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ON SALT AND SALT GATHERING IN ANCIENT MESOPOTAMIA

BY

DANIEL POTTS

(Freie Universität Berlin)

*Introduction**

Pliny succinctly summed up a view shared by peoples all over the world living in many different circumstances when he wrote, "Heaven knows, a civilized life is impossible without salt"[1]). There are, to be sure, countless illustrations of salt's importance to mankind through the ages. Some of the most impressive ones which spring to mind, however, are the famous Iron Age salt mines at Hallstatt in Austria; the Roman monopoly of salt in the Near East, and the famous caravan trade centering on Palmyra which grew out of it; and the extremely lucrative trade in salt and gold carried on between West Africa and Europe beginning in the sixteenth century A.D. In comparison with many other parts of the world, however, the Near East, and in particular Mesopotamia, has received very little attention in studies of the technology of "winning" salt, or in studies of its social and economic importance.

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* A = Siglum of the Oriental Institute.

1) *Natural History* XXXI, xli, 88.

After a brief review of the uses of salt in ancient Mesopotamia, this study[2]) will focus on the sources of salt available in the area, the

2) The impetus for taking up the question of salt in the ancient Near East came while I was listening to a lecture last year on salt and its uses among the Indians of eastern North America. The lecture was given by Dr. Ian Brown at the Peabody Museum, Harvard University, under the auspices of the Dept. of Anthropology. It has now been expanded, and a monograph by Dr. Brown has appeared under the title *Salt and the Eastern North American Indian: An Archaeological Study*, Bulletin No. 6 of the Lower Mississippi Survey, Peabody Museum, 1980, pps. 106. Listening to Dr. Brown's lecture, I was struck by a superficial similarity between ceramic vessels used as *augets*, or salt molds, in various parts of the world, and certain common types of pottery known in Mesopotamia during the early third millennium B.C. Further reading into the matter of salt in prehistory, and its extraction and transport according to both historical sources and ethnographic studies confirmed an observation frequently made by students of this subject, i.e. that the technology and material equipment associated with salt "winning" around the world in pre-industrial times is often very similar from continent to continent due to the basic exigencies of the task. Brown, for example, writes, "One thing which has become quite clear from the various studies is that there was a great deal of uniformity in salt production techniques employed throughout the world. The parallels should not be that startling, as nature has limited the ways in which it (salt) can be obtained. If it is not mined, it has to be removed, in some manner from solution...Sea water, brine, rock salt, and salt-plant ashes are the only source. The techniques which evolved seem to have remained fairly stable through time", Brown, *op. cit.*, p. 60. Cf. J. Nenquin, *Salt: A Study in Economic Prehistory*, Diss. Arch. Gandenses VI, Brugge, p. 100 ff. R. Multhauf writes, "In general primitive methods proved susceptible to increased levels of production, and there was, until the last century, no compelling reason for innovation in salt production," in *Neptune's Gift, a History of Common Salt*, Johns Hopkins Univ. Press, Baltimore, 1978, p. 21, cited in Brown, *op. cit.*, p. 60. (This work was unfortunately not available to me while the present study was being drafted).

With these thoughts in mind, I decided to pursue further the superficial formal similarity between prehistoric American, European, African, and Asian *augets* and what I believe may be some of their early Mesopotamian counterparts. The study, in its present form, however, has gone beyond simply the problem of identifying *augets* in ancient Mesopotamia, and encompasses many more social, economic, and geographical problems as well.

Some recent standard works on the subject of salt in antiquity, besides those of Brown and Nenquin already mentioned, include K. de Brisay and K. A. Evans, eds., *Salt: The Study of an Ancient Industry*, Colchester Archaeological Group, Colchester, 1975; R. J. Forbes, "Common Salt," in *Studies in Ancient Technology* III, E. J. Brill, Leiden, 1965, p. 164-209; and a whole series of articles by M. R. Bloch, of which one will be cited here, "Zur Entwicklung der vom Salz abhängigen Technologien," *Mitteilungen der List Gesellschaft* Fasc. 11 (1971): 254-94. For more specific references to salt in classical antiquity, see the entry "Salz" in Pauly-

methods employed to gather it, the people who may have been involved in such work, and the containers used to hold and transport it from source area to consumer. My attempt has been to integrate the available archaeological, ethno-historical, geological, and philological information, and in so doing to suggest possible answers to questions which arise on the basis of one category of data by drawing on other categories. In this way, I have tried to remove the study from any one scholarly province, as I believe that only by making full use of any and all available sources can a proper appreciation of the subject be acquired. It is hoped that the material gathered here will be of interest to archaeologists, anthropologists, philologists, and economic historians alike.

The Uses and Importance of Salt in the Ancient Near East

The renowned medievalist Marc Bloch counts the discovery of the use of salt for the preservation of food and the curing of hides as one of the great achievements of mankind, ranking it alongside the development of agriculture and metallurgy[3]). The European prehistorian J. G. D. Clark, too, has stressed the important association between the development of a neolithic economy and the beginnings of salt procurement, for as he writes[4]):

> People who live largely on an animal diet obtain the salt they need in their meat. On the other hand the appetite for free salt grew with every increase in the part played by plant food, and it is notable that in prehistoric Europe ostensible indications of salt-working first appear with the establishment of settled agriculture.

Wissowa's *Real-Encyclopädie*. On Mesopotamian use of salt, relatively little comprehensive literature exists, but see M. Levey, "Gypsum, Salt and Soda in Ancient Mesopotamian Chemical Technology," *ISIS* 49 (1958): 336-41, and as a starting point for the philological side of the problem, see the entry "*ṭâbtu(m)*" ("Salz") in W. von Soden's *Akkadisches Handwörterbuch*, Lieferung 15 (1979): 1377.

3) Bloch, *op. cit.*, p. 266.

4) J. G. D. Clark, *Prehistoric Europe: The Economic Basis*, Methuen & Co., London, 1952, p. 127.

Indeed, Bloch has suggested that the important early neolithic site of Jericho may have achieved its extraordinary prominence through the processing and exchange of salt from the Dead Sea area[5]), but this thesis has gained few followers[6]). D. Kirkbride recognized the need of a salt supply for curing hides when she suggested that the neolithic site of Umm Dabaghiyah was a trading post dealing in onager and gazelle hides[7]). Yet with these few exceptions, relatively little attention has been given in archaeological studies to the role of salt in the ancient Near East, prior to the Palmyrene caravan trade.

If we begin to examine salt's position in the ancient Mesopotamian world, however, we find that it had a multitude of functions. Bread and salt appear together as the most basic wants of human existence in a Sumerian proverb[8]). Thus, we read,

> When a poor man has died, do not (try to) revive him! (When) he had bread, he had no salt; (when) he had salt, he had no bread.

Moreover, in Akkadian we find the idiom *ṭâbat X leḫēmum*, literally, "to eat the salt of (a person)", used to express the act of making a covenant with a person or permitting a reconciliation with another individual[9]).

Salt, of course, had any number of important functions in daily life which were not merely proverbial. As would be expected salt was used in the diet of the ancient Mesopotamians[10]). There is, however, considerable disagreement among authorities on just how much free salt is required by the body, and the degree to which the use of salt as

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5) Bloch, *op. cit.*, p. 261-62.

6) Cf. J. Mellaart, *The Neolithic of the Near East*, Thames & Hudson, London, 1975, p. 51, where it is suggested that, in the case of Jericho, "Asphalt, sulphur and salt, products of the Dead Sea, may have played a moderate role in the barter and exchange of the time, but these commodities are fairly widespread in Palestine."

7) D. Kirkbride, "Umm Dabaghiyah: A Trading Outpost?" *Iraq* 36 (1974): 85-92.

8) E. I. Gordon, *Sumerian Proverbs, Glimpses of Everyday Life in Ancient Mesopotamia*, University Museum, Philadelphia, 1960, Coll. I.55, p. 69.

9) *Ibid.*, p. 123, Coll. I.156.

10) Levey, *op. cit.*, p. 339 and note 52.

a condiment is, for all practical purposes, a culturally acquired taste rather than a physiological necessity. There seems to be a general consensus, typified by the statement of Clark's quoted above, that hunting-gathering and fishing peoples do not require salt supplements, whereas agriculturalists do[11]). Nevertheless, estimates of the "normal" or "suggested" free salt intake for a human being vary widely. Thus, Brown cites the following recommendations from a survey of the pertinent literature: between 2-5 gr. daily; 6 gr. daily in a temperate climate with a predominantly vegetarian diet; and 12-15 gr. daily for an adult with a mixed diet[12]). Perhaps more astounding is Bloch's statement that, based on statistics from the 1950's, daily consumption of salt in the United States was 280 gr. per person, while in primitive areas of the world it was 2 gr. per person per day[13]). While there may be disagreement over the minium daily dosage of free salt required by the body, there is certainly none concerning the ill effects of a salt deficient diet. Among the effects of prolonged salt deficiency can be mentioned reduced fertility, weight loss, fatigue, cramps, irritability, and loss of appetite[14]).

Not unexpectedly therefore we find that salt is a component of many ancient medical prescriptions[15]). M. Civil has published an Ur

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11) Exception to this view has been expressed by C. O. Carter in a very short statement entitled "Man's Need of Salt," in de Brisay and Evans, *op. cit.*, p. 13. Carter writes, "Man, except perhaps in the most exceptional circumstances, has no physiological need to add extra salt to his diet. His widespread efforts to prepare salt, and its value as a commodity, must therefore arise from his taste for salt as a condiment and for preservation of food."

12) Brown, *op cit.*, p. 3.

13) Bloch, *op. cit.*, p. 254. These figures were taken from D. W. Kaufmann, ed., *Sodium chloride, the production and properties of salt and brine*, American Chemical Society Monograph Series, Reinhold Publishing Corp., New York, 1960, p. 413. This was not available to me.

14) Brown, *op. cit.*, p. 3.

15) On Mesopotamian medicine in general, see, *inter alia,* A. L. Oppenheim, "Mesopotamian Medicine", *Bull. of the History of Medicine* XXXVI (1962): 97-108, and R. D. Biggs, "Medicine in Ancient Mesopotamia," *History of Science* 8 (1969): 94-105. Pliny's long discussion of the medicinal uses of salt certainly reflects the generally high regard in which salt was held by doctors in antiquity. See *Nat. Hist.* XXXI, xlv.

III prescription which calls for salt[16]), while W. Farber has suggested that salt could be obtained from the ancient equivalent of a pharmacy in Babylonia and Assyria[17]). Mountain salt (Akk. *ṭâbtu šadî*) was esteemed as a drug[18]).

No less important than these overtly medical uses to which salt was put were the equally significant applications of salt in remedies designed to help afflictions of the soul or psyche. A wide range of spells, incantations, and rituals called for the inclusion of salt in recipes of all kinds. Sulphur and "Amurru" salt are burned together in an Assyrian incantation which forms part of the *Maqlû* series[19]). Salt is included in several recipes to restore potency in texts from Bogazköy and Aššur[20]). It is also used in an Assyrian spell to ward off evil and in a Babylonian ritual with similar intents salt is sprinkled over a mixture of honey and water[21]). The *Maqlû* series also suggests that salt was necessary for the preparation of ritual meals for the gods, and as an accompaniment to the burning of incense. Thus, we read[22]).

O Salt, created in a clean place,
For food of gods did Enlil destine thee,

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16) M. Civil, "Prescriptions Médicales Sumériennes," *RA* 54 (1960): 64.

17) W. Farber, "Drogerien in Babylonien und Assyrien," *Iraq* 39 (1977): 226.

18) *AHw* Lieferung 15 (1979): 1377, citing F. Küchler, *Beiträge zur Kenntnis der Assyrisch-Babylonischen Medizin*, Leipzig, 1904, p. 4, 38.

19) G. Meier, *Die assyrische Beschwörungsrituale Maqlû*, AfO Beiheft 2, Berlin, 1937, V: 79; *ṭâbti amurri*. Whether in this case Amurru is meant to be read as a simple adjective, meaning "western", as a more specific designation denoting salt coming from the region in Syria known as Amurru, or as a reference to salt either used by or sold by Amorite people is not known. On the changing meaning of the designation Amurru through time, see M. Liverani, "The Amorites," in D. J. Wiseman, ed., *Peoples of Old Testament Times*, Clarendon Press, Oxford, 1973, p. 102-3, 116, 119, 120, 122, 123, and 126. Cf. also the discussion below p. 257-258.

20) R. D. Biggs, *ŠÀ.ZI.GA, Ancient Mesopotamian Potency Incantations*, Texts from Cuneiform Sources II, Locust Valley, 1967, esp. *KUB* 4 48, *KUB* 37 80, *LKA* 95 r. 4, and *LKA* 98 8.

21) R. Campbell Thompson, *Semitic Magic: Its Origins and Development*, Luzac & Co., London, 1908, p. liii, xlii.

22) T. Jacobsen, translation of *Maqlû* Tablet VI: 111-19, in "The Cosmos as a State," in H. Frankfort, ed., *Before Philosophy*, Harmondsworth, 1951, p. 143.

Without thee no meal is set out in Ekur,
Without thee god, king, lord, and prince do not smell incense.

The practice of using salt for all ritual meals is mirrored by the much later *mola salsa*, or salted meal, of the Romans. Thus, Pliny writes, "But the clearest proof of its importance (i.e. salt) lies in the fact that no sacrifice is carried out without the *mola salsa*[24])". Van Driel has published an account of cultic practice associated with the god Aššur which gives a very vivid illustration of the role played by salt in the performance of cultic rites[24]). Quoting from the text A 125 V, lines 22-29[25]),

the queen (?) has risen,
she collected (everything needed??), "Šerua has started out"
she has said three times; the temple of Anu he (?) has entered,
he has brought salt, he has brought a *pagulu*,
.....has entered the temple of Adad, he started to burn incense,
.....he has put salt, he heaped up, he has brought [one] torch,
the [gods?] have risen;

In A 125 VI 6-9, we read[26])

he has offered, after that (?) the king has put
salt on? the *niknakku's*
.....has gone straight to the palace.

A ritual meal prepared for Ishtar, specifying that salt was poured out for her, has been discussed by W. Farber[27]). Another text from

23) *Nat. Hist.* XXXI, xli, 87-89.
24) Ezek. 43:24, Lev. 2:13, Ezra 6:9, 7:22.
25) G. Van Driel, *The cult of Assur*, Van Gorcum, Assen, 1969, p. 131.
26) *Idem.*
27) W. Farber, *Beschwörungsrituale an Ištar und Dumuzi*, Franz Steiner Verlag, Wiesbaden, 1977, p. 67, A Ia:27. Another dedication of salt to Ishtar was published originally by E. Ebeling, *Quellen zur Kenntnis der babylonischen Religion* II, Mitteilungen der Vorderasiatischen Gesellschaft, 23. Jahrgang, Leipzig, 1918, p. 22-23 and 27-28, and re-published in a new French translation more recently by M.-J. Seux, *Hymnes et Prières aux Dieux de Babylonie et d'Assyrie*, Littérature Anciennes du Proche-Orient 8, Editions du Cerf, Paris, 1976, p. 459-461 (esp. p. 460 and note 12). See also, for an example from the dynasty of Larsa, UET V 789, Col. II 3, in H. H. Figulla, "Accounts Concerning Allocations of Provisions for Offerings in the Ningal-Temple at Ur," *Iraq* XV (1953): 183-84, in which the deity Nin-šubur is

Aššur, VAT 8005, describes a ritual in which salt is strewn on the ground upon leaving the temple of Aššur[28]). A much more sinister example of salt being strewn on the ground is also Assyrian in origin, but is not conducted in praise of the gods. Rather, it was the final act of the conquering Assyrian king Tiglath Pileser I after laying waste to the city of Hunusa. The monarch scattered salt over the devastated town, and thereafter ordered a shrine to be built in which a bronze thunderbolt was placed, engraved with a decree stating that the city should never be rebuilt[29]).

Turning now to some of the practical, industrial uses of salt in the ancient Near East, we can begin by mentioning the use of salt in the process of curing hides. Marc Bloch's assertion that the ability to preserve animal hides was a great achievement in human cultural evolution was mentioned above (p. 227). It must, however, be stressed that the role of salt in ancient hide treatment was largely limited to curing, i.e. preparing a hide for tanning by salting it in order to ensure its preservation. This could be effected by simply drying a hide in the sun, or by following any of three processes involving the use of salt. These were *dry-salting*, i.e. spreading dry salt over the hide; *wet-*

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offered 4 (?) *qa* salt along with butter, cheese, dates, coriander, and cassia. Note, however, that salt is not among the goods offered to the gods in the temple of Ninurta at Nippur during the Isin Larsa period. See the recent study by R. M. Sigrist, *Ninurta à Nippur. L'Economie du culte pendant la période d'Isin et Larsa*, unpubl. Ph.D. dissertation, Yale University, New Haven, 1976, p. 87-90.

28) E. Ebeling, "Kultische Texte aus Assur," *Orientalia* 21 (1952): 129-48. Cf. also VAT 13717, in which the king, upon leaving the palace, spreads salt before the god Assur, and does the same upon the terrace of the god Sibi within the context of a more complicated sequence of ritual offerings. See E. Ebeling, "Kultische Texte aus Assur," *Orientalia* 22 (1953): 25-26. In the same article by Ebeling we find VAT 10568a, which contains an account of a ritual performed before the "Daughter of the River". Here the scribe, after stating that salt should be strewn, writes, following Ebeling's translation, "die Zurüstung mit dem Salz (5) darfst du nicht vergessen," Ebeling, *op. cit.*, p. 43, 45.

29) A. T. Olmstead, *History of Assyria*, Univ. of Chicago Press, Chicago, 1975, p. 64. See, *inter alia*, for further examples of salting a defeated city, A. M. Honeyman, "The Salting of Shechem," *Vetus Testamentum* 3 (1953): 192-95, and S. Gevirtz, "Jericho and Shechem: a religio-literary aspect of city destruction," *Vetus Testamentum* 13 (1963): 52-62.

salting, which involved soaking the hide in brine; and *salting and drying*, a combination of the first two techniques[30]). Thus, strictly speaking, when Bloch asserts that the production of leather in antiquity was practically impossible without salt[31]), he is perhaps giving undue emphasis to the first step in the process, without mentioning the very necessary process of tanning itself, which tended to involve either animal or vegetable substances, or alum, as tanning agents[32]). To be sure, however, a ready supply of salt would have been available to the inhabitants of Umm Dabaghiyah, whom D. Kirkbride has suggested may have been running a tannery during the neolithic period. The site is located well within an area of Mesopotamina which has a very

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30) R. J. Forbes, "Leather in Antiquity," *Studies in Ancient Technology* V, E. J. Brill, Leiden, 1966, p. 3.

31) Bloch, *op. cit.*, p. 280.

32) See, for example, M. L. Ryder, "Remains Derived from Skin," in D. Brothwell and E. Higgs, eds., *Science in Archaeology*, Basic Books, New York, 1969, p. 531. In his discussion of "Methods of Preserving and Tanning Skin," Ryder treats the practice of tanning with oil, e.g. fish oil; the use of milk, butter, and egg yolk as tanning agents; the uses of urine and ashes; and the very widespread use of oak-bark in western Asia and Europe, and the acacia pod in ancient Egypt. He does not even mention the use of salt as a tanning agent in antiquity, stating, "The only mineral process of ancient times was alum dressing (tawing). This was probably used first in the Near East where alum was available..." But see M. Levey, "Alum in Ancient Mesopotamian Technology," *ISIS* 49 (1958): 166-69, where the author states quite clearly that tawing, i.e. tanning with alum alone, is not attested in ancient Near Eastern texts, p. 168. Certainly it must be mentioned in this regard that tannin was a most important preservative, well-known in the ancient Near East, and largely derived from either oak-bark or oak-galls (see J. W. Waterer, "Leather," in C. Singer *et al.*, eds., *A History of Technology* II, Clarendon Press, Oxford, 1956, p. 151). The oak gall, produced on the exterior of the dwarf oak (*Quercus infectoria*) after the gall-fly has laid an egg in the tree, contains a higher percentage of tannin than the bark of the oak itself. Pliny mentions that the "green gall-nuts of Aleppo" were the finest available, and were traded as an important export commodity (*Nat. Hist.* XVI, ix, 26-27). Their commercial value in the early twentieth century was discussed by Sir G. W. Prothero, genl. ed., *Mesopotamia*, Handbook No. 63 of the Historical Section of the Foreign Office, H. M. Stationery Office, London, 1920, p. 112. A recipe which calls for both alum and oak-galls was discussed by F. Thureau-Dangin in "Notes Assyriologiques: L'Alun et la noix de galle," *RA* 17 (1920): 27-30. Sumac, which also contains tannin, was, according to Pliny, also known to the Babylonians. He calls it "the currier's plant" (*Nat. Hist.* XXIV, xi, 91). See now M. Stol "Leder" in RlA.

high concentration of salines (Map 2). These will be discussed below when we turn to the question of salt sources.

Salt played a particular role in one aspect of ancient metallurgy, the separation of gold from silver. R. J. Forbes describes the "salt process" as follows:[33])

> The principle consists in the addition of salt to the silver-gold alloy, some reducting agent like straw, charcoal or other organic material being added. The salt attacks the silver and forms silver chloride which is absorbed by the walls of the crucible.

Although the only ancient sources given by Forbes to prove that a similar process was used in antiquity are late ones (Theophilus III, 33-34, and Agricola, Books Vii and X), it is reasonable to suggest that UET III 1498 offers confirmation for the use of this or a similar technique as early as the Ur III period in Mesopotamia. The text in question is an account of the inventory of equipment and materials in a goldsmith's shop for the 11th year of the reign of Ibbi-Sin, and included we find 20 sìla, or approximately 17 liters, of salt[34]).

The preservation of fish in salt was widespread in the ancient Near East. This has been discussed by A. Salonen, who also points to the existence of ḫa-mun-na, mun-ḫa = *nūn ṭâbti*, "Salzfisch, gesalzener Fisch," in pre-Sargonic texts[35]).

In addition to the preservation of fish, salt was used for the preservation of corpses as well. Perhaps the most famous known instance of this practice occurred when Assurbanipal ordered that the slain Nabu-bel-shumate be put in salt along with the head of his shield-

33) "Cupellation and other refining methods," *Studies in Ancient Technology* VIII, E. J. Brill, Leiden, 1971, p. 180.

34) L. Legrain, *Ur Excavation Texts III: Business Documents of the Third Dynasty of Ur*, British Museum and University Museum, London and Philadelphia, 1947, p. 259.

35) A. Salonen, *Die Fischerei im alten Mesopotamien, nach sumerisch-akkadischen Quellen*, Helsinki, 1970, p. 262 and 287 for further references. Salonen cites interpretations of ezen-ḫa-mun and GN ^{d}Ḫa-mun as "Festival of the Salt Fish" and a "Salt Fish God", respectively. Prof. Hallo kindly informs me in a letter, however, that "the deity (and probably the festival) are more likely ḫa-mun = *miṯḫurtu*, confrontation or the like than ku_6 (ḪA)-mun = "salt fish"."

bearer[36]). There is also a case known of a foetus being preserved in salt. This occurs in the omen series *šumma izbu*, where we read of the birth of an anomalous piglet with eight feet and two tails (signifying, according to the diviner, that "a prince will seize universal kingship") which the diviner then "pickled" in salt[37]).

Natural Occurrences of Salt

Salt occurs naturally in several forms: as rock salt; in briney lakes or marshes, usually called salines or salterns; in the sea; and in exploitably high concentrations in certain plants. Mesopotamia is well-endowed with various salt sources, and indeed they constitute one of its very few mineral assets. Its salt domes, of which the largest is perhaps that of Basra[38]), are noteworthy. Tectonic activity in recent centuries in southern Mesopotamia has been such that salt plugs continue to be extruded there[39]). Such salt plugs, or perhaps salt "domes", may in fact be alluded to in two texts from Ur which mention "the salt hill field" and a certain number of "acres of salt hill"[40]).

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36) H. C. Rawlinson, *A Selection from the Miscellaneous Inscriptions of Assyria*, British Museum, London, 1891, Vol. V, Plate 7: 31-41, cited in M. Levey, "Gypsum...", *op. cit.*, p. 339.

37) *Cuneiform Texts in the British Museum* (1910) XXVII: Pl. 45: 9-11, cited *idem*, and E. Leichty, *The Omen Series Šumma Izbu*, Texts from Cuneiform Sources IV, 1970, p. 11, who writes, "The preservation of an anomaly, mentioned here, is elsewhere unattested. It was probably done in this case to convince any future skeptics that the birth actually occurred." Cf. also the entry *muddulu* (*mundulu*), CAD M II, p. 162, "salted, pickled (said of meat)."

38) W. C. Brice, *Southwest Asia*, Univ. of London Press, London, 1966, p. 284. I know of no descriptions of the exploitation of these salt domes. Note, however, that R. LeB. Bowen records the extraction of salt from salt domes in southern Arabia, see "Ancient Trade Routes in South Arabia," in Bowen and F. P. Albright, *Archaeological Discoveries in South Arabia*, Johns Hopkins Univ. Press, Baltimore, 1958, p. 35. Note also the salt domes of southern Iran discussed below on p. 245.

39) W. C. Brice, "Synopsis of Part IV," in Brice, ed., *The Environmental History of the Near and Middle East*, Academic Press, London, 1978, p. 276.

40) Legrain, *op. cit.*, texts 1357, 1367.

Both the Tigris and Euphrates are characterized by a "high concentration of dissolved salts"[41]); and Forbes has suggested that the ordinary table salt of the ancient Mesopotamians was this "impure river salt"[42]), although this must be questioned in light of the ready availability of much finer salt from other, more easily exploitable sources, as we shall see.

Indeed, the most important sources of salt in Mesopotamia have probably always been the many salines which can be found in a variety of locations within the region. Vital Cuinet's four volume work, *La Turquie d'Asie* (1891-1894), contains a great deal of information about the use of salines in Turkey, Syria, and Mesopotamia under the Ottoman Public Debt Administration just prior to the first World War. It constitutes by far the most extensive source of documentation on salt gathering at Mesopotamian salines for any historical period. Because traditional extractive methods were employed, it is invaluable as an ethno-historic source for the study of salt gathering in Mesopotamia. Furthermore, despite occasional inaccuracies, it is of inestimable value as a guide to the geographical location of the salt sources in Mesopotamia, and for that reason we will draw on it heavily. Because the Ottoman Public Debt Administration was charged with the administration of the state salt monopoly[43]), exploiting even those sources which were inferior in an attempt to deny private individuals or groups any opportunity of taking salt freely, their knowledge of the location of salines within their domain can be assumed to have been very nearly complete.

Table I is a list of all the salines in Mesopotamia exploited in the late Ottoman era under the supervision of the Public Debt Administration. Based upon Cuinet's data, it gives the location of the saline, its size, the names of the towns which drew their salt supply

41) C. E. Larsen and G. Evans, "The Holocene Geological History of the Tigris-Euphrates-Karun Delta," in W. C. Brice, *op. cit.*, p. 234.

42) R. J. Forbes, "Common Salt," *op. cit.*, p. 175.

43) V. Cuinet, *La Turquie d'Asie: Geographie Administrative, Statistique, Descriptive et Raisonné de Chaque Province de l'Asie-Mineure*, Ernest Leroux, Paris, Vol. I, 1891, p. 8.

from it, the names of the tribes which used it, the annual average yield in kilograms, and the relative quality of salt produced there[44]). The geographical situation of these salines can be seen on Map 1.

Map 1 — Salines in Mesopotamia exploited in the late nineteenth century under the Ottoman Public Debt Administration.

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44) Where there are blanks in the table it is an indication that Cuinet did not address that particular point in his text. With regard to the locations of the salines, Cuinet's descriptions are often very general, and only those sources at towns whose names could be found in E. Guest's "Gazeteer of Place-Names in Iraq," in Guest, ed., *Flora of Iraq*, Vol. I, Ministry of Culture, Baghdad, 1966, p. 21-55, are accompanied by their latitude and longitude. E. Unger, in "Zur Salzsteppe südlich des Sindschar Gebirge," *Petermanns Mitteilungen* 62 (1916): 302, has noted some errors in the locations of certain salines on Cuinet's maps, and for this reason I have not

Table 1

Salines in Mesopotamia exploited in the late nineteenth century under the Ottoman Public Debt Administration.

Saline	Location	Size	Towns Supplied	Tribes Using It	Yield in Kgs. c. 1890	Quality
Hamdan	30°28′N47°47′E	18 km²	----------	----------	190,000	very good
Sérouth	1. around Amara 31°51′N47°09′E	----------	----------	----------	192,400	average
	2. 22 kms. from Amara	----------	----------	Beni-Lam	641,470	very good
Abou-Roba	near Amara	----------	----------	Beni-Malek, el-Chèddé	256,590 with Beni-Malek	mediocre
Beni-Malek	8 kms. from Abou-Roba	----------	----------	Beni-Malek, el-Chèddé		mediocre
Doga	21 kms. from Souq-el Chiouk	2 km²	----------	----------	641,475	average
Muntefik	40 kms. from Nasariyah	5 km²	----------	----------	513,180	----------
Djezaïr	halfway betw. Qurna and al-Hammar	2 km²	----------	----------	769,770	----------
Cheik-Omar	SW of Baghdad	.9 × .45 km.	----------	----------	384,885	inferior
Hit	2 kms. S of Hit	2.7 × 1.8 km.	Hit, Hillah	----------	769,770	mediocre
Kobéissé	= Kubaisa 33°55′N42°50′E	----------	----------	----------	----------	----------
Châdi	32 kms. E of Aziziyah	11 × .2 kms.	----------	----------	641,475	good
Malha	65 kms. NE of Baghdad	3.64 × 1.82 kms.	----------	----------	256,590	----------
Drehem	16 kms. E of Samarra	3.6 × 2.7 kms.	----------	el-Hazi	256,590 with Abou-Tabba	very good
Abou-Tabba	2 kms. from Drehem	3.6 × 2.7 kms.	----------	----------	----------	very good

Saline	Location	Size	Towns Supplied	Tribes Using It	Yield in Kgs. c. 1890	Quality
Teltar	numerous sources from c. 50 kms. NE of Hit to 290 kms. NW of Hit	----------	Baghdad, Kazmieh, Deir-ez Zor, Hit, Anah, Délim, Tékrit	Chamar, Djerbah Anézé, el-Bouhiazeh	millions	excellent
Mendèli: Ain el Gharb Tahlaou Haourin Hamamiat Dechtlek Zorbatieh	= Mandali 33°45′N45°33′E	----------	Mandali, Zorbatieh, Kut-al-Imara, Baghdad, Khorassan	Kurds	millions	very good
Kasr-el-Rahaba	near Najf	3.64 × .05 kms.	Najf	----------	641,475	good
Ouadi	near Najf	.91 × .05 kms.	Najf	----------	192,442	good
Chefftatiyeh:						
Rézazé	near Karbala	16 × .3 kms.	Karbala, Mussayib,	----------	c. 1,000,000 from all	good
Rahaliyè	32°44′N43°23′E	----------	Hindiyah,		three	good
Chefftatiye	32°33′N43°29′E	----------	Chamiyah			good
Sémava	= Samawa 31°18′N45°17′E	----------	----------	Méedan	millions	the very finest in Iraq
el-Ain	80 kms. S of Samawa	----------	Nejdi towns	unnamed local tribes	millions, over 150,000 camel loads yearly	very good
Bevara	35°20′N41°45′E	1-1.5 x 3-4 kms.	Urfa, Siverek, Viransehir, Yenisehir, Ras-al Ain, Mardin, Mosul, Deir-ez Zor, Baghdad	Chamar	----------	very good
Azkar	35°55′N40°0′E	----------	----------	----------	----------	good

Our list covers Mesopotamia from south to north, beginning in the Ottoman *vilayet* of Basra, which had seven principal salines (Hamdan to Djezair)[45]), and proceeding north through the *vilayet* of Baghdad, with twenty-one salines (Cheik-Omar to el-Ain), and on to the *vilayet* of Mosul, with two principal salines, Bevara and Azkar. Some of Cuinet's comments on individual salines may be of interest, and will be briefly summarized here.

Concerning the salines of the *vilayet* of Basra, Cuinet notes some lacunae in the knowledge of their distribution. Particularly as regards those which are in the southwestern desert districts, i.e. the north Arabian Nejd, he notes that while many of these are of considerable size, their great distance from the Ottoman administrative centers made their exploitation impossible[46]). On more than one occasion Cuinet notes that the annual yield from a particular saline was far below its potential yield. Thus, for example, he states that the saline of Hamdan could easily have supplied over a million kilograms of salt per year, while in fact no more than 190,000 kgs. per year were taken from it in the late nineteenth century.

The saline of Beni-Malek consisted of a great number of pits excavated by the El bou-Mohammed tribe down to the water table (c. 2

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attempted to offer latitude and longitude based on the positions of salines on Cuinet's maps. With regard to the orthography of the Arabic place names, I have retained the original spelling given by Cuinet, although in some cases I have been able to identify certain of the names with more currently used Anglo-Saxon renderings, e.g. Kobéissé = Kubaisa.

45) In fact there were eight important salines in the Ottoman *vilayet* of Basra, but I have omitted one here which was located a few kilometers west of modern Kuwait City, an area falling within the administrative district of Basra during the late Ottoman period. See Cuinet, *op. cit.*, Vol. III, p. 228.

46) *Idem.* There are several scanty references to salt in the northern Nejd contained in A. Musil's *Northern Neǧd: A Topographical Itinerary*, American Geographical Society Oriental Explorations and Studies No. 5, New York, 1928, p. 100, 167, 171. While travelling from Mowkak (Mawqaq), southwest of Hail, to al-'Ela' (Al 'Ula) Musil passed as-Shaba and Sarmada, and writes, "to the northwest we saw a lowland bounded on the north by the high bank of al-Čih, from which good, clear, white salt is dug," *op. cit.*, p. 100. The abundance of salines in the Nejd is revealed by the fact that the price of a camel load of salt, c. 1890, was only one *piastre*, the equivalent at that time of 23 French *centimes*, Cuinet, *op. cit.*, Vol. III, p. 228.

m.). Saline water was taken from these pits and put into "basins" dug in the surface. The water evaporated in the sun, producing crystalline salt in the process. This was then sold for a very low price by the families engaged in its extraction to boatmen who sailed the Tigris, and they in turn sold it for a profit to Arabs camped on either side of the river[47]).

Turning to the salines in the *vilayet* of Baghdad, we read that, with the exception of the salt from that part of the Cheik-Omar saline nearest to the Baghdad city gate known as the Bab-el-Tlessem, the rest of the salt produced there was suitable only for tanners to use in curing hides. In fact, despite the poor quality of the salt obtained from this source, it seems to have been favored by local people because of its proximity to the tombs of certain venerated Moslem figures. Therefore, the Public Debt Administration persisted in working this source simply to discourage illegal procurement of its salt by the tribes, although such was the Ottoman disdain for this inferior salt that, should there be any salt left over after attempting to sell it, this was simply thrown into the Tigris[48]).

In the case of the saline at Drehem, the Ottoman officials normally engaged the el-Hazi tribe to gather the salt and transport it to a fixed point to which merchants would come who were interested in buying it[49]).

The numerous salines in the Tharthar basin, which Cuinet says produced millions of kilograms of salt per year, were annually exploited by great numbers of Arabs belonging to many different tribes. Whatever was not consumed by them then formed the basis of a caravan trade which operated in a long corridor from Délim, just north of Ar-Ramadi, as far as Deir-ez Zor in Syria. By exchanging salt the tribes thus acquired grain, butter, wool, and other commodities[50]).

47) *Ibid.*, p. 229.
48) *Ibid.*, p. 29.
49) *Ibid.*, p. 31.
50) *Ibid.*, p. 32.

The salines of the Mandali area are not discussed in detail, with the exception of Dechtlek, which was located in territory disputed by Turkey and Persia. This saline was controlled by a Kurdish ruler who also acted as governor of Luristan.

The salt of Semava was ranked as the very finest in Iraq, and comparable to the very best obtainable in Constantinople during the 1890's. The salt was extracted by tracing 50 cm. squares on the surface of the dried up lakes in summer, and then cutting the salt out in blocks, called *tabouk*, or "brick", in Arabic.

The salines in the *vilayet* of Mosul are particularly interesting. Aside from the two principal ones, Bevara and Azkar, there were many more which produced salt suitable only for livestock. If not the most important region of salines in Mesopotamia, then surely the region of Bevara is of above average significance. Bevara, which produced extremely high quality salt, was located 25 hours from Bouseire, which sat at the junction of the Khabur and the Euphrates; 60 hours southeast of Mardin; 60 hours east of Deir-ez Zor; and 109 hours southwest of Mosul. It is located in a valley surrounded by hills which allow access only on the north and south. Cuinet notes that the Shammar tribe, in particular, was engaged in massive contraband trade in salt from Bevara in the late nineteenth century. The tribe, numbering some 15,000 tents in all, came each spring, and stayed until November. Because of their attacks on unnamed victims, presumably including the Turkish cavalry stationed near all the most important salines in the empire as guards, the *vali* of Diyarbakir marched against them in 1874, and succeeded in destroying most of the tribe. The survivors, who fled to the *vilayet* of Baghdad, lived to return six years later to their old camp sites, and having lost most of their animals, turned to wholesale looting of salt from Bevara. The Shammar are said to have sold their salt from Urfa to Baghdad, and from Mosul to Deir-ez Zor, in exchange for grain and other goods[51]),

51) Cuinet, *op. cit.*, Vol. II, p. 802.

much to the consternation of the Public Debt Administration which strove to extract maximum profit for the state salt monopoly.

This area is mentioned briefly by W. C. Brice in his review of southwest Asian geography[52]), and by L. Dillemann, in his treatise on the historical geography of northern Mesopotamia[53]). It has not, however, been the subject of careful study from the point of view of its salt sources since E. Unger's brief but important article on it of 1916[54]). Here lie the sources of salt, indicated as being 100-125 miles from Nineveh by R. Campbell Thompson in his table of the mineral resources of Mesopotamia. Moreover, these are the very sources which the residents of Umm Dabaghiyah would probably have exploited during the neolithic era, in order to obtain salt for curing their onager and gazelle hides[55]). Finally, it might be mentioned, this is, in part, the arid region through which the remnants of the Roman army passed on their way from Hatra to Nisibis in 363 A.D. following the death of Julian and the disastrous peace with Shahpur I, as related by Ammianus Marcellinus[56]).

The use of this region during the Neo-Assyrian period is perhaps indicated by the discovery in 1905 at a saline nine hours south of

52) Brice, *Southwest Asia*, *op. cit.*, p. 234.

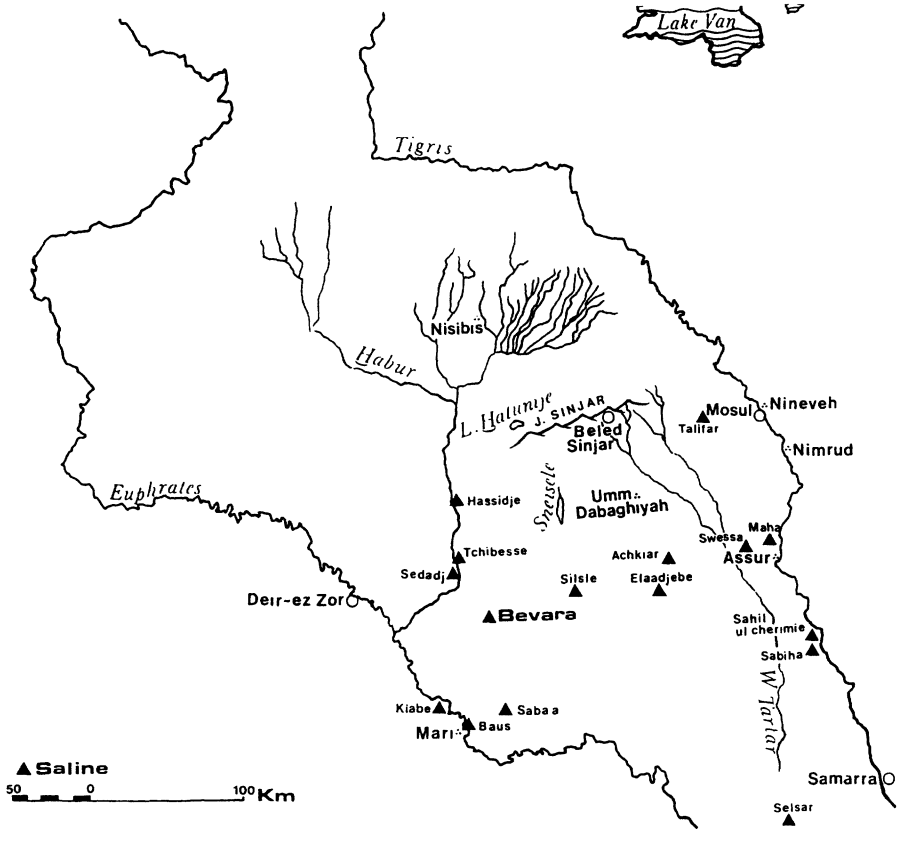
53) L. Dillemann, *Haute Mesopotamie Orientale et Pays Adjacents: Contribution à la Géographie Historique de la Region, du V^e S. avant l'Ere Chrétienne au VI^e S. de Cettre Ere*, Paul Geuthner, Paris, 1962, p. 62. Dillemann observes that these salines constitute upper Mesopotamia's sole natural mineral resource.

54) Unger, *op. cit.*, p. 302-303.

55) R. Campbell Thompson, "Section 28. A Table of the Minerals of Mesopotamia," *On the Chemistry of the Ancient Assyrians*, Luzac & Co., London, 1925, p. 80. D. Kirkbride notes, "It should be pointed out that a large salt lake exists about twenty minutes' walk from Umm Dabaghiyah. The salinity has not yet been analysed, but if enough sodium chloride proves to be present, it is possible that salt was obtained at the lake by evaporation, brought to the site and used to cure hides, and also perhaps as a further export product," see Kirkbride, *op. cit.*, p. 91. The approximate location of Umm Dabaghiyah is 35°45′N × 42°20′E according to D. Kirkbride (pers. com.).

56) Treated in Dillemann, *op. cit.*, p. 308-12; D. Oates, *Studies in the Ancient History of Northern Iraq*, British Academy, London, 1968, p. 93 ff.; and most interestingly by Lieut.-Col. W. H. Lane, in *Babylonian Problems*, John Murray, London, 1923, p. 131-32. The events are recorded in the Roman history of Ammianus Marcellinus, XXV, viii, 6.

Bevara called Saba'a of a stele of Adad Nirari III, which was published by Unger[57]). Unger's map of the salines in this region is presented here in a simplified form (Map 2). During the course of his treatment of this region, Unger was very concerned to demonstrate that the saline Bevara is the "Lacus Beveraci" shown on the Peutinger Table, and not Lake Khatuniyah as has generally been assumed since the mid-nineteenth century. This discussion is outside the limits of the



Map 2 — Salines south of Jebel Sinjar in northern Mesopotamia (after Unger's map in *Petermanns Mitteilungen* Jahrgang 1916: Tafel 40).

57) "Reliefstele Adadniraris aus Saba'a und Semiramis," *Publikationen der Kaiserlich-Osmanischen Museen* V, Constantinople, 1917. Also illustrated in T. A. Madhloom, *The Chronology of Neo-Assyrian Art*, Athlone Press, London, 1970, pl. XLI:1.

present inquiry, but the author hopes to publish a re-examination of this question in the near future.

Outside of Mesopotamia proper, salt is, of course, abundant in many areas and in many forms[58]). In Iran, for example, M. H. Ganji reports salt layers up to 7 m. thick at the top of the Qum playa sequence[59]). Salt domes are a common feature on the southern Fars coastal plain and have been exploited on the islands of Hormuz and Qeshm south of Bandar Abbas[60]). Salt flats, or *sabkhas*, are a common feature in eastern Arabia, and in the interior of southern Arabia are the salt mines of Aiyadin, near the mouth of the Wadi Beihan[61]). Salt lakes, of which Lake Tuzgölü, the ancient Lake Tatta, is perhaps the most famous, are found in central and southern Anatolia[62]).

Many of the existent salt sources, including any number not mentioned above, were known to the writers of classical antiquity, of whom Pliny and Strabo are our best sources. Salt mines at Colupene and Camisene in Cappadocia, and Ximene in the Pontic region, are mentioned by both of these writers[63]). They also mention the existence of brine springs in Cappadocia, and of salines along the coast of Asia Minor and near the mouth of the Halys. Pliny discusses the various qualities and types of salt available from and/or used in Sicily, Phrygia, Cyprus, Egypt, Bactria, India, Arabia, Spain, Crete, Africa, Babylon, Attica, Euboea, and Thebes[64]).

58) Once again, for all areas within the former Ottoman Empire, Cuinet's work is extremely valuable. Here I will not deal with those sources outside of Mesopotamia discussed by him in any great detail.

59) M. H. Ganji, "Post-Glacial Climatic Changes on the Iranian Plateau," in Brice, ed., *Environmental History...*, *op. cit.*, p. 160.

60) Brice, *Southwest Asia, op. cit.*, p. 171, 314.

61) W. Phillips, *Qataban and Sheba*, Victor Gollancz Ltd., London, 1955, p. 82-84, cf. Bowen and Albright, *op cit.*, p. 35-36.

62) O. Erol, "The Quaternary History of the Lake Basins of Central and Southern Anatolia," in Brice, ed., *Environmental History...*, *op. cit.*, p. 124-26.

63) Strabo XII, iii, 37; Pliny *Nat. Hist.* XXXI, xxxix, 77; Strabo XII, iii, 39, XX, v, 4; Pliny XXXI, viii, 99, XXXI, xxxix, 82; Strabo XIII, i, 48, XII, iii, 12. For full documentation of salt sources in classical antiquity, see Pauly-Wissowa's *Real-Encyclopädie*. Nenquin, *op. cit.*, p. 101-06, also gives a comprehensive review of salt sources known to classical writers.

64) *Nat. Hist.* XXXI, xxix-xlv.

The wide variety of salt sources and the recognition of the different properties of salts from different regions is reflected in the nomenclature associated with salt which has come down to us. Lexical lists, such as the so-called "Practical Vocabulary of Assur," give the names of different types of salts[65]). No attempt will be made here to offer an exhaustive lexical study of the Mesopotamian salt types. Rather, only some of the more interesting ones will be commented upon. Von Soden's *Akkadisches Handwörterbuch*, lists the names of ten different types of salt, and this may be taken as a starting point for a review of some of the salts of ancient Mesopotamia.

Amānu is translated by the CAD as "red salt," and the author of the entry raises the question as to whether this should be related to the plant Ú.AMA.A.NI[66]), and hence whether this salt is vegetal in origin. The redness of this salt is a very good indication that it was not produced from a salt plant, but rather that it was gathered at a saline. Nequin, for example, has observed,

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65) B. Landsberger and O. R. Gurney, "Practical Vocabulary of Assur," *AfO* 18 (1957-58): 328. Sultantepe 51/131 has the following entries for salt: MUN.MEŠ, MUN.EME.SAL.LA, MUN *A-ma-nim*, MUN.KÙ.PAD, and MUN. *bàḫ-ri*. Cf. also *MSL* XI:135 ff., "Old Babylonian Forerunner 1 to Hh XXIV, col. xii, 41-47, which lists seven types of salt: mun, mun.dur$_5$ (moist?), mun.è.a, mun.al.kum (crushed), mun.nu.al.kum (not crushed), mun.ba.ba.za, and ⌜mun.x⌝. I would like to thank A. Westenholz for bringing this to my attention, and for suggesting these translations.

On mun.ba.ba.za, cf. Akk. *pappasu* in the *AHw.* and the discussion by A. L. Oppenheim in note 89 of "On Beer and Brewing Techniques in Ancient Mesopotamia," *JAOS* Suppl. No. 10, Baltimore, 1950, p. 51 and p. 26, Col. IV A 23.

Further, *MSL* XI:158, "Old Babylonian Forerunner 15 to Hh XXIV, col. xi, 479-485 = *Oxford Editions of Cuneiform Texts* 4:154 xi 24-28, lists mun.sal.la, mun.nu.luḫ.ḫa, mun.ḫi.ḫi, and mun.gazi. I would like to thank Prof. W. W. Hallo for bringing these latter references to my attention. Prof. Hallo also noted in a letter to the author, "Canonical Hh XXIV probably had MUN entries between 11. 279 and 285." On MUN gazi (pulverized or crushed salt) see the discussion in A. L. Oppenheim, *Catalogue of the Cuneiform Tablets of the Wilberforce Eames Babylonian Collection*, American Oriental Series Vol. 32, New Haven, 1948, p. 7.

66) *CAD* Vol. I A II:2, but see the comments of Dr. Butz in the following contribution. There is one clear case of a plant-derived salt, mun.ú.kur, in the Nippur Forerunner to ḪAR-ra XXIII-XXIV, *MSL* XI:128, entry 19.1.5. My thanks to Dr. Butz for pointing this out to me.

> in many places where salt is extracted from brine-springs by solar evaporation, the concentrated solution is coloured a vivid red by bacterial action[67]).

Red salts were certainly very familiar in the classical era, as Pliny writes:

> The colour too of salt varies: blushing red at Memphis, tawny red near the Oxus, purple at Centuripae, it is of such brightness near Gela (also in Sicily), that it reflects an image[68]).

Several salt names reflect their specific regional or cultural associations. We have already mentioned Amurru salt[69]). Another name, *barīkitu* or *barīkatu*, reflects an association with the town Bariku in Media. This was a highly esteemed type of salt in the time of Assurbanipal, and may have been the by-product of a salt plant[70]).

The "salt of fine tast"—MUN.EME.SAL.LA[71])—incorrectly called "river salt" by Forbes[72]), was also derived from a salt plant, according to the CAD. This is suggested by Thompson, who found the name in two Assyrian lists of plants published by S. Smith[73]). Another vegetable salt, used not only as a condiment and in medical prescriptions, but also by Shalmaneser I and Adad Nirari I to scatter over a conquered city, was known by the name *kuddimmu*[74]).

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67) Nenquin, *op. cit.*, p. 142-43. Unger also noted that the salt around the Bevara saline was rose colored, *op. cit.*, p. 303.

68) *Nat. Hist.* XXXI, xli, 86.

69) See note 19.

70) CAD Vol. 2 B:110. See also S. Parpola, *Neo-Assyrian Toponyms*, ADAT 6, Neukirchen-Vluyn, 1970, p. 68. Cf. also E. Weidner, "Salz aus Bariku," *AfO* XIII (1939-1941): 324.

71) *CAD* Vol. 4 E: 148.

72) Forbes, "Common Salt," *op. cit.*, p. 166.

73) R. Campbell Thompson, *The Assyrian Herbal*, Luzac & Co., London, 1924, p. 252, see also CT XXXVII, Pl. 26 ff., No. 108859.

74) *CAD* Vol. 8 K:493. Cf. also E. Herzfeld, " 'Salt and Weed', Symbols of Destruction," in E. Herzfeld, *The Persian Empire*, ed. G. Walser, Franz Steiner Verlag, Wiesbaden, 1968, p. 112-14.

Salt Extraction

With the exception of the Aiyadin mines in the Wadi Beihan, of uncertain age, and those in Cappadocia and the Pontic region mentioned by classical writers, there is no evidence for full-scale mining of rock salt (*sel gemma*) in the ancient Near East, excluding Egypt, on a scale with that known in European prehistory at sites like Hallstatt and Hallein-Dürrnberg[75]). Not does it seem that sea water was

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75) Just as Cappadocia was known for its salt mines in classical antiquity, so too was it the location of almost all the salt mines worked during the late Ottoman period in territory under Ottoman rule. Relatively speaking, however, salt mining was still very rare at this time in comparison with salt gathering at the numerous salines throughout the Ottoman Near East. Cuinet cites several Ottoman salt mines. These include the salt mines of Kirmizi, located c. 121 kms. southeast of Erzerum, and Saghir-Kaya, c. 46 kms. north of Erzerum, in eastern Turkey (Cuinet, *op. cit.*, Vol. I, p. 153). In the region of Ankara were the mines of Hacibektas, c. 65 kms. southeast of Kirsehir; Sékilo, which was near the banks of the Delice River, c. 50 kms. from Yozgat; and Tepesi-delik, c. 60 kms. north of Hacibektas, *op. cit.*, Vol. I, p. 263-65. In 1889 a large salt source was discovered c. 22 kms. east of Sivas, in east-central Anatolia, *op. cit.*, Vol. I, p. 633. A very important Ottoman mine was located just south of Cankiri, in north-central Anatolia, *op. cit.*, Vol. IV, p. 427-28. The British Foreign Office Handbook *Mesopotamia, op. cit.*, p. 86, notes a source of rock salt south of Kirkuk at Taẓa Khurmali, and similarly both W. Ainsworth, "Notes of an Excursion to Kalah Sherkat and to the Ruins of Al Hadhr," *Journal of the Royal Geographic Society* XI (1841): 19-20, and C. J. Rich, *Narrative of a Residence in Koordistan*...II, refer to rock salt being sold in Mosul which was extracted from deposits of red sandstone west of Al Hadhr by the Bedouin, cited in C. Ritter, *Die Erdkunde*..., Vol. 11, Berlin, 1844, p. 481. We may mention two further examples of the use of rock salt by Bedouin. Doughty, discussing Tayma, wrote of the use of rock salt as follows: "In the grounds below the last cultivated soil, are salt beds, the famous *memlahát Teyma*. Thither resort the poorer Beduins, to dig it freely: and this is much, they say, "sweeter" to their taste than the sea-salt from Wejh. Teyma rock-salt is the daily sauce of the thousand nomad kettles in all these parts of Arabia," *Travels in Arabia Deserta*, Jonathan Cape Ltd., London, 1926, p. 296. Similarly, D. Kirkbride has described the manner in which salt was utilized by the Bedouin near Beidha: "Although no prehistoric trace of this mineral can be established, it seems worthwhile to record that salt is contained in certain strata within the sandstone and especially one mountain in the Wadi Araba. This salt is utilized by the Beduin today. They pound up bits of rock, place the pieces in water, strain it and isolate the salt through evaporation. The resultant product has been used by the writer both at Beidha and in the more remote Wadi Rumm," quoted in "Five Seasons at the Pre-Pottery Neolithic Village of Beidha in Jordan," *Palestine Exploration Quarterly* Jan.-June 1966:53.

evaporated on a large scale for salt (*sel marin*) manufacture, probably because this tends to be relatively inefficient in terms of labor input necessary to achieve the same yield as could be gathered in a much less labor-intensive manner[76]). In many areas of the world an argument against salt winning through induced evaporation of sea water has always been the relative cost of fuel, as indeed this method could consume an enormous amount of firewood[77]). However, in the Near East the climate is such that, whether we are dealing with salt winning at inland salines or by the sea, the boiling of saline solution is never attested since the summer's heat is sufficient to evaportate any and all saline solutions. Thus, in every case discussed by Cuinet where salt was taken from salines or the sea in the late Ottoman period, the work was done in the summer after the salt had crystallized following the natural, solar evaporation of the saline solution.

The fact that several well-known salts used in Mesopotamia were vegetal in nature, if the etymology of certain salt names is considered, prompts two questions. First of all, one must ask *why* salt was extracted in this manner when there were so many readily available sources of salt at salines throughout Western Asia. The answer to this question is not apparent, and if we are to judge by sources such as the Assyrian plant lists, there was a certain amount of salt produced from plants in ancient times alongside other, non-vegetal salts. In this regard it is interesting to note that, at least up until 1967, salt was gathered by four different, yet co-existent methods in the African country Niger at a) places where salines evaporated naturally; b) sites

76) Cuinet notes that on the island of Lesbos, off the west coast of Turkey, sea water was evaporated in salt pans during the late nineteenth century, and some two million kilograms of salt were produced here annually, *op. cit.*, Vol. I, p. 364-65. This quantity was consumed on the island alone, although to a large extent in the manufacture of olive oil and soap. The finest sea salt in late Ottoman times was said to come from salt pans along the Gulf of Izmir in the vicinity of Foça. This same area, exploited by the Genoese during the middle ages, produced no less than 76,200,000 kgs. of salt yearly in the late nineteenth century, *op. cit.*, Vol. III, p. 369. With the exception of these two cases, Cuinet does not mention any sea water evaporation occurring in other parts of the Ottoman empire.

77) Cf. Brown, *op. cit.*, p. 61.

where the boiling of saline solution was done artificially; c) places where salty earth was gathered; and d) sites where salt plant ashes were washed and refined, albeit in different ecological zones, yet nonetheless within a relatively confined area[78]).

Assuming such may have been the case in ancient Mesopotamia, can we identify the plants which may have been used to yield salt? There seems no definitive answer to this last question as of the present time. There are no English or Latin equivalents offered in either of the two main Akkadian dictionaries for the plants associated with the vegetable salts mentioned above[79]). Nor do we find useful insights by looking at the halophytic plants of Iraq. To judge from available works on the economic botany of Iraq, these have utility only as fodder for animals[80]), and thus we must assume that in recent centuries extraction of salt from plants, if in fact it was formerly prac-

78) P. L. Gouletquer, "Niger, country of salt," in de Brisay and Evans, eds., *op. cit.*, p. 47.

79) Nor are they treated in R. Campbell Thompson's *A Dictionary of Assyrian Botany*, British Academy, London, 1949. In *The Assyrian Herbal, op. cit.*, p. 36, Thompson does discuss *Atriples halimus* L., which he equates with Akk. *úmallaḫtu*, calling it a Syrian spinach, as well as two other types of Chenopodiaceae, *Salsola Kali* L. and *Salicornia herbacea* L., both used for making lye soap (= Akk. *úkarni/karnānu* and *úkiltum* according to Thompson). Chenopodiaceae are plants with a high concentration of salt, but there is nothing to suggest that any of these were used in antiquity to produce salt.

80) In *Notes on Plants and Plant Products with their Colloquial Names in ʿIraq*, Bulletin No. 27, Dept. of Agriculture, Baghdad, 1933, Evan Guest discussed a large number of plants which were generally found in saline soils, but which were used only as fodder for animals without any reference to their being exploited for human consumption. Among these may be mentioned *Aeluropus villosus* Trin. and *A. littoralis* Parl., two halophytic grasses found along the edges of salt marshes and in saline areas of fields; *Arthrocnemum sp.*, a bushy shrub which grows in salt marsh areas, and is an important source of fodder for camels; *Salsola Kali* L., a spiny annual herb favored by camels, which grows in saline regions and is known in English as "saltwort"; and *Suoeda vermiculata* Forsk, a perennial herb found in saline areas, grazed by sheep and camel. For references, see Guest, *op. cit.*, p. 3, 10, 87, and 97. For a brief discussion of "Halophytic Vegetation of Lower Iraq," see Guest, "The Vegetation of Iraq and Adjacent Regions," in Guest, Flora..., *op. cit.*, p. 92.

The importance of salt for livestock of any kind is well-known, and hence the value of these halophytic plants in Mesopotamia is considerable. Nenquin notes that horses require 50 grs. of salt daily, while cows need nearly 100 grs. daily, Nenquin, *op. cit.*, p. 140.

ticed in Mesopotamia, gave way to other techniques before botanists had a chance to document the practice[81]).

In view of the salinity of the soil in Mesopotamia, it is interesting to read about a technique which, in certain parts of the world, actually turned what is normally considered an ecological disaster into an exploitable resource[82]).

> Another technique was to collect salt-impregnated sand and wash and boil it, a process which was also conducted historically in North America...This technique was quite laborious, but it was typical of many areas, especially the North Sea coast from Normandy in France to Denmark...It was also practiced in Japan and China during the nineteenth century...It is still a common salt production technique in Niger in the African Sahara. In the latter area, baskets are used to filter out the sand and other impurities from the brackish water... The brackish water is then boiled in pots and molded in palm leaves. The only

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81) What can be said of the techniques of salt production from Halophytic plants? In East Africa during the nineteenth and early twentieth century a common river weed, *Pistia stratiotes* L., was dried and burnt, after which the ashes were placed in perforated bowls and doused with water, and the resulting solution evaporated over an open fire, thus producing salt. Other techniques included using the ashes of salt grasses which had been burnt in pits; collecting the congealed mixture of juices and ashes which result from the burning of certain salt plants; collecting the salt which remained after having dried, ground, and sieved salt grass; beating the leaves of certain plants which collect salt on them; and burning stumps of rotten wood which had been left for a time in a salt swamp, and then dried, the ashes thereafter being used as salt, Nenquin, *op. cit.*, p. 117.

82) Brown, *op. cit.*, p. 64. On the Niger example, see Gouletquer, *op. cit.*, p. 49. The saline soils of southern Iraq are well-known. Guest, following P. Buringh, distinguishes the saline alluvial soils of the terraces from those of the flood plain, the delta plain, the marshes, the estuary, and the eastern plain in his "Soils of Iraq," Guest, *Flora*, *op. cit.*, p. 10-11. In "The Geology of Iraq", W. A. Macfadyen writes, "*Common salt*, sodium chloride, is very soluble in water, and so it is not found as a deposit exposed at the ground surface in Iraq. It occurs, however, in deposits underground, and is a common constituent of waters in many parts of the country. It is often associated with gypsum in the strata, in ground waters, and in inadequately drained soils as a secondary evaporation product, e.g. at Mandali. In quantity it is deleterious to the growth of certain plants. The river water at Mandali contains about 660 parts per million of $CaSO_4$, and 330 of NaCl. Common salt, the chief salt in sea-water, may in some cases indicate a marine origin or connection for recent deposits in which it is found as a saline water. It also forms deposits in and around salt lakes such as the Bahr al Milh and Lake Abu Dibbis, both near Karabala," in Guest, *op. cit.*, p. 7.

evidence of the production process left for the archaeologists to find are heaps of washed earth.

Quite clearly it would be difficult to document the use of many of the techniques of salt production mentioned above without written testimony or ethnographic observation. Moreover, as salt production does not take place within residential settlements, evidence for it must be sought at the source area, and such investigation has not yet been underaken in Mesopotamia.

Judged on a worldwide scale, the utilization of salines for salt production was probably the most important method of salt winning in antiquity. Despite the existence of several impressive salt mining sites on virtually every continent, it was not until after the Industrial Revolution that salt mining outstripped man's heavy reliance on salt water bodies and salines for providing his necessary salt[83]). We have already seen how very important the salines of Mesopotamia were in the late nineteenth century. It seems just as likely that they were equally important in the earlier periods of Mesopotamian history as well. Concrete proof that salines were valued in the ancient Near East comes, however, in a letter from Mursilis II to the king of Ugarit in which he discusses the secession of the vassal kingdom of Siyannu from the latter king's sphere of influence to his own, and takes pains to divide up a saline between the kings of Ugarit and Siyannu[84]).

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83) Brown, *op. cit.*, p. 63.

84) J. Nougayrol, *Le Palais Royal d'Ugarit*, Missions de Ras Shamra tome IX, Paris, 1956, p. 74; texts in question are 17.335, 17.379, 17.381, and 17.235. The word for saline is Akk. *eqil ṭâbti* literally, "field of salt". See also Michael C, Astour, "The Kingdom of Siyannu-Ušnatu," *Ugarit-Forschungen* 11 (1979): 18, where the author suggests that the saline in question is perhaps the same one mentioned in *PRU* IV 125: 12, as the "saline of Atallig." Astour notes that the division of the saline between Siyannu and Ugarit must have been very important, as the saline lay far beyond the shared border between the two kingdoms, and yet Siyannu was given the right of access to it. One should also note the much discussed Ugaritic word *ṣṣ or ṣiṣūma.* This has been variously translated as "salt marsh", as in B. Landsberger, "Jahreszeiten im Sumerisch-Akkadischen," *JNES* 8 (1949): 276, n. 89, and CAD Ṣ, p. 150; "salt mine", in C. H. Gordon, *Ugaritic Textbook*, Vol. 3, Analecta Orientalia 38, Rome, 1965, p. 475; and "saline", J. Nougayrol, "Textes Accadiens et Hourrites des Archives Est, Ouest et Centrale," *Le Palais Royal*

Cuinet constantly remarks, in discussing the many salines of Mesopotamia, that due to the intense summer heat of this region, the salines became completely dried up and it was then simply a matter of gathering the crystallized salt that remained. The profession of "salt gatherer", it is therefore interesting to note, is attested already in the Fara texts of the Early Dynastic period[85]), although the profession is

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d'Ugarit III, Paris, 1955, p. 229, thus equivalent to Akk. *eqil ṭâbti* according to Nougayrol. In light of the entire discussion of the importance of salines which I am presenting here, I would opt for Nougayrol's reading. Further discussions of the term can be found in W. L. Moran, "Ugaritic *ṣiṣūma* and Hebrew *ṣîṣ*," *Biblica* 39 (1958): 69-71; M. Heltzer, "The Word *ṣṣ* in Ugaritic," *Annali* XVIII (1968): 355-361; M. Dahood, "Hebrew-Ugaritic Lexicography VIII," *Biblica* 51 (1970): 401; M. Liverani, "*kbd* nei testi amministrativi ugaritici," *Ugarit-Forschungen* 2 (1970): 93; and more recently by G. Del Olmo Lete, "Notes on Ugaritic Semantics V," *Ugarit-Forschungen* 10 (1978); 42, n. 38. Of particular interest are texts PRU V 96 and 97, which constitute lists of salines (*ṣṣ*) followed by the name of a person and a number, probably either the amount of salt produced there or else the amount payed to the king's stores. Dahood, summarizing Heltzer's discussion, writes, "*ṣṣ* were salt-bearing plots of land that belonged to the king. The king in turn distributed them among royal dependents as holdings, and the latter were obliged to deliver certain amounts of salt to the royal stores," *op. cit.*, p. 401. This system of sub-contracting the work of "harvesting" salt from specific salines to specific persons can be compared with the Ottoman practice of engaging tribes or smaller groups in southern Mesopotamia yearly to gather salt for the imperial storehouses, as we shall see below.

Finally, it is interesting to consider Weidner's comments on the *mē marrūtu* mentioned in l. 25 of the so-called geography of Sargon of Akkad's empire, *AfO* XVI (1952-53): 17. In regard to the line "*adî me-e mar-ru-tu* ^{mat}*E-mut-ba-lum*^{ki}", Weidner writes: "Handelt es sich, was zur Ansetzung von Emutbal gut passen würde, um den Hōr Suwēkije nördlich von Kut al-'Amara, der nach deutschen Generalstabskarte von 1917 'im Frühjahr überschwemmet und im Herbst meist trocken und mit 1-2 Fuss mächtigen Salzkrusten bedeckt' ist?"

85) I would like to thank Aa. Westenholz for bringing this to my attention. The text in question is A. Deimel WF 36 from Fara/Šuruppak, which dates to c. 2550 B.C. It is published in D. O. Edzard, *Sumerische Rechtsurkunden des III. Jahrtausends aus der Zeit vor der III. Dynastie von Ur*, Bayr. Ak. d. Wiss., Phil.-Hist. Kl. Abh., N. F. Heft 67, Munich, 1968. Here a man named Ekur-pa^{2}e, described as a salt gatherer, is witness to the sale of a field. In RTC Nr. 12, a woman salt gatherer named Atu is witness to the giving of a gift. See D. O. Edzard, "Zwei altsumerische Schenkungsurkunden," in *Festgabe für Dr. Walter Will, Ehrensenator der Universität München*, Carl Heymanns Verlag, 1967, p. 65. The Sumerian for "salt gatherer", as translated by Edzard, is simply mun-ur$_4$, or salt + "to gather", and Edzard notes that he was led to this translation by observing nomads in Iraq gathering salt. Cf. also lú-mun in the Old Babylonian Lu-series, *MSL* XII: 167, 307.

not elucidated in any further detail. In this regard it may be interesting to note the conditions prevailing during the late Ottoman period as regards salt gathering labor.

As already stated, all salt sources in the Ottoman Empire were the property of the state. The Public Debt Administration acquired that salt by contracting with groups of peasants and nomads who lived in the environs of a particular saline to gather the salt during the summer. In some cases an entire tribe was hired to perform this task, such as the el-Hazi tribe which gathered salt at the Drehem saline[86]). None of these contractors, however, were full-time, professional salt gatherers.

The most vexing problem which faced the officers of the public Debt Administration was the clandestine extraction of salt by nomad groups, and the sale of that salt to sedentary villagers at a price below that which the state was charging. We read on several occasions of attacks by Ottoman forces on Arab tribes engaged in the illegal trafficing of salt, and of armed guards patrolling the salines[87]). Indeed, the flow of contraband salt from the Bevara saline into the *mutessarifat* of Zor (capital: Deir-ez Zor) was so great at one time that it constituted the entire supply of salt used by the local population, completely eclipsing the once famous salines of Tadmor/Palmyra[88]).

Furthermore, there is no question that the sale or exchange of salt for commodities such as butter, grain, and cloth represented a significant addition to the economic base of the Arab tribes engaged in this activity. It was, in effect, a "cash crop" which has not been treated in recent discussions of multiple resource exploitation among pastoral groups in the Near East[89]) today, nor has it appeared in any study of

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86) Cuinet, *op. cit.*, Vol. III, p. 31.

87) *Ibid.*, *op. cit.*, Vol. II, p. 140.

88) *Ibid.*, *op. cit.*, Vol. II, p. 285.

89) E.g. P. C. Salzman, "Movement and Resource Extraction Among Pastoral Nomads: The Case of the Shah Nawazi Baluch," *Anthropological Quarterly* 44 (1971): 185-97, and "Multi-Resource Nomadism in Iranian Baluchistan," in W. G. Irons and N. Dyson-Hudson, eds., *Perspectives on Nomadism*, E. J. Brill, Leiden, 1972, p. 60-68. In general, the focus in studies of pastoralists in the Near East is normally on

points of contact between nomadic and sedentary populations in antiquity[90]).

The relative paucity of references to salt acquisition in Sumerian and Akkadian economic texts prompts me to suggest that a certain, not insignificant amount of salt was, at times, supplied to the sedentary population of ancient Mesopotamia by nomads who appropriated it for themselves. This is not to suggest that such activity was illegal, for there is no indication in any ancient sources, with the exception of the Roman regulations relating to the salt monopoly and Palmyra[91]), that conditions such as those described for the late Ottoman period prevailed in remote antiquity. However, from the reigns of Ishbi-Erra and Shu-ilishu (First Dynasty of Isin) in the early years of the second millennium B.C. we do have certain indications that Amorites may have been employed by the state, much as the later Ottomans contracted with villagers and tribes, to gather salt. The evidence, which is admittedly circumstantial, comes from Isin, where some forty-three texts record the disbursement of leather containers and bags to Amorites[92]). G. Buccellati, in his study of the

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the exchange of surplus pastoral products for commodities available in settled communities. Note, also, that in Dillemann's study of Northern Mesopotamia, published in 1962, the author states that the salines south of the Jebel Sinjar, for example, were only being used by nomads in the winter, when they would come to graze their animals. By this time, the nomads were probably buying salt in towns and had given up gathering it for themselves. As late as the end of World War I, however, salt gathering was still practiced in Mesopotamia. Thus, the British Foreign Office Handbook *Mesopotamia, op. cit.*, p. 86, says, "The inhabitants of the country districts are allowed to collect what salt they need for their own use, but the supply of salt for the town markets is in the hands of the Public Debt Administration." Thus, we can assume that sometime between 1920, when that was published, and the time during which Dillemann composed his study, the practice was given up.

90) E.g. Victor Harold Matthews, *Pastoral Nomadism in the Mari Kingdom (ca. 1830-1760 B.C.)*, ASOR Dissertation Series No. 3, 1978. The exchange of salt for the products of the sedentary population by nomads is not mentioned under Matthews' discussion of "Economic Contacts Between Nomad and Sedentary," *op. cit.*, p. 92-103.

91) See "The duties regulations of Palmyra, of the springs and of the salt monopoly..." in F. Heichelheim, "Roman Syria," in T. Frank, ed., *An Economic Survey of Ancient Rome*, Vol. VI, Johns Hopkins Univ. Press, Baltimore, p. 252.

92) The texts published by V. E. Crawford in *Sumerian Economic Texts from the*

Amorites during the Ur III period, has written that "the use to which the products (i.e. those given to the Amorites) were put is not problematic but obvious"[93]). I would question this assessment; the rationale behind the disbursement of leather bags and containers is not so very obvious unless you know what went in them, and Buccellati does not offer his readers a single clue.

Here Cuinet's discussion of salt in the late Ottoman period is again of value. Although he tends to simply say where salt was gathered, and in what quantities, without describing the containers used for salt, he does mention, in discussing the salines of the *vilayet* of Basra, that the inhabitants of Kuwait and the tribes of the desert supplied themselves at the salines west of Kuwait city because the price of two large bags, presumably a camel load, of approximately 300 kgs. of salt, cost only 3 *piastres*, or about 69 *centimes*[94]). This is also interesting

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First Dynasty of Isin, Babylonian Inscriptions in the Collection of James B. Nies, Vol. IX, Yale Univ. Press, New Haven, are BIN IX 39, 217, 224, 225, 226, 227, 240, 269, 271, 276, 280, 282, 283, 286, 288, 289, 292, 293, 301, 314, 316, 317, 324, 325, 326, 363, 388, 390, 392, 395, 400, 405, 406, 407, 408, 409, 410, 411, 414, 416, 419, 423, and 425. On the difference between a bag and a container, Crawford writes, "Behind the translation "bag" the chief terms are ^{kuš}A.EDIN.LAL. ^{kuš}dùg-gan, and ^{dug}šagan. Behind "container" the principal words are *na-aḫ-ba-tum* and pisan. The only purpose in distinguishing between "bag" and "container" is to help show that the original language has different terms to apply to objects made to contain various types of materials. "Bags" and "containers" are made of leather unless otherwise specified," Crawford, *op. cit.*, p. 41. Aa. Westenholz has kindly pointed out to me, however, that the first term mentioned by Crawford—^{kuš}A.EDIN.LAL—is a water bag given to travellers, while the third term—^{dug}šagan = Akk. *šappatu*—is a pot or bowl with a flat bottom according to the *Akkadisches Handwörterbuch*, whereas Crawford, in his unpublished Ph.D. dissertation *Terminology of the Leather Industry in Late Sumerian Times*, Yale Univ., New Haven, 1948, p. 51, contends that, while normally considered a ceramic vessel, it was more often a leather container in the early Isin texts.

93) G. Buccellati, *The Amorites of the Ur III Period*, Ricerche I, Istituto Orientale di Napoli, Naples, 1966, p. 309.

94) Cuinet, *op. cit.*, Vol. III, p. 228. One might also refer here to the study entitled "Money and Merchants in Ur III," *Hebrew Union College Annual* XXX (1959): 118, by J. B. Curtis and W. W. Hallo, which gives prices of 13.58, 15, 18, and 22.09 grains of silver per pound of salt during the reigns of Amar-Sin and Šu-Sin. For more on this point, see the forthcoming *Ledgers and Prices: Ur III Silver Balanced Accounts*, Yale Near Eastern Researches 8, by D. N. Snell. Compare, however, the maximum price for salt given in the Laws of Eshnunna, 2 kur salt for

in that Cuinet frequently writes that salt was gathered and then heaped up in a great pile, after which it was sold. It may be that under such circumstances the individual buyers came with their own leather sacks and filled them on the spot, as we know occurred at the saline of Drehem which had no *ambar*, or depot, whereas in other situations the salt was transported by the contracted gatherers to Public Debt Administration warehouses, and there sold to the public. In such cases the salt was probably transported to the warehouse in leather bags, and another historical example, this time from Aden, attests to the use of leather (goatskin) bags for transporting salt from the Aiyadin mines to town in camel caravans. R. LeB. Bowen gives a detailed account of caravan procedures associated with this trade, noting that salt-filled goatskins varied in weight between 150-200 lbs. A camel load consisted of two skins, and in Aden the official weight of a "bag" of salt was put at 224 lbs., which Bowen suggests may derive from the approximate capacity of one skin, for tax purposes[95]).

It is thus possible that the Amorites at Isin were, in some cases, being supplied with leather bags and containers by the state either because they were contracted to gather salt themselves, or because they were being sent to fetch it from other, unnamed salt gatherers. It should also be noted that in Tablet XI of the lexical series HAR-ra = *ḫubullu* we find Sumerian kuš.dùg.gan.mun = Akkadian *tuk-kan ṭa-ab-ti*, i.e. a leather bag for salt, in a list of types of leather bags[96]). The absence of this particular designation in the Isin texts can

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1 shekel of silver, §1: A i 14. See A. Goetze, The Laws of Eshnunna, *Annual of the American Schools of Oriental Research* XXXI (1951-1952), New Haven, p. 24. Neither R. Yaron, in his 1969 discussion of these laws, nor E. Szlechter in his 1954 treatment, comment on the high price of salt given here. See Yaron, *The Laws of Eshnunna*, Magnes Press, Jerusalem, 1969, p. 147, and E. Szlechter, *Les Lois d'Ešnunna*, Publications de l'Institut de Droit Roman de l'Université de Paris XII, Paris, 1954, p. 65.

95) Bowen, *op. cit.*, p. 35-36.

96) *MSL* VII: 149, see also A. Salonen, *Die Hausgeräte der alten Mesopotamier*, Teil I, Sarja-Ser. B. Nide-Tom. 139, Helsinki, 1965, p. 194, where the author translates the phrase in question as "Tasche für Salz." Levey, *op. cit.*, p. 339, suggests that salt was kept in a bag while a person was travelling.

perhaps be explained by the fact that these were brief notes, and the information relating to the intended purpose of the goods being given out could be considered superfluous for their purposes. As a final note to this matter, it might be asked whether the *ṭâbti Amurri*, or Amorite salt, mentioned in the *Maqlû* series is salt which was gathered by or sold by Amorites?

Augets in Mesopotamia?

We may now turn to another problem of salt storage and transport, and take up the question of non-leather containers used in ancient Mesopotamia to hold salt. The *Akkadisches Handwörterbuch* translates Akk. *tangallû* as "ein Salzgefäss", and this is a word which occurs in several Neo-Babylonian texts from Uruk, including two "lists of temple utensils"[97]). In certain cases, the *tangallû* might be made of silver or gold. A seventh century B.C. Neo-Assyrian marriage conveyance from Nimrud includes two wooden bowls for salt (2 GIŠ *pu-ru-si-a-te ša* MUN$^{?!}$) in the dowry of Subetu[98]).

It seems most likely that these vessels were household objects used as salt containers in the home, whereas the leather sacks discussed above were used for the transport of large quantities of salt from salines to villages and towns. We should, however, also consider another container for transporting salt. In many parts of the world salt was packed in *augets*, or salt molds, of clay or reeds for transportation, after which the salt was sold as "salt cakes". At this point, it was up to the consumer to grind up the cake of salt for daily use, store-bought granular salt being a relatively recent invention. In Akkadian, therefore, we have the word *kirbanu*, meaning a lump, as of salt, stone, metal, slag, etc., and LAG MUN which denotes a lump of salt[99]).

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97) *AHw* Lieferung 14 (1977): 1319. R. P. Dougherty, *Records from Erech, Time of Nabonidus (555-538 B.C.)*, YOS 6, New Haven, 1920, texts 189:15 and 192:14.

98) J. N. Postgate, *Fifty Neo-Assyrian Legal Documents*, Aris & Phillips Ltd., Warminster, 1976, p. 104; the text in question is ND 2307 = IM 63414, line 39.

99) *CAD* Vol. 8 K:403.

Bricks of salt were common in Egypt, and we find them mentioned also in UET III 1021, and in Pliny's *Natural History*[100]). It is also interesting to remember a point made by Cuinet concerning the saline of Semava near modern Samawa. Here, he records, the Arabs cut 50 cm.^{2} "bricks" of salt, to which they applied the colloquial Arabic term *tabouk*, right out of the dried up surface of the saline[101]). It is possible that salt which reached town in the form of a brick might be sold either intact—hence the Ur records of a brick of salt—or broken up into smaller quantities—for which the term *kirbânu* may have been used. Whether the salt was in a lump, a cake, or a brick, it had to be ground up for use, and we find two texts from Ur which mention a "pestle for salt"[102]).

The question must also be asked, was salt ever packed in *augets* in ancient Mesopotamia? It would seem almost self-evident that for gathering and transporting large quantities of salt a leather bag is eminently suitable. Nevertheless, it is a fact that in many areas of the world where salt is extracted from salines, small ceramic vessels are used to hold the salt. These vessels seem useful especially where the climate is not so arid that evaporation takes place naturally, and evaporation of the saline solution is induced through boiling. Under such conditions the crystallized salt is normally scooped up when still damp and rammed into an *auget* for transportation. To insure that all

100) R. J. Forbes, "Common Salt," *op. cit.*, p. 174, gives the following dimensions for two bricks of Egyptian salt from c. 1500 B.C.: 20 × 11 × 5 cm. and 19 × 9 × 4 cm. See also A. Lucas and J. R. Harris, *Ancient Egyptian Materials and Industries*, Edward Arnold Ltd., London, 1962, p. 268-69. Note UET III 1021 where sig_4mun, "brick of salt", is mentioned in a list of food surplus from the year Šulgi 40. These and other bricks of salt have also recently been discussed by H. Limet in "Les Schémas du Commerce Néo-Sumérien," *Iraq* 39 (1977): 54, and note 17. Prof. Hallo kindly has pointed out to me the presence of sig_4-mun = *libitti ṭâbti* in Ḫḫ XXIV, 1. 285, *MSL* XI:86. For salt bricks from Cappadocia, see Pliny's *Nat. Hist.* XXXI, xli, 84. It is also interesting to note that in recent, pre-modern times, "on the East coast of Ethiopia near the Red Sea, naturally evaporated salt was dug out by nomads and cut into standard sized blocks. This was used as a form of currency before the introduction of the Maria Theresa dollar," De Brisay and Evans, *op. cit.*, p. 51.

101) Cuinet, *op. cit.*, Vol. III, p. 34.

102) Legrain, *op. cit.*, UET III 739, 752.

moisture will be dispersed, *augets* are often made of a porous ceramic material. Because of the large quantities of salt gathered this way in historically documented cases, *augets* have often been mass-produced in a cheap material, such as clay. Perhaps because of the action of scooping up the salt and ramming it into a container, a tall, conical shape, one which is narrow enough to fit easily into the hand, has often been preferred by salt gatherers all over the world[103]).

German archaeologists working in the area of Halle, E. Germany, have established a typology of *augets* which runs from the Early Bronze Age, c. 1800 B.C., through the Iron Age. Of particular interest are the types in use during the Bronze Age. Here we find that a goblet with "thick walls" was the earliest type of *auget*, succeeded by "narrow chalices with thin walls". D. Kleinmann suggests that this shape was easy for the salt packers to handle. These vessels, she writes,[104]),

> took less space around the hearth. (i.e. where the saline solution was boiled-DP) The thin clay walls were not too heavy when left on the cakes to protect them during transport and were easily removed later.

In Japan, chalices and goblets were used as *augets* in the Jomon Period (pre-400 B.C.) and in the Early Iron Age, or Yayoi Period, from c. 200 B.C. to 300 A.D.[105]).

During the Middle Neolithic era in Poland, vessels called "conical cups" by Polish archaeologists were used as salt molds by the Lengyel Culture (c. 3900-2300 B.C.), while in the Lusatian culture in Poland, which spanned the Bronze and Early Iron Ages (c. 1400-500 B.C.), we find the use of tumblers which are typologically similar to the solid-footed goblets of Mesopotamia[106]). In Fig. 1 the *augets* of

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103) Cf. Brown, *op. cit.*, p. 74-75, and Nenquin, *op. cit.*, p. 121.

104) D. Kleinmann, "The Salt Springs of the Saale Valley," in De Brisay and Evans, eds., *op. cit.*, p. 45.

105) Y. Kondo, "The Salt Industry in Ancient Japan," in De Brisay and Evans, eds., *op. cit.*, p. 64-65.

106) A. Jodlowski, "Salt Production in Poland in Pre-historic Times," in De Brisay and Evans, eds., *op. cit.*, p. 85. According to Jodlowski, the "conical cups" of the Lengyel culture, of which only the bases were illustrated, have a higher

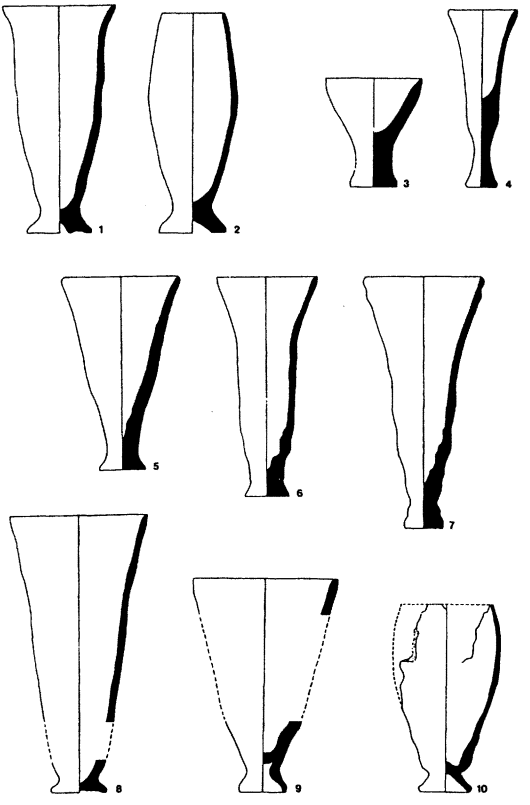

Fig. 1 - *Augets* from Poland, Germany, and Japan, and solid-footed goblets from Mesopotamia.

No.	*Ht.*	*Base Dia.*	*Rim Dia.*	*Provenience*
1	17.6	5.2	9.0	Poland, after Jodlowski, p. 85
2	17.0	5.4	4.9	Poland, after Jodlowski, p. 85
3	8.5	3.6	7.6	Germany, after Kleinmann, p. 46
4	13.8	2.3	5.4	Germany, after Kleinmann, p. 46
5	15.0	3.6	9.0	Mesopotamia, after Delougaz, Pl. 148
6	17.0	3.5	8.0	Mesopotamia, after Delougaz, Pl. 148
7	19.6	3.0	9.2	Mesopotamia, after Delougaz, Pl. 148
8	21.5	4.3	10.8	Japan, after Kondo, p. 65
9	16.6	3.6	11.4	Japan, after Kondo, p. 65
10	14.6	3.9	7.4	Japan, after Kondo, p. 65

All examples illustrated are the same as those discussed in the text. The measurements are given in centimeters.

Poland, Germany, and Japan are juxtaposed against three solid-footed goblets from the Diyala region of Mesopotamia. The question which must now be asked is, did the solid-footed goblets of early third millennium date from Mesopotamia function as early salt molds?

The solid-footed goblet has been called the hall-mark of the Early Dynastic I period[107]). H. J. Nissen has included it in his series of three mass-produced types of common pottery in use from the Late Uruk through the second Early Dynastic period at Warka, where hundreds of examples were found during his own excavations in K/L XII[108]). They are joined in this series by the bevel-rim bowl and the conical cup. While indeed this is a common ceramic type in Mesopotamia, we might mention several of the most impressive discoveries of solid-footed goblets in excavated contexts.

During the fifth season of excavations in the Diyala in 1934-35, the remains of c. 660 solid-footed goblets were found in the "sacristy" (Room D 17:26) of the Third Archaic Shrine of the Abu Temple at

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sodium chloride content than other types of pottery. He writes, "At Barycz their content of NaCl was 1.25% while that of other vessels of daily use was only 0.55% and of undisturbed soil 0.02%". In the tumblers of the Lusatian Culture, analyses showed only slightly higher than normal concentrations of sodium compounds. "The Tumblers from Biskupice contained 0.90% Na_2O, and a fragment of a daily use vessel from the same settlement 0.70% Na_2O. In Kraków-Kurdwanów daily use pottery had 0.45% Na_2o, but tumblers had 0.48, 0.50 and 0.60%," Jodlowski, *op. cit.*, p. 85-86. The methods of analysis used here are not specified.

107) D. Hansen, "Relative Chronology of Mesopotamia. Part II," in R. W. Ehrich, ed., *Chronologies in Old World Archaeology*, Univ. of Chicago Press, Chicago, 1965, p. 209.

108) H. J. Nissen in R.McC. Adams and Nissen, *The Uruk Countryside*, Univ. of Chicago Press, Chicago, 1972, p. 97-103, and "Grabung in den Quadraten K/L XII," *Baghdader Mitteilungen* 5 (1970): 139-42. Cf. however P. R. S. Moorey, *Kish Excavations 1923-1933*, Clarendon Press, Oxford, 1978, p. 100-101, who writes, "Solid-footed goblets were in use at Ur before it became customary to build in plano-convex brick. Solid-footed goblets, together with incised and reserved slip wares, occur down to level G, where they were with distinctive Jamdat Nasr fabrics. In level G, to which it is virtually confined, the solid-footed goblet was common. In pit Z, to the south-east of F, the level which Woolley designated SIS 8 was distinguished by this vessel, which was rare above and below this stratum. At Nippur, though these vessels were still found in level IX, they were most common in X (98). At Uruk the same type of vessel appeared with protoliterate pottery (99)."

Tell Asmar (Fig. 2)[109]). At Khafajah "great quantities" of solid-footed goblets were recovered during the excavation of Sin Temple IV and, according to H. Frankfort, "it seems as if they were deliberately smashed and thrown together after the completion of a ceremony"[110]). Approximately twenty-seven solid-footed goblets were also found in eight graves associated with private houses 9, 10, and 11 at Khafajah[111]).

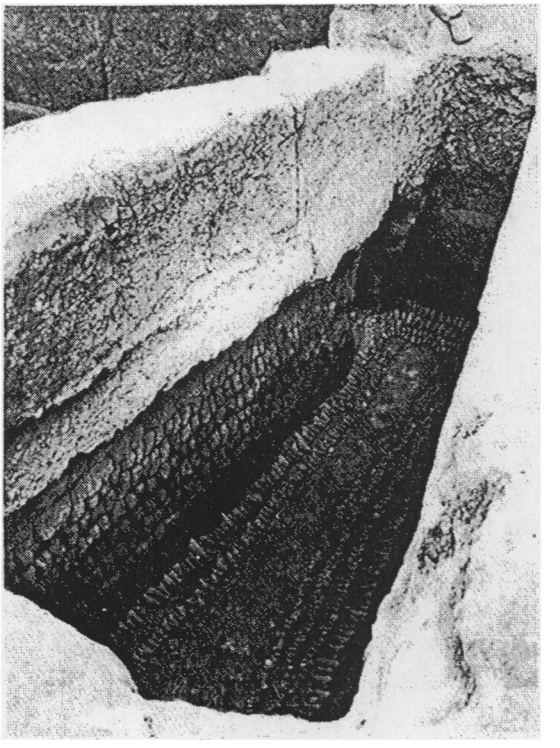

Fig. 2 – View of the solid-footed goblets found in the Third Archaic Shrine of the Abu Temple at Tell Asmar.

109) H. Frankfort, *Progress of the Work of the Oriental Institute in Iraq, 1934/35: Fifth Preliminary Report on the Iraq Expedition*, OIC 20, Chicago, 1936, p. 7 and Fig. 5-6.

110) *Idem.*

111) See P. Delougaz, H. D. Hill, and S. Lloyd, *Private Houses and Graves in the Diyala Region*, OIP LXXXVIII, Univ. of Chicago Press, Chicago, 1967, p. 70 ff. Solid-footed goblets were found as follows: 1 in Grave 33, House 11; 10 in Grave 51, House 11; 5 in Grave 56, House 10; 5 in Grave 57, House 10; 1 in Grave 62,

Solid-footed goblets were also recovered in large numbers at Kish, and, as Langdon and Watelin write, "these occurred in compact masses and are confined to a layer one metre thick immediately above the water table"[112]). Their occurrence at Ur was so great that, in his preliminary report on the eighth season of excavations, Woolley tentatively named a sub-period of his sequence "the period with the tall clay-footed goblet"[113]). He reported finding hundreds of fragments of these vessels in a fairly restricted stratum between 10.80 and 9.70 m.a.s.l.[114]). More recently they have been found in great quantities in apparently domestic quarters on the West Mound at Abu Salabikh[115]).

In light of the wide variety of uses which salt enjoyed in ancient Mesopotamia, it is to be expected that any salt *augets* should show a wide distribution within different functional areas of an archaeological site. To judge from the excavations mentioned above, solid-footed goblets have been found in large numbers in both domestic and religious contexts, as well as within burials. Considering the large amounts of salt which came into the temple and were consumed in any number of ways—in ritual meals prepared for the gods, in incantations, spells, and offerings of various kinds—it is to be expected that in temple contexts we might find some evidence of *augets*, if indeed such vessels were used in ancient Mesopotamia at all. Assuming for a moment that the solid-footed goblet was an *auget*, it is tempting to see in the so-called "sacristy" of Archaic Shrine III at Tell Asmar, where fragments of 660 solid-footed goblets were discovered, a forerunner of the "lishkat-melach", or salt chamber,

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House 10; 1 in Grave 65, House 10; 2 in Grave 60, House 10; 2 (?) in Grave 72, House 9.

112) S. Langdon and C. Watelin, *Excavations at Kish* IV, Paris, 1934, where they were known as Type Aa, quoted in Moorey, *op. cit.*, p. 102.

113) C. L. Woolley, "Excavations at Ur, 1929-30," *Antiquaries Journal* X (1930): 339.

114) Woolley, *op. cit.*, p. 331.

115) J. N. Postgate, "Excavations at Abu Salabikh, 1978-79," *Iraq* 42 (1980): 102-03.

which was an important part of the Jewish temple in Biblical days[116]). Indeed, the quantities of salt used by the temple could sometimes reach staggering proportions.

For in addition to the steady supply of salt coming into the temple for cultic purposes, we also know that large shipments might be required for disbursement as rations. In a soon to be published edition of Akkadian texts relating to the reconstruction of the É-kur in Nippur under Naram-Sin and Sharkalisharri, we find several texts which deal with salt[117]). Hundreds of highly skilled artisans were employed in this massive project, including 86 goldsmiths, 10 sculptors, 77 cabinet makers, and an uncertain number of metalsmiths, just to name a few of those mentioned in the ration lists. Records of rations given to the skilled and unskilled workmen involved in the project include allotments of barley, dried fish, and salt. While certain workmen were given 4.21 liters of dried fish, and .421 liters of salt as well, others were given twice that amount. We read in one text (CBS 4693) that the *sanga* of the temple is overdue in the delivery of no less than 865.6 liters of salt. Depending on whether it was distributed in small or large rations (i.e. .421 liters per person, or .842 liters per person), this amount of salt could have provided anywhere from c.

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116) M. R. Bloch, *op. cit.*, p. 280, and note 73, citing Flavius Josephus, *Jüdische Altertümer*, 2 Vols., Verlag Benjamin Harz, Berlin-Wien, 1923, p. 645 and 724. I have not been able to check this reference. Note also that in their final report on the Abu Temple, P. Delougaz and S. Lloyd expressed the opinion that the solid-footed goblets in Archaic Shrine III were used as drinking vessels, and had been deliberately broken after a ceremony. See P. Delougaz and S. Lloyd, *Pre-Sargonid Temples in the Diyala Region*, OIP LVIII, Univ. of Chicago Press, Chicago, 1942, p. 166. It should be pointed out, however, that in cultures where *augets* are used as salt molds, the standard procedure for removing the salt in order to grind it and use it is not to dig it out of the mold, but rather to break the mold to remove the salt, see Nenquin, *op cit.*, p. 86, cf. Brown, *op. cit.*, p. 74. Thus, the solid-footed goblets at Tell Asmar could just as easily have been destroyed in removing salt from them as smashed after a drunken ceremony.

117) These are in the University Museum, and are going to be published by A. Westenholz, Univ. of Copenhagen. I would like to thank Prof. Westenholz for allowing me to cite his as yet unpublished manuscript. Cf. also, D. J. Wiseman, "Ration Lists from Alalakh VII," *JCS* 13 (1959): 19-33, and A. Goetze, "Remarks on the Ration Lists from Alalakh VII," *JCS* 13 (1959): 34-38.

1028 to 2056 workmen with their monthly salt ration, assuming it was all intended to be used for this purpose. This is over a metric ton of salt[118]), and obviously would presuppose the existence of a proper storage facility in the temple complex, again supportive of the conjecture that a "Salzkammer" may well have existed in the early temples of Mesopotamia, regardless of whether or not the salt came in leather bags or in *augets*.

We may recall for a moment that the estimate given above on p. 229 for the minimum daily salt intake requirement of an adult eating a mixed diet was 12-15 gr. If we take the small ration of .421 liters of salt given to certain workmen in the É-kur reconstruction project, we find that this represents an average of 10.4 gr. of salt per person per

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118) While it is impossible to know exactly how much a liter of Mesopotamian salt weighed, a rough appraisal may be gained by looking at modern, granular salt. The volume of a 1000 gr. bag of salt is .8 liters, thus 800 liters of salt would equal one ton, or 865.6 liters of salt, the sum in question, would equal 1.082 tons.

Another factor we might consider briefly is transport. We have already mentioned Bowen's description of camel loads of salt in the Wadi Beihan (p. 00). According to his estimates, one camel load was between 300-400 lbs., or roughly 130-180 kgs. Thus, at this rate, 6-9 camels would be necessary to carry 1.082 tons (865.6 liters) of salt. Since it is more likely that donkeys would have been used as pack animals in the third millennium, let us consider the following information. In discussing the transport of tin and textiles by donkey from Assur to Kanesh (Kültepe) in the Old Assyrian period, Veenhof notes that these commodities were sent in two half-packs and a top-pack on the donkey's back. A donkey carrying tin normally took 130 minas, or about 65 kgs., plus about 10 minas of tin to cover expenses during the journey, and a few textiles, totalling in all approximately 90 kgs. An animal carrying textiles alone normally took about 30 pieces, weighing c. 75-80 kgs. See K. R. Veenhof, *Aspects of Old Assyrian Trade and its Terminology*, Leiden, 1972, Part One, "The Donkeys and their Loads." Thus, a delivery of 1082 kgs (= 1.082 tons) of salt, if we calculate on the basis of the figures cited above, would require at least 10-12 pack animals. It could well require more if the salt were packed in clay molds, which would add on extra weight, rather than leather bags.

On the other hand, travel by boat down the rivers and canals would have been another possibility in certain cases, at least for part of the journey from saline to town. Salonen has calculated the cargo capacity of some of the most common boat types used in ancient Mesopotamia, see A. Salonen, *Die Wasserfahrzeuge in Babylonien*, Helsinki, 1939, p. 155, 159. A small boat, no more than 6 m. in length, could have transported 2,526 liters, or 2.526 cubic meters of goods. Thus, the quantity of salt which was overdue at Nippur—865.6 liters—would have taken up slightly more than one-third of the cargo space in a boat of this size.

day in a 30 day month. Thus, this is slightly below the recommended dosage cited above, while the higher ration would have been well above that figure. It is, however, much higher than some of the other suggested salt intake figures, but as we do not have records for a full year, we do not know whether this was a fixed ration. We do know, however, that the ration texts in question are dated "Month of Early Hot Season," and this may have had an effect on the amount of salt given to the workforce at Nippur.

Perhaps one obvious consideration in examining the relative utility of salt transport in *augets* vs. bags would be the ultimate purpose for which the salt was destined. As we know of certain cases, like that just discussed, where salt was given out in fixed amounts as a ration payment, the rough standardization of an *auget*, like the solid-footed goblet, could have been a convenience for approximating, in a cheap ceramic vessel, the intended ration amount. Without a large sample of solid-footed goblets at hand, it is impossible to verify or disprove any suggestion that these vessels represent a standard sized *auget*, though it is perhaps a possibility to be considered. The typological similarity of the solid-footed goblet and *augets* from other parts of the world is, at any rate, suggestive and worthy of further investigation.

Conclusions

These observations on the social, spiritual, economic, and physiological importance of salt in ancient Mesopotamia, when combined with figures showing the actual quantities of salt consumed in the region under circumstances where we have written records, point to the obvious conclusion that salt was ever present in the lives of the ancients, even if it has hardly ever been detected by archaeologists. Hardly a luxury in the sense of a scarce commodity which existed in very restricted quantities, salt was a commodity whose consumption in southern Mesopotamia alone must have run into many, many tons each year, if the records of one temple at one moment in time are any indication of the quantities involved, and the later Ottoman records

are at all analogous to the ancient situation. Certainly, if one were to extrapolate from the estimated daily requirement of 12-15 gr. per person per day and calculate, on the basis of the population estimated to have lived in Mesopotamia (however crude that estimation might be), how much salt was being consumed in a year, this observation would only be further confirmed. To simplify the calculation, let us say that 10 grs. per day is consumed daily per person in a hypothetical Sumerian village. This equals therefore 300 gr. per month, or 3600 gr. (3.6 kg.) per person per year. In a village of 100 people, that represents 360 kgs. per year, over a third of a metric ton. If we think for a moment how many tons this represents for the entirety of the southern alluvium, assuming a population of many thousands if not hundreds of thousands during the third millennium, then we are talking about truly massive salt consumption, and accordingly we must reckon with large scale salt gathering, a system of transport and disbursement, and an as yet unrecognized complement of material equipment to go along with it.

The sheer volume of salt which must have moved from source area to consumer suggests that there might be, in the archaeological record, some indication of how this ubiquitous commodity travelled. Formal, typological comparison with salt molds from sites in Europe and Asia prompted the initial consideration of the common solid-footed goblet as a likely candidate for a class of comparable containers which might have existed in Mesopotamia during the early third millennium. The fact that this was a mass-produced, cheaply made container accords well with what is known of *augets* in other parts of the world, and the recovery of hundreds of these vessels from the Archaic Shrine III in the Abu Temple at Tell Asmar poses a riddle which must be answered.

In view of the fact that the solid-footed goblet is but one of a series of mass-produced types which, along with the conical cup and bevel-rim bowl, stand in relation to each other according to H. J. Nissen, and in view of recent debates concerning the function of the bevel-rim

bowl[119]), the question may naturally arise whether all three of these vessel types served the same function. I am not prepared to suggest, at this point, that the bevel-rim bowl served as an *auget*, but I would point out that the porosity of this vessel type would have been ideal for the purpose of serving as a salt mold. In many cases where *augets* have been positively identified archaeologically, and in certain ethnographic situations today where salt is processed in a traditional manner, *augets* are often porous in order to allow the remaining dampness to evaporate from the salt after it has been put in the mold. Certainly a whole host of common, small pottery vessels could have been used as *augets* in antiquity, but the fact that salt gathering ran to many tons, and had to be sustained in order to satisfy a large clientele, makes it plausible that, as in other regions of the world, the manufacture of salt molds may well have been "industrialized" so that great quantities of cheap salt containers could be mass-produced on a scale commensurate with the needs of salt winning as it must have been practiced in the third millennium. In this case, the state or large temple households may have furnished these more or less standardized containers to people employed to gather salt seasonally during the early third millennium, as a means of acquiring the salt needed as ration payments and also for internal, cultic purposes. If such were the case, that could account for the distribution of solid-footed goblets in both religious and domestic contexts on archaeological sites in Mesopotamia.

119) See, especially, G. A. Johnson, *Local Exchange and Early State Development in Southwestern Iran*, Anthropological Paper No. 51, Univ. of Michigan, Ann Arbor, 1973, and T. W. Beale, "Bevelled Rim Bowls and Their Implications for Change and Economic Organization in the Later Fourth Millennium B.C.", *JNES* 37 (1978): 289-313. It is probably correct to say that, although pottery may be the most common artifact on Bronze Age sites in the Near East, archaeologists are rarely able to specify the function of a ceramic type or particular vessel in antiquity. General attributions such as "cooking pot" or "storage jar" may sometimes be offered, but would the precise function of four ceramic vessels of Neo-Babylonian date in the British Museum as containers for "incense of the he-goat", "incense for epilepsy", "incense for heart-break", and "incense for fever", ever have been deduced if it were not for the fact that these "labels" had been inscribed on the vessels? See C. B. F. Walker, "Some Mesopotamian Inscribed Vessels," *Iraq* 42 (1980): 84-86.

But this system of salt gathering for certain official institutions, whether governmental or religious, would probably have existed alongside two other systems of salt procurement. Undoubtedly there took place private gathering of salt among pastoralists and village peasants to supply their own needs. In addition, however, it could well be that the needs of the urban population were in part satisfied through a system which existed outside of that one connected with the large temple and palace institutions. On analogy with the late Ottoman era, we can postulate the existence of a system of salt procurement which was in the hands of pastoralists who "harvested" salt annually to use as a currency or barter good in order to obtain commodities from the settled communities which they did not produce for themselves. In this way, much of the salt consumed in ancient Mesopotamia by the settled population could have entered into circulation without ever being recorded in economic texts, since it went directly from the producer, in this case the tribes, to the consumer, settled towns-people, without passing through the hands of a middleman—such as a palace or temple—where its arrival and departure could be recorded.

The pattern of a central government extending contracts for the "harvesting" of salt, so common in the late nineteenth century, may be reflected in the Isin texts discussed earlier which record the disbursement of leather bags and containers to people, many of whom had Amorite names. Such salt was, presumably, gathered for the use of the state, although it could have reached the domestic sphere as well if used for rations to state employees. Still, part of the domestic supply of salt, when not dependent on such state offices, could have come from a mobile pastoral population that sold salt from town to town to the local inhabitants.

The importance of salt in the Roman Near East[120]), and the rise of Palmyra along an important caravan route, do not, in all likelihood,

120) F. Heichelheim, *op. cit.*, p. 228, 252. Cf. M. Rostovtzeff, *The Social and Economic History of the Hellenistic World*, Clarendon Press, Oxford, 3 Vols., 1953, p. 309, 444, 469-71, 817, and 966.

represent the beginning of intensive salt utilization and determined control over its distribution in Western Asia. Rather, I would venture to suggest that Palmyra's pre-eminence in this regard is a late, if obviously highly developed and very impressive, manifestation in a pattern of salt usage which had its roots far back in time, perhaps as early as the transition from a hunting-gathering economy to one dominated by an agricultural subsistence base.