Center for Archaeological Materials/Center for Materials Research in Archaeology and Ethnology

The mission of the Center for Materials Research in Archaeology and Ethnology (CMRAE), a consortium of eight Boston-area educational and cultural institutions, is to advance our understanding of prehistoric and nonindustrial societies through analysis of the structure and properties of materials associated with human activity. Plant and animal food remains and human skeletal material, as well as metal, ceramic, stone, bone, and fiber artifacts are the objects of study, along with the environments within which these materials were produced and used. At the Center for Archaeological Materials (CAM) at MIT, investigators concentrate on the materials-processing technologies that transform natural materials into cultural objects. CAM is administered by the Office of the Provost.

In 1998–1999, the Department of Materials Science and Engineering (DMSE) established a new undergraduate major in archaeology and materials, Course 3-C, as well as an interdisciplinary doctoral degree program in archaeological materials. These are the only academic degree programs of their kind in the United States. The graduate students enrolled in the PhD program and the undergraduate Course 3-C majors who participate in the Undergraduate Research Opportunities Program all carry out their dissertation and senior thesis research in the CMRAE laboratory facilities.

Archaeological Science, the CMRAE/CAM undergraduate subject offered jointly by DMSE, the Department of Chemistry, and the Department of Earth, Atmospheric and Planetary Sciences, continues to enjoy high popularity among students from CMRAE institutions. This year, 139 of the 144 students enrolled were from MIT; the others were from Brandeis University, Harvard University, and the University of Massachusetts Boston. Ten faculty members from five CMRAE institutions lectured in the subject.

During the spring term, 40 first-year undergraduate students in 3.094 Materials in Human Experience were engaged in lecture and laboratory sessions that explored (1) the development of metallurgy among ancient Andean societies and (2) ancient and contemporary methods of winning metals from their ores. The laboratory projects assigned for the Andean metallurgy unit included crucible smelting malachite ore to produce metallic copper, shaping copper sheet metal through plastic deformation followed by annealing, and melting copper and silver metal to form copper-silver alloys, some of the most valued alloys in ancient Andean societies. Students hammered, annealed, and pickled these alloys to shape them and to develop pure silver surfaces that coated the underlying pink alloy metal. The laboratory project assigned for the extractive metallurgy unit challenged the students to smelt malachite ore in clay furnaces they built to resemble the ancient Bolivian highland furnace known in the Quechua language as *wayra*. They produced sponge copper metal and some small solid copper prills from once molten metal. The 3.094 students carried out both the ancient Andean styles of plastically shaping solid metal and Andean smelting activities in traditional *wayra* furnaces they built in the DMSE Merton C. Flemings Material Processing Laboratory.

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