goods as copper alloy kettles– rolled in a conical form. These cones were presumably inserted one into the other on a rope, each cone being supported by a knot which ensured that it was only partly inserted into the preceding and following ones. The rattle function of these tinkling cones is well established, whether it be as a series of cones attached side by side to bags, as illustrated by an archaeological bag dated to the 17th century, or, somewhat later, as series sewn to clothes as illustrated by many ethnographic examples.

A previous INAA study of a series of 52 tinkling cones from many regions of Québec showed 35 of red copper (*ca.* 98% Cu), 14 of yellow brass (Cu *ca* 74 % and Zn *ca.* 26%), and 3 of gray/white? iron (*ca.* 94% Fe). Given this differential distribution according to colour, this work aims at showing if there is any relationship between the sound (level and pitch) obtained with these different categories of tinkling cones and their colours. Given the rather obvious use as «rattles«, a specific sound level/pitch for each colour would enhance the orientation of cultural choice and the ensuing symbolic value. If, on the other hand, no specific sound is associated with a specific color, reflections should be proposed to explain the dissociation between the visual and auditive appearances of the tinkling cones. In order to enhance the discussion INAA data from tinkling cones not yet considered will be described along with chronological considerations based on the elemental composition of the metallic sheets making up the copper alloy kettles.

KEYWORDS: Metals, Québec, copper.

## ARCHAEOMETALLURGICAL STUDIES IN INTERACTION OF COOPER-USING CULTURES IN DOBRUDJA BRONZE AGE

(42)



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Our knowledge of cultural and economic life throughout the Dobrudja area in the Bronze Age years has grown so significantly that we can undertake new attempts at historical reconstruction. Archaeometallurgical studies have contributed to this endeavor.

In this paper the question of continuous and discontinuous interaction between some of the cooper-using cultures is examined. We must make a distinction between interaction within a prehistoric culture and interactions between different prehistoric cultures.

Data for the study of cooper-using in Dobrudja Bronze Age are the impurity patterns of copper artifacts. The method of analysis used by us to obtain the impurity patterns is emission spectroscopy.

From the analyses of the Bronze Age copper objects from Dobrudja there is some evidence of interaction between copper-using cultures (in spite of awareness of incomplete data).

KEYWORDS: Bronze Age, cultures, interaction.

## THE ANALYSIS OF COPPER SAMPLES FROM THE WARMINSTER AND BALL SITES IN SOUTHERN ONTARIO, CANADA

(43)

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