these nodes are present. The internal surface shows granulated texture and at time spongy spicules are also noticed.

Under the scanning electron microscope (SEM) the external surface differs from the internal (mamillary) semispherical nodes (tubercles). They are equally spaced, isolated and are rarely of coalescing type. These are surrounded by spongy mass at times with depressions. The broken nodes show horizontal growth layers of biocalcite. The pores mostly circular to semicircular in outline and rarely polygonal, are very much present in the so called horizontal growth layers.

The internal (mamillary) surface is characterised by fine mamillary knobs and at places resorption craters too are visible within these mamillary knobs. The knobs are surrounded by some curvillinear disconnected grains.

The vertical section displays basal mamillary zone and overlying zone with prismatic layering. Some spongy mass is also present in between. Very narrow vertical to sub-vertical, at times very irregular canaliculae, are also present.

The occurrence of Upper Cretaceous egg shells have been reported from China, Mongolia, Brazil, Peru, Montana, Utah and European Mediterranean. In India the dinosaurian egg shell fragments have been reported by Prof. Ashok Sahni from Lameta beds of Jabalpur. The discovery of complete egg shell fragments by the author in the present area has opened new vistas for studying the nesting habits of the extinct dinosaurs and palaeopathological condition of these eggs. The mode of occurrence of these fossil eggs and their state of preservation suggests their autochthonus nature of occurrence. The dinosaur must have dug shallow holes and laid the eggs, a typical behaviour found mostly in reptiles. The state of preservation of these fossil eggs suggests that they had not been hatched. Further detailed studies are necessary to understand the actual position. The discovery of dinosaurian fossil bones in the close proximity has made it more interesting. The detailed study (under progress) would throw light on the nesting habits, habitation and the probable causes for the extinction of once dominating dinosaurs.

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