Landscape and Settlement in the Neo-Assyrian Empire

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Archaeological surveys and satellite images are used to provide insights into the structure and scale of the Neo-Assyrian Empire. When this empire attained its peak during the eighth and seventh centuries B.C., it resulted in a distinct imprint on the landscape which differs significantly from that of the Bronze Age. In the Neo-Assyrian period, capital cities attained unprecedented size, rural settlement patterns were predominantly dispersed, the scale and extent of visible route systems increased, and irrigation systems were constructed for the intensification of agriculture and for the irrigation of parks and gardens. Beyond the core region between the Tigris and Euphrates rivers, a distinct outer zone of the Assyrian landscape in the northwest Levant is also recognizable, in the form of tell-based settlements. This may reflect the persistence of earlier Bronze Age social organization. This paper demonstrates the contribution that landscape archaeology can make to an understanding of the development of empires, particularly when it is applied with the record derived from excavated sites and cuneiform texts.

The archaeology of empires has attracted considerable attention over recent years, but because of their sheer size and complexity, empires can easily evade archaeological analysis. In this paper we undertake a preliminary analysis of the landscape of the Neo-Assyrian Empire, which at its peak in the eighth and seventh centuries B.C. was arguably the largest and most powerful empire the world had witnessed (Taagepera 1978; Matthews 2003: 133). Although landscape archaeology alone does not provide the complete spectrum of data required for the comprehensive analysis of empires, the information supplied by regional analysis can contribute significantly to the identification of imperial cultural and economic patterning (see also Parker 2003). The record of the archaeological landscape and ancient textual sources complement each other in a remarkable way, and in addition the landscape provides a valuable supplement to the already large corpus of information available from Assyrian art (Thomason 2001). By selecting sample survey areas from across the Assyrian Empire, we provide snapshot views of the landscape of the empire as well as inferences as to how these areas may have functioned (fig. 1). The chosen survey areas were recorded using conventional settlement surveys, landscape analysis, and remote sensing in order to provide what may be described as "signature landscapes" (Wilkinson 2003), and these signatures were then viewed in the context of other classes of information relevant

to ancient empires such as cuneiform texts and bas reliefs.

**DEFINITIONS OF EMPIRE**

Empires can be defined as territorially expansive states that incorporate and control other sociopolitical entities (such as chiefdoms or other states) as well as significant material diversity (Sinopoli 1994: 160; Morrison 2001: 3). They form political organizations that extend over large territorial areas and develop, in part, by exerting a substantial (although variable) degree of political control over such areas.

A fundamental property of empires is their scale: they can extend well beyond the normal reach of minor polities such as city-states or chiefdoms. Because of their huge spatial extent—for example, the Assyrian Empire extended over a maximum of roughly 1200 x 900 km during the reign of Sargon II (721-705 B.C.: Roaf 1990: 179)—they are hardly amenable to analysis by conventional archaeological means. Thus, Morrison (almost) despair:

Extending archaeological understandings across very large spatial scales moves beyond any one scholar's own fieldwork; the masses of local data to be assimilated make supra-regional analysis on the basis of archaeological evidence difficult, though of course far from impossible. (Morrison 2001: 7)

While the analysis of empires may pose certain problems for archaeologists, the administration of such vast territories no doubt presented their creators with huge problems as well. It is evident that the exertion of imperial control over such large areas required the investment of considerable power such that the laws of diminishing returns may have operated under what has been described as a “distance parity rule” (Stein 1999). In fact, when we examine the landscapes or settlement systems of empire, we may expect to see not only that raw power was projected over very large areas, but also that the role of charismatic and powerful individuals may have been crucial in the creation of so-called landscapes of power (Morandi Bonacossi 1996a). Landscapes of empires can exhibit considerable time-depth; Livernari, for instance, has suggested that the Neo-Assyrian Empire evolved from a network of client states to a more rigidly controlled entity in which the Neo-Assyrian administration exerted a greater measure of control over at least the central provinces (Liverani
1988; 2005). In order to make such political entities operational, it was strategically effective for the imperial rulers to adapt earlier economic infrastructures or create entirely new ones, to shift people from place to place for reasons of political control or to enhance economic production (Sinopoli 1994: 165; for specific traits characteristic of the Neo-Assyrian Empire, see Parker 2003: 525). In the case of the Assyrian Empire, dramatic efforts were undertaken to reconfigure the social landscape in order to maintain some degree of control over the large areas involved as well as to ensure that the land was agriculturally productive. The evidence for such resettlement programs is now becoming increasingly clear in the archaeological record, and recent advances in our knowledge of the archaeology of the Iron Age of Upper Mesopotamia, and landscape archaeology in general, enable us to explore the distinctive landscape imprint of the Assyrian Empire. This paper outlines some of the key contributions of archaeological landscape analysis, namely:

1. Increased scale of the capital cities and an associated incorporation of the countryside and rural settlement into the sphere of urban influence.
2. Evidence of changing social organization in the form of dispersed patterns of rural settlement as part of a process of landscape infilling.
3. Construction of canal systems, especially around the king Sennacherib’s capital city of Nineveh, but also at Nimrud (Kalhu), near Erbil, and at provincial centers such as Dur-Katlimmu (Tell Sheikh Hamad).
4. Increased prominence, extent, and scale of the regional road system.
5. Increased extent and intensity of agricultural production as well as an interest (in the case of the ruling elite) in the creation of parks and gardens.
6. Extension of the limits of the empire to the north, south, and west.
7. Spatial variation of the political landscape. This ranges from a core area between the Tigris and Euphrates rivers, characterized by a dispersed pattern of settlement, to a tell-based landscape to the west of the Euphrates.

Although such a range of topics is admittedly ambitious for a relatively short paper, it is critical to tackle such issues as a group because, taken together, these characteristics define the signature of the Assyrian Empire at the height of its power.

HISTORY AND DEVELOPMENT
OF THE EMPIRE

In the Early Bronze Age, the Mesopotamian landscape was characterized by a dense pattern of locally administered settlement clusters centered on large tells. This pattern gradually devolved during the second millennium B.C., so that by the onset of Assyrian consolidation, the region had become a thinly populated landscape characterized by a sparse and more dispersed pattern of smaller tell-based communities or occasional small tell-foot villages. As opposed to the Akkadian Empire, which left a relatively light imprint on the landscape, the new Assyrian administration produced significant and conspicuous changes, particularly in the pattern of settlement. The dramatic shift in the settlement pattern, propelled in large part by the Assyrians, will be discussed later in this paper.

It is possible to view the history of the Assyrian Empire in terms of the following phases of expansion and contraction, culminating in a period of decline and collapse in the late seventh century B.C. (Liverani 1988; Postgate 1992).

- A Middle Assyrian phase, (ca. 1400/1350–1200 B.C.), during which the city-state of Ashur (Assur) was transformed into a territorial state extending westward to a border zone between the Balikh and the north-south arm of the Euphrates in Syria. This “land of Ashur” then became the main core of the Neo-Assyrian Empire (ca. 1000 B.C. until 612 B.C.).
- The period from ca. 1200–900 B.C., a period characterized by various degrees of decline, during which the empire at times contracted to the Assyrian heartland from Ashur up to Nineveh, punctuated by minor episodes of expansion, as during the reign of Tiglath-pileser I (1114–1076 B.C.).
- Commencing with the reigns of Ashur-dan II (934–912 B.C.) and Adad-nirari II (911–891 B.C.) and especially during much of the ninth century B.C., the empire experienced a phase of re-expansion into what had been a mosaic of Aramaean states and other local communities. Although this phase was also marked by various phases of decline, especially during the early eighth century B.C., it was also during this time that the Assyrians pushed beyond the Euphrates River and
incorporated a series of client states in western Syria and the Levant.

• From 745 B.C. the empire once again enlarged its stretch to well beyond the traditional line of the Euphrates in north Syria, until it ultimately extended westward throughout the Levant and into Egypt. To the east it encroached into the Iranian state of Elam.

• Finally, between 630 and 609 B.C., the empire suffered a phase of terminal decline and eventual collapse, evident most dramatically in the sack of the great capital city of Nineveh by a coalition of Medes and Babylonians in 612 B.C. When considering the archaeology of empires, it is important to recognize the dynamic nature of the political administration; that is, the ebb and flow of the empire and its accompanying phases of settlement must be seen in conjunction with the record of the landscape. This remains as a palimpsest of superimposed features, the phases of which are difficult to disentangle because the ceramic sequence remains poorly resolved into subperiods. Moreover, while it is in some instances possible to suggest a sequential development of landscape features—for example, in the case of canals around Nineveh—where poorly dated features are involved, such as the hollow way roads, chronological differentiation is meager at best.

In order to understand the development of landscape in the Assyrian Empire, it is logical to begin with the heartland, known as the “land of Ashur.” This region—from the Assyrian capital cities of Ashur, Nimrud (Kalhu), Nineveh, and Khorsabad (Dur-Sharrukin), to the Euphrates in Syria—was usually fully under Assyrian control, and the inhabitants participated in the cult of its god and contributed to its upkeep (Postgate 1992: 252). Beyond the land of Ashur, the client kingdoms (the “yoke of Ashur”) formed a halo which first became evident from the reign of Tiglath-pileser I (1115–1077 B.C.; Postgate 1992: 254). This outer zone of empire provided tribute in the form of valuable gifts, precious metals, animals, etc., which were presented to the Neo-Assyrian king and not the temples. In this region, the local rulers usually managed to maintain their autonomy (Postgate 1992: 255). This distinctive political geography appears to be reflected in the character of the archaeological landscape, as will become apparent in the following discussion.

THE SCALE OF THE CAPITAL CITIES

Even without textual records there would be little doubt that the capital cities were the foci of power of the Assyrian Empire. In terms of their size, their monumental architecture, and the iconography that decorated their palaces, the royal capitals eloquently demonstrate that they were the centers of administration of a large and expansive empire. In terms of historical development, Ashur, with an area of 65 ha, was the main administrative capital during most of the Old and Middle Assyrian periods, being supplanted for some time during the Middle Assyrian period by Kar Tukulti-Ninurta (built by Tukulti-Ninurta II: ca. 1233–1197, site area 500 ha). The capital subsequently reverted to Ashur until Ashurnasirpal II (883–859 B.C.) expanded the older city of Nimrud (Kalhu: 360 ha), which remained the royal capital during much of the ninth and eighth centuries B.C., followed by Khorsabad (Dur-Sharrukin: 300 ha), the city built by Sargon II (721–705 B.C.) between the years 717 and 706 B.C. The final Assyrian capital was Nineveh, already an ancient and important royal city when Sennacherib (704–681 B.C.) designated it the imperial capital. Sennacherib enlarged it from an area of approximately 150 ha, and the city attained the unprecedented size of 750 ha by the time of its destruction in 612 B.C. (Stronach 1994). Of these capital cities, Kar Tukulti-Ninurta and Khorsabad were newly established and may thus be termed disembodied capitals, primarily because of their foundation on previously unoccupied sites (Joffe 1998). On the other hand, Nimrud and Nineveh were created by extending the area of existing settlements. Not only did their settled areas increase significantly beyond the occupations of the third and second millennia B.C., but also their outer towns must have extended over what had previously been agricultural fields. This, in turn, would have necessitated the expansion of the territorial area well beyond the normal threshold of self-supporting towns. This was particularly evident in the case of Nineveh, the area of which in the seventh century B.C. dramatically exceeded that of its Bronze Age predecessor, but which also exceeded that of most Bronze Age settlements throughout Upper Mesopotamia (Wilkinson 1995: 148). Moreover, because Nineveh's agricultural area was constrained by low hills of lesser agricultural productivity, by extending
the 750 ha lower town over most available cultivable land, it would then have been necessary for agricultural supplies to be imported from farther afield, as well as for production to be intensified within its immediate vicinity.

ASSYRIAN CANALS IN
THE HINTERLAND OF NINEVEH

The impact of Assyrian imperial control was not limited to the creation of capital cities and the reorganization of the rural countryside (discussed below). The movement of populations (voluntary or otherwise) implied by the archaeologically recovered settlement patterns was accompanied by substantial state investment in the agricultural infrastructure. During the Early Bronze Age, the intensification in the dry-farming regions of northern Mesopotamia which accompanied the first cycle of urbanism appears to have been limited to manuring, the application of household-derived debris onto the associated fields of a settlement (Wilkinson 1989; 1994); while this practice may have been encouraged by the state, there is no evidence that it was organized at a level higher than the household itself. Beginning with the consolidation of the Assyrian Empire in the ninth century under Ashurnasirpal II, intensification in the form of massive irrigation canals, some over 100 km in length, was overseen by the highest levels of administration.

Following the investigation of the Assyrian capital cities, it was elements of this irrigation infrastructure that attracted the attention of the earliest archaeological explorers in Mesopotamia, although they did not always immediately recognize these features' true nature; they were mostly drawn by the associated inscriptions and carved reliefs. Austen Henry Layard visited the rock reliefs at Khinis in 1851 to make an acrobatic investigation of the so-called Bavian inscription; he also visited the aqueduct at Jerwan, which he interpreted as a bridge (Bagg 2000). He was followed in 1914 by Walther Bachmann (1927), who described the rock reliefs at Khinis and Maltai and the feature at Jerwan (fig. 2). Neither recognized the hydraulic nature of the associated dams and canals, despite the fact that the inscription at Khinis was one of the earliest known Assyrian inscriptions and remains the most complete description of Sennacherib’s canal network. It was only with the Oriental Institute excavation of the aqueduct at Jerwan and the dam at Khinis in 1932–1934 (Jacobsen and Lloyd 1935) that the nature and magnitude of Assyrian hydraulic engineering began to be appreciated. More canal remains were recognized near Bandwai in 1957–1958 (Oates 1968b: 49–51, pls. 4a–b) and at Faida in the 1970s (fig. 2; Reade 1978). The association of reliefs and canals at Khinis and Bandwai suggested to Reade (1978; 2002) that other seemingly arbitrarily placed rock reliefs in the hills of northern Assyria might also be associated with irrigation features. This hypothesis was supported by a GIS reanalysis of the known canal features using 1950s aerial photographs and declassified CORONA and KH-7 intelligence satellite photographs (Ur 2005).

Textual and Archaeological Evidence for Neo-Assyrian Canals

The canal networks (fig. 2) were considered by the kings themselves to be great engineering accomplishments, and as such they feature prominently in propagandistic royal inscriptions (Bagg 2000). As a result, the development of Assyrian state irrigation can be reconstructed with great chronological acuity.

The largest Assyrian canals were built in close connection with the creation of new capital cities. By 879 B.C. the royal inscriptions of Ashurnasirpal II record the construction of the Patti-Hegalli, which transported water from the upper reaches of the Greater Zab River to the left bank of the Tigris in the immediate region of the new capital at Nimrud (fig. 1; Bagg 2000: 95–102). The traces of this canal were recognized by Layard and Jones in the 1850s, but first investigated systematically by Oates (1968b) and Davey (1985). This canal, which was still in use during the reign of Esarhaddon (680–669 B.C.), originated in a dam across the lower reaches of the Greater Zab, or possibly the Khazir River, near its confluence with the Zab (Oates 1968b).

Sargon’s relocation of the Assyrian capital from Nimrud to Khorsabad in 717 B.C. was also accompanied by canal construction, according to his royal inscriptions (Bagg 2000: 147–54). However, the plain where it was founded, northeast of Nineveh, had long been a locus of settlement and agriculture, and it is impossible to assign to him any of the small and fragmentary traces that survive (Ur 2005).

By far the most prolific canal builder was Sennacherib. Although not the first king to undertake major building projects at Nineveh, he appears to
have been the first to proclaim it as an imperial capital (Barbances 1999: 94), and he devoted enormous effort and resources to enlarging and equipping the city (Stronach 1994: figs. 4, 5). Following the pattern established by his predecessors, he filled his new capital city and the villages of its hinterland with the forcibly deported populations of conquered lands (Oded 1979) and constructed an elaborate associated canal network (Reade 1999–2001: Ur 2005).

Sennacherib’s canal program can be traced in four increasingly ambitious stages of construction over 15 years, beginning with the 13.4 km Kisrî canal behind Nineveh itself and culminating with the massive Northern and Khinis canal systems, the latter of which stretched almost 100 km, involved over 50 km of excavated canals, and included at least one aqueduct of an estimated two million cut blocks (see fig. 2 for location). Sennacherib’s constructions were not limited to the area around Nineveh, and other schemes of canalization and tunnel construction have been attributed to him in the vicinity of, for example, Erbil (Safar 1946; 1947; see also Bagg 2000: 226).

**Design and Morphology of Assyrian Canals**

By synthesizing the ground observations of Oates (1968b), Reade (1978; 2002), and Boehmer (1997) with new observations from aerial and satellite photography (Ur 2005), we can propose some generalizations about the state-built canals of northern Assyria. The canals drew upon a wide range of water sources from the Zagros Mountains which enclose the
plains of Assyria to the north and east. The Greater Zab River, one of the largest Tigris tributaries, was tapped in part, as were smaller perennially flowing rivers such as the Gomel/Khazir and the Rubar Dohuk. Springs were tapped and their openings were often enlarged to form reservoirs. It is likely that springs were a much more important source of irrigation water in antiquity than today; if deforestation and overgrazing of the Zagros were not as advanced in the first millennium B.C.E., a greater proportion of moisture would have been absorbed into the water table where it would have fed springs. In recent centuries, lack of vegetation has meant that water flows on the surface, often in episodic floods, so that wadi flow is intermittent and springs have dried up. Even such overland runoff may have been captured by Assyrian canals. Stone features along the course of the Faida canal (fig. 2) appear to have been designed to redirect small drainages into the canal (Reade 1978: fig. 10b). Indeed, it is only at the Jerwan aqueduct that we find evidence of an Assyrian canal avoiding the addition of runoff moisture.

The canals themselves varied in size, depending on the intended volume of water and the nature of the terrain. For example, the canal near the canal head at Khinis (fig. 2) was 6 m wide and 2 m deep (Jacobsen and Lloyd 1935: 46–49), and the Faida canal was only 3.2 m wide but of unknown depth (Reade 1978: 159–63). As the Khinis canal progressed toward Nineveh and accumulated the waters of springs and small tributaries, its width expanded to between 19 and 22 m, although its estimated depth at Jerwan remained at 2 m (Jacobsen and Lloyd 1935: 6, 30). Several segments of the Northern System required deep excavation through basin catchments in order to maintain a consistent slope; at these points the surviving traces appear substantially wider than the Khinis and Faida canals, generally in the range of 70–100 m, according to measurements from aerial photographs (e.g., fig. 3). The size of these earthworks has more to do with the need to excavate large quantities of soil in order to maintain channel gradients, rather than simply to conduct large amounts of water, and since none have been archaeologically investigated, it is impossible to determine the dimensions of the canals themselves.

Earlier studies of Assyrian canals have frequently assumed that they were purely conduits for transporting water from the highlands to the north directly to the immediate areas of the capital cities. Such an interpretation is encouraged by the nature of Sennacherib’s inscriptions, which frequently focus on Nineveh, and the urban bias of royal inscriptions in general. However, aerial and satellite photography hint at local irrigation along these canals at points much closer to the canals’ sources than to their supposed ultimate destinations. Along the Faida and Khinis canals in particular, it appears that small offtakes extracted water from the main channels and applied it to fields in the vicinity (fig. 4). As none of these local distributaries have been recognized on the ground, it is impossible to indicate their dimensions precisely, although they appear not have exceeded 2 m in width.

The routes of the smaller Assyrian canals were almost wholly dictated by topography, generally accommodating local hills and drainages rather than cutting through them or passing over them on aqueducts. Even when landscape impediments were unavoidable, as in the case of the inter-basin watersheds, the engineers still attempted to circumvent easily avoided prominences rather than have to excavate too deeply. The small local distributaries generally ran parallel to existing small drainages, to minimize the slope. Although the topographic maps available for this study are relatively coarse, it is possible to propose an overall design gradient of approximately 1 m per kilometer for the majority of the canals (table 1). These figures must be considered preliminary until a proper study can be made of the canal beds themselves, rather than relying on their surface signatures from aerial photographs and digital elevation models (DEMs).

Overall, the engineers who designed and constructed these canal networks must have possessed a sophisticated knowledge of topography, hydrology, and climate at local and regional scales. Their work appears to have completely remade the drainage of a great expanse of northern Assyria for some two centuries. The enormous scale of these works required

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1 In the provinces, Euphrates tributaries were also utilized, such as the Khubur River near the provincial capital Dur-Kattimmu (Ergenzinger et al. 1988).

2 An exception appears to be the Tarbisu canal along the Tigris River (Oates 1968b), but there are reasons for doubting an Assyrian date (Ur 2005).

3 A digital elevation model (DEM) is a raster image wherein each pixel’s value corresponds to its elevation (i.e., metric height above sea level).
substantial state investment, but when the loosely organized Median and Babylonian administrations of northern Mesopotamia took over following the collapse of the Assyrian state in the late seventh century, the network fell out of use.

The Functions of the Canal Network

Recent work on Assyrian canals has tended to downplay their economic function and to focus on the ideological value of the network, with particular regard to conspicuous use of water in royal gardens and parks in and around the capital cities (Reade 1978; Bagg 2000). Assyrian kings viewed the landscape as mutable, a medium for symbolizing their mastery of exotic foreign landscapes by recreating them in the core of the Assyrian heartland. At Nineveh, Sennacherib simulated the forests of the Amanus Mountains of Anatolia in a park just beyond the city wall, and he arrested the flow of the Khosr River to create a Babylonian marsh, complete with reeds and pigs (Jacobsen and Lloyd 1935: 34–35 and references therein). It has also been proposed that his canals irrigated gardens in the city or perhaps conducted water to the palaces on the mound of Kuyunjik itself (Lumsden 2000; Stronach and Lumsden 1992). Such gardens may have been the origin of the Hanging Gardens, which, according to some, Herodotus mistakenly placed in Babylon (Dalley 1994; 2001–2002; Dalley and Oleson 2003). By re-
moving certain climatic limitations, the canal network made possible the recreation of the Assyrian-dominated universe on a smaller scale in the core of the empire.

Another ideological aspect relates to the cultural relationship between Assyria and its southern neighbor. Babylonia, where irrigation canals had been an indispensable element of the agricultural economy for millennia, was the ancestral source of many aspects of Assyrian culture (Oppenheim 1977). By creating extensive cities surrounded by well-watered fields and gardens, the Assyrian kings may arguably
have been consciously emulating Babylonian urbanism (Brinkman 1995: 29; Radner 2000).

The canals and their associated monuments had an ideological value beyond the immediate hinterland of the capital cities. Because of imperial deportation policies, a substantial proportion of the rural inhabitants of Assyria were born elsewhere (or were first-generation "citizens") and might not have had the same allegiance to the king as a native Assyrian. To these people, who were predominantly rural farmers, the canal network would have been a highly visible symbol of the might of the ruler, who could remake nature by moving rivers. Local off-takes on the Faiqa canal were associated with reliefs depicting the king and the gods; thus a farmer would have been confronted by images of royal legitimacy when opening the sluices. Other reliefs near the hydraulic features at Malatu, Bandawai, and Khinis would have been powerful royal symbols in an ideologically contested landscape.

While the ideological roles of Assyrian irrigation networks are significant, their primary function continued to be economic. Access to a reliable water source would greatly reduce the risk inherent in dry-farming regions, where rainfall is unpredictable from year to year. Simultaneously, irrigation enables production to be intensified. Under modern conditions, irrigated fields in southern Iraq produce one and a half to two times more per unit of land than rainfed fields in northeastern Syria (Weiss 1986); it is possible that irrigation brought a similar increase in yield to the irrigated fields of Assyria. The additional water in the summer would have allowed the expansion of vegetable crops and gardens.

The idea that Assyrian canals primarily served luxury gardens comes from the depiction of such places on palace reliefs. However, Irene Winter (2003) has made a strong argument that depictions of the agricultural and pastoral abundance brought about by the king are omnipresent. Although there are no examples of agricultural scenes in the narrative scenes that receive most of the attention of art historians, the importance of the king's role as the "provider of abundance" is depicted nonetheless in the form of "ornamental" patterns of repeating agricultural and pastoral symbols. The organization of bands of palmettes, pomegranates, rosettes, and even caprids "replicates in a rather astonishing way the three tiers of the ideal Mesopotamian plantation," including the irrigation canals themselves in the form of the guilloche (Winter 2003: 256). The modern viewer is inclined to overlook such bands as ornament, but the ancient Assyrian observer would have correctly understood that they represented the agricultural plenty that emanated from the Assyrian king. A rare textual confirmation of this royal attitude can be found in Sennacherib's inscription at Khinis. There he described the earlier agricultural conditions of the fields "which through lack of water had fallen into neglect and were covered with spiders' webs, while its people, ignorant of artificial irrigation, turned their eyes heavenward for showers of rain" (Jacobsen and Lloyd 1935: 36 and n. 27). Such uncommon passages in royal inscriptions and non-narrative elements in imperial royal iconography suggest that productive agriculture was a major motivation for the construction of canal systems.

Analysis of aerial and satellite photographs makes clear that these benefits were not limited to the surroundings of the capitals. The region of Girepan (fig. 2; possibly the provincial capital Talmusa; Reade 1978) and the plain below Jerwan were particularly well watered. The increased produce of the former area, as well as areas even farther upstream on the Tigris, could have been efficiently brought to Nineveh by low-friction water transport (Wilkinson 2003: 128–30).

The simultaneous creation of massive capital cities, deportation of conquered populations (while maintaining their economically productive social groups), redistribution of rural labor in an agriculturally efficient manner, and installation of vast canal networks could all be seen as the result of a carefully planned program to remake the economy and demography of Assyria. These elements combined to overturn the agricultural and labor limitations that had restricted the growth of Bronze Age urbanism (Wilkinson 1994), while the introduction of a quasi-monetary system of exchange removed social and economic limitations (Sherratt and Sherratt 1993). This centralized state-sponsored system ably supported urban populations of a previously unheard of scale as well as a dense rural population for generations but could not survive the collapse of the imperial institution that administered it.

THE ROAD SYSTEMS OF ASHUR AND NINEVEH

Another distinctive feature of the landscape of the Assyrian Empire is the network of roads that acted as the main transportation links across the country.
The road network probably formed the main means of communication between the riverine transport arteries of the Tigris and some of its major tributaries, which may also have played a significant role in moving produce around the landscape (Fales 1995; Parker 2001: 81–82). Here the term “road” does not necessarily refer to formal, intentionally constructed transport routes (cf. Trombold 1991: 3), but to route systems that cross the landscape often to link widely separate places. Although the origin of such roads was probably in the everyday movement of people and animals, they are distinguished from small, informal tracks or paths by their length, breadth, and the wide range of types of transport in operation (pedestrians, animals, and wheeled vehicles). Nevertheless, because paths and tracks often developed into the more imposing hollow way “roads,” these two classes of features must be regarded as forming a continuum.

The general road systems (Akkadian ḫarrānu) and so-called royal roads (Akkadian ḫarrān šarrī) have been well known from textual evidence for a considerable time (Fales 1990: 98–99; Kessler 1997), but evidence for these features on the ground is more elusive. Remote sensing is increasingly providing evidence for ancient road systems in many parts of northern Mesopotamia. These roads are referred to as “hollow ways.” Hollow ways are defined here as remnants of ancient roads or tracks that form shallow depressions, often measuring around 1 m in depth and up to 200 m in width (Wilkinson 1993: 551; Ur 2003). These depressions are created by repeated movement of human and animal traffic across the landscape, supplemented by wind and water erosion (van Liere and Lauffray 1954–1955; Wilkinson 1993: 557). Hollow ways (or linear hollows) have been recognized in aerial photographs and high-resolution satellite images such as those of the CORONA series4 where they can be seen to have connected ancient settlements either with their agricultural fields or with associated settlements (fig. 5). In certain cases they can be seen to form more general alignments across the landscape. In the field and in satellite images, hollow ways can be distinguished from other linear features, such as canals, because they lack banks of upcast spoil and their courses are not constrained by gravity. At some sites they can be seen leading directly toward historically known gates in the ramparts, providing compelling evidence that these features were in fact ancient roads (fig. 6).

Although most hollow ways focus upon Bronze Age tells, and are estimated to date in the range of 3000 to 1500 B.C., it is also evident that some must have been in use over several millennia (Wilkinson 1993: 555–56). In the Assyrian heartland, a number of hollow ways radiate from the Assyrian capitals, and because these features relate to parts of those sites that are specifically Neo-Assyrian (1006–612 B.C.) in date, a Neo-Assyrian date can therefore reasonably be inferred for the routes themselves. In northern Iraq, many Bronze Age sites were connected by an intraregional network (Altaweel 2004), and there were also a limited number of long-distance routes. In later periods, long-distance routes became more significant; major historical towns were also connected by long-distance hollow ways, and towns such as Parthian-period Ashur and Hatra (both located in northern Iraq) were similarly connected (fig. 7). Of these sites, Ashur had a major phase of Parthian (or strictly speaking Arsacid) occupation in the range between the first century a.d. and the third century a.d. (Hauser 1996: 57–58). Hatra also attained its peak occupation during this period, but may have been occupied during the Neo-Assyrian period as well (Ibrahim 1986: 94–95). One of Ashur’s historically known gates, the Tabira Gate, is connected to the main road that led to Hatra, suggesting that this road was in use during the Parthian period (Andrae 1977). This long-distance Parthian road differed significantly from the interregional roads of the Bronze Age system, in that it extended for many kilometers linking the distant towns. However, it would be an oversimplification to suggest that all the hollow ways illustrated in the accompanying images were in use at the same time. Because many of the sites have a long history, it can be assumed that routes associated with them also evolved over a long period of time. Thus, at Ashur and Nineveh, both of which were occupied before and after the Neo-Assyrian period, the present long-distance routes probably developed from earlier and shorter systems of more restricted radii. As needs and circumstances changed during the first millennium B.C. and later, these systems metamorphosed or elaborated into the systems that are now apparent in the imagery.

Ashur was a political capital of the Assyrian Empire in the Middle Assyrian period (ca. 1400–
1200 B.C.) and remained politically and economically important in the Neo-Assyrian periods (Radner 1999). By at least Neo-Assyrian times, Ashur became the focus of many routes, and interregional routes appear to have become more common throughout the area between Ashur and Nineveh. On CORONA satellite images, ancient routes can be recognized as faint linear hollows or related soil and vegetation marks, which ran between some sites and radiate out from others. Some of these sites—such as Tulul al-Bag, Tell Akrah, Farah, Isdare, Ibrahim Bayis, and Tell ‘Alibat (fig. 7)—have been dated to the Neo-Assyrian period (Directorate General of Antiquities 1976; Altaweel 2004). Because many of these sites were located on or very near long-distance routes that led in the direction of Ashur, with some routes leading specifically to the Tabira Gate (Mallowan and El-Amin 1950; Ibrahim 1986), they lend support to the hypothesis that these routes were in use during the Neo-Assyrian period, and moreover that by at least the Neo-Assyrian period, interregional routes were centred upon Ashur. This observation seems to be corroborated by a historical text from Sheikh Hamad that mentions a road connecting the site of Sheikh Hamad (ancient Dūr-Katlimmu) with Ashur. This could be part of the same road that was later used to connect Hatra and Ashur (Radner 2002: 2; Kühne 2000: 273). Even if the route observed on the satellite image is not the feature referred to in the texts, it is clear from the textual reference that during the Neo-Assyrian period some form of interregional road did connect Ashur to this city some 200 km to the west.

In the region of Nineveh, as in the area of Ashur, interregional hollow ways led toward this major capital city (fig. 8). Again, these cannot be assigned
a precise date: some probably form the remains of systems dating back to the Bronze Age or earlier, whereas others, like their counterparts in the Ashur region, are inferred to have been in use during the Neo-Assyrian period due to their association with sites of this period or because they are aligned on Nineveh's Neo-Assyrian gates. The preservation of hollow ways in this area presents more of a problem than in the area of Ashur to the south, because it is evident that there is a broad zone to the west of the Tigris where hollow ways are either weakly preserved or absent. This appears to be either because the presence of elongate ridges did not favor the preservation of roads, or because this area lies within the zone of long-term rain-fed cultivation. In the case of the latter factor, the sustained effect of long-term settlement as well as plowing and associated erosion and sedimentation appear to have resulted in the loss of these lightly etched features.

Historically known gates on the east side of Nineveh appear to have hollow ways aligned upon them. This must be a tentative inference because of the short and discontinuous nature of these associated hollow ways, but their presence and alignment support the identification of hollow ways as ancient roads. Two gates in particular, the Kār-Mullissi and Šibanība Gates, appear to have been associated with roads that then led to archaeological sites at modern Karmallis and Tell Billa (which coincide with the towns of Kār-Mullissi and Šibanība, respectively; Madhloom 1969: 45; Stronach and Lumsden 1992). To the west of Nineveh, a long-distance road is associated with Tell Khathir and Tell Khamira, both of which were occupied in the Neo-Assyrian period (Ibrahim 1986). This suggests that the route in question was in use during the Neo-Assyrian period, although a longer history cannot be discounted. In addition, and rather less clear, Tell Herada and Khirbet Khan Al-Zanazil show evidence for Neo-Assyrian occupation (Directorate General of Antiquities 1976) and are near or on potential long-distance hollow way routes. Other long-distance routes can be recognized leading in the direction of Nineveh, but because of the meager survey data in the region of Nineveh and Mosul, little is known of the occupational phases of any associated sites.

Evidence for long-distance routes connecting the region of Nineveh with the Jazira of Syria also can be inferred from a Neo-Assyrian text mentioning a road between Gūzāna, modern-day Tell Halaf in
northern Syria, and Dūr-Šarrukin, located 15 km to the northeast of Nineveh (Kessler 1980: 140; Postgate 1995: 8). In fact, one of the routes indicated on figure 8 might be one such historically attested route. A noteworthy feature of the road network of Nineveh is that many of the hollow ways include a local component that is focused upon tells as well as longer features that run across country. Because many of these shorter local segments radiate from tells whose main occupation phases are of Early Bronze Age date, these associated routes are also probably of Bronze Age date. On the other hand, farther away from these tells the route segments beyond are frequently associated with Neo-Assyrian tells, which suggests that the remainder of these interregional routes may have been in use during the Neo-Assyrian Empire.

During the Bronze Age, the relatively small size of settlements would have required restricted supply zones and therefore road systems of limited length to deliver essential staple products (Wilkinson 1994; Ur 2003; Schloen 2001). In contrast, it has long been assumed that a city of the scale and population of Nineveh—about 750 ha at its peak in the seventh century B.C.—would have required a long-distance road network to supply it with food and other products (Madhloom 1969). In the case of Ashur, the city’s political and economic significance, as well as its limited area of land for agriculture, could have necessitated the adoption of long-distance roads for the movement of agricultural products (Altaweel 2004). Nevertheless, in the context of the prevailing economy, such transport would only have been economical up to a distance of approximately 100 km or so (Greene 1986: 39–40). The presence of these extended systems of radial hollow way roads implies that during the Neo-Assyrian period there was a fundamental transformation and a change of scale in the interregional routes as well as the landscape itself that can be directly associated with the rise of the Assyrian capitals. Because of their wide political extent and considerable economic reach, these capitals ap-
pear to have encompassed much more extensive hinterlands than was the case previously in Upper Mesopotamia.

Supplementing information derived from satellite data, cuneiform texts from the reign of Sargon II attest to the existence of a road network based upon both long- and short-distance routes. The long-distance routes were particularly preferred by messengers dispatched by the king with letters that required rapid transport (Purpola 1987). Such long-distance roads were termed “royal roads,” as mentioned earlier, while the short-distance roads were referred to simply as “roads” (Fales 1990: 98–99). The implication of the texts—namely, that both types of roads were in use simultaneously—suggests that both systems may have formed part of a hierarchical transport framework, similar to some modern road systems. In such a system, only a relatively small number of towns would be located on royal roads, while the vast majority of settlements would be interconnected through a localized transport network within which the royal roads represented the major artery (Altaweel 2004). Thus, a primary purpose of the royal roads appears to be related to rapid communication between regions and key cities, while other transportation activities may have been relegated to the short-distance routes.

THE PATTERN OF RURAL SETTLEMENT

One of the most remarkable features of the landscape of the Assyrian Empire is the pattern of rural settlement that has emerged from numerous archaeological surveys conducted over the last 30 years. In most survey areas examined, this distinctive pattern of dispersed, small, low rural sites stands in marked contrast with the tell-dominated settlement pattern of the preceding Bronze Age. In much of the fertile steppe between the Tigris and Euphrates (fig. 1), a long period of nucleated tell-based settlement was followed by a phase in which tells were abandoned, which took place during the late third and second millennia, after which large areas remained as sparsely settled or open steppe (for alternative
views, see Weiss et al. 1993; Lyonnet 1996; Peltenburg 2000; Wilkinson 2002). Archaeological surveys in the Khabur and Balikh valleys reveal that many areas seemingly characterized by abandonment and/or decline in the late second millennium B.C. eventually experienced a progressive transformation during the later ninth and eighth centuries B.C. The abandonment of the Khabur and Balikh valleys is supported by inscriptions such as those of Adad-nirari II (911–891 B.C.), who traversed the region from the upper to the lower Khabur, that is, from Nasibina near the modern Syrian-Turkish border to Gazuana and on to the lower Khabur. These inscriptions give scant mention of settlements along the route. Similarly, the early ninth-century accounts of Tukulti-Ninurta II (890–884 B.C.) and Ashurnasirpal II (883–859 B.C.), which both relate to marches through the district of the Khabur, do not mention any small towns or villages (Postgate 1974: 237; Liverani 1988: 86–87). From campaign accounts it appears that the regions of the Balikh and the Khabur were regained by the Assyrians around the time of the conquest of the Aramaean city-state of Bit Adini by Shalmaneser III in 856 B.C. (Kühne 1994: 59; Postgate 1974: 239). It was then after this (i.e., mainly during the eighth and seventh centuries B.C.) that many parts of the area became recolonized by a dense scatter of small villages (Morandi Bonacossi 2000).

The proliferation of small Iron Age rural settlements throughout the countryside first became obvious from surveys by David Oates and Jabir Khalil Ibrahim to the west of the Tigris (Oates 1969a; Ibrahim 1986), the results of which have been confirmed and extended by more recent analyses (Barbanes 1999; Altaweel 2004). In this region, the density of occupation during the Late Assyrian period represented an unparalleled surge in settlement which may be related to a major program of repopulation described on the stele of Adad-nirari III, dating from about 800 B.C. Found by Oates’s team at Tell al-Rimah, Assyrian Zama, this stele describes the foundation of 10 towns and over 300 villages in the province of Resappa, in which the Oates and Ibrahim survey areas took place (Dalley 1984: 193, nn. 28, 29). A similar expansion of settlement in the North Jazira in northern Iraq (Wilkinson and Tucker 1995) has recently been confirmed as having extended into part of northeastern Syria (Ur 2002); while outside the limits of Resappa, this area may have been part of a similar settlement scheme undertaken by the Assyrians.

This dramatic increase in the settlement of the steppe of Upper Mesopotamia can now be traced from numerous surveys extending from the Upper Tigris Valley (Algaze 1989; Parker 2001) as far west as the Turkish Euphrates (Algaze, Bruening, and Knudstad 1994) as well as to the Balikh in Syria and even farther west (Wilkinson 1995; Morandi Bonacossi 2000; Wilkinson and Barbanes 2000). General trends in settlement can be gleaned from the following surveys (from east to west): Cizre, Iraqi North Jazira, Hamoukar, Wadi Ajij, Beydar, Jebel Abd al-Aziz, Wadi Hamar, and Balikh valleys, all of which show a significant increase in Iron Age settlement (mainly dating to the eighth and seventh centuries B.C.) over that of the Middle Assyrian period (or the Late Bronze Age when it is not possible to narrow down the pottery types to Middle Assyrian; fig. 9). The increase in settlement is most apparent from surveys in the Lower Khabur Valley, where a relatively secure ceramic sequence allows sites to be dated with greater accuracy than in many parts of Upper Mesopotamia (Ergenzinger et al. 1988). In this irrigated area, there was a dramatic burst of settlement during the Late Neo-Assyrian phase, namely, in the eighth and seventh centuries B.C. (Morandi Bonacossi 1996b: figs. 33–36). A related increase can be distinguished along the Euphrates and to the west (i.e., in the Tabqa and Jabbul survey areas), although these increases are more muted.

Another relatively fine-grained sequence from the Upper Tigris River Valley near the confluence with the Batman River demonstrates a similar dramatic increase in settlement: from 19 sites occupying 32 ha during the early Iron Age (ca. 1050–882 B.C.) to 29 sites occupying ca. 89 ha in the Neo-Assyrian occupations (or the Assyrian Imperial period of 882–612 B.C.: Parker 2003: 529–36). In this case, the growth

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5 Archaeological phases continue to be ill defined because the Iron Age ceramic chronology of much of eastern Syria is still being refined. Despite recent achievements, such as the publication of a volume on Iron Age ceramics by Hauser and Reiche (1999), there is still no widely accepted chronology for much of the area under consideration (Akkermans and Schwartz 2003: 363, 385).

is represented by a minority of occupations continuing on from the early Iron Age, together with a rash of newly founded settlements.

In the Jazira, the Iron Age settlements typically comprise low mounds of 1–2 ha area and < 2 m in height, although “lower towns” situated at the foot of previously occupied Bronze Age tells are also common (fig. 10; Wilkinson 1995; Morandi Bonacossi 2000; Wilkinson and Barbanes 2000). Iron Age and Neo-Assyrian settlement is also evident occasionally on the summits of tells, but from detailed surveys this seems to be less common than during the Early and Middle Bronze Ages. Examples of tell summit settlement are found, however, in the form of inscribed bricks from a palace of Tukulti-Ninurta II (890–884 B.C.) at Tell Barri (in the Khabur) and a temple of Adad rebuilt by Shalmaneser III at Tell al-Hawa (Ball 1990: 20) as well as, of course, at the Assyrian capitals themselves. It would seem that such positions of power and status were therefore not specifically sought out or were perhaps even discouraged. In contrast, as is elaborated below, in many areas to the west of the Euphrates, Iron Age settlement of Neo-Assyrian date is frequently found on the summits of tells.

Because most Neo-Assyrian rural settlement is known only from surface remains rather than from excavation, it is difficult to describe the precise function of the many small sites scattered throughout the countryside. Nevertheless, many of these settlements may well be the *kapru* of Neo-Assyrian texts (Fales and Postgate 1995: 31), which were probably small hamlets or villages. Such settlements are well attested in the so-called Assyrian Domeday book, which appears to have functioned as a register (housed in the Assyrian capital of Nineveh) of tax-exempt land during the seventh century B.C. These texts list in some detail the real estate, families, and agricultural holdings that were recorded in the Upper Balikh Valley and neighboring areas of present-day southern Turkey and northern Syria (Fales and Postgate 1995: 31).

From their landscape context, rural Neo-Assyrian settlements developed both within the former agricultural lands of Bronze Age tells as well as beyond them. In the latter location, they would have fallen within the steppe or former pasture lands. In addition to rural settlements and lower towns, occasional small forts have been recognized. One example, situated in the Balikh Valley, consists of a fortified hilltop structure built on hills flanking the western side of the valley and overlooking a hollow way road. Unfortunately, the distinctive marching camps depicted on Assyrian reliefs (Russell 1991: fig. 34) are less in evidence, perhaps because they cannot be recognized in the field because they lack permanent
architecture and, owing to their short duration, also lack sherd scatters. The presence of elite “palace ware” pottery, as well as fragments of stonework associated with high-status buildings, are occasionally evident on Iron Age settlements in the Jazira, but there is little clear evidence of the status of most Neo-Assyrian rural settlements. Nevertheless, from both the Harran register and the field evidence, there can be little doubt that most of the smaller sites were fairly humble farmsteads or hamlets.

Archaeological surveys are therefore fairly clear in demonstrating that there was a considerable reorganization of the landscape of Upper Mesopotamia during the Neo-Assyrian period. Exactly when such a transformation occurred is less obvious, in part because the sequence of Iron Age ceramics was not always well known at the time the surveys were conducted. Nevertheless, most Iron Age sites in the Jazira can be assigned an approximate date from the presence of a distinctive assemblage of ceramics dating roughly to the eighth and seventh centuries B.C. that is very characteristic of the Assyrian Empire at its height (Hausein and Reiche 1999; Bernbeck 1993). Significantly, this coincides with the main phase of mass deportations during which artisans, peasant farmers, entire communities, and captives of war were transferred throughout the Assyrian Empire. These transfers, which were most frequently toward the core part of the empire itself (Oded 1979: 33), were particularly common from the reigns of Tiglath-pileser III (744–727 B.C.) to Ashurbanipal (668–627 B.C.; Oded 1979: 19).

The Infilling of the Landscape

Although the growth and development of the Assyrian Empire was partly fueled by a desire for increased landholdings and the acquisition of plun-
der or tribute, these were not the only factors. By colonizing new lands and populating them, some conquered lands were rendered more agriculturally productive (Liverani 1988: 88; Parker 2001: 252; Radner 2000). This point is made primarily on the basis of evidence from Neo-Assyrian cuneiform tablets, some of which state unequivocally that one of the major aims of the king was to colonize new lands, to make them productive, and to generally increase the agricultural productivity of the empire (Postgate 1974: 237). Thus, Sargon II explicitly declared that he directed the settlement of the “desolate steppe” and created furrows in “barren land that had not known the plough” (Radner 2000: 238). Here the archaeological record can provide a useful test of the veracity of such statements, which otherwise might be perceived as representing bombastic statements of imperial ambition rather than records of actual achievements.

It is already clear that the dramatic spread of settlement that occurred during the Neo-Assyrian period was by no means a uniform process. For example, in the area of the Iraqi North Jazira, voids in the pre-existing (i.e., Middle Assyrian) pattern of settlement were filled in during the Neo-Assyrian period. In this case, a series of small settlements were developed between two alignments of earlier settlement, namely along the mutual territorial boundary of the earlier settlement systems (Wilkinson 1995: fig. 5).

Similarly, in the Western Khabur, where many tells occupied during the third millennium B.C. were abandoned in the late third or early second millennium B.C., Iron Age settlement resulted in a dispersed pattern of small settlements across the landscape (Wilkinson 2003). By comparing the distribution of Iron Age settlements with the inferred catchments and agricultural areas of the Bronze Age tells, it can be shown that the Iron Age settlements developed not only on what had previously been cultivated land during the Early Bronze Age, but on former non-settled steppe lands as well. This is evident in figure 11, which shows the pattern of Early Bronze Age settlements, together with their estimated cultivated areas (inferred from the fade-out point of hollow ways: Wilkinson 1994) as well as the sustaining area of the sites (estimated from site area: Stein 1994). During the eighth and seventh centuries B.C., numerous minor mounds had sprung up on what would have been uncultivated lands during the third millennium B.C. In figure 12 this is especially clear to the east and southeast of Tell Beydar, where a tract of low rolling hills along the watershed between two wadi systems was settled during the Neo-Assyrian period by a sprinkling of small settlements. Areas of Bronze Age cultivation around tells were also colonized, as is evident from the location of Iron Age sites within the agricultural territories of the Bronze Age sites. In the Bronze Age, the basalt plateau to the southwest was effectively devoid of sedentary settlement and probably formed a long-term pastoral resource, but during the first millennium B.C. this area was at least partly settled by a number of Iron Age settlements. One such site (TBS 23) located within the center of the plateau developed adjacent to the faint traces of two hollow way roads; in addition, sprawling sites of Neo-Assyrian date have recently been investigated along the fringes of the plateau (van Berg et al. 2003). This spread of Neo-Assyrian settlement in the Beydar area represents not simply a change in the pattern and structure of settlement, but also apparently a change in the strategy of agriculture. Emphasis shifted away from relatively intensive cultivation around nucleated tells toward a strategy of extensification in which small settlements occupied many more landscape niches (see below and fig. 13).

The Productivity of the Neo-Assyrian Territories

The increase in settlement that occurred after the sparsely settled Middle Assyrian and Late Bronze Age periods (McClellan 1992; fig. 9) appears to stem, in part, from the colonizing policies of the Neo-Assyrian kings. However, because we know less about the Late Bronze Age landscape than we do about that of the Early Bronze Age, we can compare the settlement of the Iron Age with that of the Early Bronze Age, a period for which we have better estimates of land use. These data are derived from three detailed survey areas for which there is well-controlled survey evidence: the North Jazira Project in northern Iraq (Wilkinson and Tucker 1995), and the Tell Beydar and Hamoukar surveys, both in northern Syria (for Tell Beydar, see Wilkinson 2000; for Hamoukar, see Ur 2002).

Here, aggregate settlement area (measured in hectares) is used as a proxy for total population; that is, population is assumed to be proportional to occupied site area at any one period (fig. 13). In the cases of the North Jazira (1) and Hamoukar (3) areas, aggregate settlement area was greater during the Early Bronze Age than in the Iron Age, whereas in the Beydar area (2), both periods have approximately the same aggregate settlement area. This implies that
population levels during the Early Bronze Age were probably somewhat greater than or the same as those of the Iron Age. When settlement numbers alone are plotted, the picture is less ambiguous, and in all three cases there was a considerable increase in the number of sites from the Early Bronze Age to the Iron Age. Bearing in mind that these two periods were separated by phases of sparser settlement during parts of the second millennium B.C., it appears that there was a substantial increase in the number of small settlements in the landscape during the Iron Age, although, as noted above, the total population levels were probably similar to or lower than was the case during the Early Bronze Age. In other words, a similar or slightly lower population was spread over a larger number of settlements which themselves also extended over a larger area of land. Because these small Iron Age settlements were dispersed across the landscape, it can be inferred that the associated agricultural systems were more extensive than those of the Early Bronze Age. Therefore, in contrast with the much more intensive agriculture practiced from nucleated tell settlements (Wilkinson 1994), Iron Age agriculture entailed smaller populations being supported from any given unit of land and presumably lower investments of labor per hectare.

Although our data are insufficient to demonstrate that there was genuinely an increase in agricultural surplus available for shipment to the major Neo-Assyrian cities, the settlement record does show that the total area under agricultural settlement increased and that formerly unoccupied lands were settled during the later part of the Neo-Assyrian period. Moreover, some of these colonized landscapes were areas of barren steppe, which clearly supports the rhetoric
of the Assyrian kings (such as that of Sargon II quoted above) who claim to have rendered such areas productive, often for the first time within the historical record (Radner 2000: 238).

In the Tell Beydar area, such colonized lands included part of the basalt plateau (which hitherto had been virtually unsettled) as well as the strip of upland between the two major alignments of Early Bronze Age settlement (fig. 12). Similarly, in the North Jazira survey area, Neo-Assyrian settlement developed on a strip of land between two preexisting settlement systems, as well as extending to the west over an area of rolling steppe that had been deserted during the entire Early Bronze Age. Similar colonization of formerly unoccupied land can be inferred for parts of the Cizre Plain (Algaze 1989; Parker 2001; 2003), the Balikh Valley (Wilkinson 1995), and especially the valley of the Lower Khabur and Wadi Ajij areas (Morandi Bonacossi 1996b; Bernbeck 1993; Ergenzinger et al. 1988; fig. 14). In the case of the Lower Khabur, Morandi Bonacossi has characterized the increased settlement as being an artificial strategy of land management that contrasted with the more natural or organic growth that was typical of the rain-fed areas to the north (such as the North Jazira area; Morandi Bonacossi 2000: 369). Although it is likely that deportees contributed to population growth in both rain-fed and irrigated areas, irrigated areas would have required more imported labor in order to excavate some 150 km of canals as well as any associated infrastructure. In contrast, parts of the rain-fed northern areas may simply have been parcelled out as estates to court retainers or other notables to be populated ad hoc as the landowners saw fit (David Oates, pers. comm. July 2003; see also Fales and Postgate 1995 for the tax-exempt
Fig. 13. Aggregate settlement area (top) and number of sites (bottom) for three survey areas in upper Mesopotamia. 1 = North Jazira Project (Iraq); 2 = Tell Beydar area (Syria); 3 = Hamoukar (Syria).

status of large landholdings in the Harran area of southern Turkey).

Using the combined record of the archaeological landscape and Assyrian texts, it can be argued that the Neo-Assyrian period was characterized by substantial increases in agricultural production, representing the colonization of former steppe lands in the rain-fed north, the settlement of massive areas of subdesert lands by irrigation along the southern Khabur, and the intensification of production by irrigation well within the area of rain-fed farming in the hinterland of Nineveh. The process of agricultural colonization was not uniform because different types of land use were imposed depending upon circumstances. Despite such variations, the resultant archaeological landscape was characterized by a certain uniformity, namely, one of dispersal of rural settlement and the extension of the limits of cultivable lands.

As a supplement to the agricultural resources of the lowlands, some of the surrounding uplands would have supplied much needed timber for the Assyrian heartland (Parker 2003: 540), although this would, in turn, deplete the local economy of building timber and fuel. Such losses would have been exacerbated by increased soil erosion, thereby providing a compelling example of an expansive polity "exporting" land-use degradation to outlying peripheral areas in order to satisfy demand within an administrative core (Chew 2001: 21).

Certainly not all of the surplus agricultural production would have found its way to the Assyrian capital cities, and during the earlier phases of colonization under the jurisdiction of the Assyrian kings, perhaps before soil exhaustion set in, large parts of the Jazira region must have experienced a considerable surge in the production of staple crops and agricultural productivity. Moreover, similar expansions observed in the northern areas of the empire such as the Cizre Plain, being situated along the Tigris River, were fully capable of acting as a supply zone for Nineveh, with the excess grain being shipped downstream (perhaps on rafts) to the capital area, thereby obviating the necessity of arduous and expensive overland transport of grain by means of pack animals (Wilkinson 1995; Parker 2001: 82).

**EXTENSION OF THE LIMITS OF EMPIRE**

At present the survey evidence, although rapidly increasing, is hardly sufficient to describe the expansion of the limits of empire. Nevertheless, based on the surveys of Algaze in the Cizre area, Parker suggests that the reign of Tigrath-pileser III (in the mid-eighth century B.C.) witnessed the establishment of "forts and garrison towns" followed by the colonization of agricultural villages away from those
towards. He then infers that part of this settlement was associated with the settlement of deportees (Parker 2001: 82–83). This settlement represents an extension of the limits of the empire into land formerly not directly under Assyrian administration. Similarly, to the south within the Lower Khabur (fig. 15), the massive expansion of settlement mapped by Kühne, Morandi Bonacossi, and others appears to coincide with at least an extension of dense settlement into formerly lightly settled areas of desert. That this area had formerly been under the control of Ashur during the Middle Assyrian period has also been argued by Kühne (1995). In the case of the Khabur, although the limit of empire may not have been physically extended, the extent of densely populated lands clearly increased. Although there are well-attested cases of sites of Iron Age rural settlement in the Balikh (Wilkinson 1995), along the Euphrates (Algaze, Breuninger, and Knudstad 1994), and perhaps in the Jabbul Plain to the west of the Euphrates (Schwartz et al. 2000), it is difficult to define precisely when such expansion occurred. Whereas some of the increases in settlement in the Balikh, especially in the area of Harran (fig. 15), probably coincide with the period of the Harran register of the seventh century B.C. (Fales and Postgate 1995), overall this phase of settlement probably relates to several centuries within the Neo-Assyrian period, and its temporal definition must await future refinements of the ceramic sequence in the region.

The Political Landscape of Buffer and Client States

From the Tigris to the Euphrates (the Jazira), the dominant form of rural settlement is one of dispersal, albeit one in which the hierarchy of larger settlements varies from place to place (Wilkinson 1995; Morandi Bonacossi 2000). This pattern can be traced to approximately the Euphrates River, but to the west of Aleppo in Syria (fig. 15), the Iron Age settlement pattern contrasts markedly with that of the Jazira by forming various combinations of settlement on tells with some degree of rural dispersal. Neo-Assyrian reliefs suggest that the landscape of the northern Levant appears to have been more fertile and diverse than that of the Jazira, and perhaps because of this factor these landscapes became a model for those recreated by various Late Assyrian kings around the Assyrian capitals (Thomason 2001: 92).

Because the pattern of settlement may not immediately reflect changes in political authority, and also the dates of occupation cannot always be pinned down accurately from available survey data and excavated sites, the following must be regarded as little more than a preliminary assessment of the political landscape. The pattern of settlements to be discussed should be seen also within the context of the collapse of the Levantine Late Bronze Age polities after 1200 B.C., the decay of Canaanite city-states to the south, as well as the encroaching Assyrian Empire to the east (Joffe 2002). In the case of the southern Levant, settlement dispersal was already underway toward the end of the second millennium B.C. and during the early phases of the Iron Age (Finkelstein 1998), whereas in the northern Levant the emergence of new polities such as the Syro-Hittite or Neo-Hittite states were associated with a new phase of urbanization (Mazzoni 1994). Major political entities such as Phoenicia and Aram, which emerged after the collapse of the Late Bronze Age, have been described as “ethnicizing” states (Joffe 2002) in which identity played a key role in the functioning of the state although they were territorially based.

In contrast to the pattern of dispersed settlement and lower towns of the Jazira, to the west of Aleppo and more generally in the northwest Levant, a much greater proportion of Iron Age settlement occurred, as it did during the Bronze Age, on tells. More specifically, Iron Age phases corresponding to the Neo-Assyrian occupation—namely, parts of Iron II and Iron III (in the Tell Afis chronology: Mazzoni 1990: 850–550 B.C.)—are to be found on tell summits. Although there appears to be evidence for a less hierarchical pattern of settlement (Mazzoni 1997; Akkermans and Schwartz 2003: 368), the limited intensive survey data available suggests that when rural dispersal did occur, it was less pronounced than in the Jazira, and it took place between the preexisting framework of tells (Nishiyama 2003; Schwartz et al. 2000). The situation in western Syria is illustrated by excavated Iron Age levels that occur on the summits of several tells, including Tell Qarqur (Dornmann 2000), Tell Kazel (Capet and Gubel 2000), Tell Afis (Mazzoni 1990: 77), Tell Toqan (Mazzoni 1990: 80), Tell Mardikh (Mazzoni 1990), Tell Rifaat (Seton-Williams 1961; 1967), and Tell Mastuma (Wakita, Wada, and Nishiyama 1995). This pattern is supported by surveys around Homs

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7 We are very grateful to Shinichi Nishiyama for providing a manuscript of his important research on Iron Age settlement in the northern Levant prior to its completion or publication.
Fig. 15. Key sites within two phases of the Neo-Assyrian Empire: (a) the core area early in the reign of Tiglath-pileser III; and (b) the extent under Sargon II (based on Roaf 1990: 179).
The existence of such settlement on tells should occasion no surprise. There are several reasons why settlements might not be expected on tell summits: occupation in such locations involves a longer trek for water, there is less space to build houses, and conditions can become squalid and cramped. Nevertheless, there is no reason why such conditions should not have been present both west and east of the Euphrates during the Iron Age. It has already been noted that locations on tell summits are advantageous as positions of defense, power, and status; but, as such, occupation on high mounds appears to have been discouraged by the Assyrian authorities (Wilkinson and Barbanes 2000; Fales 1990). Consequently, in the Jazira, not only were tell summit locations for domestic occupation arguably discouraged, but also there may have been no pressing need for such defensive locations, being situated under the protective umbrella of the Assyrian Empire.

Beyond the Euphrates in the northwest Levant, the political geography of the Neo-Assyrian Empire contrasted with that to the east of the Euphrates. During the earlier periods of Assyrian expansion, in the reigns of Ashurnasirpal and Shalmaneser III, the lands west of the Euphrates were client or so-called vassal states under the “yoke of Assyria,” unlike the centrally administered lands of the “land of Ashur” or Assyria proper (Postgate 1992: 251–54). Following a period of lessened imperial control during the late ninth and early eighth centuries B.C., the expansionist empire of the eighth and seventh centuries incorporated these outer client states into the provincial administrative system, although they retained varying degrees of political control from place to place (Postgate 1992; Parker 2001: 249–51; van de Meiroop 2004).

It is therefore within this political context that the settlement landscape of the northwest Levant should be viewed (fig. 17). In the client kingdoms, the tradition of local rulers occupying high-status defensible locations would have probably continued unless explicitly discouraged by the Assyrian authorities, especially during the later empire. In the northwest Levant for the ninth and tenth centuries B.C., Sader (2000) observed that there were numerous small fortresses scattered over the territory of the emerging (Aramaean) state. From the persistence of settlement on tells, it is clear that to the west of the Euphrates this pattern continued to some degree into the period of Neo-Assyrian colonization—that is, from the reign of Tiglath-pileser III (744–727 B.C.).
Fig. 17. The Assyrian Empire showing the western empire, where Iron Age settlement was predominantly on tells, and the Jazira where rural settlement was mainly dispersed. The area of client states discussed in the text is located in the area to the west of the Euphrates (boundaries of settlement zones based on maps in Liverani 1992).

Even when the petty chiefdoms of the client states were incorporated into the Assyrian state, the settlement pattern itself does not necessarily appear to have been transformed as radically as it was in the Jazira between the Tigris and Euphrates. Whatever type of administrative organization existed, whether client state or province, the local rulers were frequently able to continue the old Bronze Age way of life, living in fortified citadels on tell summits. It has been suggested by Postgate (1992: 255) that such local kings, even if little more than Assyrian puppets, were kings in their own countries, and the Assyrian kings usually chose not to interfere in their internal affairs. This would have been the case if, for example, a local king submitted peacefully to Assyrian demands and was thus allowed to remain in power. On the other hand, if he or his community showed signs of opposition, then the might of the Assyrian king could be used to depose the local ruler in favor of a more amenable puppet ruler (Parker 2001: 250). Whether this necessarily resulted in a change in settlement is unclear, but from the pattern of settlement visible in the archaeological record, it appears that local continuity of occupation on tells was more the pattern in the northwest Levant than it was in the lands between the Tigris and Euphrates. Although it is suspected that changing socioeconomic factors in the northern Levant contributed to a shift toward a more dispersed pattern of settlement (Casana 2003), this was neither as radical nor as pervasive as occurred under Assyrian administration within Assyria proper.

By way of contrast, in the Jazira under the Neo-Assyrian administration, only certain classes of settlement occur on tell summits. For example, at Tell Barri (Kahat), Tikultu-Ninurta II erected a palace in the ninth century B.C., and at Tell al-Hawa, inscribed cones and remains of a mud-brick structure indicate
that Shalmaneser III refurbished a temple of Adad (Ball 1990; George 1990). Similarly, at what appears to have been an administrative center at Ziyaret Tepe, Turkey (probably Tušhan), Neo-Assyrian material culture was found both on the tell and in the lower town (Matney 1998). More mundane types of settlements associated with the burgeoning agricultural economy were for the most part clustered as lower towns around the base of tells (fig. 10) or dispersed across the landscape closer to their fields.

Because intensive surveys capable of distinguishing small dispersed settlements within a landscape context are still relatively scarce in western Syria, Lebanon, and adjacent parts of southern Turkey, the above landscape model requires rigorous testing before it can be applied with confidence in those areas. Nevertheless, the contrasting patterns of Iron Age settlement to the east and west of the Euphrates mirror to some degree the political history of the respective regions. This implies that there is indeed a recognizable imprint of the Assyrian Empire in the landscape.

CONCLUSIONS

Using data from intensive archaeological surveys together with satellite image analysis, it is possible to recognize a range of signatures of the Neo-Assyrian landscape. These are evident both spatially, in the form of changing patterns of settlement, as well as chronologically, as a result of the significant contrast that can be drawn between the Neo-Assyrian and the Early Bronze Age settlement landscapes. In terms of imperial geography, a model empire might include some evidence for multiple concentric rings depicting decreasing imperial authority with increasing distance from the imperial center (Sinopoli 1994: 169). The Assyrian landscape shows this pattern to some degree, especially to the west of the Euphrates (fig. 17). In addition, archaeological evidence for imperial boundaries can be inferred from the combined interpretation of ceramics, archaeological surveys, and textual information (Parker 2002).

Overall, the pattern of settlement within the core area of imperial control (here defined as that part of northern Syria and Iraq between the Tigris and Euphrates rivers) provides the most compelling example of the imprint of imperial power. This successfully illustrates one outcome of imperial political control—namely, the reconfiguring of the pattern of settlement (Smith and Montiel 2001: 247). Within this core zone of the empire, the hierarchical pattern of settlement comprised large imperial cities, a widespread dispersal of small rural settlement throughout the countryside, occasional fortified places (as suggested for the provinces of Mashnubu and Tušhan along the Tigris River: Parker 2003), as well as large towns (such as Dur-Katlimmu; Kühne 1995; Morandi Bonacossi 1996b) acting as lower-order administrative foci in between. This was both distinctive and markedly different from the tell-dominated landscape of the Early Bronze Age city-states. Moreover, such patterns can be related to textually attested processes such as the deliberate colonization of thinly populated or desert areas as a result of imperial edict. Although it would be rash to posit that every occurrence of dispersed small settlements was the result of deliberate colonization, a good case can be made for the distinctive pattern of settlement being a direct or indirect result of the umbrella of imperial authority. In some cases, the pattern of settlement is likely to be the result of deliberate schemes of resettlement, whereas in other cases settlement may have been a spontaneous result of the settlement of Arameans during the relative stability brought about under Assyrian dominance. Elsewhere, new estates may have emerged and been populated and serviced by people who were under the control of local landlords or their equivalent.

Much has been made of the distinction between “network empires” and “ink stain” models of imperial development (Liverani 1988; Postgate 1992: 255–56), and it is therefore useful to consider the record of hollow way routes that provide evidence of the structure of communication and transport networks within the empire. Bearing in mind the low level of precision in the dating of hollow way features, the evidence seems to indicate that during the first millennium BC there was a general extension and elaboration of earlier systems of hollow ways that formed conspicuous radial patterns around tells. Overall, the “reach” of these features was arguably significantly longer than during the Early Bronze Age, which implies that the imperial cities from which they radiated were more important and administered a larger area than the Bronze Age tells. Clearly, however, these interpretations need to be tested by further fieldwork and satellite image analysis.

The empire appears to have adopted multiple strategies of agricultural production: dry-farming areas within the marginal steppe lands were opened
up for what must have been relatively low-yield rain-fed cultivation; and areas nearer the capital, especially Nineveh, were irrigated, presumably in order to increase yields above and beyond those obtainable under rain-fed cropping in the region. Meanwhile, in the most marginal areas where rain-fed cultivation was ineffective, large-scale canal systems were constructed in order to bring large areas of new lands into irrigated production, lands that had hitherto seen little or no significant agriculture.

The irrigation systems near to the imperial capitals were most likely intended to both raise agricultural production and to make a statement of imperial strength—namely, to demonstrate that the king controlled large and geographically diverse territories, this message being manifest in lush gardens filled with exotic, imported plants. Furthermore, the hydraulic works eloquently demonstrated that the king was capable of impressive feats such as diverting rivers, mobilizing large quantities of labor, and erecting large monuments in both countryside and town. In contrast to the hollow ways, which mainly were non-constructed, organically developed features resulting from the passage of humans and their animals, the canals and associated relics were quite explicit expressions of imperial objectives and power. As such, the canals may have been imbued with more symbolic significance than the hollow way routes.

Rather than attempting to amass a conclusive picture of imperial landscapes, we have attempted to present certain features that together provide a particularly coherent picture of the Neo-Assyrian landscape. Large gaps in the data sources remain, although there is a compelling convergence of landscape and textual data in certain instances, specifically those that relate to the development of rural settlement and canal systems. Not only are there extensive gaps in the record of regional surveys, where more detailed evidence is accumulating, it is evident that this record is to some degree heterogeneous. For example, in the area of the Upper Tigris area in Turkey, Parker (2003) has noted “blank spots” in the archaeological record, which may signify areas that are bereft of indications of a Neo-Assyrian presence because they represent buffer zones intended to insulate frontier states of the empire from enemy states. Similarly subtle but still significant are the inferences that obtain from the outer territories where settlement continues on tell summits. Lacking, or still to be recognized, are signatures of landscape features such as hunting parks and Assyrian military camps which probably left a light record of earthworks or refuse in the landscape. However, vast areas of Upper Mesopotamia remain unsurveyed, and very few of the archaeological surveys discussed have been more than general multiperiod surveys, even though some have been conducted at a fairly high level of intensity (Wilkinson, Ur, and Casana 2003). There is no doubt that with more focused methods and more specific questions, the amount of information gleaned from the investigation of landscape features will only increase.

What does emerge from a study such as this is the overall coherence of the Neo-Assyrian Empire when viewed in terms of its settlement patterns. The landscape of a vast region from the Tigris to the Euphrates Valley, and perhaps as far west as Aleppo, experienced some degree of reorganization as a result of Assyrian expansion. This is not simply recognizable as a new pattern of farms, villages, and their infrastructure, but the landscape itself also reflects new levels of social organization, as vast quantities of people either spontaneously adopted a sedentary life style or were mobilized and resettled at the behest of the king. How such displaced communities experienced their new lands, or whether they were truly competent or equipped to deal with the new set of agrarian problems raised by such lands, is another matter. Nevertheless, the deliberate resettlement clearly attests to Assyrian intentions: to create a coherent political entity that would operate to benefit the central imperial authorities. Having implemented such ambitious and effective settlement strategies, it is hardly surprising that the Neo-Assyrian Empire left a substantial, distinctive, and lasting imprint on the landscape of the Near East.

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