[*See also* Athens; Greece: The Rise of Greek City-States; Greece: The Greek Archaic Period; Greece: Classical Greece; Greece: The Hellenistic Age.]

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Groundstone Tools

The term “groundstone tools” is used for a large variety of artifacts generally made of granular igneous, sedimentary, and metamorphic rocks. However, these artifacts can be obtained through abrasion, as well as through percussion, cutting, and drilling techniques, or may simply require the selection of appropriate cobble stones. The alternative term “macrolithic tool” is therefore increasingly used as these artifacts tend to be larger and heavier than most flaked tools and in general were designed for rather heavy-duty tasks such as percussion, abrasion, polishing, grinding, pounding, and chopping. Among macrolithic tools we find abraders, smoothers, polishers, sharpeners, shaft straighteners, grinding slabs, hand stones, mortars, slabs, pestles, hammer stones, percussors, axes, adzes, picks, maces, casting molds, anvils, and so on. Given that these labels are often used ambiguously among authors and in different languages, the study of macrolithic tools requires a series of analytical approaches, such as morphometric description, geological characterization, and functional analysis. In addition to the type of activities performed, macrolithic tools convey information about the intensity of given tasks, their technical constraints, and the organization of production. Their heuristic potential turns them into crucial archaeological evidence for the analysis of the economic organization of past societies.

Artifact Description. Different proposals have been made concerning the typological analysis of some categories of groundstone tools, as for example grinding tools or axes. However, macrolithic tools can appear in large quantities on archaeological sites and need to be described in a standardized way. Even macroscopically (5–50X), it is possible to record morphometric, petrographic, and functional variables in a unitary analytical inventory system. With such multivariable databases it becomes possible to compare artifact collections, and to gain insight into the technological development of the different tool categories and related activities through time and space.

Petrographic Analysis and Mechanical Properties. Macrolithic tools can be stone blocks coming from primary outcrops or, more often, cobbles that are collected in secondary deposits. The archaeological study of stone queries or clast deposits implies different approaches and research strategies. Such studies are usually combined with the petrographic analysis in order to determine the origin of the raw material and the supply networks. More recent methodological proposals underline the relation between the petrographic nature of rocks and use-wear in the different work processes in which macrolithic tools take part. Mechanical experiments address the question about the efficiency of different rock types in production, and, consequently, the economic and social implications of the access and use of alternative rocks.

Functional Analysis. Ethnographic, experimental, and archaeological sources inform about the wide variety of activities carried out with macrolithic tools such as working skin, bone, wood, and fiber, flint knapping, pottery production, metallurgy, stone trimming, and wood chopping as well as food processing. Often, these artifacts are the only material evidence in the archaeological record that document such activities. The working zone of macrolithic tools corresponds most often to a surface, but edges can also come into the analysis, especially for axes, anvils, and other percussion tools. Use-wear analysis of these active surfaces was already part of the pioneering work of S. A. Semenov, but was not taken forward with the same intensity as on flint artifacts. Systematic approaches, combined with experimental programs, have become an important part of archaeological research only in recent years. The need for a standardized procedure and vocabulary for the description of use-wear traces on macrolithic tools has been addressed by a group of European and American researchers who reached a consensus in 2006 on occasion of the 15th International Union for Prehistoric and Protohistoric Sciences (UISPP) Congress. Residue analysis offers a further possibility to approach the function of these artifacts, and is tested increasingly in archaeology.

[*See also* Microliths.]

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GUILÁ NAQUITZ

Guilá Naquitz is a small cave (elevation: 6,320 feet [1,925 m]) some 3 miles (5 km) northwest of Mitle, Oaxaca, Mexico. Its dry location in the piedmont of the valley of Oaxaca led to superb preservation of ancient food plants, including early cultivars. During its first stage of use (8750–6670 BC), the cave would have been near a deciduous thorn forest with oaks, piñon pine, prickly pear and organ cactus, and acacia. Wild runner beans (*Phaseolus*) and wild squash (*Cucurbita*) grew in the underbrush.

Guilá Naquitz was excavated in 1966 by a team of archaeologists, botanists, zoologists, geologists, and palynologists under the direction of Kent V. Flannery of the University of Michigan. Owing to its small size (230 square feet [64 sq m]), the cave was excavated in its entirety. Its six earliest living floors had been occupied by small groups of aceramic hunter-gatherers who eventually began to include runner beans and squash in their diet.

These early food collectors hunted deer with the *atlatl* (spearthrower), trapped rabbits, made fire with wooden drills, and collected plants using baskets and knotted net bags. Probable women's work areas yielded hearths, storage pits, concentrations of plant processing refuse, and utilized flint flakes. Probable men's work areas displayed flint knapping, tool repair, and butchering of animals. The complex of plant and animal remains suggests that the cave was repeatedly occupied between August and December, when plant resources in the piedmont were at their peak.

While the initial occupants of Level E had left behind only wild plants, some bottle gourds (*Lagenaria*) and squash (*Cucurbita*) appeared by the time of Level C (ca. 7450–7280 BC). Two close relatives of other cultivars—the wild runner bean and the wild coyote melon (*Apodanthera*)—were also used at this time, suggesting a period of incipient cultivation.