FROG MOTIFS ON ARCHAEOLOGICAL MOLLUSKS OF HOHOKAM AND MOGOLLON INDIAN CULTURES

*Glenn A. Long**

This is a preliminary report of research on carved shell ornaments from archaeological remains of pre-Historic Indian cultures in the Southwest. In the current phase of study, a checklist of frog images is being compiled and motific groups are being catalogued. Forty-three pendants and eight bracelets carved with frog motifs, or overlaid with turquoise mosaic, comprise the initial checklist.

Of the carved pendants without overlay, several motific groups can be identified. The bracelets with frog images carved or the umbonal region of the shells are less varied in form than are the pendants. The pendants and the bracelets were made from whole valves of various Glycymeris *species, such as* G. gigantea *(Reeve) and* G. maculatus *(Broderip). Other shells were also used but less frequently.*

Frog motifs are not restricted to worked shell. Stone and clay vessels are known from the Southwest which incorporate frog images in relief modelling and carving.

Conclusions which can be drawn, so far, are few. Among them we have found that: (1) incidence of carved frog pendants is rather frequent in archaeological contexts throughout the Hohokam and Mogollon culture areas and (2) that when not found in association with architectural fill and floor debris, the pendants have been excavated most frequently in connection with burials.

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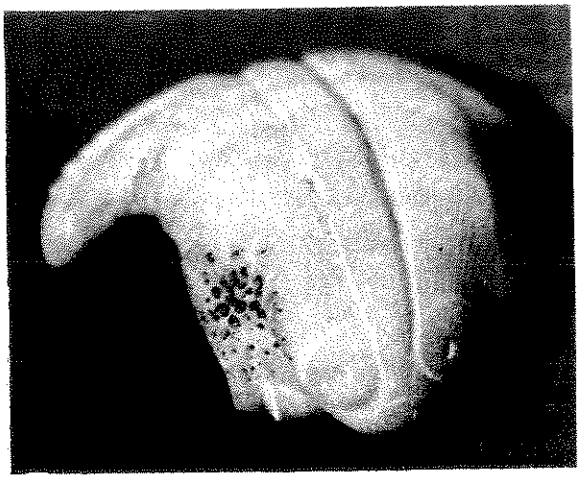

Shell *(Glycymeris gigantea* (Reeve)?, carved in the form of a frog, Hohokam, Central Arizona (P:14:14). From the collections of the Arizona State Museum (A23646) (Photo by G.A. Long).

FOSSIL AND LIVING FRESHWATER MUSSELS (UNIONACEA) FROM THE PECOS RIVER, NEW MEXICO AND TEXAS

*Artie L. Metcalf**

The Pecos River arises in north-central New Mexico, traverses eastern New Mexico and western Texas and empties into the Rio Grande above Del Rio, Texas. At the present time, its discharge is rigidly controlled by a series of reservoirs and the river terminates in Amistad Reservoir. The middle reaches of the river suffer from salinization and from some pollution from oil fields.

The lowest segment of the river is deeply entrenched in Cretaceous limestone, suggesting a relatively great age for that part of the valley. The mid-upper part in eastern New Mexico seems, however, to be relatively young, having removed Pliocene sediments that presumably formerly occupied the valley.

At present, unionaceans are found almost exclusively in the lowest, canyonlands part of the river. A few collections made in the past indicate that the richest fauna was at the mouth near the Rio Grande in that area now covered by Amistad Reservoir. At least two species still persist in the lower river: Popenaias popeii *(Lea) and* Cyrtonaias grandensis *(Conrad) and the former may still persist in southern New Mexico.*

Holocene bank deposits along the Pecos in its middle section have yielded radiocarbon dates in the range of 3600 to 1130 years B. P. These deposits also contain only the two species listed above. One late Pleistocene locality near Toyah, Texas, contains Anodonta grandis *Say and a lampsiline tentatively assigned to the genus* Disconaias.

At what is judged to be a still older (undated) Pleistocene locality below Lake McMillan (a reservoir) in New Mexico, the same Disconaias *(?) occurs along with another, unidentified lampsiline, a* Quadrula, *and* Megalonaias nervosa *(Raf.).*

Affinities of the Lake McMillan fauna seem to be with the lower Rio Grande system and possibly some systems to the south of it. Construction of a new reservoir that will inundate the Lake McMillan fossil locality has been authorized.

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NORTH CAROLINA SCALLOP FISHERY, 1972-1973

*Hugh J. Porter**

This talk was illustrated by a silent 16 mm motion picture documenting the fishery. Location, description, and investigative efforts of the 1972-1973 fishery were covered. Scenes showing scallops being caught, types of gear used, fauna associated with scallops, unloading of scallop catch and pictures of scallop processing by automatic scallop shucking machinery were included. Research and development of film was supported by Grant #456 of the North Carolina Board of Science and Technology.

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THE EFFECTS OF TEMPERATURE ON GROWTH AND REPRODUCTION IN AQUATIC SNAILS

*Henry van der Schalie** and *Elmer G. Berry**

Nuclear reactors, either built or projected, are destined to bring large amounts of heat into lakes, streams and regions where natural waters will be used to cool the machinery in nuclear power stations. This may have profound effects on the resident populations of freshwater mollusks. The research, which is partially summarized here, sought to determine what these effects might be. The study extended over a three-year period and used seven species of freshwater snails for stressing in aquaria with temperatures ranging between 6°C and 36°C at 6° intervals. Following the initial tests, the same species were again tested in aquaria at 2°C intervals in a temperature range compatible for each. Species tested included: Lymnaea stagnalis *and* L. emarginata (= castacopium); Helisoma trivolvis, H. anceps *and* H. campanulatum; Physa gyrina; *and* Amnicola limosa.

The results can be summarized by noting that the lymnaeids, which have a northern distribution, grow best under "cool" conditions (about 18° to 20°C) with egg-laying somewhat better under slightly warmer conditions (22°C); the planorbids cultured better under warmer conditions (about 25°C) with egg production best at about 28°C but restricted at 30°C — conditions that resemble for some species the tropical and sub-tropical environments; the Physa *tested had the widest range of tolerance in that they grew and reproduced in temperatures ranging between 14°C and 30°C — an indication that this group occupies perhaps the widest range of conditions in nature of any of the snails tested.*

The study showed that none of the snails studied could grow and reproduce below 12°C or above 30°C; while all seemed to reproduce better at temperatures higher than their optimum for growth, the adverse effects of heat on the gonads lowered egg production at the upper temperature ranges. Consequently, as shown by gonad tissue studies, temperature approaching 30°C usually results in some degree of sterility. This effect has also been observed on the gonads of fish.

The data, although unfortunately limited largely to the pulmonate ("pond") snails, serve to indicate the dangers to mollusks in regions where the ambient temperatures of an environment will be changed appreciably by effluents from reactors. The tolerances measured also give a better appreciation of climates during interglacial periods which heretofore were designated "hot" or "cool" almost solely on what was known about the geographical distribution of the snails.