

Exploring the Burial Caves of the Baq'ah Valley in Jordan

by PATRICK E. MCGOVERN



Since the Late Middle Palaeolithic—about 45,000 years ago—the Baq'ah Valley of Jordan, 15 kilometers northwest of Amman, has seen an almost continuous succession of human occupation. A good soil, abundant water and an upland climate which sustains diverse plants and animals have probably characterized this fertile, self-contained valley during much of its history—certainly during most of the post-Pleistocene era after 10,000 B.C., and very likely well before that. With average temperatures varying between about 9° Centigrade in January and 28° Centigrade in July, the Baq'ah now supports two crops each year, in May and September, including wheat, tobacco, tomatoes, and melons, along with the yield from vineyards and fruit and olive orchards.

Today the Baq'ah Valley is rapidly becoming a suburb of Amman. Its considerable archaeological treasures are jeopardized by modern development, and rescue operations have been undertaken to recover the maximum amount of data with the least expenditure of time, money and effort. Among the ancient remains explored so far are a series of burial caves which line the hills on the northwestern side of the valley, and numerous ancient buildings scattered throughout the valley itself. The buildings are made of roughly shaped limestone and sandstone boulders, some measuring up to two meters in length and weighing as much as a ton; some of the walls still stand to a height of five-and-one-half meters.

It is not surprising then that the remains of these structures first impressed late nineteenth and early twentieth-century explorers, including Laurence Oliphant, Gottlieb Schumacher, C. R. Conder, and

The outlines of a large Early Roman building probably dating to the first century after Christ are just distinguishable beneath the surface of an upper terrace at Khirbet Umm ad-Danānir in Jordan's Baq'ah Valley. An ancient road descended through the Wadi Umm ad-Danānir, visible in the background, into the Jordan Valley to the west. (Inset) Cave A4, on Jebel al-Hawāyah in the Baq'ah, was literally crammed with bones. A number of the burials contained jewelry, such as this bronze anklet, still in place.

Duncan Mackenzie, as "megalithic" relics of a remote epoch, possibly contemporary with similar structures in the western Mediterranean region and Europe. Massive circular towers, comparable to second millennium B.C. *nuraghi* on Sardinia, especially stand out. While the tradition of "megalithic" construction is now known to date back at least to the Late Bronze Age (ca. 1550-1200 B.C.), 1980 test soundings at Rujm al-Henū West in the Baq'ah demonstrated that the building had been constructed, occupied and destroyed, perhaps as the result of an earthquake, during a relatively short period at the end of the Iron Age (ca. 650-500 B.C.).

In the 1930s more extensive surveys of the visible remains in the Baq'ah were undertaken by the well-known archaeologists Nelson Glueck and Roland de Vaux. Although these surveys provided the first detailed overview of the valley from a modern archaeological perspective, their quality was impaired by cursory descriptions and a poorly understood pottery sequence for Transjordan. Doubts have been raised about some of their proposed datings and cultural interpretations, and it is only very recently that the archaeological sequence in the Baq'ah has been established on a more scientific basis. This has been accomplished by combining geophysical prospection with standard archaeological surveying, followed by a carefully planned program of excavation. Consequently, the archaeological returns have been both exciting and impressive.

One of the most significant achievements has been the recovery of an artifact and skeletal sequence from a group of burial caves that spans the Late Bronze Age down to the beginning of the Iron Age, from about 1550 to 1050 B.C. Imported Greek and Cypriot pottery wares recovered from the Late Bronze caves demonstrated that Transjordan took part in the international trade of the time. Cylinder seals and glass beads, standing very near the beginnings of glass-making in the Near East, were evidence of Mesopotamian contacts. Scarabs attested to Egyptian relations. Most important of all, however, was a cache of 11 complete pieces of iron jewelry from an Early Iron Age tomb. Together with 40 additional frag-

ments of another two dozen such artifacts, this jewelry almost tripled the number of iron objects known from Early Iron Age Palestinian contexts, and represented a seven-fold increase for Transjordan. The iron is in fact a form of mild steel and as the earliest verified instance of mild steel from Jordan, it joins a small group of the earliest dated steel from the eastern Mediterranean.

Archaeological material from the Baq'ah first surfaced in the winter of 1975-76, when Late Bronze I (ca. 1550-1400 B.C.) pottery of an exceptional quality suddenly appeared on the antiquities market in Amman. The pottery had important implications, since an apparent lack of Middle Bronze and Late Bronze remains had been noted by Glueck and de Vaux, not just in the Baq'ah but in all of central and southern Transjordan. In order to account for this, Glueck proposed that the Transjordanian plateau, south of the Wadi Zarqa, had been inhabited only by nomads between about 1900 and 1300 B.C. His hypothesis appeared to support the biblical stories of patriarchal "nomadic" life and the eventual rise of the Israelite, Ammonite, Moabite, and Edomite kingdoms only at the beginning of the Iron Age. In one form or another, Glueck's theory found its way into most of the standard biblical and archaeological handbooks. When contrary evidence for permanent settlement began to appear, especially in the Amman area, Glueck modified his theory by positing a contraction to a few major settlements. The absence of Middle Bronze-Late Bronze remains in an outlying region, such as the Baq'ah, appeared to fit with this argument.

Yet the fine Late Bronze Age pottery on the antiquities market immediately called Glueck's thesis into question again. The looted pottery was traced to a partly robbed-out burial cave (A2) on a hill bordering the northwestern Baq'ah, Jebel al-Hawāyah. A rescue operation was initiated under the auspices of the American Schools of Oriental Research and the Department of Antiquities of Jordan. At first, the plan was only to carry out a trial sounding in the cave with the hope of finding an undisturbed strati-

graphic sequence of Late Bronze Age pottery and artifacts. Although this goal was only partially realized, the archaeological remains recovered from the cave in 1977 were so impressive that a full-scale program of survey and excavation was planned with additional support from the University Museum of the University of Pennsylvania, the National Geographic Society, the Kyle-Kelso Archaeological Fund, and a number of private donors.

Beginning with an intensive geophysical survey of the Umm ad-Danānir region in 1978, the study of the Baq'ah Valley became an integral part of the University Museum's Applied Science Center for Archaeology (MASCA). Test excavations of significant magnetic features in 1980 and 1981 led to the discovery of undisturbed Late Bronze II (ca. 1400-1200 B.C.) and Iron IA burial remains (ca. 1200-1050 B.C.)—finds that filled out the archaeological record from 1550 to 1050 B.C.

Moreover, test soundings at potential settlement sites in the region during the last two seasons culminated in the extensive investigation of a two-and-one-half hectare (six acre) site at Khirbet Umm ad-Danānir, located at the northwestern pass to the valley, above the perennial spring of 'ain Umm ad-Danānir. Archaeological remains discovered here, contemporary with those from the burial caves, enabled archaeologists to make the essential connection of a settlement site with a cemetery.

The role of scientific survey methods has been crucial to the success of the Baq'ah Valley Project. Geophysical prospecting instruments, which had initially been developed to aid in the exploration for subsurface natural resources, have also proved to be invaluable for archaeological reconnaissance. The successful use of a prospecting instrument is directly related to the geology of a region. To start with, the Baq'ah Valley itself is a geological anomaly on the central Transjordanian plateau—a flat depressed plain encircled by hills, in striking contrast to the series of deeply cut gorges descending to the Jordan Valley that characterize the plateau. This suggested an ancient lake bed to early travelers, an intriguing hypothesis yet to be proved. The valley was created at the intersection of three flexures or folds in the earth's

crust. A basin was formed by the erosion of an upper stratum of limestone, which exposed an underlying red sandstone stratum in many parts of the valley. This basin may then have supported an inland lake until further erosion eventually produced a permanent drainage outlet via the Wadi Umm ad-Danānir. In any event, modern borings have revealed the existence of an extremely good drainage system about 120 to 150 meters below the surface of the valley floor. A large aquifer accumulates to the southeast and flows northwest; consequently, the Baq'ah is encircled by perennial springs whose density is among the highest for any part of the plateau. These springs partially offset the relatively low annual rainfall of about 40 centimeters, most of which occurs between October and May, and they make a significant contribution to the valley's ability to support two yearly crops.

The hills surrounding the valley consist of tiers of limestone and sandstone, and the burial caves run in rows at the back of these tiers. Most of the caves were probably first formed by erosion, and subsequently were enlarged for burials or occupation. They were all eventually silted up partially or fully, depending on the amount and intensity of rainfall, vegetation and soil development. In many places along the slopes, a soil covering of about 15 centimeters that thickens toward the back of the terraces would have permanently sealed off some of the cave entrances.

The challenge was to find and employ a method of detection which improved upon the visual techniques undoubtedly used by grave robbers—the usual telltale visual signs are vegetation clumps over cave entrances and unfilled crevices. After simulated trial tests in Philadelphia using soil and stone from the valley, the cesium magnetometer was ultimately chosen as best suited for the task at Baq'ah because a measurable magnetic contrast of as little as one part in 10,000 could be detected between the more magnetic soil inside the caves and the surrounding limestone and sandstone bedrock.

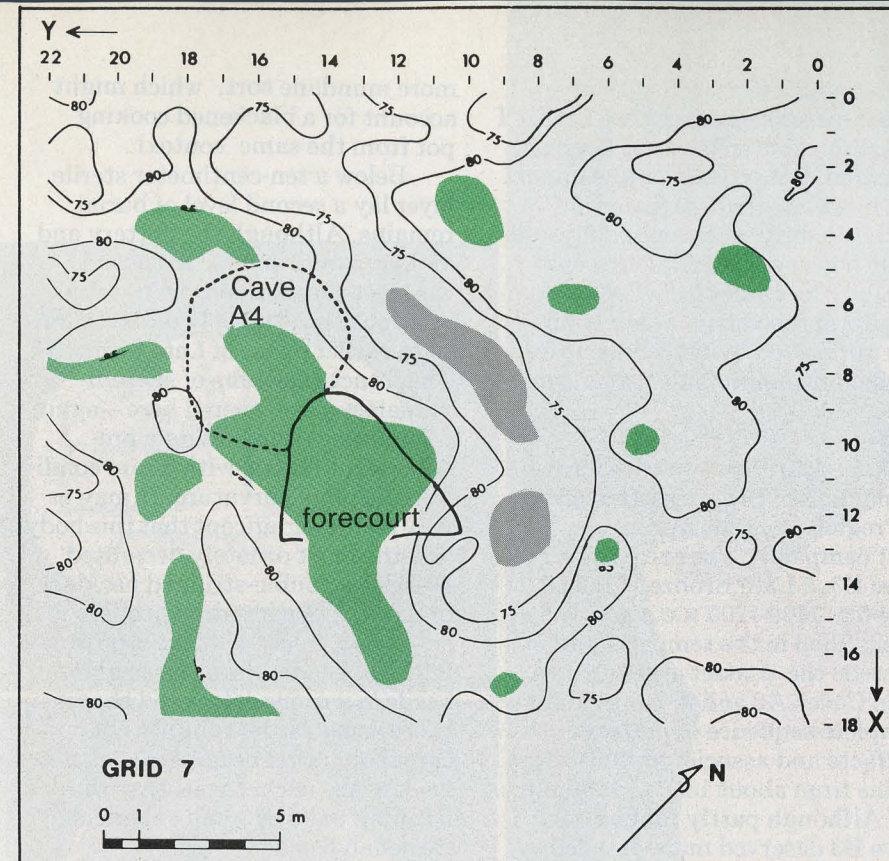
The geophysical phase of the 1978 survey involved taking magnetic measurements every two meters in

the vicinity of known robbed-out caves—32 in all, almost all dating to various phases of the Late Bronze Age. The data were then prepared as a contour map with equal intensity intervals. Areas of high magnetic intensity could be pinpointed where filled-in caves might exist. The 1980 and 1981 field seasons were mounted with high hopes that archaeologically important caves could be found still hidden and intact. The area selected for initial study was a logical one on Jebel al-Hawāyah, close to the already investigated Caves A1 and A2. Its high magnetic pattern showed a large, deep elliptical shape, and there were also smaller low magnetic disturbances lying close by to the north.

The test excavation completely fulfilled all expectations. An undisturbed Iron IA burial cave (ca. 1200-1050 B.C.) lay beneath the ground, precisely in the area of high magnetism. And yet, when excavation began, only a small outcrop of bedrock was visible beneath a heavy cover of vegetation. The cave itself, designated Cave A4, had been completely silted up; it had also been sealed off by six large boulders, each about 1.5 meters in length, which blocked the main entrance. A secondary entrance in the back roof of the cave had also been closed off with another large boulder. The interior of the cave was circular, and measured about 4.5 meters in diameter and two meters in height. Its main entrance faced due east onto a forecourt, measuring about 20 square meters, which was entered by a ramp on the southeast. Both the ramp and forecourt were completely silted up, in some places to a depth of 2.5 meters.

Cave A4 was literally crammed with bones. Over 220 individuals had been deposited in a pair of secondary heaps within the very restricted area of the cave. All ages were represented among the human skeletal remains; adult males were twice as numerous as adult females. The main pathologies consisted of arthritis and dental caries. The faunal collection included sheep, goat, dog, and various species of terrestrial mollusks.

Accompanying the burials was a unique assemblage of 70 whole vessels in a considerable variety of forms—bowls, lamps, jugs, juglets, kraters, "beer strainers," a chalice, and basalt mortars. The pottery



Archaeologists employed a magnetometer survey to help locate and determine the exact size of Cave A4.

was an inferior product: the clay was poorly levigated, the wares badly fired, and decoration almost nonexistent. Other assorted artifacts included beads of semiprecious stone, bone, and shell (glass and faience were rare); and one example each of a pendant, a scarab, a stamp seal, and a cylinder seal.

Possibly the most important discovery from this tomb, however, was the mild steel jewelry, which has major implications for the transition from the Bronze to Iron Age on the Transjordanian plateau. Why jewelry should have been manufactured of steel is unclear. Eight of the 11 complete specimens were anklets or bracelets; the other three were rings. The same simple methods of construction—overlapping or open ends with circular, elliptical or flat cross-sections—were evident in the 40 additional fragments. So well-preserved and uncorroded were six of the anklets or bracelets that a detailed study of the microstructure was possible.

Exactly how the steel was made is open to question. The production process seems to have been well controlled, given the consistent levels and uniform distribution of carbides in the samples. Rather than the artisans having a clear under-

standing of the process, however, they may have left the artifacts to cool slowly in the hearth, which would effectively steel them. It should be noted that consistent levels of tin (ten to 15 percent) are also typical of the bronze artifacts recovered from this tomb. These bronze objects include the same basic anklet, bracelet and ring types as well as earrings and toggle pins. Reflecting the more well-established tradition of bronze metallurgy, it is not surprising that the bronze items outnumber the iron items by a two-to-one ratio. Yet rather surprisingly, no weapons in either metal were found in Cave A4, even though the transitional period of Transjordan's entry into the Iron Age is often regarded as one of upheaval and war.

Still, there is no reason to suppose that the mild steel artifacts found here were imported. The proximity of iron ore deposits in the Wadi Zarqa and Ajlun region, ten to 80 kilometers to the north, strongly suggests a nearby production site, as does the sheer quantity of steel in a burial context where virtually nothing else could be considered an import, apart from perforated Mediterranean and Red Sea mollusk species. Archaeological investigation in the Wadi Zarqa/Ajlun region,

the only known source of iron ore in the Levant, has so far been limited to Mediaeval Islamic smelting operations; sherding evidence from the Roman-Byzantine and Early Iron periods, however, points to earlier activity.

While Cave A4 furnished archaeological data for the beginning of the Early Iron Age in the Baq'ah, Cave A2—only 15 meters away—provided abundant evidence for a sedentary lifestyle in the valley during the Late Bronze Age. It also attested to the existence of well-developed trade connections with other parts of the ancient world. The 1977 sounding in Cave A2 was confined to a 20-square-meter area. This represented only a quarter of the cave's total area, but afforded a very clear picture of the burial deposits. The uppermost layer, of course, had been very recently disturbed by the grave robbers. Even so, this layer produced eight whole vessels and over 5,000 sherds, mostly rims and bases of bowls, lamps, jugs and juglets. This pottery dated primarily to the period from about 1550 to 1480 B.C., the Late Bronze IA period, with a small mixture of later materials from Late Bronze IB (ca. 1480-1400 B.C.) and Late Bronze II (ca. 1400-1200 B.C.).

A unique find from this layer consisted of a body sherd from a thirteenth century B.C. Mycenaean IIIB stirrup jar, comparable in shape and decoration to stirrup jars from several important nearby contexts—the Amman Airport Building, the Deir 'Alla sanctuary and Level VIII at Beth Shan. This sherd and another four vessels of the same type from Cave B3, a Late Bronze II tomb, originated most probably from central mainland Greece, according to a neutron activation analysis study.

Moreover, neutron activation analysis of the ware of three Base Ring II jug fragments suggested a northeastern coastal Cypriot origin. This fact, combined with the central mainland Greece origin of the Mycenaean vessels, suggests that a maritime trade route flourished between Greece and Palestine during the period, with a probable stop-over point in Cyprus. Imports probably traveled overland along the Jezreel Valley, south through the Jordan Valley, and then up the Wadi Zarqa and Wadi Umm ad-Danānir to the Baq'ah Valley.

The ancient burial remains in

Cave A2 were found below the upper layer. In the process of laying out multiple burials, earlier interments were disturbed; older skeletons and their associated grave goods were pushed into jumbled heaps under and around boulders and cobbles that had washed into the cave or spalled off its roof. The skeletal remains comprised 14 people, at least six adults and three infants. Dental caries and excessive tooth wear, perhaps a result of the inadvertent mixing of grinding debitage with grain, as well as arthritic lipping on vertebrae and limb bones (also a function of age and other factors) pointed to an agricultural way of life.

The 75 glass beads found in Cave A2 also imply that people in the Baq'ah Valley shared in the cosmopolitan civilization of the Late Bronze Age. While 42 types of beads were discovered—made not only of glass, but of faience, frit (primarily Egyptian Blue), copper, bronze, worked bone and shell, and various semiprecious stones, principally carnelian and agate—the most significant specimens from a technological standpoint were the so-called crumb and eye beads. Since glass was probably invented about 1600 B.C. in northern Mesopotamia, these finely crafted beads must stand very near the beginnings of glass-making in the Near East. And they are certainly among the earliest glass artifacts recovered on the Transjordanian plateau. The fact that the glass beads in this cave outnumbered those of faience by more than three to one, together with the discovery of four Mitannian Common Style cylinder seals, would indicate stronger Syro-Mesopotamian—as opposed to Egyptian—connections in the Late Bronze I period. Yet a green stone scaraboid and four glazed steatite scarabs, which have Egyptian parallels from late Second Intermediate and early Eighteenth Dynasty contexts, clearly attest to Egyptian contacts, either by trade or through a tradition of manufacturing techniques.

Thus, the Cave A2 sounding provided detailed evidence for an advanced Late Bronze I culture in the Baq'ah Valley. With the exception of the Cypriot pottery and possibly the glass, cylinder seals, and scarabs, most of the pottery and artifacts were best explained as part of the local material culture,

often found associated with imported material in other Late Bronze I Palestinian burial caves at Lachish, Megiddo, Gezer, Pella, and Amman. The most adequate explanation for the quantity of exceptionally well-made pottery and artifacts would be a fully sedentary Late Bronze community in the valley, which is further supported by the evidence for animal husbandry and agriculture.

More definitive evidence for permanent Late Bronze settlement in the region emerged during the 1981 campaign. The excavation of Cave B3, a Late Bronze II burial cave (ca. 1400-1200 B.C.) on Jebel al-Qešir, filled in the temporal gap between the artifact assemblages from Caves A2 and A4, providing a complete sequence of pottery, artifacts and associated skeletal remains from about 1550 to 1050 B.C.

Although partly robbed out, Cave B3 deserved more detailed investigation for two reasons: it appeared to be the only known cave dating to the Late Bronze II period, and it promised to be the largest cave on Jebel al-Qešir if a high magnetic anomaly, four by six meters, proved to be another chamber or extension of the cave. Excavation revealed that the magnetic disturbance was indeed the result of the accumulation of enormous quantities of stone and soil that had silted through the hole at the back of the cave. This compacted mass of fill covered two undisturbed burial layers.

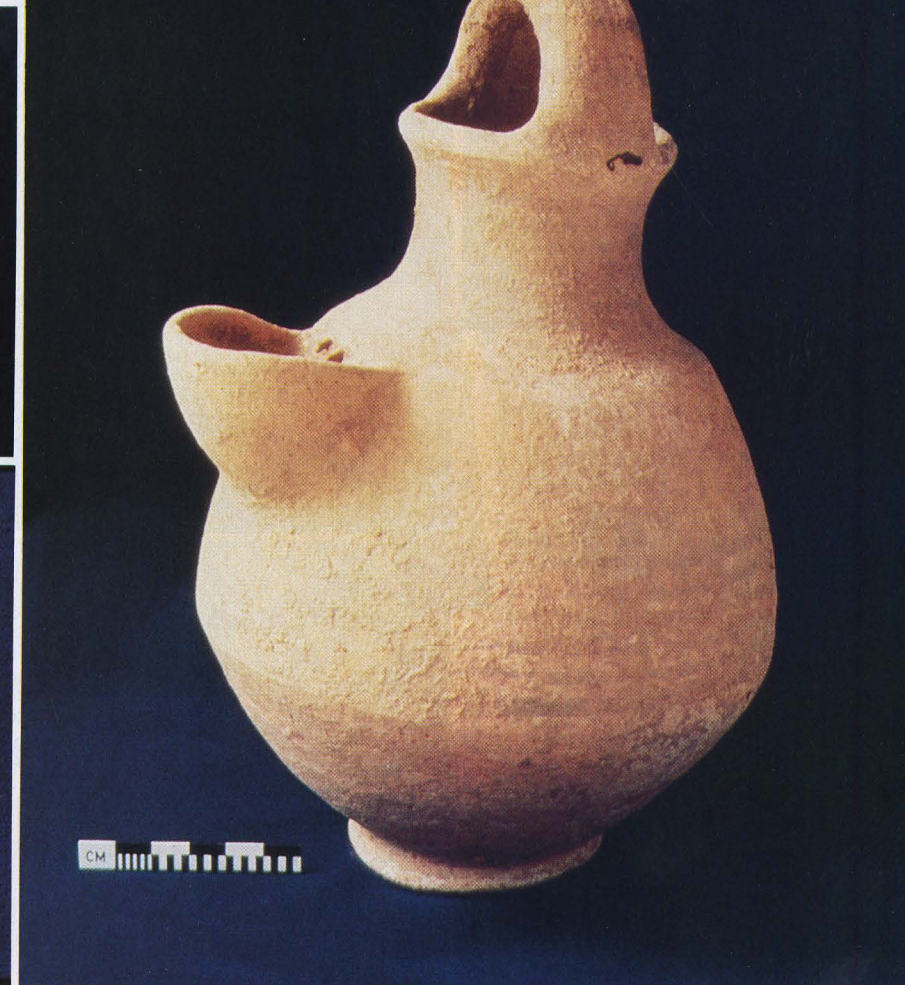
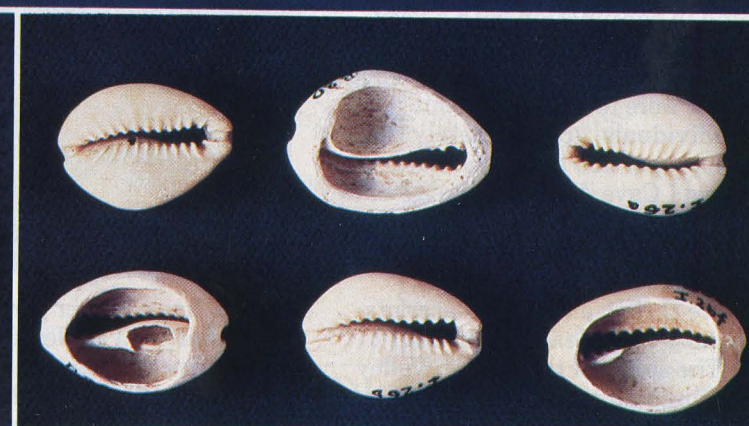
In the topmost layer, three skeletons were clustered around an inverted bichrome bowl. The legs of each body had apparently been detached before the flesh had completely decayed, since there were no butchering marks on the bones nor evident disarticulation which results from dismembering a skeleton. Fully articulated legs and stacks of long bones laid out in the same direction were found elsewhere in the cave. Intermingled with the upper skeletons (three others lay nearby) were pieces of charcoal and completely charred long bones. These might be interpreted as cremation remains as the charred human bones found in and around the Amman Airport Building have been. But it is possible, too, that the bones in Cave B3 found their way into a campfire in the cave of a

more mundane sort, which might account for a blackened cooking pot from the same context.

Below a ten-centimeter sterile layer lay a second level of burial remains. Although the pottery and artifacts were similar to those in the level above, their stratigraphic relationship obviously dated them to an earlier phase of Late Bronze II. The intact skeletons of six individuals were recovered here—again without legs—including a pre-adolescent female with a rare condition of spinal curvature. It may or may not be significant that this body was the most ornately decorated. Besides a double-stringed necklace of more than a hundred beads—one string solely of short bronze cylindrical beads, the other of glass beads in various colors and shapes—there was a large, roughly cut carnelian barrel bead placed at the back of the neck, together with flanking pairs of small spherical carnelian beads.

The cave deposits yielded over 300 whole vessels, primarily bowls and lamps, a partially decomposed calcite vessel and fragments of a bronze bowl, four Mycenaean IIIB stirrup jars, a Cypriot White Slip II milk bowl, and an excellent collection of jewelry, including a fragment of an iron anklet or bracelet comparable to a Cave A4 type. Two weapons—a bronze javelin head and an arrowhead—were also found. Several fish vertebrae were a new addition to the faunal collection, which was again dominated by sheep and goat remains. A single grain of carbonized bread wheat (*Triticum durum*), clearly a domesticated species, was the first direct evidence for agriculture.

Cave B3 provides the all-important connection between the Late Bronze I and Iron Age IA remains recovered earlier from Caves A2 and A4. The wide technological divergence between the fine wares of the Late Bronze I period and the coarse, badly fired pottery from the Iron Age IA period is bridged by the Late Bronze II evidence recovered from Cave B3. Less care was taken in forming the Late Bronze II vessels, and at least seven examples, all miniatures, were handmade. Poor firing and tempering with calcite, which disintegrates at a low temperature and weakens



Representative Iron Age IA artifacts from Cave A4 on Jebel al-Hawāyah include (clockwise from top left) a steatite scarab dating to the twelfth century B.C. inscribed with hieroglyphs; a pyxis with a clay fabric noticeably tempered with limestone; a group of Red Sea cowrie shells with their backs shaved away to be worn as a necklace; a conical stamp seal with two animals back to back carved in relief on its base; and an anklet made of mild steel.



Late Bronze I artifacts recovered from Cave A2 in the Baq'ah Valley include (above) a glass "eye bead," its yellow central disc colored with a lead antimonate compound; (right, above) Chocolate-on-White vases; and (right, below) a steatite scarab decorated with floral and geometric elements and a number of hieroglyphs.



the fabric, are features shared by the Late Bronze II and Iron IA wares.

On the other hand, the Late Bronze II pottery types, which are often slipped and painted with monochrome or bichrome bands, show greater affinity with Late Bronze I types. Nor was pottery as prevalent in Cave A4, the Iron IA cave. There, only 70 vessels were found in conjunction with a very large number of burials—227—whereas, in Cave B3, more than 300 vessels were found with about 50 individuals, approximately the same proportion as for the Late Bronze I Cave A2. The three-to-one ratio of glass to faience in the Late Bronze I period is just the inverse of that for Late Bronze II (one to three), and both materials virtually disappear in Iron IA.

The study of the Baq'ah Valley is an ongoing project which will continue for some time. Now in progress, for example, are pathological and genetic studies of the bones from the three caves. These analyses may well hold the key to establishing the racial continuity or discontinuity of the Late Bronze-Early Iron Age human population in the Umm ad-Danānir region. Preliminary results have already shown that all ages of each sex are represented in each cave, but not in equal numbers. Cave B3, for in-

stance, has a higher percentage of juvenile and adolescent burials, while Cave A4 has about twice as many males as females. Similar pathological conditions—arthritis and dental caries—have been observed in all the caves. Perhaps in keeping with the conspicuous lack of weaponry, no traumatic injuries have been noted with the minor exceptions of a broken rib and finger in Cave B3.

There remains to be discussed the probable settlement site associated with the cemetery at Khirbet Umm ad-Danānir, which promises to be highly rewarding because ar-

chaeological material from the same time span covered by the burial caves is found here. During the 1980 and 1981 seasons, five four-by-four meter squares were opened, which resulted in the discovery of an unusually massive wall, about one-and-one-half meters wide and consisting of two lines of large boulders, three meters below the surface and beneath Early Roman and Late Iron Age remains. An ashy layer covered and continued along the wall for about a meter; at this point, a clay surface with a deep pit cut into it was found adjoining the wall. In the pit, beneath large timbers of carbon-

ized wood, lay a deposit of charred animal bones, several large Late Bronze II pottery vessels, and the front half of a hollow zoomorphic bull similar to one found in Cave A2.

The pit and its contents can be compared to the pits surrounding and inside the Late Bronze II Fosse Temple at Lachish. Moreover, this pit is clear evidence for a permanent settlement at Khirbet Umm ad-Danānir in the Late Bronze Age. In fact, the large vessels and the associated massive wall suggest a well-established community. Such a site is large by Transjordanian standards, and Khirbet Umm ad-Danānir's stratified sequence of architectural remains is also unusual for the Amman area.

The goals of future seasons of work at Khirbet Umm ad-Danānir will be to gain a wider exposure of the upper levels, and then remove them to excavate fully the Late Bronze Age levels. Iron I surface sherds suggest that the site was occupied during that time as well. This level may be more difficult to locate, however, since the apparent lower standard of living may have gone along with a contracted area of settlement. The ideal result would be to find a stratified sequence of Late Bronze and Early Iron Age levels matching those from the burial caves. But the fulfillment of such a hope must await a great deal of further meticulous work in this fascinating and culturally complex region.

FOR FURTHER READING on the Baq'ah Valley project: Patrick E. McGovern, *American Schools of Oriental Research Newsletter* 4 (January 1979): 9-11; the *Annual of the Department of Antiquities of Jordan* 24 (1980): 55-67; *Biblical Archeologist* 44 (1981): 126-8 and 45 (1982): 122-4, and the *Liber Annus* 31 (1981): 329-32, contain preliminary reports on the four field seasons; *MASCA Journal* 1:2 (June 1979): 39-41; 1:7 (June 1981): 214-17, 2:1 (January 1982): 8-12 (with G. Harbottle and C. Wnuk), and 2:2 (December 1982): in press (with V.C. Pigott), treat the cesium magnetometer survey, mild steel, jewelry, and the neutron activation and petrographic analyses of the pottery.