6 · Cartography in the Ancient Near East

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Under the term "ancient Near East" fall the modern states of Iraq, Syria, Lebanon, Jordan, and Israel. Turkey, Saudi Arabia, the Gulf States, Yemen, and Iran may also be included. The eras embraced begin with the first urban settlements (ca. 5000 B.C.) and continue until the defeat of Darius III by Alexander the Great, who officially introduced Hellenism to the area (330 B.C.). There are few examples of maps as they have been defined in the literature of the history of cartography, but those that remain are important in helping to build a picture of the geographical knowledge available, and of related achievements.

Babylonian Geographical Knowledge

Babylonia was open to travelers from all directions. The courses of the Tigris and Euphrates rivers offered major routes to and from the north and the northwest, and the Persian Gulf allowed contact by sea along the coasts of Arabia and east to India (fig. 6.1). It is no surprise, therefore, to find the urban culture which the Sumerians developed during the fourth millennium B.C. spreading far afield through trade and conquest. Recent excavations have revealed a large settlement on the middle Euphrates (Khabuba Kabira) where buildings and pottery have characteristically southern Mesopotamian styles. There is increasing evidence, too, of Sumerian influence eastward into Iran. Arguably the greatest achievement of this culture was the invention of writing, with the development of the cuneiform script, commonly written on clay tablets.

Although there is nothing that qualifies as an unambiguous attempt at mapping in this area during the fourth millennium B.C., the scribal activities and traditions beginning then created the circumstances in which geographical knowledge could be stored and maps could be produced. The extant examples of ancient knowledge and its application have been discovered by chance; new discoveries may add significantly to what is currently available.

The Sumerian scribes compiled long lists of words by category, for reference and teaching, and among these were lists of towns, mountains, and rivers. Good examples of these lists have been unearthed in Babylonia, at Abū Salābīkh near Nippur, and at the northern Syrian settlement of Ebla, the scene of important discoveries by Italian archaeologists, lying fifty-five kilometers south of Aleppo. The scribes who wrote these tablets were working between 2500 and 2200 B.C., but their lists were drawn from earlier sources that reached back as far as the beginning of the third millennium. Besides the names of places in Babylonia, names of Syrian towns appear in the lists from Ebla, including Ugarit (Ra's Shamrah) on the Mediterranean coast.[1] This is one indication of the level Babylonian geographical knowledge had reached at an early date. In support of that may be cited historical sources, contemporary and traditional, for military campaigns by King Sargon of Akkad and his grandson Naram-Sin into northern Syria and even Anatolia in the century 2330–2230 B.C. Place-name lists continued as an element of scribal lore throughout the history of the cuneiform script. In a revised form, they became part of a standard compendium of lexical information that was copied repeatedly with minor variations and explanatory additions. Regrettably, the manuscripts of the second and first millennia B.C. are incomplete, and their total purview remains unknown. As part of a standard, traditional compilation, however, they do not reflect contemporary information.[2]

The marches of armies to distant goals, and the ventures of traders in search of precious metals and stones, timber, and other products, were the obvious means by which the scribes learned about their own and foreign lands. That they knew much more than the lists of place-names reveal is clear from the evidence of links with Iranian towns and the centers of the Indus Valley culture at Mohenjo Daro and Harappa, links formed at least in part by the sea route through the Persian Gulf. Various

1. Robert D. Biggs, "The Ebla Tablets: An Interim Perspective," *Biblical Archaeologist* 43, no. 2 (1980): 76–86, esp. 84; Giovanni Pettinato, "L'atlante geografico del Vicino Oriente antico attestato ad Ebla e ad Abū Salābīkh," *Orientalia*, n.s., 47 (1978): 50–73.

2. Benno Landsberger, *Materialien zum Sumerischen Lexikon: Vokabulare und Formularbücher* (Rome: Pontifical Biblical Institute Press, 1937–), vol. 11, *The Series HAR-ra = ḫubullu: Tablets XX–XXIV*, ed. Erica Reiner and Miguel Civil (1974). (Series title after 1970: *Materials for the Sumerian Lexicon.*)

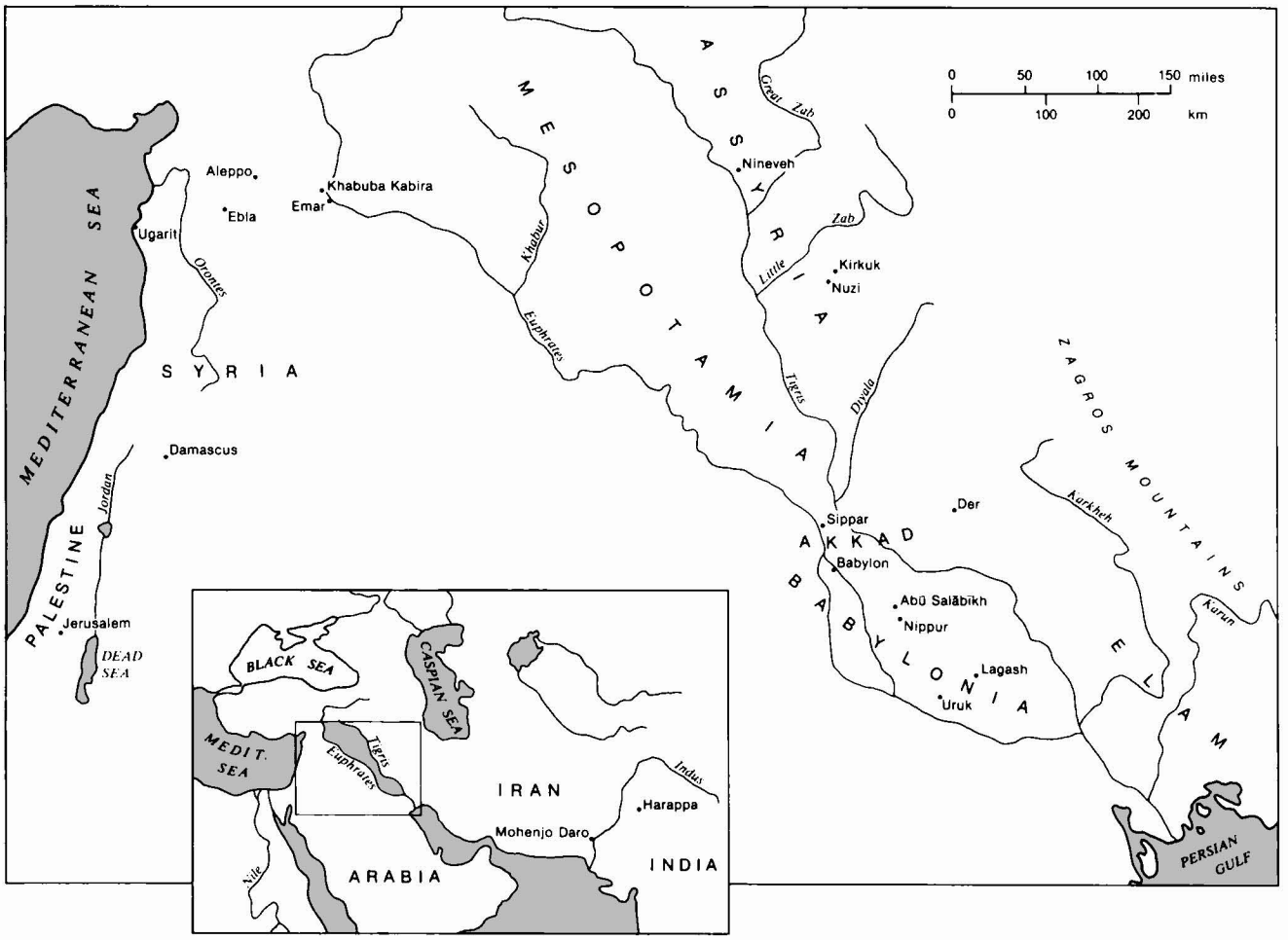

FIG. 6.1. PRINCIPAL PLACES ASSOCIATED WITH MAPS IN THE ANCIENT NEAR EAST.

objects from those places have been found at several Babylonian sites, mostly in levels of the middle and later part of the third millennium B.C.[3]

Occasionally details of such journeys are preserved in business and administrative records. The most useful have the form of itineraries, naming the places visited, some with a note of the time taken to travel from one to another. The longest example describes a route from southern Babylonia to Emar (Meskene) on the middle Euphrates. It appears to have been a military expedition, although its purpose is unclear; the number of nights spent at each place is carefully recorded.[4] Other itineraries concern the routes from Assyria to central Anatolia in the nineteenth century B.C. and the marches of Assyrian armies in the early first millennium B.C.[5] In their annals the Assyrian kings often included references to the terrain they crossed, and sometimes to local vegetation and other features. Pictorial records of some of their campaigns, in which artists attempted to represent local features, can be seen in some of the bas-reliefs that decorated the walls of palaces in Nineveh and neighboring cities. In addition, treaties and other documents might define boundaries, naming towns, villages, or natural features that marked them.[6] For purposes of control or taxation the towns in a territory or kingdom were also listed.[7]

3. C. C. Lamberg-Karlovsky, "Trade Mechanisms in Indus-Mesopotamian Interrelations," *Journal of the American Oriental Society* 92 (1972): 222–29.

4. William W. Hallo, "The Road to Emar," *Journal of Cuneiform Studies* 18 (1964): 57–88.

5. Dietz Otto Edzard, "Itinerare," in *Reallexikon der Assyriologie und vorderasiatischen Archäologie*, ed. Erich Ebeling and Bruno Meissner (Berlin: Walter de Gruyter, 1932–), 5:216–20.

6. Jean Nougayrol, *Le palais royal d'Ugarit, IV: Textes accadiens des Archives Sud (Archives Internationales)*, Mission de Ras Shamra, 9 (Paris: Imprimerie Nationale, 1956), 48–52, 63–70; Mervyn E. J. Richardson, "Hebrew Toponyms," *Tyndale Bulletin* 20 (1969): 95–104, esp. 97–101.

7. Fritz Rudolf Kraus, "Provinzen des neusumerischen Reiches von Ur," *Zeitschrift für Assyriologie und vorderasiatische Archäologie*, n.s., 17 (1955): 45–75.

Babylonian Mensuration and Calculation

The Babylonians developed means for measuring distances on the basis of the time taken to travel, the main unit being the *bēru*, "double hour," of about ten kilometers. For shorter lengths the cubit (*ammatu*) of about fifty centimeters was used, and this could be divided into "fingers" (*ubānu*), usually thirty to the cubit, but in the late period only twenty-four. The statues of Gudea (see below, "Babylonian Plans") depict graduated rulers, and we may assume knotted cords were the means for measuring longer distances. A goddess is said to carry the rope of cubit and reed measures.[8] Babylonian measurements could be very exact, and the evidence of various mathematical problem texts suggests surveys and plans could be done accurately. Mathematical tables and the problem texts reveal an extensive knowledge of square and cube roots, reciprocal numbers, solutions for quadratic and other equations, and means of calculating areas of rectangular, circular, and irregular figures and the volumes of prisms and cylinders. The Pythagorean theorem was understood both in practice and in theory in the seventeenth century B.C., a millennium before Pythagoras himself was born. Central to Babylonian calculation was the sexagesimal system, in which units of sixty form the base (so 1 + 20 = 80, 2 + 10 = 130, etc.). Late in Babylonian history this led to the division of the circumference of the circle into 360 parts.

Babylonian Plans

Besides their normal habit of writing on clay tablets, the Babylonian scribes also used the tablets as surfaces for drawing. From the days of Sargon of Akkad (ca. 2300 B.C.) until the middle of the first millennium B.C., these drawings included plans of property, land, houses, and temples. Incised lines indicated walls, streets, rivers, and canals, occasionally with wavy lines to denote water. Some of the plans are no more than sketches, perhaps school exercises, but others are carefully drawn, with the walls of buildings of even width and the measurements of the rooms marked precisely in cubits.[9] The most famous is the plan on a statue of Gudea, prince of Lagash (Telloh), ca. 2141–2122 B.C. (figs. 6.2 and 6.3). The seated figure holds on his knees a tablet engraved with the plan of an elaborate enclosure wall, probably for a

FIG. 6.2. THE GUDEA STATUE, CA. 2141–2122 B.C. This statue depicts Gudea, prince of Lagash, with the temple plan illustrated in figure 6.3 on his lap.
Height of the original: 93 cm. By permission of the Musée du Louvre, Paris.

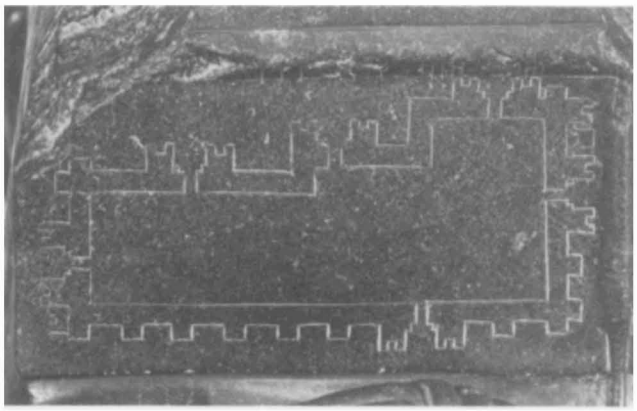

FIG. 6.3. THE TABLET ON THE GUDEA STATUE. A plan of an enclosure wall for a temple or other large building is shown. Note the graduated ruler at the top edge which provided an indication of scale.
Size of the tablet: 12 × 24 cm. By permission of the Musée du Louvre, Paris.

8. Ignace J. Gelb et al., eds., *The Assyrian Dictionary* (Chicago: Oriental Institute, 1968), vol. 1, pt. 2, 448.

9. Ernst Heinrich and Ursula Seidl, "Grundrißzeichnungen aus dem alten Orient," *Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin* 98 (1967): 24–45. For a gridded plan of a large building, probably a royal palace, see British Museum, *Cuneiform Texts from Babylonian Tablets, etc., in the British Museum* (London: British Museum, 1906), pt. 22, pl. 50, BM 68841 + 68843 + 68845 and 68840 + 68842.

temple. Beside it lie a stylus and a ruler with graduated divisions, badly damaged. Another statue of the same prince bears a blank tablet with a complete ruler. Since the statues are not life-size (respectively ninety-three and eighty-six centimeters high), it is difficult to discover the exact values of the units of length. Both statues are in the Musée du Louvre, Paris. Most of the plans depict single buildings, but a few show more: the shape of a town, or a part of a town. One fragment marks a temple and adjacent streets, thought to be in Babylon (fig. 6.4),[10] another shows part of the city of Uruk (Erech) and a building inside it (fig. 6.5).[11] A piece of a tablet in the British Museum has part of a town on one side, with a river, a gate, and an intervening suburb. On the other side are measurements that appear to relate to parts of a suburb of Babylon (fig. 6.6).[12] Still incomplete, but far more impressive, is a tablet incised with a plan of Nippur, the religious center of the Sumerians in Babylonia (fig. 6.7). Drawn about 1500 B.C., it marks the principal temple, a park and another enclosure, the river Euphrates, a canal to one side of the city, and another canal running through the center. A wall surrounds the city, pierced by seven gates which, like all the other features, have their names written beside them. As on some of the house plans, measurements are given for several structures, apparently in units of twelve cubits (about six meters). Scrutiny of the map beside modern surveys of Nippur has led to the claim that it was drawn to scale. At present this is difficult to verify in detail because excavations have not uncovered sufficient remains of the town shown in the plan. How much of the terrain around Nippur was included cannot now be known because of damage to the tablet, nor is there any statement of the plan's purpose, although repair of the city's defenses is suggested.[13]

FIG. 6.4. FRAGMENT OF A CITY MAP, PROBABLY BABYLON. This cuneiform tablet probably shows the great temple of Marduk in Babylon, and the adjacent street is probably the sacred procession road that led up to the temple. Size of the original: 7.5 × 4.5 cm. By permission of the Trustees of the British Museum, London (BM 73319); see also British Museum, *Cuneiform Texts from Babylonian Tablets, Etc., in the British Museum*, pt. 22 (London: British Museum, 1906), pl. 49.

A plan of a temple drawn, perhaps, in the sixth century B.C. is unique in marking individual bricks of the walls. Here the precise measurements suggest the plan may be a scale drawing. By calculating from the standard brick size of the time, a scale close to 1:66⅔ has been deduced, which Heinrich and Seidl claim to be a common scale in use by architects of the period.[14] Other plans of temples or houses may also follow a scale, but there is no indication of it on the drawings, and some are clearly not in proportion to the measurements given.

Property transactions, sales or disputes, or estimates of yield were probably the reasons for the plans of fields drawn on tablets. Often a single plot of land is delineated, with measurements written along the sides. A few plans set out the relationships of adjacent plots and watercourses (vital to agriculture in southern Babylonia). Examples of this type date from the third millennium B.C. onward. A particularly complex example from Nippur, belonging to the same age as the town plan (about 1500 B.C.), displays the situation of several fields and canals around the hairpin bend of a water-

10. British Museum, *Cuneiform Texts*, pt. 22, pl. 49, BM 73319 (note 9).

11. H. J. Lenzen, Adam Falkenstein, and W. Ludwig, eds., *Vorläufiger Bericht über die von dem Deutschen Archäologischen Institut und der Deutschen Orient-Gesellschaft aus Mitteln der Deutschen Forschungsgemeinschaft unternommenen Ausgrabungen in Uruk-Warka*, Abhandlungen der Deutschen Orient-Gesellschaft, Winter 1953–54, Winter 1954–55 (Berlin: Gebr. Mann, 1956), 42, pl. 23c.

12. British Museum, *Cuneiform Texts*, pt. 22, pl. 49, BM 35385 (note 9); Eckhard Unger, *Babylon, die heilige Stadt nach der Beschreibung der Babylonier* (Berlin: Walter de Gruyter, 1931), 252–53.

13. Samuel Noah Kramer and Inez Bernhardt, "Der Stadtplan von Nippur, der älteste Stadtplan der Welt," *Wissenschaftliche Zeitschrift: Gesellschafts- und Sprachwissenschaftliche Reihe* 19 (1970): 727–30; Samuel Noah Kramer, *From the Tablets of Sumer* (Indian Hills, Colo.: Falcon's Wing Press, 1956), 271–75; idem, *History Begins at Sumer*, 3d ed. (Philadelphia: University of Pennsylvania Press, 1981), 375–79; McGuire Gibson, "Nippur 1975: A Summary Report," *Sumer* 34 (1978): 114–21, esp. 118–20.

14. See Heinrich and Seidl, "Grundrißzeichnungen," 42 (note 9).

FIG. 6.5. FRAGMENT OF A CITY MAP OF URUK. One of the finds resulting from the Uruk-Warka excavations, 1953–55. Unfortunately, no other fragments of this map were found. Size of the original: 8.1 × 11.2 cm. By permission of the Deutsches Archäologisches Institut, Abteilung Baghdad.

course (fig. 6.8).[15] In an area where routes commonly followed rivers or canals, well-defined passes, or coastlines, maps of larger coverage may have been less necessary, but a few tablets do have wider range and broader significance.

Babylonian Small-Scale Maps

From time to time there were attempts to depict relationships between more widely separated places. A diagrammatic map of the late second millennium B.C., from Nippur, shows nine settlements with canals and a road between them, without noting any distances.[16] On a fragment of a tablet in the British Museum, belonging to the mid-first millennium B.C., a rectangle marks the city of Sippar, parallel lines above it mark the river Euphrates, and parallel lines below mark canals following a sinuous course (fig. 6.9).[17]

The British Museum has long exhibited the famous "Babylonian World Map," drawn about 600 B.C. (fig. 6.10). In the text accompanying the map various legendary beasts are named which were reputed to live in regions beyond the ocean that encircled the Babylonian world. A few ancient heroes reached those places, and the badly damaged text appears to describe conditions in them, one being the region "where the sun is not seen." The map is really a diagram to show the relation of these places to the world of the Babylonians. Each place is drawn as a triangle rising beyond the circle of the salty ocean. There may have been eight originally. Each is marked as being at a certain distance, probably from the next one. Enclosed by the circle of the salt sea lies an oblong marked "Babylon" with two parallel lines running to it from mountains at the edge of the enclosure, and running on to a marsh marked by two parallel lines near the bottom of the circle. The marsh is the swamp of lower Iraq, its identity secured by the name Bit Yakin at its left end, known to be a tribal territory covering marshland. A trumpet-shaped arm of the sea curves around the right end of the marsh so that its neck

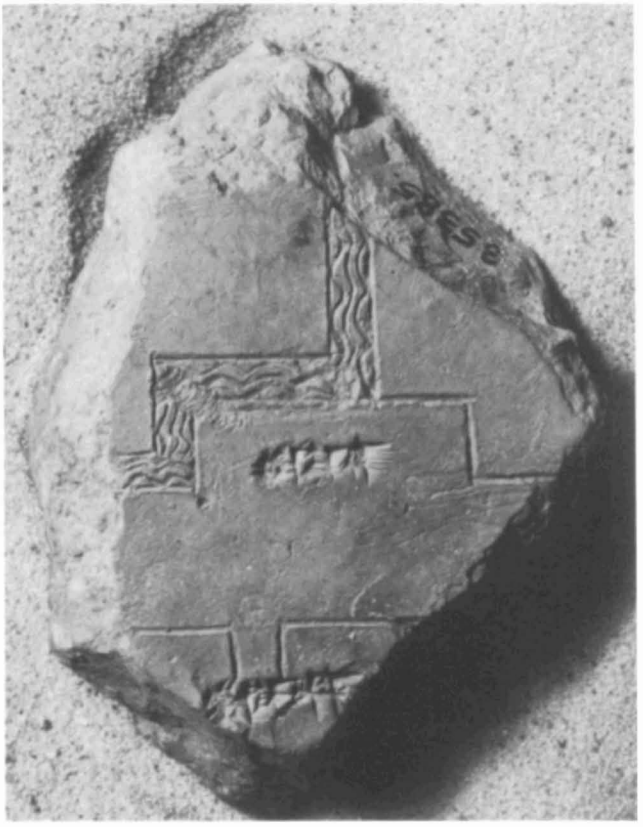

FIG. 6.6. FRAGMENT OF A CITY PLAN, POSSIBLY TÛBU. This cuneiform fragment shows the course of a canal or river, flowing outside the city wall, with one of the city gates, the Gate of Shamash, below.
Largest dimensions of the original: 10.5 × 7.5 cm. By permission of the Trustees of the British Museum, London (BM 35385); see also British Museum, *Cuneiform Texts from Babylonian Tablets, Etc., in the British Museum*, pt. 22 (London: British Museum, 1906).

15. Stephen H. Langdon, "An Ancient Babylonian Map," *Museum Journal* 7 (1916): 263–68; Jacob J. Finkelstein, "Mesopotamia," *Journal of Near Eastern Studies* 21 (1962): 73–92, esp. 80 ff. For a description of seventy late Babylonian field plans in the British Museum, see Karen Rhea Nemet-Nejat, *Late Babylonian Field Plans in the British Museum*, Studia Pohl: Series Maior 11 (Rome: Biblical Institute Press, 1982). See also Wolfgang Röllig, "Landkarten," in *Reallexikon*, 6:464–67 (note 5).

16. Albert Tobias Clay, "Topographical Map of Nippur," *Transactions of the Department of Archaeology, University of Pennsylvania Free Museum of Science and Art* 1, no. 3 (1905): 223–25.

17. British Museum, *Cuneiform Texts*, pt. 22, pl. 49, BM 50644 (note 9).

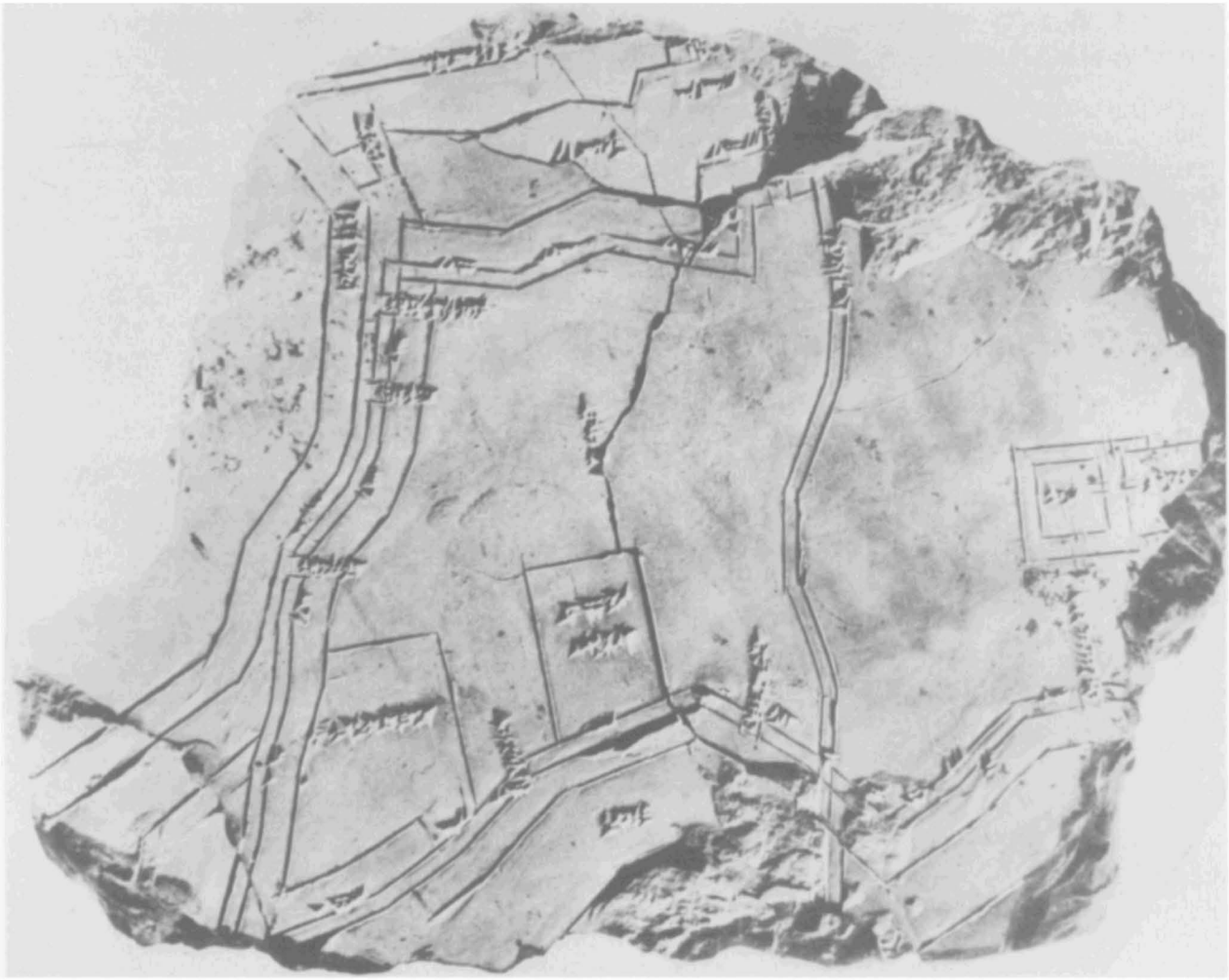

FIG. 6.7. PLAN OF NIPPUR, CA. 1500 B.C. Possibly the earliest town plan drawn to scale, this shows the temple of Enlil in its enclosure on the right edge, city walls, canals, storehouses, and a park. Size of the original: 18 × 21 cm. By permission of the Hilprecht Collection, Friedrich-Schiller-Universität, Jena.

touches the lines from Babylon. Despite the absence of a name, it is clear that the parallel lines running to and from Babylon represent the river Euphrates. To the right of Babylon an oval marks Assyria, and above it is apparently Urartu (Armenia). Several other cities are marked by small circles; one near the trumpet-shaped sea, named "Fort of the god," is probably Der (Badrah) at the foot of the Zagros Mountains. The name Khabban to the upper left appears to denote an area of Elam southeast of the Zagros, geographically out of place (it might be another town of the same name otherwise unknown).[18] Obviously this is not so much a topographical map as an attempt to illustrate ideas expressed in the accompanying text, greatest attention being paid to the remote regions. The Babylonians evidently viewed the earth as flat, in common with other ancient peoples.[19] Their references to the "four quarters" relate to the directions of the winds and should not be taken as implying that they thought it was square. (The same is true for Isa. 11:12, which mentions the "four corners of the earth.") There is no reason to suppose, as some have,[20] that the creatures described in the text accompanying this Babylonian world map were intended as zodiacal

18. British Museum, *Cuneiform Texts*, pt. 22, pl. 48, BM 92687 (note 9); Unger, *Babylon*, 254–58 (note 12); A. Leo Oppenheim, "Man and Nature in Mesopotamian Civilization," in *Dictionary of Scientific Biography*, 16 vols., ed. Charles Coulston Gillispie (New York: Charles Scribner's Sons, 1970–80), 15:634–66, esp. 637–38.

19. Wilfred G. Lambert, "The Cosmology of Sumer and Babylon," in *Ancient Cosmologies*, ed. Carmen Blacker and Michael Loewe (London: George Allen and Unwin, 1975), 42–65, esp. 47–48.

20. Eckhard Unger, "From the Cosmos Picture to the World Map," *Imago Mundi* 2 (1937): 1–7, esp. 1–5.

FIG. 6.8. PLAN OF FIELDS FROM NIPPUR, CA. 1500 B.C. The fields, belonging to royal and religious estates, are situated on both sides of a hairpin bend in a watercourse, separated by irrigation channels.
Size of original: 13 × 11 cm. By permission of The University Museum, University of Pennsylvania, Philadelphia (CBS 13885).

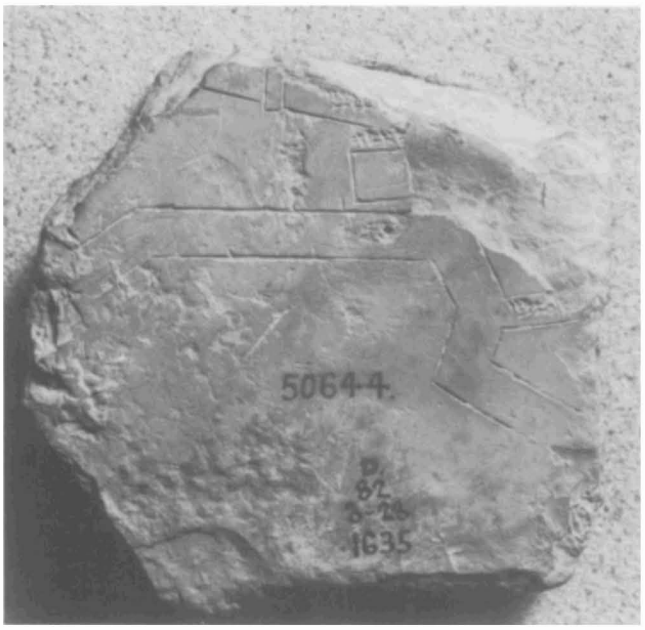

FIG. 6.9. MAP OF SIPPAR AND ITS SURROUNDINGS, FIRST MILLENNIUM B.C. The rectangle marks the city, with the Euphrates above and canals below.
Size of the original: 8 × 9 cm. By permission of the Trustees of the British Museum, London (BM 50644).

in any way. At the end is part of the title that might be translated "[These are the drawings] of the four regions (or 'edges') of all [the world]."

Equally significant for the history of cartography is a clay tablet 7.6 × 6.8 centimeters unearthed at Yorghan Tepe near Kirkuk in 1930–31 (fig. 6.11). With it were other tablets from the time of the dynasty of Akkad, and there is no doubt this one belongs to the same date, about 2300 B.C. At that time the place was known as Gasur; a thousand years later it was Nuzi. The surface of the tablet bears a map of a district bounded by two ranges of hills and bisected by a watercourse. Inscriptions identify some features and places. In the center the area of a plot of land is specified as 354 *iku* (about twelve hectares), and its owner is named—Azala. None of the names of other places can be understood except the one in the bottom left corner. This is Mashkan-dur-ibla, a place mentioned in the later texts from Nuzi as Durubla.[21] By the name, the map is identified as of a region near Yorghan Tepe, although the exact location is unknown. Whether the map shows a stream running down a valley to join another or running from that to divide into three, and whether they are rivers or canals, cannot be determined. The shaded area at the left side, to or from which the channels run, was named, but the writing is illegible. Groups of overlapping semicircles mark ranges of hills, a convention used by artists then and in later times. Finally, the scribe oriented his map, writing "west" at the bottom, "east" at the top, and "north" at the left.[22]

With this, the oldest known example of orientation, and the possibility of a scale drawing in the Nippur map, Babylonian cartographers of the third and second millennia B.C. may be held to have practiced two essential principles of geographical mapmaking. Written itineraries and surveys testify to their awareness of greater

21. A. R. Millard, "Strays from a 'Nuzi' Archive," in *Studies on the Civilization and Culture of Nuzi and the Hurrians*, ed. Martha A. Morrison and David I. Owen (Winona Lake, Ind.: Eisenbrauns, 1981), 433–41, esp. 438 and n. 5 (contributed by Karl-Heinz Deller). There is no justification for linking this place with the famous Ebla or Ibla of northern Syria, as suggested by Nadezhda Freedman, "The Nuzi Ebla," *Biblical Archaeologist* 40, no. 1 (1977): 32–33, 44.

22. Harvard University, Semitic Museum, *Excavations at Nuzi*, 8 vols. (Cambridge: Harvard University Press, 1929–62), vol. 3, Theophile James Meek, *Old Akkadian, Sumerian, and Cappadocian Texts from Nuzi*, XVII ff., pl. 1; idem, "The Akkadian and Cappadocian Texts from Nuzi," *Bulletin of the American Schools of Oriental Research* 48 (December 1932): 2–5.

FIG. 6.10. THE BABYLONIAN WORLD MAP, CA. 600 B.C. This map shows the relationship between the legendary regions beyond the ocean and the Babylonian world. The parallel lines running to and from Babylon (the elongated rectangle) represent the Euphrates, while the circular band represents the salt sea.
Largest dimensions of the original: 12.5 × 8 cm. By permission of the Trustees of the British Museum, London (BM 92687).

distances and spatial relationships, and it may be that the difficulty of drawing on a flat surface of damp clay and the limited size of the clay tablets (they are seldom more than twenty centimeters square) were obstacles to more extensive mapping. Even allowing for the accidents of survival, mapmaking cannot have been common among the scribes of ancient Babylonia. Beside the thousands of administrative and legal documents in cuneiform, the number of plans of houses, properties, and towns is small, counted in dozens rather than hundreds, and the number of maps is limited to the few just described. Recently a fragment of a clay tablet originating in the sixth century B.C. and preserved in the Louvre has been made known (fig. 6.12). It shows a mountainous region, the mountains being marked by small squares, with a road running through it, a river, and a canal with its secondary streams.[23]

FIG. 6.11. CLAY TABLET MAP EXCAVATED AT YORGAN TEPE. This is a cast of the earliest known example, ca. 2300 B.C., of a topographical map in which the cardinal directions are clearly marked.
Size of the original: 6.8 × 7.6 cm. By permission of the Semitic Museum, Harvard University, Cambridge (acc. no. SMN 4172); see also Theophile James Meek, *Old Akkadian, Sumerian, and Cappadocian Texts from Nuzi*, vol. 3 of Harvard University, Semitic Museum, *Excavations at Nuzi*, 8 vols. (Cambridge: Harvard University Press, 1929–62), tablet 1.

Celestial Geography

From early times the Babylonians observed how the heavenly bodies moved or did not move, and in the second and first millennia B.C. they noted this in writing. Their basic aims were calendrical and astrological, yet they went on to make accurate records which are still of value to scientists.

The practical problems of regulating the calendar provoked Babylonian sky watchers to calculate when the new moon should appear on the western horizon, so that they could inaugurate a new month by theory when weather conditions prevented a sighting. Eventually, probably in the Persian period (fifth century B.C.), mathematical predictions were generated to give tables of the moon's position throughout the year. From these it was possible to compute when a month should be inserted in the lunar calendar to keep it in step with the solar year (seven times in nineteen years).

The fixed stars were classed in three parallel bands called "roads," named after the major gods, Enlil, Anu, and Ea. Through the central "road of Anu" ran the

23. D. Arnaud, *Naissance de l'écriture*, ed. Béatrice André-Leicknam and Christiane Ziegler (Paris: Editions de la Réunion des Musées Nationaux, 1982), 243, no. 189.

FIG. 6.12. THE LOUVRE TABLET MAP. A sixth-century B.C. fragment showing mountains (small squares) with a road, a river, and a canal with secondary streams.
Size of the original: 12 × 7.5 × 2.9 cm. By permission of the Musée du Louvre, Paris (AO 7795).

equator. This concept is described but not specifically illustrated. Other tablets provide computations of the distances between the stars. Related to the scheme of "roads" is a group of texts now labeled "astrolabes" or "planispheres." The earliest known example was written in the twelfth century B.C. Some of these show three concentric circles divided radially into twelve segments, each marked for a month of the year. A star is named in each division, with numbers which increase and decrease in a linear zigzag fashion, a concept basic to later calculations about periods of visibility. These texts are believed to relate to the length of the day as well as to the positions of the stars. Some have linear diagrams of the constellations, making a kind of schematized celestial map. Other tablets list distances between the heavenly bodies in "double hours," a process somewhat similar to an itinerary.[24]

Cartographic Knowledge in Syria and Palestine

Where Babylonian cultural and scribal influences were strong, the possibility exists that similar plans and maps were drawn. This was true for most of Syria and, to a lesser extent, most of Palestine during the second millennium B.C. and, as the Ebla texts show, in the previous millennium also. To date, however, no examples of cartography from those ages have come to light in the Levant. As in Babylonia, there are written records which could provide the basis for constructing diagrammatic maps. To the cuneiform texts can be added itineraries in the Old Testament (e.g., Numbers 33), following basically the same form: "They set out from A and camped at B."[25] From the Old Testament, too, come the detailed delineations of the borders of Israel's Promised Land (Num. 34:2–12): "To the east you shall draw a line from Hazar-enan to Shepham; it shall run down from Shepham to Riblah east of Ain, continuing until it strikes the ridge east of the sea of Kinnereth. The frontier shall then run down to the Jordan and its limit shall be the Dead Sea. The land defined by these frontiers shall be your land" (Num. 34:10–12). Similar are the specifications of each tribe's territories by various topographical indicators (Joshua 15–19). A larger horizon is provided by the "Table of Nations" in Genesis 10, which arranges the peoples of the known world mostly on a framework of kinship but with some geographical references.[26] Ancient Israelite scribes, and their colleagues trained in Phoenician and Aramaic, used papyrus as their writing material for all but monumental or ephemeral documents, after the Egyptian fashion, and so their products can hardly be expected to have survived in the damp soil unless through special circumstances of preservation.

24. Ernst F. Weidner, *Handbuch der babylonischen Astronomie, der babylonische Fixsternhimmel* (Leipzig: Hinrichs, 1915; reprinted Leipzig: Zentralantiquariat, 1976); B. L. van der Waerden, "Mathematics and Astronomy in Mesopotamia," in *Dictionary of Scientific Biography*, 15:667–80, esp. 672–76 (note 18).

25. Graham I. Davies, "The Wilderness Itineraries: A Comparative Study," *Tyndale Bulletin* 25 (1974): 46–81; idem, *The Way of the Wilderness: A Geographical Study of the Wilderness Itineraries in the Old Testament* (Cambridge: Cambridge University Press, 1979).

26. Donald J. Wiseman, ed., *Peoples of Old Testament Times* (Oxford: Clarendon Press, 1973), xvi–xviii.

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