BONE FLUORINE AND EARLY MAN IN NORTH WESTERN INDIA

S. B. LAL

44, *E. C. Road, Dehra Dun*

ABSTRACT

The paper establishes that relative dating of cultures and fossil remains can be based on the fluorine contents in the bones. It also explains that this method can advantageously be applied to geological, prehistorical, protohistorical and historical periods. It further confirms the date of the Nagri Stage of Siwalik System at Haritalyangar area as Miocene. The table indicating fluorine contents of bones of the chalcolithic sites from North Western and Western India, have also been appended to the paper for ready reference to facilitate comparison of their antiquity.

INTRODUCTION

Man is always inquisitive to know about man. The archaeologists and the geochronologists have particularly taken great pains to know the chronology of man. Man or the man-like creatures existed as far back as Miocene, but by the term man here we are concerned with the creature who made implements which reveal the technological skill of the maker, which in turn throws light on his culture. Culture is the basic truth of life, attitude of life or the total activity of life. To know about what the man did in the past or about his culture, one has to depend on the implements that he left in the area he occupied, now found in the earth and which are excavated by the archaeologist. The first implement that man made is traced to early part of the second Interglacial Period, i.e. some 4,00,000 years ago. These chopper chopping tools were made by the early Soan people in the North Western India. The Soan tools were so crude that these do not exhibit any marked human chipping. Tools in the true sense of the term were found at Guler and at Vadmadurai in the post lateritic times (LAL, 1973). No tools of the Proconsul or the Ramapethicus—the likely ancestor of man, have been found. It was only the homosapeins who appear to have invented and used tools. Such palaeolithic, microlithic, neolithic and chalcolithic tools that tell us about the existence of early man in North Western and Western India are quite numerous. To put them in the order of antiquity, Radiocarbon method of dating was largely employed where wood or charcoal specimens were available, but on the bone specimens this method could not be applied. The author preferred to use the fluorine dating method as the human or animal bones were available. Some results of his work have already appeared (LAL, 1975).

The work on fluorine estimation of bones was continued and fossil remains of the likely progenitor and of the early man from North Western and Western India were duly analysed to secure more information for deciphering the antiquity of the early man and his ancestor. This may evoke interest of the layman and the scientist alike.

DISCUSSION

Table 1 gives the results of fluorine percentages of bones from Haritalyangar area. Haritalyangar is famous for its rich fossil accumulation (CHAUDHRI & GUPTA,

Geophytology, **6** (1) : 108-111, 1976

1969) and as such it has attracted the attention of geologists and anthropologists alike for the vertebrate and hominoid remains. In the map given by PARSAD (1962) all the three divisions of the Siwalik System are exposed in this area. It will be observed that average of fluorine percentage of Artiodactyla bones is 2.85, that of Perissodactyla is 1.60 and that of the unidentified bones is 1.87. The total average of all the bones from this area comes to 2.10 %. It is, therefore, evident that the fluorine percentages in Artiodactyla and Perissodactyla belonging to the same age differ, which in turn indicate that for a comparative chronology of geological formations one particular part of one particular genus may be analysed for its fluorine contents. CARNOT (in LAL, 1975) gave the results of analyses of the bones ranging from Palaeozoic to Recent. According to him, Tertiary bones contained 2.30% fluorine. Since Miocene forms the middle part of Tertiary it may be assumed that bones belonging to this period contain that percentage. Strangely enough the bones analysed from the area under discussion, on the average, contain 2.10% fluorine and this coincides with the results given by CARNOT. The age of the Nagri Stage of the Middle Siwalik System at Haritalyangar is, therefore, confirmed as Miocene.

Table 1—Percentages of Fluorine in bones from Haritalyangar area in Middle Siwalik

Identification	Artiodactyla			Perissodactyla			Unidentified	
				Rhinocerotidae		Equidae		
Description ..	Long Bone	Rib	Horn	Tusk	Molar	Molar	Carpal Bone	Long Bone
F%	2.73	3.30	2.54	1.42	1.48	1.90	1.66	2.08
Average ..		2.85			1.60		1.87	
Total Average ..					2.10			

It has been shown that fluorine is proportional to the age. The higher the percentage of fluorine in bones the greater will be the antiquity of the beds or layers containing them (LAL, 1975). In Table 2 are given the percentages of fluorine of the bones excavated from different chalcolithic sites of North Western and Western India. A comparison of the antiquity of the likely progenitor and that of the chalcolithic man i.e. the early man is, therefore, easy. It is now established that Ramapithecus is the likely ancestor of man who existed in the Nagri Stage of Middle Siwalik System at Haritalyangar. The Nagri Stage is regarded as twenty million years old (ZEUNER, 1962). We must bear in mind that the 'Rule of three' does not hold good in these cases. All that our knowledge and experience have so far led us to accept as dependable basis for dating the comparative antiquity, is the proportionate amount of fluorine contents of the bones of different periods, say—that of chalcolithic sites and those of the Siwalik.

CONCLUSIONS

In view of the above the author has come to the irresistable conclusion that fluorine method holds good for the comparative chronology of different periods of a single site in one particular area and that it should throw light on the antiquity of bones belonging to

Table 2—Percentages of Fluorine in bones from chalcolithic sites.

Site	Periods	F%
Bogor	III	0.1596
	II A	0.2736
	II	0.3269
	I	0.1900
Inamgaon	III	0.0114
	II	0.0228
	Overlap ..	0.0380
	I	0.0537
Kodekal	L 3	0.0760
	L 4	0.3877
Kayatha	IV	0.0912
	III	0.1446
Langhnaj	.. ..	0.1292
Mathura	.. ..	0.0380
Muchchatala	.. ..	0.0537
Navdatoli	III	0.0684
	II	0.0988
	I	0.1064
Nevasa	V	0.0304
	IV & III ..	0.1343
	III	0.1064
Palvoy	.. ..	0.1064
Prabhas Patan	III	0.0304
	II	0.0759
	I	0.0912
Songaon	L 2*b*	0.0988
	L 2*a*	0.1216
Tilwara	III ..	0.2736
	II	0.3192
	I	0.3192

the geological periods also, for which one particular part of one particular genus will give the best results. Exceptions are always there, as at Bagor—I and Tilwara—I, there seems to be no explanation at present. Our efforts will, however, continue unabated to solve such anomalies.

ACKNOWLEDGEMENTS

The author expresses his sense of gratitude to Shri A. R. Sankhyan of the Anthropological Survey of India, Dehra Dun, for kindly providing the fossil remains from Haritalyangar area, discussing the subject matter in detail and for sparing his valuable time. He is also grateful to the authorities of the Deccan College, Poona, for supplying the bone specimens from different chalcolithic sites. Last but not the least, thanks are due to the Chief Archaeological Chemist, Archaeological Survey of India, Dehra Dun, for inspiring encouragement.

REFERENCES

CHAUDHRI, R. S. & GUPTA, V. J. (1969). A Contribution to the Geology of Haritalyangar and adjoining region. *Bull. Indian geol. Assoc.* **2**(3 & 4): 102-104.

LAL, S. B. (1973). Geochronology of Laterization. *Radiocarbon and Indian Archaeology*. Bombay.

LAL, S. B. (1975). Bone fluorine as a measure of archaeological antiquity. *Geophytology*. **5**(1): 105-109.

PARSAD, K. N. (1962). Fossil primates from the Siwalik beds near Haritalyangar, H. P., India. *J. geol. Soc. India*. **3**: 86-96.

ZEUNER, F. E. (1962). *Dating The Past*. London.