

ANCIENT COPPER WORKINGS : SOME NEW ^{14}C DATES

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Some organic samples from ancient copper workings in Rajasthan, Gujarat and Andhra Pradesh have yielded ^{14}C date, out of which the earliest goes back to the Mauryan times (c. 300 B. C.) and the latest to the early Medieval Period. (c. 1000 A. D.) Copper has been used extensively even during proto-historic times in these regions, but no ^{14}C dates are available so far. For the first time, the antiquity of some-mining areas go back to early historic Period. An attempt is made to give a connected historic background along with resultant effects of socio-economic impact of mining and knowledge of metallurgy for the advancement of material life of the Period. Further samples from proto-historic sites may yield ^{14}C dates and add information on mining and metallurgy of the period.

INTRODUCTION

Copper was known and used from the pre-Harappan times, but the sources exploited for ancient copper have been difficult to locate. In the absence of ^{14}C dates, some efforts have been made by Agrawal¹ and Hegde² to locate the protohistoric mining areas by comparing trace impurity patterns of known ore bodies and the chalcolithic artifacts. From these studies it appears that the Khetri belt was exploited both by Harappan and the chalcolithic cultures.

Recently efforts have been made to collect organic samples for directly dating the ancient workings. We present here all the ^{14}C dates measured so far for old copper workings. Though none of the ^{14}C dates (Table 1) presented here belong to the protohistoric period, yet they provide a new chronological evidence. For the first time, we now know the definite antiquity of some mining areas.

We will briefly discuss below the evidence of ancient workings, their historical background, their socio-economic impact and their chronology.

EVIDENCE OF ANCIENT WORKINGS

There are extensive chalcocopyrite copper ore deposits in the Aravalli region. Khetri, Babai, Singhana, Dariba, Devbari and Kotri are some of the important sites of the ore deposits of the region. At Khetri, Singhana, Bairat and Babai, the ore deposits are associated with ancient mining and metal smelting³.

Ancient copper ore workings with large heaps of copper slag have been recorded at and near Rohira⁴ in Sirohi, bordering the Banaskantha District of Gujarat. In recent times existence of ancient copper workings have also been reported in the former Danta State⁵, extending over a kilometre along the summit of a ridge running north-west from Ambamata, parallel to the road to Mount Abu. Indications of copper mining and smelting have also been found near Dariba (Bikaner) and Dariba (Udaipur). It appears that the word *Dariba* was generally used to denote ancient copper mining and metallurgical camps.

At Agnigundala, District Guntur (A.P.), old copper workings are spread over more than 3 kms. The mining activity is indicated by rock dumps, ore dumps, pounding stones (pestles and mortars), washing tanks, tailing dumps, smelting furnaces, slag dumps, crucibles, etc⁶. One can observe the remains of all phases of winning metal right from mining to crushing and smelting. In some places, open cost mines reached depths upto 30m.

No datable objects were found at Agnigundala. But now Bandlamottu hill, in the same range, has given a ¹⁴C date.

HISTORICAL BACKGROUND

Evidence⁷ of foreign travellers during c.200 B.C.—150 A.D. attests to the fact that copper was abundantly available in India and that the metal was also exported. Pliny speaks of copper as one of the chief products of India, in addition to iron and lead arriving at Carmanian Port, on their way to Persian Gulf. It was further confirmed by the author of *Periplus of the Erythrean Sea* who included copper as one of the items of export from the Port of Barygaza (Broach) to the Persian Gulf. Perhaps the metal was extracted in the region around Aravallis and then transported by road to Broach (ancient Barygaza) for exporting to the regions of Persian Gulf and West Asia by sea.

EMERGENCE OF TOWNS ALONG COPPER BELT

Archaeological evidence suggests there were a number of prosperous towns flourishing in Rajasthan during the Historic Period (c.300 B.C.—400 A.D.) close to the copper ore areas. Some of the important among them include, Nagari near Chitorgarh, Nagar near Tonk, Pushkar near Ajmer, Bairat, Rairh and Sambhar near Jaipur. Even Jodhpur, which is on the border of the Thar Desert, according to the early epigraphs, was populated by foreign and Indian tribes from c. 500—600 A.D. Quite a large number of copper objects, especially coins, from Bairat⁸, Rairh⁹ and Sambhar¹⁰ reveal that copper was extensively used for domestic objects, ornaments and so on.

^{14}C DATES

Table 1 gives the ^{14}C dates from the old copper workings of Rajasthan, Gujarat and Andhra Pradesh. The ^{14}C dates show that the earliest mining activity is indicated at Dariba mines, Rajasthan, as the date goes back to c. 360 B.C. It is interesting to see that the Dariba mines were being exploited from the Mauryan times, or even earlier. Ambamata mines were also being tapped from Maurya-Sunga times. Kumbharia (Gujarat) shows mining activity around the tenth and fifteenth century A.D. The Agnigundala area mines of Andhra Pradesh indicate an antiquity of at least 900 years.

A search for further samples for dating is on and it is expected that protohistoric antiquity of the copper workings will also be determined soon.

TABLE 1
 ^{14}C dates of Ancient Copper Workings

Sample No.	Site	Date in yrs. B.P. \pm = 5730 yrs.	Locus	Samples From
TF-1117	Dariba Mines, Rajasthan, District Udaipur	2310 \pm 105	Depth 64 m, Layer 436	G.S.I., Udaipur
TF-1221	Kumbaria, Dist. Banas- kantha, Gujarat	535 \pm 90	Dumps behind Jain Temples, Kumbaria	G.S.I., Ahmedabad
TF 1222	"	905 \pm 85	"	"
PRL-53	Ambamata, Dist Banaskantha	2110 \pm 200	12 m distance in No. 3 west Drive of the underground mine.	Mineral Explora- tion Corporation Ltd., Ambaji
PRL-66	"	850 \pm 100	Bore hole No. 100, N-W zone of Ambamata deposit	G.S.I., Ahmedabad
TF-805	Bandlomattu Hill, Dist. Guntur, A.P.	900 \pm 80	From contact of dolo- mite-phyllite of Cumbum stage of Nallamallai series.	Hindustan Copper Ltd., Bollapalle.
TF-806	"	655 \pm 90	"	"
TF-373	Mailaram, Dist. Khammam, A.P.	535 \pm 90	One km. west of Maila- ram from a slag heap, 1 m depth.	G.S.I., Hyderabad

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