A House-Burning in Serbia

What do burned remains tell an archaeologist?

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In the summer of 1977 archaeologists from Brooklyn College and the Beograd National Museum conducted a unique experiment in the Lower Morava River Valley of northern Serbia, Yugoslavia: they burned an abandoned wattle and daub house which was similar to the type of dwelling probably constructed more than 2,000 years ago. The purpose of the house burning was to determine what kinds of archaeological evidence would result from a fire. This experiment offers new insights into prehistoric architecture and raises interesting questions concerning the archaeological interpretation of destruction by fire.

The project developed during a regional survey and excavation of eight Yugoslavian sites in the valley of the Morava River, which runs northward from Macedonia into the Danube River. As early as Neolithic times or about 7,000 years ago, the area served as a major passageway between the eastern Mediterranean and southeastern and central Europe. Although the ancient cultures on the Greek side of this access line are well known, the corresponding Serbian cultures have received relatively little attention by American archaeologists. Before the 1977 field season, only settlements from the final phase of the so-called Vinča period, which corresponds with Late Neolithic times (ca. 4500-3300 B.C.), had been excavated in this region. Earlier Neolithic phases and the entire Bronze and Iron Ages were known only from small cemetery excavations and settlements outside the immediate area.

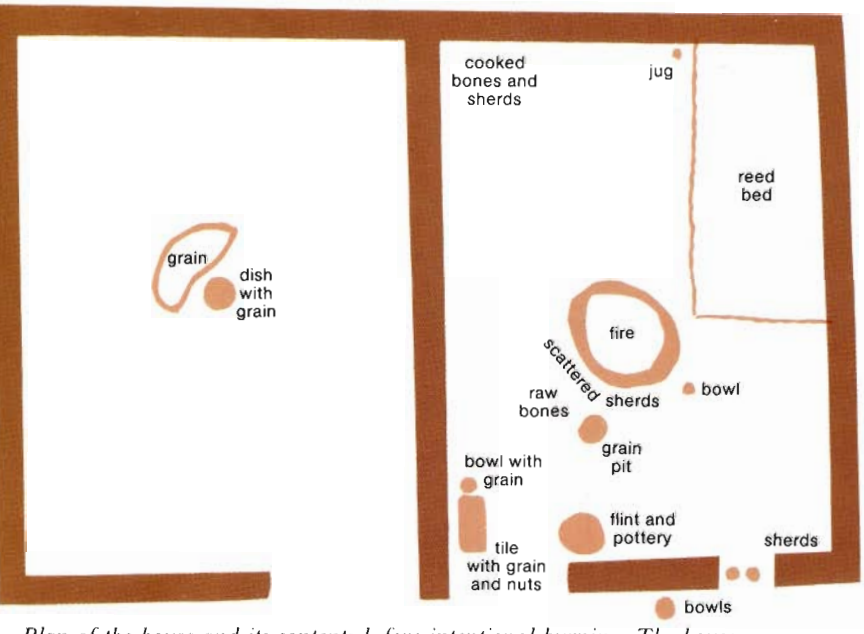
During the Late Neolithic period, settlers in the Morava Valley lived in compact villages similar to the proto-urban centers of the eastern Mediterranean area and Near East. In the east Mediterranean and Near East these proto-urban centers evolved into fully urban state civilizations during the beginning of the Bronze Age (ca. 3000 B.C.). But in the Morava Valley the late Neolithic populations dispersed, and by ca. 1800 B.C. the typical post-Neolithic Morava sites were large localities with widely scattered dwellings. Covering areas of more than 20 hectares, the same scattered sites were occupied by different cultures at various intervals throughout the Bronze and Iron Ages. Because no single plot of land was occupied for any length of time, refuse such as wall rubble and other forms of cultural debris failed to build up in significant depths. Fluctuating occupational patterns continued until the Roman conquest of Yugoslavia in the first century after Christ when urban centers finally appeared. As a result, a cultural deposit of less than one meter is the norm for later prehistoric (post-Neolithic) sites in this part of Yugoslavia. Nowhere on the surveyed sites did the depth of deposit reach two meters. Many deposits, which in deeper sites might have remained intact, had been cut into and churned up by the deep plowing characteristic of the region. So great was this disturbance that no structural remains were found *in situ,* except for refuse pits that had been dug below the plow depth into the sterile soil beneath.

Despite these shallow deposits, it is still possible to determine what kind of houses were constructed by the ancient peoples of the Morava Valley. The eight excavated sites yielded many baked clay fragments; in one case, more than 18 kilograms of clay were discovered in a single 30 centimeter stratum within a two by two meter trench. This clay, called daub, was used as packing to insulate the interlaced twig and branch walls of the wattle and daub houses. In fact, the baked clay retains impressions of the twigs and wattle beams over which it was spread. Wattle and daub house construction is still encountered in the Yugoslav countryside, although tile roofs usually replace the highly flammable thatch used in both the recent and distant past. When these wattle and daub houses are destroyed by fire, some of the clay daub is baked and thus preserved. Although the type of housing used by the prehistoric settlers could be clearly identified, a number of questions remained. How much baked daub would be produced when a wattle and daub house burned? How difficult was it to set fire to one of these buildings? What other archaeological traces would be produced when one of these buildings was burned?

Interior of the western room prior to the lighting of the fire. Simulated prehistoric equipment has been placed around the room to test the effects of a house fire on these materials. The corner of a reed bed is visible in the left foreground; a small cooking fire and a pile of raw animal bones have been set in the center of the room. Unbaked clay pots, some of them filled with grain, have been set in the center of the room, the doorway, on the window sill and on a fired ceramic tile near the door.

Detail showing the western side of the house and part of the open-walled shed attached to it. Part of the wattle skeleton of the house and the northwestern corner beam are exposed where the daub has flaked off the walls.

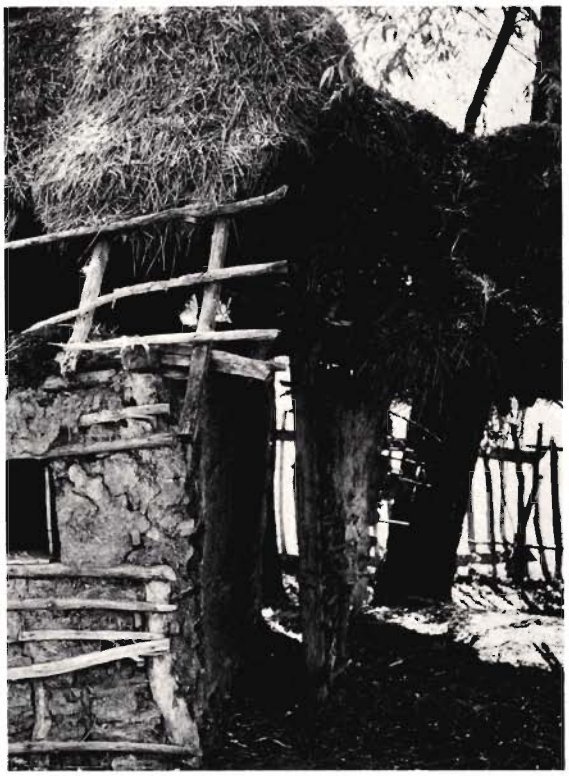
ndoned wattle and daub house in the vicinity of Jerinin grad in northeastern Serbia. Built some time after World War I, the house a thatched roof, a western living room with a window and ceiling (right) *and an eastern open-roofed chamber. The house is similar he wattle and daub houses built throughout Europe during later prehistoric times.*



Plan of the house and its contents before intentional burning. The house was equipped with simulated prehistoric materials: a reed bed, cooked and uncooked animal bones, grain and fired pottery sherds, and flint from a nearby prehistoric site. Analysis of these materials after the burning tested the effects of an accidental fire and pointed to the archaeologically retrievable artifacts from an actual prehistoric dwelling.

Fragment of baked daub excavated at the Late Bronze Age site of Jerinin grad in northeastern Serbia. The clay packing presumably was used as insulation on the wattle or interlaced twig skeleton of a prehistoric house. Burning of the wattle framework would have baked the daub. The parallel ridges mark the positions of the burnt-out wattle.

Interior of the western room prior to the lighting of the fire. Simulated prehistoric equipment has been placed around the room to test the effects of a house fire on these materials. The corner of a reed bed is visible in the left foreground; a small cooking fire and a pile of raw animal bones have been set in the center of the room. Unbaked clay pots, some of them filled with grain, have been set in the center of the room, the doorway, on the window sill and on a fired ceramic tile near the door.



Detail showing the western side of the house and part of the open-walled shed attached to it. Part of the wattle skeleton of the house and the northwestern corner beam are exposed where the daub has flaked off the walls.

Good fortune led the Brooklyn and Beograd research team to an abandoned wattle and daub thatched-roof fieldhouse in the vicinity of one of the ancient sites. The house was purchased; after it was mapped and the details of its construction recorded, it was set afire. Isolated in a small compound surrounded by a wattle wall, the structure was a small version of a typical peasant house and had been used as a temporary refuge by farmers during the harvest season. According to local informants, the house had been constructed not long after World War I. It had been recently abandoned in favor of a new, slightly larger mudbrick and partially tile-roofed structure set in the same compound. A fresh water well and the rusting frame of an old automobile were the only other features within the compound.

Both the old building and the one that replaced it were similar in plan: each rectangular structure was divided into two equal rooms by a cross-wall that ran the full width of the building. In the house, the western room was covered by a low ceiling that, like the walls, was made of wattle and daub. Above the ceiling, an attic space was enclosed by the partially deteriorated thatched roof. The eastern room rose directly to the roof. On the western side of the building a small open-walled shed—its thatched roof almost totally disintegrated—provided some protection from the sun for the pigs who are the compound's only regular residents.

Assuming that the wattle and daub fieldhouse

To begin the experiment, a fire was lit in the hearth and allowed to burn. As the cooking fire and reed bed in the western room burn out of control, the thatch roof begins to catch fire, barely three minutes after the fire had been ignited. Three minutes later the thatch roof is fully ablaze.

tail of the roof nstruction of an andoned field house Serbia. The thatched of was laid on a oden framework pported by three rtical posts. The small oss-timbers were ached to the vertical st by iron nails. In a ehistoric roof, the aber would have been d in place with rope, rk or leather strips.

Only six minutes after the fire in the western room was lit the roof is fully ablaze. Fallen burning thatch and debris from the roof litter the east chamber and front of the house. Structural damage was limited, resulting mainly from secondary fires caused by this debris.

Thirty hours after the fire was started, the burnt-out shell of the house remains standing. The wattle and daub walls were surprisingly resistant to the fire. The only structural damage resulted from the burning of some of the wattle horizontals along the upper line of the walls and the burning of two of the vertical wall posts, one in the front and the other in the rear of the house.

Detail of the front of the house after the fire shows the soot and char stains marking the location of one of the burnt-out vertical posts. The post began burning at ground level when fallen smoldering debris ignited it at its base. The ash and charcoal-filled posthole produced marks one of the only features of the fire which would be detectable archaeologically.

was used in the same manner as the mudbrick house that replaced it, the western chamber with its low ceiling and small window, must have served the human residents of the house. The eastern room must have held their animals. The small attic above the western room may have been a storage area for fodder or grain. To parallel the furnishings found in the mudbrick house, a straw bed and a fireplace were constructed in the abandoned building. Next the house was stocked with simulated "prehistoric" materials: cooked and uncooked animal bones, flint, grain and nuts, fired potsherds from our excavations and unfired clay pots. The aim was to test the effects of fire on the building and the objects it contained.

At 1:14 on a September afternoon, when all the furnishings had been prepared, their location drawn on the house plan and the preliminary photographic recording completed, the cooking fire was lit and deliberately allowed to burn out of control. Within three minutes, the fire had burned through to the roof. Within six minutes, the thatched roof was aflame, and the roof and western chamber with its straw mattress had become an unapproachable inferno. Enormous quantities of smoke billowed from the house. No one working in the surrounding fields could have ignored such a fire.

Almost as quickly as it flared up, the fire subsided. After 20 minutes, the thatch was almost entirely burned away and except for the main cross-beam and the three upright supports, the roof had collapsed. At this point, the heat of the now smoldering fire had diminished enough to allow someone to enter the dwelling and retrieve valued items. The blaze had caused only minimal damage to the daub-packed walls and structural elements of the house. It would have taken relatively little effort to repair the roof, clear the house of burned debris and restore it to a habitable condition. This is what a prehistoric owner of such a house could have done. We, however, let the fire continue to smolder in the uppermost beams along the roofline as well as in the collapsed debris within and alongside the building. Over the next 30 hours, the fire slowly ate away at the wattle skeleton. The final structural damage to the house resulted from secondary burning. The roof and upper wall beams fell into the house, slowly smoldered and occasionally flared briefly into flame. The beams supporting the inner ceiling of the western room began to burn 50 minutes after the initial fire was started. In just under three hours, most of the ceiling had collapsed. The fire-dried daub of the ceiling easily separated from the wattle and beams, allowing this wood to contribute to the secondary burning.

The grain-filled bowl which had been placed on a tile near the front door of the western chamber shows only a limited amount of soot staining after the intentional fire. Almost all of the heat had been directed upward; as a result the unbaked clay bowl, positioned on the house floor, was not baked sufficiently to allow it to be preserved archaeologically. Diameter, 15 centimeters.

After a while, two of the main vertical wall posts began to burn out within the still standing walls of the house. Fallen smoldering debris ignited the posts at ground level and eventually reduced them to charcoal and ash. A set of clearly recognizable ash-filled postholes was left as the fire gradually burned below ground level into the beam ends. These postholes marked the first archaeologically distinct evidence of the house-burning to be formed in the more than six hours since the fire was kindled. The earlier manifestations of fire consisted exclusively of ash and charcoal that could easily have been misinterpreted by archaeologists as evidence of cooking fires or other pyrotechnological activities.

By the afternoon of the next day, the fire was almost spent, and only one vertical beam continued to smolder within the daub wall along the western side of the house. The walls of the house had resisted the fire and remained standing. Surprisingly, little baked daub had been formed during the fire. The archaeologically retrievable daub amounted to probably no more than one percent of the total quantity used in constructing the house. Some of this daub came from the uppermost part of the walls and a bit less came from the areas immediately adjacent to the burnt-out

vertical posts. By far the greatest quantity was derived from the ceiling of the western room. It seems likely that much of the baked daub recovered in excavations, normally termed "wall daub" by archaeologists, actually comes from ceilings or the daub-plastered bottoms of second floors.

During the fire most of the heat seems to have been directed upward so that the objects and foodstuffs placed on the floor within the house were hardly affected by the flames. The only exceptions were the uncooked bones that had been placed around the central fireplace, some loose grain on a tile near the floor, grain in an unfired clay bowl on the windowsill, and grain in another bowl set just in front of the house. Nearly all of the uncooked bones had been burnt to unrecognizable cinders due to the fat that was still attached to them. The loose grain and the grain in the unfired pots had been covered with fallen burning thatch and had been partially carbonized.

Although some of the unfired clay pottery was soot-stained, none of the pieces was sufficiently baked to allow it to be archaeologically preserved. This again serves as a warning that prehistoric peoples could have supplemented their ceramic repertoires with unbaked clay objects that would not leave archaeological traces when caught in severe fires. Such unbaked clay items have been found in excavations at early Mesopotamian sites where the dry climate has allowed them to be preserved. Unbaked clay objects are still employed for a variety of purposes in the Middle East. In the damper conditions of temperate Europe, such artifacts decompose and would not be retrievable in their archaeological contexts.

This experiment served to approximate ancient conditions and did not, as an archaeologically replicative project ideally should, exactly duplicate them. Under optimal conditions, replicative experiments should only be conducted using materials available to the ancient technology being studied. The reliability of an experiment as a means of explaining ancient phenomena is obviously reduced when modern materials are substituted for ancient ones. The burned house contained a number of features that could not have been present in a prehistoric dwelling. For example, iron nails unknown in ancient times were used to hold the horizontal wattle beams onto the vertical wall posts. This probably produced a slightly different arrangement of the beams. Perhaps the nails also allowed the use of larger horizontal pieces than might have been present on prehistoric houses where beams were held in place by twig interlacings or bark or leather strips. These minor structural differences may well have affected the manner in which the house burned. The house burning project is best viewed, therefore, as one designed to give a general indication of what happens when a wattle and daub house is consumed by fire.

Despite these limitations, the durability of the structure through such a long-lasting fire has clear archaeological implications. Although prehistoric thatched roofs might have caught fire with ease and probably some frequency, the houses themselves would have suffered little damage. Such thatch fires may explain the characteristically dark grayish-brown colored earth of the cultural strata found in areas where this roofing was prevalent. The widespread construction of wattle and daub structures by prehistoric people living in temperate climates may be due to the durability and natural flame retardant qualities of these materials. In areas where open hearth cooking and heating were the rule, wattle and daub had a definite advantage over all wood or plank constructions.

Future work on this aspect of the Morava Valley Project will include a reinvestigation of the house in the summer of 1980 in order to evaluate the damage three years of exposure has done to the building. The joint team is also considering the possibility of conducting a truly replicative experiment concerning the destruction by fire of wattle and daub houses built to exact prehistoric specifications. Such experiments have been conducted in the past, most notably in Denmark at Allerslev and Roskilde. Although these houses had considerably lower walls and a proportionally greater expanse of thatched roof than the house in Yugoslavia, the results of the Danish experiments were not so different from ours, especially at Allerslev with respect to the efficiency of daub as an insulating material.

FOR FURTHER READING on archaeological experiments: John Coles, *Archaeology by Experiment* (Charles Scribner's Sons, New York 1973), this excellent introductory text on the role of replicative experimentation in archaeology includes a discussion of other house-burning experiments.

On European prehistory in general: Sarunas Milisauskas, *European Prehistory* (Academic Press, New York 1978) is a recent, anthropologically oriented study; Stuart Piggott, *Ancient Europe* (Aldine, Chicago 1965) remains a standard, although somewhat dated, introduction.

On Yugoslavian prehistory: John Alexander, *Yugoslavia Before the Roman Conquest* (Praeger, New York 1972), presents the only comprehensive account of Yugoslav prehistory written in English.

On unbaked clay items in the Middle East: Edward Ochsenschlager, "Mud Objects from al Hiba," ARCHAEOLOGY 27(1974):162-174.