

ON THE OCCURRENCE OF PHOSPHATIC LIMESTONE IN CHATTISGARH BASIN OF EASTERN MADHYA PRADESH

P. G. ADYALKAR, P. N. PHADTARE AND K. RAMANNA
Central Groundwater Board, Nagpur

The Chattisgarh sequence of the Purana period in Madhya Pradesh, covering parts of Raipur, Durg, Rajnandgaon, Bilaspur and Raigarh districts, forms the saucer-shaped basin of about 37,000 sq. km, comprising conglomerates, orthoquartzites, sandstones, shales, limestones, cherts and dolomites with an aggregate thickness of more than 1,500 metres.

The following geological sequence in the basin is based on the systematic geological mapping and hydrogeological survey carried out by Dutt (1963) and Adyalkar *et al.*, (1972) respectively in the southern part of the basin.

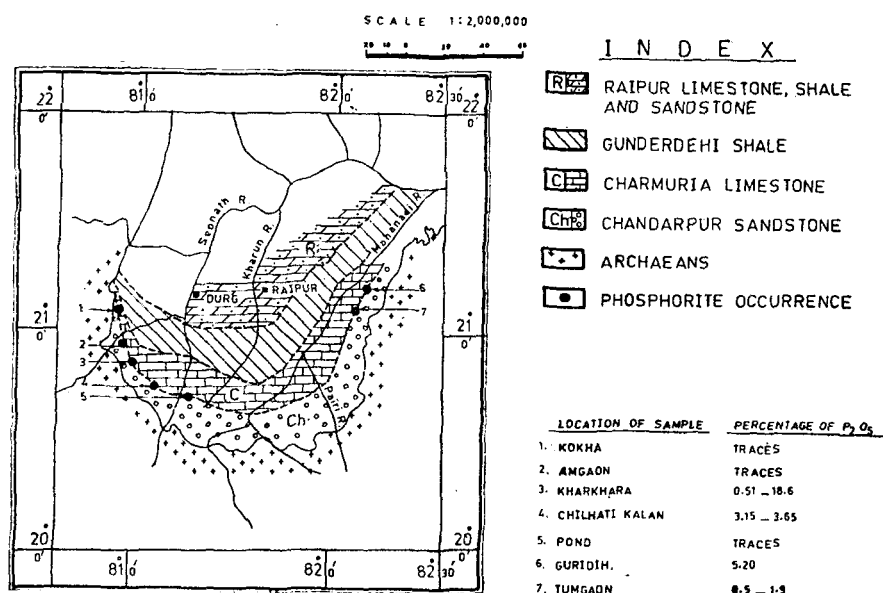
TABLE I

Formation	Thickness (in m)	
Shales, limestones and dolomites	> 100	?
Sandstones and shales	25	} Raipur Stage
Grey and purple stromatolitic limestones with intercalations of shales and dolomites	450	
----- Unconformity ? -----		
Purple calcareous shales with lenses of sandstone towards the middle	260	Gunderdehi Stage
Flaggy, dark grey limestones with intercalations of phosphatic shales, cherty towards the base	250	Charmuria Stage
Siltstones with phosphatic shales, shaly sandstones, subarkoses, orthoquartzites, grits and conglomerates	200	Chandarpur Stage
----- Unconformity -----		
Archaean Gneisses, etc.		

The upper shale beds from the Chandarpur stage and the lower shale bands with intercalated chert beds from the Charmuria stage are both phosphatic. Besides these, concentration of phosphorite is also noticed in the intercalated green shale bands with fragmentary dark green inclusions in the argillaceous limestone of the Raipur stage. Of these two, the latter is only of academic interest, as the occurrences are too small and of very sporadic nature.

The phosphatic shales occurring along the contacts of the Chandarpur and the Charmuria stages are indeed very extensive and are traceable over an arcuate distance of at least 250 km along the eastern, southern and southwestern fringe of the basin. The average thickness of the band so far noticed is about 5 m with low centripetal dips of 2° to 4°; the outcrop assumes an average width of nearly 100 m. The formations are soft enough to be concealed under the soil cover, and exposed only in well and canal sections and *nala* cuttings. The percentage of P₂O₅ varies from 0.51 to 18.60, the richer grades being confined to shaly portions from the Chandarpur stage.

The phosphatic rocks are restricted mainly to the contact zone of the Chandarpur and the Charmurias. As discussed earlier, this zone comprises sediments deposited in relatively quiet water environment with little disturbance by currents or waves after deposition. The disseminations of pyrite grains in the intercalated cherts and cherty limestones suggest deposition in a reducing and oxygen-deficient environment. Presence of chert bands suggests more acid environment than that responsible for calcite. The metasediments and igneous rocks of Archaean age bordering the basin might have been the source rock for deposition of the phosphatic material.



Geological map of part of Chhattisgarh basin. Madhya Pradesh showing occurrences of phosphorite.

The occurrence of phosphorite is fairly extensive but restricted to the contact zone of the formations of Chandarpur shales and Charmuria limestones. The content of P₂O₅ is highly irregular. Within a short distance, P₂O₅ is found to vary from 0.51 to as much as 18.6 per cent. A systematic search with the help of large scale pitting, trenching and shallow drilling will undoubtedly help in locating any promising zones of superior workable grade. The low grade varieties can perhaps be directly used as fertilizer.

About 20 per cent of the phosphorite zone is covered by the Mahanadi alluvium (Adyalkar *et al*, 1972). As rock phosphate is not readily soluble in water, the washed away phosphorite deposit might have been concentrated as nodules and lenses in the river alluvium; and it may be worthwhile to make search for such deposits in the vast stretch of the alluvial deposits of the Mahanadi and its tributaries.

References

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