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A method for the preparation of very small animal skeletons

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David and Payne (1992) describe a variety of methods by which the skeletons of animals can be prepared. These include maceration, simmering in water and, in one instance, immersion in the waters of a Greek harbour, where small carnivorous organisms will deflesh the specimen. This is reminiscent of Bolin's method (quoted by Casteel 1976) in which marine isopods of the American Pacific coast would clean a fish in only 24-42 hours.

At the risk of spoiling the opportunities that zooarchaeologists have to claim travel grants to Greek harbours and the Pacific USA for specimen preparation, I have found that other, more local organisms can be used to achieve an excellent result in cleaning the skeletons of very small animals. While simmering or burial work well for larger specimens, small fish of <15 cm length, or small birds or mammals, present a tedious job in extracting the small bones from fish or vole soup. To avoid this, it is worth enlisting the help of tadpoles.

Tests were made in a small garden pond which contained an abundant spring population of both common frog (*Rana temporaria* L.) and common toad (*Bufo bufo* L.).

The tadpoles of each species emerge from the spawn in spring, and soon become enthusiastic carnivores. A small specimen of the gudgeon, *Gobio gobio* L., measuring 10 cm from the nose to the tail fork, was perfectly prepared in about 10 days. Similarly, small birds robin or sparrow size are quickly cleaned. In the case of birds and mammals, an additional incentive can be given to the tadpoles by skinning the specimen; in the case of small fish, the abdominal cavity can be opened. The specimens are placed in a small metal container such as a food tin, with its sides perforated with 6-8 mm holes above the level of the specimen. A small piece of 10 mm mesh prevents the specimen from floating. The container is suspended a few centimetres below the water surface. Tadpoles locate this food source within a few minutes. The skeletons are thoroughly cleaned by these industrious amphibians, and by observing the process frequently, perfectly clean but articulated skeletons can be obtained. These are easily disarticulated if separated bones are needed.

Tadpoles feed with horny jaws, though the microscopic examination of very small fish bones does not show any abrasion to the bone surface. The rate of growth and subsequent metamorphosis in tadpoles are both food- and temperature-dependent. At high populations densities, metamorphosis takes several months, though it is probable that an abundant food supply in the form of your comparative specimens would shorten this time. The desired small animals could be stored in a freezer until the processing season.

By this method, the zooarchaeologist may save much frustrating work in cleaning small specimens, and assist, too, in the propagation of our increasingly urbanised amphibians.

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What are we measuring?

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When I began studying animal remains from archaeological sites it was common for archaeologists to keep only a few examples of any bones found for identification and subsequent listing in the excavation report.