

the FKN mechanism the initial decrease of  $t_{in}$  by increasing  $[Br^-]$  can be explained by the formation of  $HBrO_2$  from the reduction of  $BrO_3^-$  by  $Br^-$  through step  $(R_3)$  of the mechanism followed by reactions  $(R_5) + (R_6)$  leading to the autocatalytic state. However, when  $Br^-$  is in excess the overall reaction (A) results in greater concentration of  $BrMA$ . The FKN mechanism assumes a shortening of induction period if  $BrMA$  is added to the system<sup>6</sup>. Thus the increase of  $t_{in}$  with increase of  $(Br^-)$  (portion RS of the curve) is not explained by the FKN mechanism. It seems  $Br^-$  formed by the oxidation of  $BrMA$  by  $Mn^{3+}$  inhibits the autocatalysis through  $(R_3)$ .

With increase of bromide ion concentration the time period,  $t_0$ , remains constant till  $(Er^-)$  showing minimum  $t_{in}$  is reached. The  $t_0$  may be assumed as the time interval between two consecutive utocatalytic states. The reaction steps intervening this period involves (i) the disproportionation of  $HBrO_2$  forming  $Br_2$  through  $(R_4) + (R_1)$  followed by the bromination of malonic acid  $(R_3)$ , (ii) oxidation of  $BrMA$  so formed by  $Ce^{4+}$  or  $Mn^{3+}$  ions liberating  $Br^-$  excess of which inhibits reaction (B) through reaction  $(R_2)$  and (iii) consumption of  $Br^-$  through (A) leading to its depletion followed by the onset of autocatalytic state. It seems with excess  $Br^-$  enough  $BrMA$  is formed which on further oxidation regenerates  $Br^-$ . The greater amount of regenerated  $Br^-$  allows for greater inuction period when a longer steady state is obtaining between two competing reactions for  $HBrO_2$ ,  $(R_2) + (R_1)$  on one hand and  $(R_5) + (R_6)$  on other.

No oscillation is observed when  $[Br^-]/[BrO_3^-] \geq 2$ . Major oscillations are not obtained when  $[Br^-]/[BrO_3^-] > 1$ . The first observation can be rationalised by the consumption of  $BrO_3^-$  due to the stoichiometry of reaction (A). When  $[Br^-]/[BrO_3^-] < 2$  some  $BrO_3^-$  is available for further reaction.

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### ON THE DEPOSITION OF MANGANESE AND OTHER METAL COMPOUNDS ON THE STONES IN RIVER BEDS

THERE has been considerable scientific<sup>1,2</sup> popular<sup>3</sup> and commercial interest, lately, on the metal compound deposits on the ocean floor. We have observed that deposits of metal compounds take place even on the river beds, in some selected areas. This observation was made on stones from some parts of river Tunga (a tributary of Tungabhadra, and of Krishna) at Sringeri, Karnataka State, India (13° 25' latitude, 75° 15' longitude). We found that many of the stones were black in colour, only in certain areas of the river. Closer examination revealed that the black colour arose from superficial deposits of metal compounds on quartz pebbles. Qualitative analysis indicated that the stones themselves after leaching did not have manganese or iron. In Table I, are given the amounts of manganese and iron on the black stones picked up at random in the place of their abundance.

The stone samples were leached with aqua regia and the extracts were made up to known volumes and used for atomic absorption spectroscopic measurements. The values reported in Table I are the mean values of three measurements.

In Fig. 2 are plotted the amounts of the deposits of manganese and iron as a function of the surface area of the stones. Whereas a rough correlation exists between the surface area and the deposits of manganese on different stones, such a correlation was not found with iron. The Deposition of iron versus manganese on individual stones, plotted in Fig. 1 also shows no significant correlation.

In conclusion it can be stated that the deposits are purely superficial in nature. Manganese gets deposited on the surface of pebbles possibly because of micro-biological activity at the time of deposition. The deposition of iron is random and could be from the suspended iron oxides and other iron compounds in water.

TABLE I

Amounts of manganese and iron found on the stones and other calculated parameters

Sl. No.	Wt. of the rock (gms)	Surface area (SA) (cm <sup>2</sup> )	Manganese (Mn) (mg)	Iron (Fe) (mg)	Mn/SA (ppm)	Mn/Wt (ppm)	Fe/SA (ppm)	Fe/Wt (ppm)
1.	375	187.9	9.3	2.36	49.49	24.80	12.54	6.285
2.	62	48.1	4.59	34.63	95.43	74.03	719.9	558.5
3.	74	64.1	3.54	86.87	55.23	47.84	1255.0	1174.0
4.	65	41.75	2.86	106.2	68.50	44.00	2544.0	1634.0
5.	84	69.00	13.70	649.8	198.6	163.1	9417.0	7736.0
6.	92	77.80	3.92	14.19	50.39	42.61	182.4	154.2
7.	50	39.50	1.50	33.40	37.97	30.00	845.5	668.0
8.	126	82.50	5.66	55.05	68.61	44.92	667.3	436.9
9.	211	125.00	5.56	2.52	44.48	26.35	20.16	11.94
10.	350	182.0	4.90	29.64	26.92	14.00	162.90	84.68

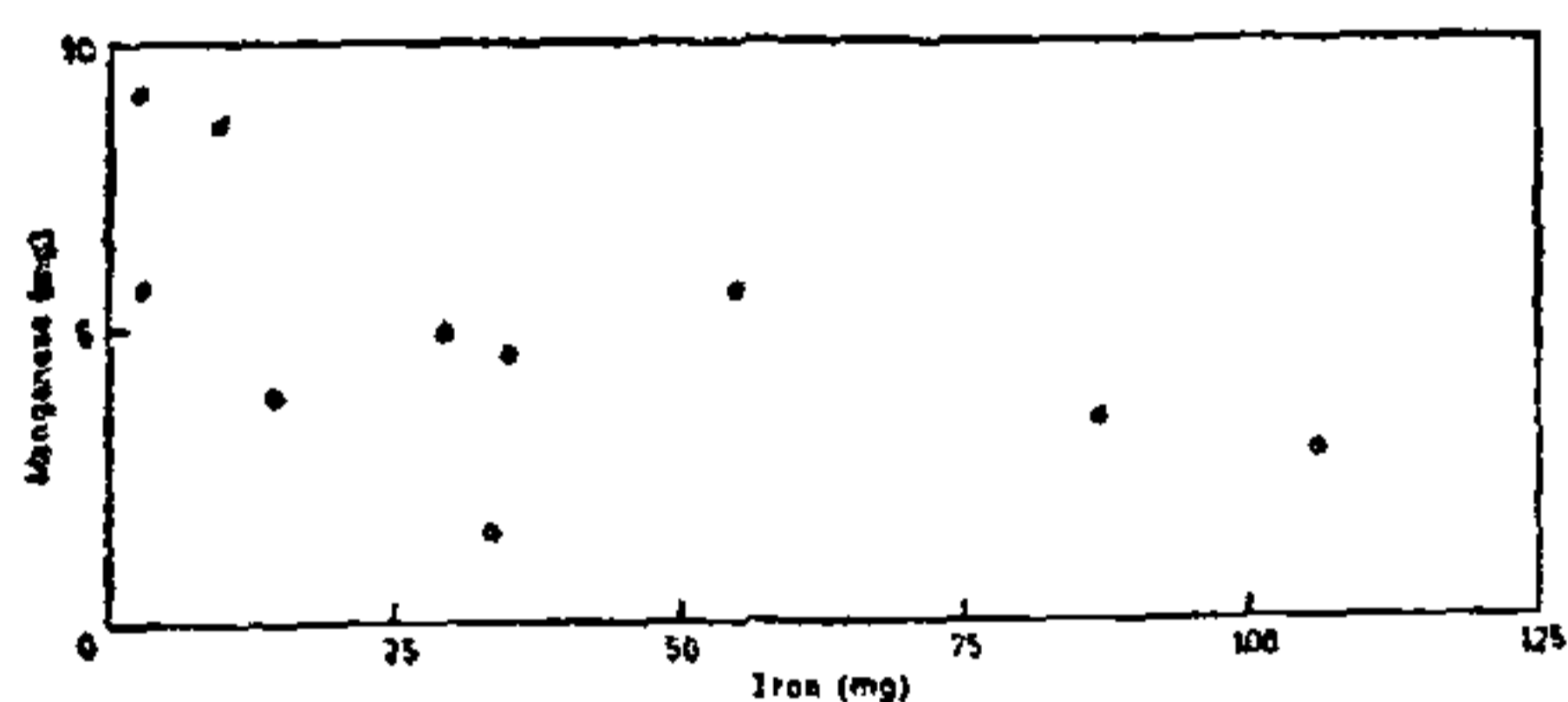


FIG. 1. The plot of total manganese versus total iron found on each sample.

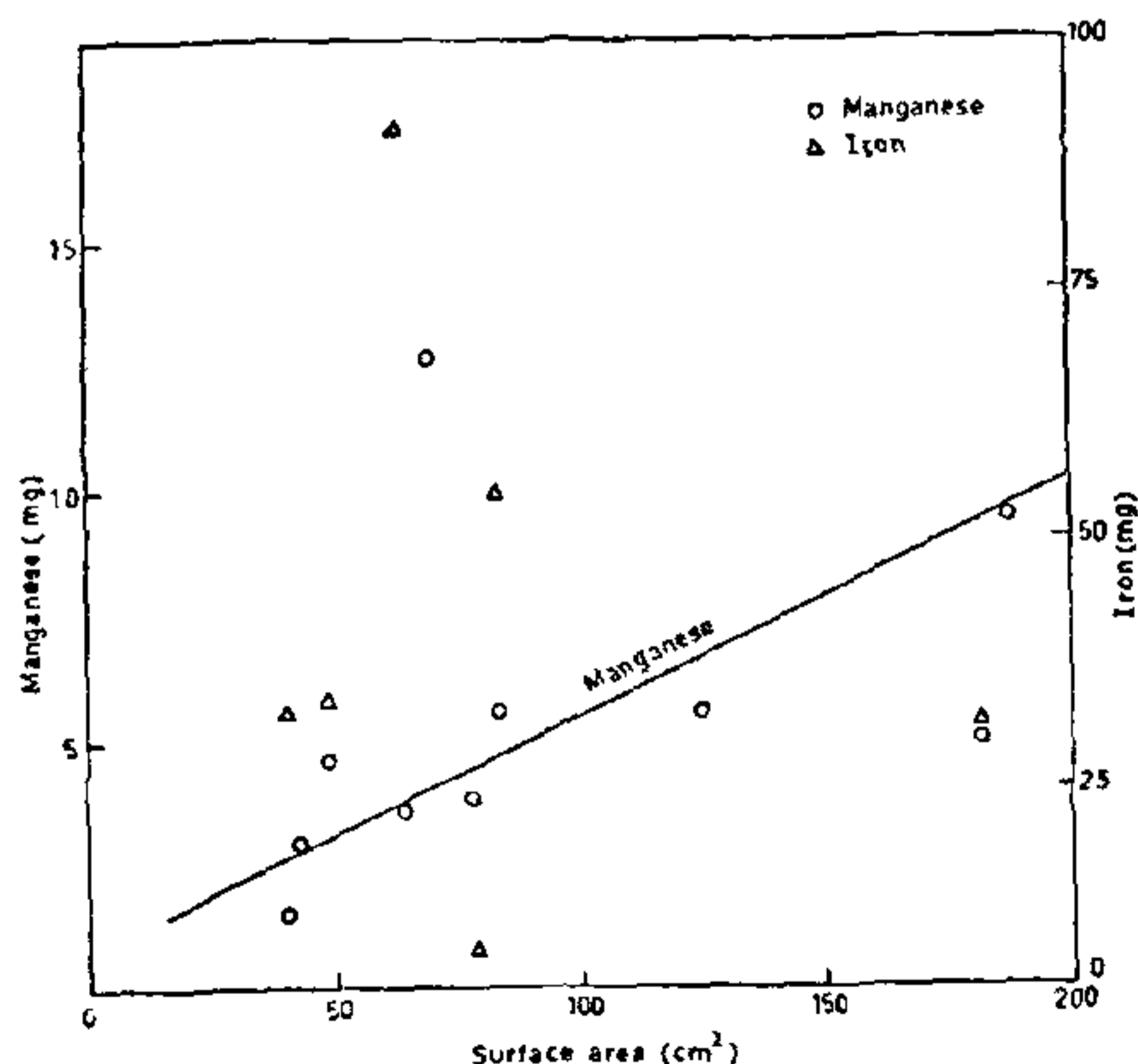


FIG. 2. The plot of total manganese and iron versus the surface area of the samples.

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#### A REVIEW OF STRATIGRAPHIC SIGNIFICANCE OF MEYERIPOLLIS BAKSI AND VENKATACHALA IN ASSAM-ARAKAN BASIN

*Meyeripollis* Baksi and Venkatachala is one of the important fossil palynomorph taxa in the Tertiary sediments of Assam-Cachar-Tripura region. Meyer<sup>12</sup> reported the occurrence of the fossil for the first time from India, in the subsurface Barail sediments of Nahorkatiya oil field of Upper Assam. Subsequently Baksi<sup>1,2</sup>, Ghosh, *et al.*<sup>11</sup>, Salujha *et al.*<sup>14</sup>, Banerjee, *et al.*<sup>7</sup>, Sein and Sah<sup>15</sup> and others noted the occurrence of *Meyeripollis* from different parts of Assam. Sahe and Dutta<sup>13</sup>, however, did not mention the taxon in their synthesis of palynological data of the region.

Biswas<sup>8</sup> and Baksi<sup>3</sup> have recorded the taxon from the subsurface Burdwan Formation of West Bengal. The former has referred to this form as *Lygodium dubia*.