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*Ancient Ammonites & Modern Arabs: 5000 Years in the Madaba Plains of Jordan*

Edited by Gloria A. London and Douglas R. Clark

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II. THE NATURAL ENVIRONMENT AND ITS CONSERVATION

FOUR RIVERS

There is sweet fresh water that is good to drink and sea-water, different altogether, salt and bitter. Yet both yield you fresh fish for food and ornaments to wear which you can bring up from them. Surah 35.12

He turns a desert into pools of water, a parched land into springs of water. And there he lets the hungry live, and they establish a town to live in. Psalm 107:35-37

In the Near East there are three prominent rivers known as the centers of ancient societies: The Tigris, the Euphrates, and the Nile. Each has its own life cycle. Each is distinct. A fourth much smaller river is the Jordan which differs from the others in all aspects (Fig. 9).

The Tigris and Euphrates both flow in the ancient land of Mesopotamia, but each river differs in its sources, flooding patterns, and the terrain through which it travels. Starting in Turkey, the Tigris stretches some 1850 kilometers (1150 miles) with numerous tributaries feeding into it. The water flows rapidly through its channel. In contrast, the Euphrates meanders slowly across the Syrian Desert where it finds few tributaries to replenish its diminishing supply. Both rivers are known for changes in their course over time, erratic annual flows, and occasionally devastating floods.

Despite the unpredictability of water levels, some irrigation channels built by the ancient inhabitants of the cities, towns and villages along the cultivated strips of land thousands of years ago still function today.

More stable in its course and pattern of overflowing is the Nile River of Egypt, which covers 6700 kilometers (4160 miles) from its sources in the Sudan, Burundi, and Ethiopia. It ranks as the longest river in the world. Of the four Near Eastern rivers, it alone flows from south to north, prior to construction of the Aswan Dam, it annually flooded the plains along its route before reaching the Delta area and

Fig. 9. Map of the Fertile Crescent showing the major rivers
Mediterranean Sea. The overflow deposited a rich soil layer on the natural flood plain and made it suitable for planting crops and grazing animals. This process provided a reliable source of fertile soil until the 1960s when dams were constructed in southern Egypt. The dams prevent flood waters from rejuvenating the earth. Before that interference, the Nile flood waters made agriculture feasible and its output sufficient to feed one of the most populous countries of the 20th century. In antiquity, that same farmland adjacent to the river could support a string of settlements.

Located between the Mesopotamian and Egyptian river valleys is a smaller river which rarely overflows its banks. Near its northern source abundant fresh water allows farmers to divert water for irrigation, but no line of settlements and farms exists along its course farther to the south. Rather than sustaining cities and large populations, the Jordan River both divides and unites a desolate landscape for much of its southerly route. Several small rivers feed into the northern Jordan River, but once the channel begins to drop, the water slowly makes its way 322 kilometers (200 miles) through a deep gorge covering a distance of 104 kilometers (65 miles). A good deal of water evaporates or serves as irrigation water before the river reaches its final destination. The gorge, known as the Jordan Rift Valley, or the Ghor, is young geologically and constitutes a part of the 6000 kilometer (3720 miles) long Syrian-African Rift Valley, which extends from Turkey in the north to eastern Africa in the south.

The deepest point in the gorge and the lowest place on earth is a landlocked body of water into which the Jordan River trickles. In Arabic, it is known as Bahir Lut, or the Sea of Lot, from the association with the story in the Bible and Qur'an concerning Lot's inheritance of the region. In the fifth century c.e., a Christian writer was the first to call it the Dead Sea. Almost 400 meters (1300 feet) below the level of the Mediterranean Sea, the Dead Sea is shrinking. With 35% salt content near the surface, and a higher salt density below, few living species can survive. Nevertheless, some organisms manage to live in the sea and hardy plants grow along its banks. The treacherously steep mountains with deep, narrow canyons on both sides of the sea create dramatic scenery.

AIR, WIND, RAIN, AND EARTH

He has poured down for you abundant rain, the early and latter rain as before. Joel 2:23

We send the fertilizing winds and bring down the rain from heaven, giving you to drink of reservoirs that are not yours. Surah 15.22

Jordan is a country of many different landscapes and weather patterns. From the depths of the Jordan River Valley rise mountains to the east that in some places give way to fertile land with adequate precipitation for agriculture. In contrast, rain falls infrequently in the southern and eastern deserts. Between these two extremes is a comfortable climate zone in the region of Amman. Summer temperatures only rarely exceed 100 degrees F (38 degrees C), but the evenings are cool and breezy. The
relatively high altitude of Amman and the Madaba Plains region assures cool summer evenings.

Given its location near the western side of the Asian continent, Jordan enjoys a pleasant Mediterranean climate. Summers are hot and dry. Winters are cool with snow falling in the highest elevations and rain at the lower altitudes. The winter rainy season, although not a steady downpour, spans the months from November to March. Winds from the Mediterranean carry moisture inland, but some of the rain falls to the west before reaching Jordan, much of which finds itself in a rain shadow. It is due to the high altitude of the Jordanian Plateau and mountains in northern and central Jordan (Fig. 10) that clouds form as the air rises to the higher elevations and create rain or snow.

As important as rain is for agriculture, dew plays a critical role as well, especially in the autumn, one of the two transitional periods when small amounts of rain fall. Dew provides the necessary moisture instead of rain. If well timed, spring and autumn precipitation results in a prosperous agricultural season. If the rain is too little or too late, the land will be less productive. On rare occasions, intense cloudbursts can cause considerable soil erosion, especially on unvegetated landscapes. For most of the year, the plants and animals ration themselves to the moisture stored in the soils from the rainy season.

One effect of the seasonality and low overall amount of precipitation in the Tall at-‘Umayri region is the absence of permanent surface streams. In other areas, springs feed streams during the dry season. But here the groundwater level is too low. Rainfall is stored as soil moisture and, in place of running streams or rivers, there are wadis—dry river beds or erosional gullies whose channels fill with water only during periods of ample rainfall. In acknowledging the significance of rain, the Qur’an uses the terms “gracious” and “blessed” to describe “rain from heaven, giving you to drink of reservoirs that are not yours” (Surah 15.22).

In a country whose topography includes mountains, lowlands, and a deep depression, the landscape varies dramatically. Perennial pine forests in the north contrast with bald hills in the south where it seems as if not a single tree or shrub thrives. Nothing appears to live in the semiarid south except near permanent water sources, or until the rain falls on dormant seeds. With the slightest encouragement, however, the seemingly desolate terrain transforms into a brilliant array of color and life. The southernmost part of the country is a sandy desert with magnificently colored Nubian sandstone. It is in the south, along a major trade route, that the Nabataeans built their capital at Petra which was later controlled by the Roman Empire.

In a fertile area between the northern hills and the southern semiarid areas lies the Madaba Plains. Geographical features delineate its boundaries—rolling hills on the north, the desert on the east, the Jordan Rift Valley in the west, and the majestic Wadi Mujib to the south. The Madaba Plains area of the Jordanian Plateau is sufficiently high to draw clouds producing between 300-500 mm of rain, enough to support dry-farming or rain-fed agriculture.

In the northern part of the study area, limestone hills have rounded, gently sloping hilltops with relatively steep hill slopes, and rounded wadi bottoms. Local inhabitants cultivate the wadis intensively (Fig. 11). In the southern part of the
'Umayri region, where it meets the Madaba Plains, the less resistant rock formations result in a gently curving, undulating topography of lower relief than in the northern area.

The life of this present world is like the water sent down from heaven, mantling the earth with vegetation as food for man and beast. But then when the earth is gay with golden splendor and people imagine that they own and rule it, Our command goes out over it and, whether by night or by day, We turn it all into stubble, as though yesterday's fertility had never been. Surah 10:24

A CHANGING LANDSCAPE

Who has measured the waters in the hollow of his hand and marked off the heavens with a span, enclosed the dust of the earth in a measure, and weighed the mountains in scales and the hills in a balance? Isaiah 40:12

It is He who gave you the earth for a place to rest and set the sky for a canopy whence He sends the waters whereby He brings forth fruits for your sustenance. Surah 2:22

Human occupation in all parts of the earth almost without exception causes changes in the environment, including the vegetation, soil cover, water storage, and plant and animal worlds. When we interfere with one aspect of the biosphere, the impact spreads throughout the system. The results linger not only for generations, but sometimes for millennia. Thousands of years of poor environmental management in the past are visible in the current landscape of Jordan.

Deforestation near areas of dense population causes the greatest damage. Land clearing for agricultural purposes and tree cutting for firewood create substantial changes. These common practices are especially destructive in the Near East because of the seasonally limited distribution of rain.

Trees in forests perform many
functions. One important task is to intercept and delay a portion of the precipitation before it reaches the soil. During a rainfall, the leaves of bushes and trees catch rain drops before they contact the ground. These rain drops fall to the ground gradually, penetrating the soil over a longer period of time than might occur on an open, treeless surface. Since the soil absorbs the water, the slow gradual process also reduces soil erosion which occurs if large quantities of rapidly moving water quickly wash over the surface. As the trees and their leaves help to stagger the rain, another benefit is better water storage for future plant growth. In an unprotected environment, where trees are lacking, the rainfall from storms runs off the landscape before the soil absorbs it and in the process takes the soil with it.

The long-term effect of soil erosion's exceeding the slow rate of soil formation eventually strips the hilltops and slopes of their earth cover, thereby limiting agriculture. The soil from the slopes collects in the wadi bottoms where thick deposits of earth can suffer additional erosion whenever the run-off rain water spills down the hills into the gullies.

Without trees, precipitation can be destructive. Trees hold the soil that holds water and seeds. Under the canopy of trees, organic materials on the ground and over roots are produced, helping the water better than inorganic soil. A delicate balance exists among these processes. Once interference occurs, the entire system is ultimately in danger of collapse.

At times agriculturalists (ancient and modern) choose to take action to control or limit soil erosion of the slopes. The result, known as terrace farming, involves the construction of stone walls to hold the soil behind them on the hillsides (Fig. 12). Farmers would bring stones to the slope from elsewhere to build low walls, usually about one meter high (three feet). Then they would pile soil behind each wall to create a series of steps on the slope. The stone embankment walls trap earth behind them and form narrow but flat surfaces suitable for farming. Rain water from the top of the hill slowly percolates down from one terrace to the next, thereby preventing erosional run-off and conserving water at the same time. The arduous work of terrace construction allows people to cultivate the slopes and control hillside erosion. In Jordan and other Middle Eastern countries people continue to terrace the landscape today, but how long ago terrace farming began remains an open question.

Plants adaptable to dry, desert-like conditions, known as xeric dwarf shrubs, predominate in Jordan today. However, the rainfall and temperatures can support a richer variety of plant life. The successful reforestation programs of the Jordanian Department of Forestry since the 1950s illustrate this well, as does the survival of remnant indigenous forests (Fig. 13).

Studies of a process known as plant succession—the gradual shift of plant populations—indicate that the desert dwarf shrubbies of today are not the natural dominant or 'climax' plant community. Instead, they represent a secondary 'subclimax' community following the original plants.

Since live oak trees (Quercus caliprinus) dominate remnant surviving plant complexes near Tall al-'Umayri, botanists and environmentalists believe they represent the original major plant community of the region. This idea finds confirmation in the young oak trees that are making a natural comeback in the shady areas of young pine forests. Many species of oak require shade to encourage growth. Once cut down, it is virtually impossible for oak trees then to reestablish themselves since they must wait until other plants grow tall enough to provide sufficient shade. Only after the sun-tolerant plants succeed can oak forests return.

Animal bones from archaeological excavations at Tall Hisban and Tall al-'Umayri
also testify to the existence of ancient oak forests and scrub. For example, the remains of wild pig and fallow deer, two animals at home in forest or scrub land, imply the presence of oaks and associated plants. Greater plant cover would not only protect these animals, but would provide food as well, since wild pigs feed on acorns. Pig bones in the archaeological record therefore suggest the presence of plants and trees capable of protecting and sustaining them.

To learn when the oak forests and associated animals prevailed, archaeologists determine the date of the animal bones by studying the artifacts found with them—for example, the clay pots and broken pieces of pottery, known as sherds. In the absence of written material, pottery provides the best artifact for dating. Preliminary studies indicate that the oak woodlands and accompanying trees and plants around ‘Umayri and Hisban date from the Early Bronze Age (3100 B.C.E.) down to at least the Iron II period (550 B.C.E.) and perhaps even later.

As early as the Iron Age or perhaps even before, people cut down substantial numbers of trees to clear farmland. Deforestation continued after that and increased during the Roman and Byzantine periods with the worst blow coming during the Ottoman era. The requirements of the Ottoman Turks for wood to fuel their trains on the Hejaz railway into the early 20th century led to destruction of the remaining forests. During and since that time, heavy sheep and goat grazing contributed to the problem by making it difficult for the original plants and trees to reestablish themselves without reforestation programs.

Research demonstrates that episodes of flourishing city life and intensive agricultural production in the hinterland coincide with a greater abundance of large domestic animals, such as cattle, horse, and donkey, than during other periods. These are the draft animals for plowing fields and transporting produce to markets and clientele. In times of less exuberant urban life, the numbers of sheep and goats rose proportionally, suggesting that a larger part of the populace relied on pastoralism than at other times. The fluctuations between numbers of draft animals versus sheep and goats through time imply a pattern of alternating periods of intensive agriculture, coinciding with the intensification of settlements, versus an emphasis on pastoralism during times of smaller populations and fewer permanent centers. Nevertheless, each element of the society is at all times present in the region to a greater or lesser extent. As a consequence, migratory people living in tent camps or villages would coexist with farmers living permanently in towns and villages. In antiquity, as today, pluralism characterizes the society.
VI. ARCHITECTURE

God also has given you a house to dwell in and animal skins for tent-dwellings, suited in their lightness both when you strike camp and when you encamp again. From their wool, hair and fur come furnishings and goods that give you pleasure while they last. Surah 16:80

They shall build houses and inhabit them; they shall plant vineyards and eat their fruit. Isaiah 65:21

TRADITIONAL DWELLINGS OF STONE

Dwellings of stone in the Madaba Plains today include modern and traditional constructions. Contemporary houses of limestone, marble, and concrete in villages and towns contrast with traditional limestone buildings and caves, each of which serves a different purpose.

Immediately south of the modern village of al-Bunayyat is a tell known as 'Umayrī North. This tell contains numerous caves, many of which were formerly inhabited by older members of al-Bunayyat village. The cluster of cave dwellings, which together constitute a seasonally-used cave village, is known as Jeriet 'Umayri. Along with its cave-homes, the village includes a small shop, a threshing floor, a cemetery, and a common well. One enters such cave dwellings through an opening with stairs leading down into them. On both sides of the stairs are walls made of reused stones hewn in antiquity. The walls prevent rocks, soil, and water from tumbling into the cave. Inside the caves are several sections: an area for the family to sleep and for the women to work, a place to keep fodder, and one or more areas to shelter animals. In addition to a hearth or kitchen area, one finds carpets, mattresses for people to sit and sleep on, and places to store food along with other belongings (Fig. 37). Some caves have a chimney as well.

The Ajermeh tribesmen are gradually abandoning the traditional migratory way of life in favor of year-round in villages and towns. Typically, however, they build the new villages

Fig. 37. Cave interior
at or near their traditional camping sites. The location of Hisban village, for example, marks the place where ancestors of the present inhabitants formerly established their seasonal cave village (Fig. 38).

The common method of constructing homes in the early days of village life when the Ajermeh began to settle down involved a rectangular structure which would be divided, just like tents and caves, into two or more separate rooms. There is usually only one entrance into each room. Windows are either nonexistent or very small. Small windows and other openings helped to maintain a comfortable temperature by keeping in the cool air during the summer and by preventing heat from escaping in the winter. To build their homes, people would haul hewn stone from nearby (archaeological) ruins to the new village. Vaulted arches of hewn stone support roofs of wooden beams which in turn had a mantle of reeds from the Jordan River Valley. Finally, a layer of mud plaster would hold it together.

Stone buildings include those housing a water wheel, as at Ayin Hisban (Fig. 39). The houses which today dominate Ajermeh villages show little resemblance to those older stone structures. The modern houses, made of concrete, exhibit a wide variety of sizes and layouts. In many cases, very elaborate homes stand side-by-side with older, more traditional homes and even tents. There are instances of a modern house being built next to a cave, which may still function as storage space, as a garbage dump, or as an animal shelter. Among the most stately and impressive traditional buildings with undulating arches and vaults is the manor, known as a qasr. Formidable walls surround these large constructions built of stone. Each qasr bears a name, for example, Qasr al-Yahudah, Qasr Bisharat, and Qasr Umm al-Basatin.

Residents of the qasr live there all year, but hire shepherds to care for their flocks during the seasonal migrations. In the compound of a qasr, the family may keep a tent for festive occasions rather than for daily use. Qasr Bisharat, now 125 years old, is square, of solid stone construction, and built around a large central courtyard. It contains square rooms with crossed arches. In the living areas, plaster covers the walls, but rough unfinished stones characterize the rooms and buildings used to store agricultural equipment and supplies. The southeastern corner of the manor houses a chapel.
THE TENT

O tent, pitched so beautifully; under you my love lies sleeping! (Arabic verse)

The summer visitor to the Madaba Plains region sees a number of long, low tents dotting the hillsides all around. One might imagine that living in a tent is uncomfortable, and the fate of those too poor to own a stone house. The tents seem somewhat out of place if they belong to Bedouin nomads—normally thought to be struggling for survival in a sandy desert. But the terrain here is not at all sandy; instead, the tents stand on fields of rich, red earth where farmers harvest wheat, barley, lentils, and chickpeas, where sheep and goats are now grazing. Some tents are near fields of melons, cucumbers, squash, tomatoes, and okra. Others are pitched by orchards of olive, pomegranate, or apple trees. Often a tent has a pick-up truck or a tractor standing in front, or a metal water tank on a stand or a trailer. In fact, the tent-dwellers are farmers who live in the tents as part of their annual agricultural cycle. In the accounts of travelers over a hundred years ago we read that the Ajmereh living in this region were superior wheat-growers. They still are.

The tent, the famous original black goat-hair tent of the fabled nomadic desert dwellers, is of special design. Although part of the tent consists of reused burlap flour and sugar bags, its construction is rigidly traditional down to the last rope. So standard red is the tent that each pole has a name, as does each woven panel and each guy rope. It is the mother of the family who makes the tent. Traditionally, she spins the shorn goat hair, usually black but sometimes brown or even white (Fig. 40). Today, with the introduction of the light brown Shami goat, which always bears twins and is known for its improved milk production, there is more pale goat hair available than previously.

After spinning, the hair is plied, that is, two threads are spun together for strength. Then women use a ground loom to weave a long, narrow section of the tent. Usually people do not make or replace an entire tent all at once. A tent section is an interchangeable module; the oldest section is replaced as needed. Another section may be replaced next year. Each individual section is sewn together. Due to the tedious and time-consuming work of spinning and weaving goat hair, some people take advantage of machine spun and woven tent strips (of goat hair). Merchants sell these by the roll in the Amman market, but they are very expensive. The cheaper alternative is to reuse burlap bags. Tents made of these are called “summer tents,” while goat hair tents, renowned as waterproof, are called “winter tents.”

The low, graceful, and timeless outlines of the tent, make it one of the most comfortable dwellings on earth. Its long guy ropes, fastened to well driven stakes, will withstand all winds. With the back, end, and side panels down and the lower skirts
weighted by rocks, tents will keep everyone sleeping inside warm during the cold nights under their wool-stuffed quilts. On hot, sunny summer days one front panel can be let down to block sunlight, while pinned up back and end panels allow a cool breeze to blow through. Pins and ties hold each panel, however temporary, in place; nothing flaps, nothing comes loose, nothing is careless. Someone may even sprinkle water on the ground around the floor mats to keep down the dust. Usually the tent is on a slope, with a view that extends across a valley, where light and atmosphere change from dawn to noon to evening.

It is no wonder that people refuse to give up summers in the tent, even though they have a house in town as well. Although the burlap tent may be replacing the labor-intensive goat-hair tent, nothing of the traditional tent hospitality is changing. The tent owners welcome the casual visitor, despite the language barrier, with a small sip of the well-known unsweetened coffee. One family member may get sitting mats, while another prepares tea, and the whole family gathers to get acquainted with the visitor. On one occasion, while we were admiring a tent and its sturdy traditional construction, an old woman, weathered by many years of outdoor work, began to sing a love song about a tent. She laughed as she sang:

_O tent, pitched so beautifully, There is no one young and beautiful under you, Only old women with bent backs._

Like all the people living in tents during the summer, this old woman also has a fine modern house, made of stone or cement blocks, in which she lives with her family during the winter months. Her village has houses with running water and electricity, and schools for the children. But in the summer, her entire family packs up and camps out in the traditional way, locating near their summer fields and grazing areas. They move their tent by truck, which is no small matter, as the tent weighs 250 kilograms (550 lbs) or more. It may require two trips to move everything: the tent with all its ropes, poles, pins, and stakes, the water tank, the farm tools, the temporary fencing set up in the camp spot, the chicken coop and chickens, the rabbits, the bags of wool and goat hair after shearing, sacks of grains and legumes, the floor mats, the family’s bedding, implements with which to grind wheat and coffee, pots and pans and kitchen utensils, a propane gas cooker, basins for washing, the tall ceramic water jar and its stand to keep the drinking water cool, and all the family’s summer clothes. Some bring along their television set, fasten the aerial to a tent corner pole, and attach the electric cord to a car battery or generator. They may move from place to place during the summer months, as the needs of their crops and flocks dictate.
VII. THE ECONOMY

AGRICULTURE

Agricultural pursuits account for a large segment of what the working population today in Jordan do and food is a major export despite the reality that only ten percent of the country is suitable for cultivation. The Madaba Plains, just south of Tall al-'Umayri, is one of the most fertile regions in the country. Within the past 100 years changes in this rural landscape have been the norm. It is no longer the seasonal residence of the Ajermeh Bedouin. It has rather become the permanent home of farmers and villagers whose livelihoods derive from supplying the urban center of Amman with food and labor. These changes also demonstrate the importance of being attentive to developments in what anthropologists call the food system. The food system includes all of the interrelated activities which people carry out in their quest for food: production; processing; storage and preservation; distribution and exchange; preparation, serving, and eating; and even discarding and clean up by nature’s agents such as dogs, wild animals, and the weather.

One of the interesting problems archaeologists and anthropologists address is what happens to food systems in the long term. Do they steadily move in the direction of greater intensity, with more permanent settlements and farms, or can they also go the other way—in the direction of abatement, with more pastoral activities and seasonal encampments rather than villages and towns? One incentive motivating the Madaba Plains Project is its continuing interest in learning more about the nature of food systems and settlement cycles. In fact, the basic research design of the project centers around food systems. Tall al-'Umayri, with its deposits beginning in the Bronze Age and continuing through the Iron Age down to the Byzantine period, helps us learn about the early periods not found at other sites and to see continuity or discontinuity at a single site over the millennia. Additionally, our regional survey examines food production installations in the hinterland of the tell. To better appreciate the agricultural potential of the land, the practices of current farmers is instructive.

AJERMEH FARMERS

In the vicinity of Tall al-'Umayri stand the tents of the Ajermeh, close to their fields of wheat (Fig. 41). During the winter months, while some members of the tribe move the flocks to the Ghor, those who remain behind prepare the surrounding slopes and wadi bottoms for the
The AJermeh grow grain and other field crops primarily for their own consumption, the arrival of two Christian families in the area from west of the Jordan River in the late 19th century led the way to increased markets for these crops and consequently also to expanded production locally. To this end they purchased large tracts of land from the AJermeh and other tribes and put the land to the plow. In the past fifty years the newcomers have introduced the growing of vegetable and fruit crops, thus adding to the area’s traditional crops (Fig. 46).

Today, the effects of this intensification of the local agricultural economy are seen everywhere. Cash crops, such as strawberries, tomatoes and tobacco replace wheat in wadi bottoms. Trees and vegetable crops cover terraces on hillsides, which in the past
would serve primarily as pasture for sheep and goats. Where formerly there were only ruins of ancient towns and communities, bustling villages now flourish. Indeed, to the north of Ajermeh territory and along the new airport highway, urbanization rapidly erases the traces of the life-style characteristic of earlier centuries.

The dramatic juxtaposition of modern machinery and traditional harvesting offers a telling sign of the great changes in the farming economy of the Madaba Plains in recent years. Harvesting by traditional methods demands an immense investment of human labor, as did all agricultural operations before the arrival of machines to do the work of many (Fig. 47). In the ancient world, as well as in more recent times, the production and distribution of goods and services would depend upon human and animal labor. In agriculture as in other sectors of the economy—manufacturing, herding, administering—the basic question is how many hands the local people could muster to plow and sow, to care for the sheep and goats, to build storehouses and silos, and to move produce from field to market. Modern technology, in the form of machines and vehicles, answers the question decisively and plays a crucial role in the food system transformation.

**ANCIENT FARMERS**

The repeated ebb and flow of land use over the long term is demonstrated by archaeological excavations and surveys throughout the Madaba Plains region. Tall Hisban, for example, was occupied, then abandoned at least once in the Iron Age; at least once during the Greco-Roman period; and once again during Islamic times. These cycles of settlement and abandonment of the tell itself accompany successive cycles of filling up and emptying out of settlements in the hinterland around the tell as well.

As at Tall Hisban, people at Tall al-‘Umayri and nearby rural settlements would respond to economic challenges in various ways depending on their involvement in the larger economy of the region. When this interaction diminishes to a minimum, for example during the early 20th century, economic activity is confined within a small radius of ‘Umayri and its close neighbors. The available labor would be organized for
farming and herding in ways that increased subsistence security, always a challenge in
this area of great environmental uncertainty. To enhance economic security, villagers
would diversify their crops by planting wheat and barley along with vegetables,
particularly lentils, and fruit trees such as olive and fig as well as grape vines. They
would devote a significant amount of energy to sheep and goat herding especially to
provide resources in case of crop failure. With the natural geographical diversity of its
environs, the ‘Umayri landscape permits a mixed economy to thrive.

Villagers also developed social mechanisms to promote and maintain community
solidarity. Households took care to store crops from a year of plenty for a year of want,
and to invest their surplus in larger family size since life was precarious and labor is the
key ingredient for economic survival. Crafts such as clothes-making carried out within
each household could provide extra income. Barter was the exchange mechanism for
obtaining other goods, such as metals from the more or less distant market centers and
livestock from nomadic pastoralists.

At other times, those involved in the local economy of ‘Umayri would participate in
a more fully developed and regionally integrated market economy. People would
continue to farm and herd animals, but now they were producing commodities for
market rather than exclusively for their own consumption. Other industries might also
contribute substantially to this more diversified and specialized economy. This system
uses money, standardized weights and measures, record keeping, business contracts
and loans and involves production centers for certain commodities, markets, warehouses,
centralized control, and far flung trading operations. In excavations of the administrative
area at Tall al-‘Umayri we find seals and seal impressions of the administrators of this
market-oriented economy during the Late Iron Age.

The transition between the more local, subsistence-oriented economy and the more
regional, market-oriented economy provides the drama of many moments in ‘Umayri’s
history. The growth of a market-oriented economy places great pressure upon the
villagers whose land and labor support the markets and the politically powerful who
direct them. Most families could not invest the capital or tolerate the risk of entering into
the regional economy. The growth of this economic zone would threaten their ability
to carry out their farming and herding practices for individual family consumption.
Instead of dependence on crops that limit risk and balance the work, the market-oriented
economy demands more industrial production. The farming residents of ‘Umayri and
its hinterland who chose to produce these commodities would come to depend upon the
market for their own daily bread. As land increased in value and people began to convert
increasing amounts of land to orchards and vineyards, grazing land became less
available and families lost the security of mixed farming and herding. Their lives and
livelihood became increasingly caught up in economic processes they could not
control. At the same time, a rapidly developing economy, for example during the Iron
Age, would result in the most impressive and lasting architecture—the citadel and the
spectacular rampart and wall systems.

The archaeological remains of agricultural intensification around Tall al-‘Umayri
include buildings, seeds, and animal bones. Pottery found on the surfaces of ancient
sites allows us to date the agricultural remains, such as the perimeter walls, cisterns,
cupholes, wine and oil presses, millstones, terrace walls, and field towers. Only three
of the 29 field “tower” sites preserve material from the Late Bronze Age. Pottery at
seven sites suggests an Iron I date, while sherds from at least 24 indicate an Iron II period
of usage. After the Iron II era, there is a gap of several centuries until Roman times, with
the operation of nine sites.

A gradual increase through the late Roman period peaks in the Byzantine period with
19 sites in use. Following this is another period of disuse which lasts until a resurgence of activity at nine sites during Umayyad times. The two primary periods of intensive agricultural activity, the Iron II and Byzantine eras, correspond to a larger number of small sites surrounding the main tell than at other times. The paleobotanical collections of ancient plant remains from the tell confirm the intensive land use for the Iron II period as the distribution of sites suggests.

Carbonized seeds retrieved by flotation techniques reveal the harvesting of barley, wheat, lentil, pea, bitter vetch, chick pea, grape, wild pistachio, olive, and pomegranate. Tree crops, such as olive and pomegranate, as well as vineyards, indicate a fairly intensive farm policy. The large amount of grape pips, representing 29% of all the Iron II plant remains, even higher than barley, means that the vineyards could supply both local consumption and an export business.

An interesting note involving grapes concerns the ancient identification of Tall al-'Umayri. On a list attributed to Tutmosis III (1490-1436 B.C.E.) of Egypt, Asiatic place names include sites in Transjordan. A prominent Egyptologist, Donald Redford who, after examining the topography of Tall al-'Umayri, thinks that it might be one of the sites mentioned on the list. It has the largest perennial spring anywhere in the vicinity; it boasts a settlement during the Middle and Late Bronze Ages; and it is in a strategic location on a transit corridor of easy passage. Furthermore, in the Bible, Abel Keramim 'bilkamm (Judges 11:33) which translates as “meadow (or plain) of the vineyards” might correspond to the site of 'Umayri.

The presence of donkey, horse, and cattle bones in the excavation debris again reflects a period of urbanization and intensification of the food system during the Iron II period. The donkey, horse, and oxen are draft and transport animals vital in times of intense cultivation of cash or surplus crops.

The discovery of the Ba'alis seal impression at Tall al-'Umayri perhaps symbolizes the ultimate success of its agricultural endeavors. The Ba'alis impression expresses the political power and prestige of the local Ammonite ruler of the sixth century B.C.E. and implies the mandate of the local authority over his contemporaries. This prowess surfaces in Jeremiah 49. The prophet rebukes the Ammonites for taking advantage of Judah by moving into new territory. In verse 4 Jeremiah asks:

Why do you boast of your valleys, your valleys so fruitful?
O unfaithful daughter, you trust in your riches and say,
"Who will attack me?"

The agricultural success of Ammon provides a firm economic base, according political confidence.

INDUSTRY

Industry in Jordan today differs from the past more in technologies than in products. At present, the industrial sector produces agricultural goods, textiles, leather, tobacco, chemicals, plastics, paper, and metal products. While oil is not found in the subsurface strata, a refinery processes foreign crude oil. Jordan also manufactures phosphates, cement, and salt. Although the technologies change, some of the same products characterized industry in antiquity, especially agricultural items, such as olive oil and wine, textiles, and salt. There is no evidence of metal workshops in the Madaba Plains region, but farther south, closer to the raw materials for making bronze and iron, there are industrial centers from the Bronze and Iron Ages as well as later periods.
SPINNING AND WEAVING

Among the traditional industries receiving careful study by archaeologists are spinning and weaving which, like pottery-making, involve the work of women. Within the household setting, rather than in separate workshops, women would spin threads and weave textiles. Added to what we have already noted, this emphasizes that the role of women in the ancient economy cannot be overestimated. It is probable that each family would use the goods made in the household, while surplus foods, cloth, and pottery would be sold or traded. One factor contributing to the lack of detectable manufacturing locations for cloth could be the predominance of household cottage industries.

In antiquity, all clothing and textiles were made by hand. Although no fragments of cloth come from our excavations in the Madaba Plains region, evidence of cloth-making exists in the form of spindle whorls, loom weights, pins, needles, spools, and pattern sticks from Tall al-'Umayri, Tall Hisban, and Tall Jawa. Clothing was made from two kinds of fibers, linen and wool. Flax seeds attest to summer clothes of linen. Sheep bones imply the availability of wool. Goat remains suggest the use of goat hair to weave tents.

Of the tools for spinning these fibers into threads, only the stone or clay whorls remain. Carefully and symmetrically cut basalt stone whorls contrast with the less regular clay whorls often made from reused and reshaped fragments of broken pottery. The circular whorls have a hole in the center for attachment to a wooden shaft which is never preserved archaeologically. Flat whorls work best for wool, while conical whorls, with the weight concentrated near the center, are advantageous in spinning linen (Fig. 48). In general, smaller whorls result in a finer thread. Spindles in current use for making thick yarn are entirely of wood and they tend to be larger than their ancient counterparts used for finer clothing fibers.

Once the threads are ready, two types of wooden looms help to fashion them into woven material. Of the two types of ancient looms, only one type, the vertical loom, leaves any trace in the archaeological record. The vertical loom, consisting of upright poles and crosspieces, creates tension by the tying of ceramic or stone loom weights to the warp threads. Many of the weights, spherical or pyramidal in shape, remain in the debris of tells (Fig. 49). Although the frames of the wooden looms no longer exist, ancient Greek vases depict weights similar to these in use on looms. Today, women weavers in Jerash work with wooden vertical looms to fashion rugs which preserve traditional techniques and designs.

The second type of ancient loom is a horizontal ground loom, consisting of four stakes driven into the ground to form a rectangle. After weaving the cloth and removing it from the loom, nothing remains other than a few sticks and stones; in other words, there are no identifiable traces. Fortunately, one can observe traditional weavers who continue to use traditional looms (Fig. 50). Ground looms are still in use by Bedouin women who sell rugs locally. It is likely a ground loom that appears in the biblical story of Samson and Delilah (Judges 16:13-14). Delilah wove Samson’s hair into her cloth as he slept. When he awoke and jumped up, he pulled the stakes from the ground, thus destroying the loom.

Spinning and weaving have not disappeared, although a good deal of the clothing
produced for men and women is now of machine-made cloth, much of it imported synthetics. But spinning and weaving are for more than clothing alone. Most women who live in tents and houses in the Madaba Plains region use wooden spindles purchased in Amman or Madaba. In addition to spinning, women still practice plying, which involves spinning two spun threads together in opposite directions to create a strong thread that will not unravel. Minor variations in spinning and plying techniques indicate that the women preserve several different handworking traditions.

Women who no longer weave threads into cloth continue to spin and ply yarn for many household purposes. Plyed yarn is useful to tie up the sheep or goats during milking. To prevent the chicks from wandering too far, women use yarn to tie one leg of mother hens to a post. Yarns are also important to sew up sacks full of threshed wheat, or for mending. In antiquity, rather than sew clothes into a particular form, it was customary to drape cloth around the body and to use a woven sash or metal pin—a toggle in the Bronze Age and a fibula in the Iron Age—to fasten the material. Sewing with iron needles was reserved for making bags from flat pieces of cloth, for mending, and for embroidering.

To embroider and weave patterns on cloth requires two types of tools along with the iron needles: clay spools and bone pattern sticks. The latter have one rounded and one mildly pointed end and were used to weave patterns into the cloth while on the loom, as people continue to do today. Women maintain the tradition of colorful designs by embroidering their black gowns with geometric or floral designs representing their communal identity (Fig. 51). Outstanding examples of regional costumes are on display in the museums of Amman and Madaba. In addition to producing clothing, women at ancient ‘Umayri could make sleeping mats and bedding, household linens, saddle blankets and saddle bags for camels and donkeys, reins and leading ropes, and commercial containers or large bags and sacks to store and ship dry products such as grains, legumes, and wool. Some women were also responsible for spinning and weaving their tents. The importance and complexity of the textile industry is very apparent in passages from Proverbs 31:

She seeks wool and flax, and works with willing hands ... She perceives that her merchandise is profitable. Her lamp does not go out at night. She puts her hands to the distaff, and her hands hold the spindle ... She is not afraid for her household when it snows, for all her household are clothed in crimson. She makes herself coverings; her clothing is fine linen and purple ... She makes linen garments and sells them; she supplies the merchants with sashes.
METALLURGY

From Tall Jawa, Iron Age metal javelins provide an opportunity to study ancient metal technology. In the Iron Age, iron became more readily available than earlier, but for centuries bronze may have been the predominate metal for tools. Iron objects, especially jewelry, are known from Late Bronze Age tombs in Madaba and elsewhere, but bronze objects remain common throughout the Iron Age and later.

An alloy of copper with tin or arsenic, bronze has several advantages over iron, although the latter is easy to produce. Whereas aging iron rusts, old bronze tools and other objects can be repeatedly melted and remelted, reshaped, and recycled making it a more efficient metal than iron, which can be cast only once. Iron implements can be sharpened, but not reshaped. Given the propensity of iron to rust, archaeologists find fewer artifacts made of iron than bronze. While one might infer that bronze artifacts will always outnumber those of iron, there is yet another consideration. Since bronze and copper artifacts can be melted down, reshaped, and reused for generations, ancient or more recent tomb robbers who might find a bronze artifact buried in a tomb can at any time melt it down to create a new object. As a result, ancient tomb robbers living in the Late Bronze Age would recycle Early and Middle Bronze Age copper and bronze artifacts. Iron Age tomb robbers could reuse metal objects of the Bronze Age, while later scavengers continue the cycle. The end result is a general shortage of metal artifacts for most archaeological periods due to robbing and reuse.

Two other metals, gold and silver, are also in short supply in the excavations of ancient cities, towns and villages. People would never carelessly leave gold and silver around at settlements due to their high value. More often than not, precious metals are in tomb deposits. If, however, a fire spread through a site before the inhabitants could collect their most valuable belongings, jewelry is occasionally left there.

JEWELRY

The jewelry of ancient times characteristically is of two major types. The first includes finely crafted items in precious metals which are usually found in association with other artifacts marking high social status and discovered in hidden hoards, sacred areas, treasuries of important buildings, and tombs of elaborate design. These pieces would belong to the leaders of society in the cult and in politics and represent their insignia of office. At Tall Hisban, particularly during the Roman and Byzantine periods, a number of items fit into the category of group one: a bronze cross and a
bronze bell from the North Church (Fig. 52), two crossbow fibulae (Fig. 53), gold foil earrings (Fig. 54), and especially the dazzling cameo earring (Fig. 55) from the tombs.

A second group of jewelry items are those typical of settlement deposits, objects many people would use in the course of their daily lives. Most of the jewelry of ancient `Umayri belongs in this second group: bangles, beads, fibulae, simple bronze finger rings, “lunate” (crescent-moon-shaped) earrings and ceramic pendants, of which some are reshaped and smoothed potsherds (Fig. 56). We learn about the manner in which people would wear and use these items from their placement on skeletons in burials and from their rendering on figurines, from Mesopotamian sculptures and from Egyptian tomb paintings. For example, on female figurines, the bronze bangle appears in groups of two to four and even six on the limbs as bracelets, armlets, and anklets. In one figurine, both the woman and her baby wear these. The bangles, then, are not worn to enhance the wearer’s attractiveness primarily, but because they relate to the goddess figurines—perhaps they were talismans to support healthy children and mothers.

Beaded necklaces embody deep significance as well. The art of bead arrangement is intricately complex. Large necklaces might resemble the ornate broad beaded collars from Egypt. However, the most popular kind of bead from `Umayri, as well as from other sites in the Madaba Plains region, is the semiprecious stone, carnelian. Its color corresponds to the rich, blood-red, fertile soil. Turquoise faience, a type of glazed clay or quartz material, might represent the color of water; a darker blue glazed ceramic bead could depict the lapis-colored sky; golden amber could designate sunlight; and green glass possibly symbolizes vegetation (Fig. 57). These and other beads would be reminders of natural phenomena which give life and sustain people, although none is available locally. A religious interpretation would suggest that the divinity behind the life-sustaining elements of nature brings our life into being and nurtures us in good health. In Roman, Byzantine, and Arabic periods, people wore not only beads of gemstones and glass, but also glass bangles reminiscent of the metal ones.

One important and popular item, the fibula (see Fig. 53), is a pin whose earliest use dates to the eighth century B.C.E. It might secure a large piece of textile material, allowing the owner to refold the cloth into different shapes to meet various needs in a matter of minutes. Because spinning and weaving are laborious tasks, textiles had to serve a variety of purposes. A large garment could be a blanket for the night, a warm cape by day, as well as a bag for shopping, for travel or for carrying laundry or even a child. The fibula helped to hold the textile secure as it was folded for differing uses. During the Iron Age, the bronze fibula might have developed from the straight pin of earlier times, used with string to keep it in place. Fibulae of each archaeological period have a distinctive decoration and shape which provide useful dating evidence.

Today jewelry is personal decorative art and often appears in the provenance of fashion accessories of women and less often of men. In antiquity jewelry was part of the insignia of societal office and status, relating both to religion and piety. At times it could have important utilitarian functions for men, women, and children. Today as well, in the traditional society of the Middle East, jewelry, especially gold wcrn by women, represents financial independence and inheritance, although the fine design and execution also results in decorative and fashionable accessories.

**Pottery**

Clay pots, the most common container in antiquity, are still made at Zizia, a few kilometers south of Tall al-`Umayri, but ancient pottery production locations evade detection. At Zizia, Egyptian migrant potters come seasonally to make pottery in Jordan (Figs. 58-59). They use local clays to throw water jugs, jars, drums, and flower
pots on a fast-moving wheel. Some shapes they form mimic water jugs from Iraq, Egypt, and Saudi Arabia.

Our knowledge of ancient technologies improves steadily as archaeologists continue to study the manufacturing techniques of ancient materials, such as metal, stone, clay, and textiles. We rarely have the opportunity to excavate industrial centers, in part because they are difficult to find. Practical needs dictate that factories and workshops should be near the raw materials and means of transportation rather than in the heart of a population center. Production locations away from the tells often escape detection. Quarries for stone construction and lime plaster are usually outside settlements rather than within. Installations to process food such as oil and wine exist both in settlements and in the surrounding countryside.

On occasion, archaeologists excavate kilns used to fire pottery or stone and gem workshops within a settlement, but more often, information on ancient technologies derives from the finished products—the artifacts themselves—the metal arrowheads, the stone buildings, and the clay pots. Much of the materials used in the workshops—wooden hammers, ropes, and tables—decompose. Organic material usually does not survive in the soil, and there is always the possibility that such items were broken down for reuse or to serve as fuel.

To learn about ancient pottery technologies, a study of the ceramics found at Tall al-ʿUmayri, Tall Jawa, Ruin Salim and al-Drayyat examines the manufacturing techniques and changes in the technology throughout history. Other concerns have to do with where the pots were made and whether or not the sources of the raw materials or the pottery would alter through time. Pottery is still made in various communities in Jordan, but in far less frequency than in the past. In antiquity, clay pots were containers for storing, cooking, eating, and preparing food. Today, as in the past, ceramic vessels are fragile and break often. Pots provide an inexpensive container and broken pots could be quickly replaced. As a result of their fragility, high rate of breakage, and constant replacement, styles change through time, much more than for any other artifact. Stone bowls, for example, would not break as easily, resulting in greater stability in their form than is the case with pottery. Craftspeople working in stone were also subject to the limitations and restrictions of the raw material which was less pliable than clay whose properties enabled potters to create almost any shape.

Along with changes in the shapes of pots come modifications of the surface treatment and accessory pieces such as handles and spouts. Painted patterns adorn pots in certain periods. At other times, potters or their assistants might apply a thin layer of clay, colored with a red pigment, to the surface and then rub or burnish it to create a shiny surface finish. For the present, we know that through time changes in the ceramic industry relate to clay types and manufacturing techniques. For example, most Early
Bronze Age wares appear to be coil-built, but the clay of decorated pieces differs from the clay of cooking pots and jars. The largest jar, of a type one would have been placed in the corner of the house or in a larder without ever moving it, again consists of another kind of clay. For the Iron II period, potters chose to use the same clay to make bowls and jars, but, as in previous periods, a special clay with heat-resistant properties characterizes the cooking ware. Yet another clay type appears for use in the manufacture of some of the finest, most delicate black burnished bowls.

This might indicate that while potters in some workshops could make the full repertoire of bowls and jars using one type of clay, potters in other workshops would use special clays for the production of cooking ware and fine pottery. In the Iron Age, the evidence at present suggests the use of coils, molds, turntables, and wheels to shape and throw clay pots.

LIMESTONE AND THE ECONOMY

Limestone, one of the most abundant natural resources in Jordan, is an important commodity in the present local economy. Every building in Amman has a limestone facing and every new road rests on a bed of crushed limestone. In antiquity, limestone played an even greater role. Excavation and exploration in the Madaba Plains region point to three primary uses for limestone in ancient times: 1) food processing; 2) water storage; and 3) construction.

FOOD PROCESSING

Limestone finds its primary agri-industrial use in wine and oil presses. Ancient wine presses in the ‘Umayri region vary in style, but usually consist of upper and lower basins connected by a shallow channel (Fig. 60). The upper basin is generally square, or rectangular, ranging in size from 0.75 to 2 meters square (2-6 feet square), and relatively shallow. Here barefoot workers would press the grapes and the juice ran through the channel into the lower basin. The lower basin, often circular, measures half the area of the upper basin, but is usually more than twice as deep to allow the juice to settle until collection time.

Oil presses, similar in design, tend to be smaller than grape presses because olives require greater force to crush than grapes. To extract the oil by mechanical means either stone weights or a screw mechanism could provide the necessary pressure. Oil then drains into a settling basin for collection and storage. Such installations often stand by themselves with little if any pottery or other datable artifacts. The limited archaeological evidence and written sources suggest a Byzantine use or reuse for many if not most of the food processing equipment, but this assumption needs testing by the excavation of areas adjacent to the presses. Some of the permanent agricultural installations might be of an earlier date.

WATER STORAGE

Rainfall patterns on both sides of the Jordan River are such that water storage is a critical concern. As a result, plastered cisterns in the shape of a bell are carved from the limestone throughout the Madaba Plains area. A small round shaft leads from the
surface to enable rain water to run into the main storage compartment below. A limestone boulder often caps the cisterns (Fig. 61) which may have a stone watering trough next to them. Many cisterns in the region remain functional to this day, although steel tanks are rapidly replacing them. As part of the work of the Madaba Plains Project in cooperation with other government and church agencies, Project Rainkeep is an attempt to restore old cisterns for use by modern farmers.

CONSTRUCTION

In antiquity, the most noticeable use for limestone was in construction. Evidence for this includes quarry marks, lime kilns, and excavated limestone walls, many with plastered faces. To quarry limestone, workers cut grooves into the rock at right angles forming a rectangle and leaving only the bottom face still attached to bedrock (Fig. 62). Wedges of wood inserted into the grooves, or perhaps rapid heating and cooling of the rock force the bottom face to "pop" free of the bedrock. Builders could use the rough hewn stone or trim and then smooth it.

Another important constructional use of limestone comes in the form of lime plaster. The process of making lime plaster is relatively simple. After limestone is heated to approximately 900 degrees Celsius, its chemical composition changes and it becomes powdered quicklime. One adds water to the quicklime to make lime plaster, a material which easily molds and shapes to suit the builder. Given the obvious benefits of this material for construction, there are more than 25 lime kilns in the 'Umayri survey region, ranging in age from the Roman/Byzantine period up to this century. They are circular structures approximately 5 meters (15 feet) in diameter, sunk into the earth down to bedrock with a superstructure of field stones. To work the kilns, laborers would fill them with alternating layers of limestone cobbles and fuel and then burn the stone for a few days until all the limestone reduces to quicklime. The production of lime plaster involves a simple process, but the amount of materials and labor necessary are considerable. To obtain one ton of quicklime requires 1.5 tons of limestone and up to two tons of fuel.
VIII. FOOD AND FEASTS

The mountains shall drip sweet wine, and all the hills shall flow with it. They shall plant vineyards and drink their wine, and they shall make gardens and eat their fruit. Amos 9.13-14

From heaven We cause the measured rain to fall—rain We house securely in the earth, though Our power can also make those waters fail—the waters from which We bring about your fertile gardens, your palm trees and vines, yours haunts of ample fruits to eat and a tree of trees originating in Mount Sinai, yielding oil that is always there to hand at your meals. Surah 23.18-20

THE ANCIENT DIET

One type of information archaeologists collect concerns diet, both plant and animal. Remnants of ancient meals do survive if the soil and climatic conditions are favorable. Some soil types, depending on their acid and moisture content, destroy all organic material while others preserve them. In addition to grains, seeds, and bones, certain artifacts, like grinding and pounding stones or clay baking ovens, provide evidence of diet and food preparation. Seeds are the most abundant organic material preserved at Tall al-‘Umayri. Some lay on the ground in front of cooking hearths. Others were stored in large jars. To be preserved for thousands of years, the seeds had to be burnt and carbonized, either intentionally during cooking and roasting, or unintentionally when a fire spread throughout a room or building. If not carbonized, the ancient seeds would decay along with other organic material such as mats, baskets, rope, and clothing.

During the excavation, archaeologists collect seeds from the soil by an elaborate flotation process. They pour the earthy deposits containing seeds into a basin along with water in order to gently wash the soil from each seed, allowing them to float to the surface. As the mixture drains, a very fine sieve retrieves the seeds. When a paleobotanist, a researcher who studies ancient seeds, uses a microscope to identify the seeds, archaeologists can learn what the ancients ate, but this is only the beginning of the research. Although one aim is to know the nutritional content of the diet, it is difficult to evaluate, given the nature of archaeological excavations. It is problematic to measure the nutritional value since the proportions of any single foodstuff in the diet remain unknown.

Questions we can address concern changes in the diet over time. If new foods were introduced, when did it happen? The earliest deposits, those of the Early Bronze Age, some 5000 years old, include a wide range of grains, fruits, vegetables, beans and peas, spices, and oils. Among the grains are wheat and barley. Fruit trees include the olive, fig, and pomegranate. The flax seed suggests the use of linseed oil alongside oil crushed from olives. Flax was also suitable as a textile fiber for clothes.

At Tall al-‘Umayri, large storage jars of the Iron I period (1200-1000 B.C.E.) held barley, for the most part, as is clear from a jar base with carbonized barley in it. Among other seeds of Iron I date, flax constitutes another find. Although the percentage of each type of food eaten remains unknown, the available foods suggest a nutritional balance.
and a wide array of seasonings. Buckwheat joins the food basket in the Hellenistic Period, but seeds from this era are found in smaller quantities than from the Bronze and Iron Ages. As a result, there may have been other changes which remain as yet undetected. Of great significance are the similarities rather than the differences among the foods found throughout antiquity. The consistency of the diet suggests that the water supply, climate, and soil remained relatively stable during the 2000-year period represented by the seeds, from the third to first millennia B.C.E.

Ancient texts refer to some of the same foods. In the Qur’an, references to grapes, olives, date palms, orchards, pasturage, grains, and pomegranates coincide with the concern for rain.

So let man look well at his sustenance. We have sent the rain in copious downpours and broken up channels in the ground, bringing forth grain there, grapes and vegetation, olives and date-palms, and orchards with dense foliage, fruits and pastures — glad provision for you and for your cattle. Surah 80.24-32

Animal bones from the excavation are all carefully cleaned (Fig. 63) before a paleozoologist identifies them according to species. Researchers separate domesticates from wild beasts and food animals from those kept as pets or draft animals. Often the bones are fragmentary and rare. For wild animals, the initial butchering may have taken place at the kill site some distance from the settlement, implying that some of the bones would remain wherever the animal fell. This is especially true of the head, hooves, and other bones with minimal amounts of meat. Only the meat bones were carried home to the kitchen. After the meal, dogs would chew on the bones, leaving even less for the archaeologist. Finally, people reuse bones to make tools, pins, needles, combs, and ornaments, again resulting in a skewed sample.

Despite all that might happen to limit the number of bones and the conclusions we can draw from their study, the animals living in the
Madaba Plains region during ancient times represent a wide array of species. These include wild pigs and fallow deer, many sheep and goats, along with more modest quantities of cattle, horse, donkey, camel, wolf, chicken, dove, weasel, rodent, dog, gazelle, deer, wild bird, turtle, fish and others. From Tall Hisban comes a lion bone (Fig. 64). At Tall al-‘Umayri, the domesticates used for food include sheep, goat, cattle, and chicken. Perhaps even more important than as a source of meat, some of these same animals would be vital sources of dairy products. The presence of wild animals, for example the gazelle, suggests that people could supplement their food supply by fishing and hunting. Other animals, such as the weasel and turtle, may have been consumed or could represent animals that crawled into the ruins either in antiquity or more recently. The intact skeletons of dogs suggest they were not eaten but were most likely kept for pets. Dog skeletons are normally found in a side alley, behind a house, or in a garbage pit.

HOSPITALITY

In traditional Jordanian society, as elsewhere in the Middle East, hospitality and courtesy toward guests and visitors achieve a level of perfection. Visitors to any tent or stone house receive a cup of tea or coffee, fresh dairy products, and fruits of the field and vineyard. On more formal occasions, the mansaf, a delicate mixture of rice, lamb and pine nuts, which hosts serve on a copper tray, has no parallel (Fig. 65). Not only is it a delicacy to the palate, it is a communal event for the enjoyment of those around the tray. More than a meal, it is a gathering among friends. Occasions like these might also help archaeologists learn about ancient social events as well as the purpose of some ancient artifacts, such as serving trays or large platters.

If there is any suggestion that in antiquity families and friends would gather together to share their meals from a majestic plate, it is the large red polished platters of the late third millennium B.C.E. Patterns of oblique, straight, and criss-crossing lines cover the interior surface of the platters to create imaginative and attractive patterns. These grandiose clay platters measure up to 40 centimeters (16 inches) in diameter. Their size alone is sufficient to suggest they could serve communal meals. At Tall al-‘Umayri, fragments of large platters date to the Early Bronze Age deposits of the third millennium B.C.E. The number of platters is small, suggesting limited use—perhaps for special occasions at specific family and community gatherings, or to entertain guests. It is not impossible that the platters once held a meal of roasted lamb. Our study of the animal bones and vegetal remains reveals that most ingredients for a regal traditional or modern mansaf were available. The Bible often refers, in its stories of the