A STUDY OF DIET IN MESOPOTAMIA
(c.3000 - 600 BC) AND ASSOCIATED
AGRICULTURAL TECHNIQUES AND METHODS
OF FOOD PREPARATION

by
Elizabeth Rosemary Ellison
Institute of Archaeology

Volume Two

Thesis submitted to the
University of London in the
Faculty of Arts for the
Degree of Doctor of Philosophy

May 1978
# TABLE OF CONTENTS

## Volume 2

<table>
<thead>
<tr>
<th>Appendix I: Capacity Measures</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>References</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appendix II: Estimates of population trends</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>References</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appendix III: Selected vocabulary</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figures</td>
<td>12</td>
</tr>
</tbody>
</table>

### References:

- Chapter 1                              | 23   |
- Chapter 2                              | 25   |
- Chapter 3: 3.1                          | 31   |
  - 3.2                                    | 61   |
  - 3.3                                    | 67   |
  - 3.4                                    | 89   |
  - 3.5                                    | 101  |
  - 3.6                                    | 111  |
  - 3.7                                    | 118  |
  - 3.8                                    | 122  |
- Chapter 4                              | 125  |
- Chapter 5                              | 130  |
- Bibliography                            | 156  |

- Bibliography                            | 157  |
List of Figures (Volume Two)

Fig. 1. Nutrition Chart for Mesopotamia. Daily intakes. 31

Fig. 2. Excerpts from the FAO Recommended Tables of Intakes, Handbook on Human Nutritional Requirements, No. 28 Table 1. 32

Fig. 3. Nutritional value of Barley from Food Composition Tables for use in the Middle East (P.L. Pellet & S. Shadarevian), Section I, Composition of Foods, 100 grams, edible portion. 33

Fig. 4. Comparison of selected professions. 34

Fig. 5. Ancient courses of the Euphrates and Tigris. Base map adapted from Gibson M. The City and Area of Kish, Fig. 69 'Reconstruction of watercourses in Mesopotamia to about 1000 BC'. The ancient courses are taken from the text of chapter 1. 35

Fig. 6. Soil map of Iraq. Adapted from Flora I, Fig. 4. 36

Fig. 7. Relief: The royal banquet of Asurbanipal, from Barnett R.D. Assyrian Palace Reliefs, Plate 105. 37

Fig. 8. Cylinder seal: Shaduf, from Parrot Sumer No. 231. 37

Fig. 9. Cylinder seal: Plain plough. Parrot Sumer No. 234. 38

Fig. 10. Cylinder seal: Seeder ploughs. Cylinder Seals, Plate XIX Nos. E & F. 38

Fig. 11. Grain threshing near Malayar, Hamadan, Iran, in 1970. 39

Fig. 12. Winnowing grain near Malayar, Hamadan, Iran, in 1970. 39

Fig. 13. Cylinder seal: man driving a seeder-plough drawn by one ox. Porada I, Plate XCV No. 653. 40

Fig. 14. Relief: Mixed herd of sheep and goats. Barnett R.D. & Faulkner W. Sculptures of Ashurnasirpal... Plate V. 40

Fig. 15. Vase: Hairy short-tailed sheep (Type 1) from the Warka Vase. Parrot Sumer No. 89. 41

Fig. 16. Relief: Humped cattle being herded along a river. Cadd Stones No. 14. 41

Fig. 17. Relief: Ilamite prisoners placing bread on a fire. By the courtesy of the British Museum. (Published in Barnett R.D. Sculptures from the Northern Palace... Plate LXVI e. 42

Fig. 18. A modern tannour near Baghdad, 1975. 43

Fig. 19. Dough being placed in the tannour, 1975. 43

Fig. 20. A bakery in Mosul, 1975. 44
<table>
<thead>
<tr>
<th>Fig.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Reliefs: Grinding and kneading in an Assyrian Camp. From King L.W. Bronze</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>reliefs from the Gates of Shalmaneser, King of Assyria Plate VI upper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>register.</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Reliefs: Preparing bread. From King L.W. Bronze Reliefs. Plate LI</td>
<td>45</td>
</tr>
<tr>
<td>23</td>
<td>Statue: Base of Ur-Ningirsu statue: men holding baskets of bread. Parrot</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Sumer No. 269.</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Cylinder Seals: Presentation scene with a sheep's head set on bread on an</td>
<td>47</td>
</tr>
<tr>
<td>25</td>
<td>Reliefs: A tannour in a camp. Gadd No. 29a.</td>
<td>47</td>
</tr>
<tr>
<td>26</td>
<td>Cylinder seals: Brewer heating the mash. Boehmer No. 557.</td>
<td>48</td>
</tr>
<tr>
<td>27</td>
<td>Cylinder Seals: Brewer 'draining' the wort. Boehmer No. 547.</td>
<td>48</td>
</tr>
<tr>
<td>28</td>
<td>Cylinder seals: Men drinking beer through tubes. Porada I, Plate XVIII No. 112.</td>
<td>49</td>
</tr>
<tr>
<td>29</td>
<td>Cylinder seals: Banquet scene with men drinking from cups. Porada I Plate</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>XXXIX, No. 250E</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Inlay: ram being slaughtered. Parrot Sumer No. 171B</td>
<td>50</td>
</tr>
<tr>
<td>31</td>
<td>Reliefs: Skinning the carcase of a sheep. Gadd Stones No. 29a.</td>
<td>50</td>
</tr>
<tr>
<td>32</td>
<td>Sounding box of a harp: Joints of meat: Parrot Sumer No. 179.</td>
<td>50</td>
</tr>
<tr>
<td>33</td>
<td>Reliefs: Hunting scene from Salonen A. Végel. Plate LXXVIII</td>
<td>51</td>
</tr>
<tr>
<td>34</td>
<td>Reliefs: Provisions being carried for the king's feast. From Layard II Plate</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>9a.</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Reliefs: 'Fishing' Barnett R.D. &amp; Faulkner M. Sculptures of Ashurnasirpal.</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Plate CXX</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Cylinder seals: Bird set on a table. VR No. 654</td>
<td>52</td>
</tr>
<tr>
<td>37</td>
<td>Cylinder seals: goat being milked. Parrot Sumer No. 107.</td>
<td>53</td>
</tr>
<tr>
<td>38</td>
<td>Inlays: Sheep being milked. Moorrgat Art No. 40.</td>
<td>54</td>
</tr>
<tr>
<td>39</td>
<td>Cylinder seals: 'Story of Etana' Dairy scene. Parrot Sumer No. 226.</td>
<td>54</td>
</tr>
<tr>
<td>40</td>
<td>Reliefs: Provisions being carried for feast. From Layard II, Plate 9b.</td>
<td>55</td>
</tr>
<tr>
<td>41</td>
<td>Reliefs: Fruit being carried for feast. From Layard II Plate 8b.</td>
<td>55</td>
</tr>
<tr>
<td>42</td>
<td>Cylinder seals: Banquet. Parrot Sumer No. 197</td>
<td>56</td>
</tr>
</tbody>
</table>
Fig. 42. Cylinder seal: Banquet scene - men seated at table with servants. Porada I Plate XXXIX No. 252.

Fig. 44. Relief: Woman with fish and bread. Du Ry C.J. Art of the ancient Near and Middle East, 122.

Fig. 45. Cylinder seal: Table laid with bread, and dishes. Porada I Plate XCIX No. 673 E.

Fig. 46. Relief: Officer eating in camp. Barnett P.D. & Faulkner M. Sculptures of Assurnasirpal... Plate LX

Fig. 47. Ivory panel: Men seated at separate tables. Mallowan M.E.L. & Davies L.G. Ivories in Assyrian Style Plate V No. 7.

Fig. 48. Relief: Elamite prisoners eating. By the courtesy of the British Museum. (Published in Barnett R.D. Sculptures from the Northern Palace... Plate LXVI Slab A.)

Fig. 49. Relief: Elamite prisoners eating. By the courtesy of the British Museum. (Published in Barnett R.D. Sculptures from the Northern Palace... Plate LXVI Slab A.)

Fig. 50. Relief: Elamite prisoners eating. Gadd Stones No.40.

Fig. 51. Relief: Elamite prisoners eating. Gadd Stones No.29b.
APPENDIX I

Capacity Measures

In ancient Mesopotamia foodstuffs, grain yields etc., were expressed in capacity measures and some understanding of these measures is essential before the nutritional value of the food eaten and the efficiency of the agricultural techniques used can be considered. The basic measure which was used from the third to the first millennium is the SīLA/ga, numbers of which form larger measures that vary from place to place and period to period. Thus, in Assyria, the imēru (homer) is made up of 100 ga; in Babylonia, the CUR/kurru equals 300 SīLA/ga (180 SīLA in the Neo-Babylonian period); in Mari (at the beginning of the second millennium) the CUR equals 120 SīLA; in the Sargonic period the CUR.SAG.GAL is made up of 240 SīLA and in the pre-Sargonic period the CUR.SAG.GAL equals 144 SīLA. These larger measures (imēru, CUR/kurru, CUR.SAG.GAL etc.) are also subdivided into units such as the PI/pānu and the BAN/sātu, which again contain varying numbers of SīLAS. This list of measures is a simplification as, especially in the earlier periods, there were other CURS (for example the CUR.SA.DUG with 140 SīLA and the CUR.A-ga-de.KI with 300 SīLA) consisting of different numbers of SīLAS. The sātu too could be made up of different numbers of SīLAS (for example the sātu of Carcemish and the bronze sātu and the sātu of 9 or 8 SīLA in the Neo Assyrian period.) However the measures listed are those used most frequently in connection with foodstuffs and agriculture and are the main ones used in this study. These measures apply mainly to solids and liquids were sometimes recorded in other terms.

Although it is possible to draw up lists of, say, the yields in SīLAS of fields in different areas and different periods, no proper comparison can be made until the size of the SīLA used can be established and preferably in terms of a modern equivalent. In other words 1) has the SīLA the same capacity throughout the third to the first millennium, and 2) how does that capacity relate to the modern litre?

There are two possible ways of approaching these questions. It has been suggested that the ubiquitous bevel-rim bowls of the Uruk period may have been used to measure out the rations issued to employees in households. If this was so there should be a standard size or sizes among these bowls, and, given the
continuation of the ration-system, it is possible that there were similar standard sizes in pottery from later periods. Second, a few pottery vessels are inscribed with a capacity measure so that if the cubic capacity of the vessel is related to the inscription some idea can be gained of the size of the SILA at that time. In addition there are some mathematical texts which have made it possible for calculations to be carried out on the size of the SILA.

**Cubic capacity of pottery**

In order to calculate the cubic-capacity of pottery the published drawings from a number of sites have been studied. Of necessity this has been rather a rough and ready method as the drawings tend to be of pottery types rather than of specific pots so that slight variations of size from one vessel to another may have been ironed out. When the cubic-capacity is worked out, the pots have been divided into size-groups and the average for each group was taken. This has been done for all types of pottery examined, and again for open-bowls.

The average sizes of the pottery suggested that if they were based on a standard measure, that measure stayed more or less the same throughout the period. Most variations, for example .6 litre open-bowl at Nippur in the Old Babylonian period, are generally caused by the smaller number of vessels falling into that range, and because of this cannot be taken as indicating a change in the standard measure. (see Table 19, pp.3-5).

**Inscribed vessels & mathematical calculations**

A vase of Entemena, dating to the Early Dynastic period, held a NIGIN according to an inscription. The entire capacity of the vase was calculated to be 4.71 litres, including the neck. The capacity without the neck was 4.15 litres. As a NIGIN = 10 SILA, the capacity of the SILA equals .471 litre, including the neck, and .415 without the neck.

A broken vessel from Nippur (dating to the Ur III period) contained 175 and 5/6 SILAS, according to an inscription on it. The partial outline of this vessel is published and if the complete outline is reconstructed the cubic capacity (excluding the neck) is 178.7 litres. Thus the SILA would appear to equal 1.016 litres.

An inscription on a pot fragment from Rimah (Old Babylonian period) suggests that the SILA there may have been about .8 litres.
<table>
<thead>
<tr>
<th>Size</th>
<th>Early Dynastic</th>
<th>Akkadian</th>
<th>Ur III</th>
<th>Isin/Larsa</th>
<th>Old Babylonian</th>
<th>Kassite/2nd mill.</th>
<th>Neo-Assyrian/Neo-Babylonian</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/40</td>
<td>- -</td>
<td>3 .196</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>63 .229</td>
<td>- -</td>
<td>Nuzi</td>
</tr>
<tr>
<td>35</td>
<td>.23</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Khafajeh</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>.22</td>
<td>24 .22</td>
<td>11 .23</td>
<td>6 .25</td>
<td>16 .24</td>
<td>- -</td>
<td>Asmar</td>
<td></td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>10 .27</td>
<td>- -</td>
<td>Ischali</td>
<td></td>
</tr>
<tr>
<td>.26</td>
<td>2</td>
<td>16 .22</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>15 .32</td>
<td>- -</td>
<td>Ur</td>
</tr>
<tr>
<td>12</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Tello</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.19</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Nimrud</td>
<td></td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>AVERAGE</td>
<td></td>
</tr>
<tr>
<td>.225</td>
<td>- -</td>
<td>.21</td>
<td>.22</td>
<td>.24</td>
<td>.24</td>
<td>.266</td>
<td>.195</td>
<td>AVERAGE</td>
</tr>
<tr>
<td>.38-.62</td>
<td>- -</td>
<td>2 .49</td>
<td>5 .52</td>
<td>3 .5</td>
<td>6 .4c</td>
<td>2 .51</td>
<td>4 .5</td>
<td>Nippur</td>
</tr>
<tr>
<td>- -</td>
<td>1 .54</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>19 .5</td>
<td>- -</td>
<td>Nuzi</td>
</tr>
<tr>
<td>12</td>
<td>.5</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Khafajeh</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.46</td>
<td>3 .56</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>4 .45</td>
<td>- -</td>
<td>Asmar</td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>2 .55</td>
<td>- -</td>
<td>Ischali</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>.476</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>15 .48</td>
<td>- -</td>
<td>Ur</td>
</tr>
<tr>
<td>2</td>
<td>.6</td>
<td>4 .48</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Tello</td>
<td></td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Nimrud</td>
<td></td>
</tr>
<tr>
<td>.5</td>
<td>.54</td>
<td>.5</td>
<td>.486</td>
<td>.496</td>
<td>- -</td>
<td>- -</td>
<td>AVERAGE</td>
<td></td>
</tr>
<tr>
<td>.62-.87</td>
<td>- -</td>
<td>1 .69</td>
<td>7 .72</td>
<td>- -</td>
<td>- -</td>
<td>1 .7</td>
<td>7 .74</td>
<td>Nippur</td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>10 .7</td>
<td>- -</td>
<td>Nuzi</td>
</tr>
<tr>
<td>6</td>
<td>.75</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>1 .67</td>
<td>- -</td>
<td>Khafajeh</td>
</tr>
<tr>
<td>2</td>
<td>.77</td>
<td>3 .76</td>
<td>- -</td>
<td>- -</td>
<td>2 .76</td>
<td>- -</td>
<td>Asmar</td>
<td></td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>6 .78</td>
<td>- -</td>
<td>- -</td>
<td>5 .69</td>
<td>- -</td>
<td>Ischali</td>
</tr>
<tr>
<td>5</td>
<td>.79</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>2 -</td>
<td>8 .72</td>
<td>- -</td>
<td>Ur</td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>Tello</td>
<td></td>
</tr>
<tr>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>- -</td>
<td>715</td>
<td>.696</td>
<td>.73</td>
<td>Nimrud</td>
</tr>
<tr>
<td>.77</td>
<td>.725</td>
<td>.75</td>
<td>-</td>
<td>.715</td>
<td>.696</td>
<td>.73</td>
<td>AVERAGE</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Early Dynastic</td>
<td>Akkadian</td>
<td>Ur III</td>
<td>Isin/Larsa</td>
<td>Old Babylonian</td>
<td>Kassite</td>
<td>2nd mill</td>
<td>Neo-Assyrian/ Yeo-Babylonian</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
<td>----------</td>
<td>--------</td>
<td>------------</td>
<td>---------------</td>
<td>--------</td>
<td>----------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>0.88-1.12</td>
<td>-</td>
<td>1 1.03</td>
<td>1 1.0</td>
<td>4 0.92</td>
<td>3 0.94</td>
<td>2 0.92</td>
<td>Nippur</td>
<td>Muzi</td>
</tr>
<tr>
<td>0.12-0.37</td>
<td>-</td>
<td>2 0.22</td>
<td>7 0.2</td>
<td>6 0.21</td>
<td>2 0.225</td>
<td>2 0.2</td>
<td>Nippur</td>
<td>Muzi</td>
</tr>
<tr>
<td>0.38-0.62</td>
<td>-</td>
<td>1 0.56</td>
<td>2 0.51</td>
<td>1 0.6</td>
<td>1 0.6</td>
<td>4 0.5</td>
<td>Nippur</td>
<td>Muzi</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------</td>
<td>---------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>egs.</td>
<td>egs.</td>
<td>egs.</td>
<td>egs.</td>
<td>egs.</td>
<td>egs.</td>
<td>egs.</td>
<td>egs.</td>
</tr>
<tr>
<td>.38-.62</td>
<td>-</td>
<td>2</td>
<td>.51</td>
<td>2</td>
<td>1</td>
<td>.6</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>.54</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.45</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.54</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.46</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.6</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.55</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>.88-.1.12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>.92</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>.975</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.88</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.95</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>.92</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(c) beveled-rim bowls

<table>
<thead>
<tr>
<th>Size</th>
<th>.12-.37</th>
<th>.38-.62</th>
<th>.62-.87</th>
<th>.88-1.12</th>
<th>1.14-2.00</th>
<th>above 2.00</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Tell</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Khafranjah</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Nuzi</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Warka</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Tell</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Brak</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Jamdat Nasr</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Godin V</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>AVERAGE</td>
</tr>
</tbody>
</table>
An inscription on a vessel from Nimrud (Neo-Assyrian period) suggests the vessel contained 137 SILA (1 ANE 3 BÁN 7 SILA). When the cubic capacity (excluding the neck) of this vessel is calculated the SILA appears to be 1.88 litres.9

An alabaster vase from the Neo-Babylonian period,6 in the reign of Amel-Marduk (561-560) had an inscription suggesting it held one third of a qa. When reconstructed (including neck) its capacity was .27 litres suggesting that the Neo-Babylonian qa equalled .81 litres.9

Calculations based on a mathematical text10 suggest that the SILA in the Old Babylonian period equalled .97 litres, and Thureau-Dangin calculated from a Seleucid text that the late first millennium qa equals .84 litre.6

From averages taken from all these inscriptions and calculations it might seem that the SILA in the Early Dynastic period was about .44 litres; in the Ur III period and the Old Babylonian period around 1 litre (with a possible smaller variation at Rimah); in the Neo-Assyrian period about 1.88 (or about double the Old Babylonian SILA); and in the Neo-Babylonian period about .83 (or about double the Early Dynastic SILA).

However the situation is not quite as simple as this. If the rations in the Early Dynastic period were based on a SILA of around ½ a litre then the amounts issued were so low as to be on starvation level. This point was made by Thureau-Dangin in his earlier discussion on the capacity measures.6 He suggested at that time that Entemena's vase was a votive object and that it only represented half the real capacity of the SILA. In this the Early Dynastic SILA would be .88 litres - and if only the body capacity (excluding the neck) of the vase is considered, the SILA would be exactly .83 (the same as the average for the two Neo-Babylonian figures).

Discussion

These calculations suggest that there was an increase in the size of the SILA after the Early Dynastic period. This is also suggested by the ration lists. In the Early Dynastic III period at Lagas the most common quantities of barley rations were 72, 48, 36 and 24 SILA a month.11 At Kish, Nippur, Nuzi and Asmar in the Agade period, and at Lagas itself in the Ur III period, the most common amounts of rations were 90, 60, 40, 30 and 20 SILAS. These later amounts of rations continue into the second millennium.
If these amounts are compared with each other it can be seen that 60 is 5/6 of 72, 40 5/6 of 48, 30 5/6 of 36 and 20 5/6 of 24. And at first sight this would appear to mean that the rations had been reduced by one sixth - perhaps because of a fall in yields.

But this explanation is not completely satisfactory, as it does not tie-in with the capacities of the SILA as calculated from the inscriptions on pottery. However, if the size of the SILA was increased when the numbers given dropped the actual rations could have stayed the same.

Thus:

- 72 SILA at 0.83 litres a SILA = 59.76 litres
- 48 SILA at 0.83 litres a SILA = 39.84 litres
- 36 SILA at 0.83 litres a SILA = 29.88 litres
- 24 SILA at 0.83 litres a SILA = 19.92 litres
- 60 SILA at 1.0 litres a SILA = 60 litres

This increase represents a rise of one sixth in the size of the SILA and is the difference between the doubled capacity of the Entemena vase (0.415 x 2 = 0.83) and the average of the Ur III/old Babylonian SILAS (1.07).

It is here suggested that at the end of the Early Dynastic III period, at least as known from Lagash, there was a change in accountancy procedures which caused the numbers of SILAS in the GOD.SAG.GAL to be raised and an increase in the size of the SILA. It is possible that this latter system was already in use in Akkad and was brought into Sumer by the Sargon dynasty. The Ur III kings standardized the system which seems to have continued, with perhaps some local variations, into the second millennium. The Assyrians apparently based their measure on double the 'Babylonian' SILA/qa but the late Neo-Babylonian kings may have returned to the old Lagash or Sumerian size of SILA/qa. These variations in the size of the SILA are probably simplified and there may have been local differences in much the same way as there are local differences in weights and measures in Iraq today - for example those local weights in use in Baghdad vary from those used at Basra.12

When calculating yields, rations etc., in this study, the Early Dynastic SILA will be taken to equal 0.83 litres and the Agade, Ur III, Isin/Larsa, Old Babylonian and Kassite/Nuzi SILA to be 1.0 litres. The Neo-Assyrian SILA will be taken as 1.88 litres. (The period covered by the Neo-Babylonian qa does not fall within this study.)
References and Notes for Appendix I

1. Thureau-Dangin F. 'Numeration et Métrologie Sumeriennes' RA 18, 121, 125-127; ARMT VII, 349, para. 5; Postgate J.N. Neo-Assyrian Legal Documents, 67-68, para.6.1.2.; Maeckawa K. Zinsan 13, 1974, 45, CUR.SAG.GAL; Gelb I.J. personal communication September 1975 (Sargonic CUR.SAG.GAL = 240 SILA); see also Salonen Hausgeräte II, 270-302; Meissner BuA


4. Some of the more elaborate styles, and jugs, have been excluded.

5. NIPPUR: McCown D & Haines R. Nippur I, Temple of Enlil...
   Plate 80 (nos. 1, 2, 5-9, 12, 14 18); Plate 82 (nos. 10, 12-15, 18-20 and 23); Plate 83 (nos. 7, 9-10, 12, 14, 16-18, and 21) Plate 84 (nos. 1-6, 9-11, 16); Plate 85 (nos. 1-4, 7-8, 11-12, 14 & 16) Plate 87 (nos. 1-4, 6-14); Plate 88 (nos. 3, 5-6, 19, 20-23); Plate 90 (nos. 1-5, 12-17); Plate 94 (nos. 1-6, 8-11, 14, 15, 18) Plate 97 (nos. 1, 7-8, 10-12); No. 98 (nos. 1-8, 11-12, 15-16) Plate 100 (nos. 2, 6-7, 11, 12-14, 19-23); Plate 103 (nos. 1, 4, 10-12, 18-25).

NUZI: Starr Nuzi: Vol. II: Plates 50 (Nos. A, B, Q)

   Plate 146 (all plate except B.001.200b and 001.310)
   Plate 148 (nos. b.052.200a-c, 062.210 a-b, 076.700, 063.200b, 077.700 a-b, 064.210, 072.200, 061.210, 072.210b) Plate 149 (all plat except B084.210a, 083.210a, 085.210 and 084.210c) Plate 150 (Nos. B174.740, 175.220a & b, 174.220a-c, 175.224)

U: UE II Plate 251 (Nos. 5 a, b, c, 7 a, b, c, 10, 12, 14 b) Plate 252 (Nos. 18 a, b, 21, 23, 26, 32 a, 33 b) Plate 253 (Nos. 29, 40, 42, 43, 44 a, b, c, 45, 46, 48, 49 b, 51 a) Plate 254 (Nos. 57, 58, 59, 60, 61-62) Plate 255 (Nos. 77-79, 81) Plate 256 (Nos. 83 a-d, 84) Plate 257 (98, 99, 100 a & b; 108 a-c) Plate 258 (Nos. 109 b, 112, 114, 119 a & b, 120 a & b) Plate 259 (Nos. 128, 129, 131, 132 a & b, 133, 134, 136, 137, 139-141) Plate 260 (Nos. 142-145, 147, 149, 150 a & b, 151) Plate 261 (Nos. 155, 157-160, 162-164) Plate 262 (Nos. 167-170, 171, 172, 174, 179 a & b, 180, 181) Plate 263 (all plate but No. 185) Plate 264 (all plate except Nos. 204-206) Plate 276 (Nos. 211-213, 217, 220, 222-224, 226) Plate 266 (Nos. 227-228).
Many bevelled-rim pots have been excavated but only a handful have actually been published.

Although the plates listed for the above sites include vessels smaller than .11 litre and larger than .12 litres only those falling between these measurements have been included in the tables.

It should be noted that the pottery from Tello is not securely dated and that the divisions into periods is therefore suspect. The divisions made by the excavators have been followed.

7. McCown D & Haines R. Nippur I, Temple of Enlil... Plate 87, No. 14 and photos. Professor Gelb kindly confirmed this calculation. With the neck included the capacity is 188.5 - 1.07 a SILA. But see Postgate J.N. 'An inscribed jar from Tell al Rimah' to be published in Iraq. Note 7: Mr. Christoph3r Watkins made the capacity maximum 183.1 and minimum 180.3. This would give a maximum SILA of 1.04 litre, and a minimum of 1.025 litre, and does not change the suggested SILA of approximately 1 litre in the Ur III period.


9. The method used here is the one used in examining the pottery drawings. It is based on measurements taken of the pot ND 6673 on display in the British Museum. This inscription is published by Postgate J.N. in Fifty Neo-Assyrian legal documents. Note that he calculated the SILA to be 1.84 litres. (see also 'Alawjan Nimrud, 168.)

J.N. Postgate's calculations of the capacity of the reconstructed inscribed vessel at Tell al Rimah give a useful comparison between two methods of calculating capacities. He filled the reconstructed vessel with dried rice, which gave a capacity of 121.3 (allowing a 2% margin of error; the maximum value was 123.5 and the minimum was 119.0 litres). From his details of the dimensions of the vessel it has been possible to calculate the capacity using the same methods as used for the pottery drawings and the Ur III pot from Nippur. This gave a value of 123.495 litres and a SILA of .82 litre - very close to the maximum value given for the dried rice filling method.

10. Thureau-Dangin F. 'La mesure du "ga" RA 34, 1937, 81

11. It is not suggested that only these sizes of rations were issued, merely that these were the most frequently used.

APPENDIX II

Estimates of population trends

Before any attempt can be made to discuss whether a food supply is sufficient for a local population, the size of the population must be established. The most accurate way of assessing population figures is to conduct a census but this process does not appear to have been carried out in ancient Mesopotamia. A number of rulers, for example Zimri-Lim of Mari, seem to have carried out a local census (one of his years carries the name 'Year when Zimri-Lim counted the land') while others, in particular of Lagaš, mention large numbers of people in their inscriptions but it is not clear whether they are referring to certain sections of the population, or to certain areas or to their states as a whole. Thus the figures they give (Entemena: 3600; Urukagina: 36,000; and Gudea: 216,000) cannot be assumed to be the population of the state of Lagaš or of the city of Girsu.

Professor Frankfort attempted to calculate the population of Mesopotamia by taking the average number of houses found per acre in the excavated sites of Ur, Tell Asmar and Khafajeh and reckoning six to ten people per house. This gave a density from 120-300 people per acre, which compared well with the density of 160 per acre which he found at modern Aleppo and Damascus.

A number of settlement surveys have been carried out recently in Iraq: the regions covered include the Diyala, the area around Warka, and central Mesopotamia north of Nippur. The periods during which the settlements were occupied were worked out on the basis of the types of pottery and other artefacts (such as clay sickles, 'nails', mud-bricks etc.) found on their surfaces. The greatest danger in this is that the pottery sequences are not always equally well known for each period and many types overlap, so that it is not always possible to say that, for example, a particular site in the Warka area, was occupied in the Isin/Larsa period but not in the Old Babylonian. However, allowing for this, distribution maps of sites can give an idea of variations in settlement patterns. In the Diyala area there appears to have been a gradual increase in settlement through the third millennium, with a slight falling-off in the Old Babylonian
period. This fall continued through the second millennium and the area would seem to have been almost deserted by the beginning of the first. In the Warka region, the early third millennium (Jemdet Nasr to Early Dynastic I) was the period with most settlement. In the late Early Dynastic III there was a fall in the number of sites although the sizes of the remaining settlements had increased. There was a continued drop in sites in the Akkadian with possibly a slight increase in the Ur III-Isin/Larsa period. The second millennium saw a gradual drop in the numbers and size of settlements, probably falling to the lowest amount in the early first millennium. The number of sites increased slightly in the Neo-Babylonian period. In central Mesopotamia the largest number of settlements date to the Ubaid/Jemdet Nasr periods, but although there may have been a slight decrease in the number of sites in the Early Dynastic period the size of such towns as Kutha, Kish and Nippur increased. There was a slight drop in the number of sites towards the end of the third millennium but the Kassite period shows an increase. The end of the second millennium saw a drastic fall in numbers of settlements but there seems to have been an improvement during the Neo-Babylonian period, with Babylon dominating the area.

Adams made a provisional estimate of the sedentary population in the Diyala area. Taking a population density of 200 per hectare he calculated that the 384 hectares of recorded settlement for the Early Dynastic period would have carried some 77,000 people. But although population estimates could be made in this manner for other periods and other areas it is not really satisfactory to use a density based mainly on modern village settlements in Khuzistan and on modern cities like Baghdad — and indeed a density which is much lower than the one computed by Frankfort from the sites of Ur, Tell Asmar and Khafajeh.

The following is an attempt to estimate a population density contemporary with the periods of the settlements, based on Frankfort's method of estimating the average number of houses on a site. This has been done by finding the average size of house, dividing this into the size of the residential area of the town to find the number of houses and multiplying this number by the average number
of people in a family. The residential area of a site is calculated from the total area of the site less an arbitrary 40% to cover temples, administrative buildings, unoccupied areas etc.

A figure of 5 for the number of people in a family has been calculated from a text from Nippur giving members of families receiving rations, two from Nuzi recording some men with their wives and immediate family and the 'Doomsday' texts from Harran which give the numbers in families plus details about their property. 7

Khafajeh Mound A. 8

<table>
<thead>
<tr>
<th>Area of site: 275,000 sq.m.</th>
<th>Residential area: 165,000 sq.m.</th>
</tr>
</thead>
</table>

**Early Dynastic**

<table>
<thead>
<tr>
<th>Houses 10:</th>
<th>Average for 5 dwellings: 75.4 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 2188</td>
<td></td>
</tr>
<tr>
<td>Population estimate: (10,941.6) 10,942.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 9:</th>
<th>Average for 8 dwellings: 71.875 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 2295.65</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 11,478</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 8:</th>
<th>Average for 7 dwellings: 89 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 1854</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 9270</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 7:</th>
<th>Average for 6 dwellings: 89 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 1854</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 9470</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 6:</th>
<th>Average for 3 dwellings: 202 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 817</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 4085</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 5:</th>
<th>Average for 3 dwellings: 200.66</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 822</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 4110</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 4:</th>
<th>Average for 11 dwellings: 124.8 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 1322</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 6610</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 3:</th>
<th>Average for 5 dwellings: 232 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 711</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 3555</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Houses 1 &amp; 2:</th>
<th>Average for 10 dwellings: 161.7 sq.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of houses in residential area: 1020</td>
<td></td>
</tr>
<tr>
<td>Population estimate: 5100</td>
<td></td>
</tr>
</tbody>
</table>

Average population for whole period: 7180
Density over whole site: 261 per hectare.
Tell Asmar

Size of Early Dynastic and Akkadian town: 35,000 sq.m.
Residential area: 21,000 sq. m.

Early Dynastic III

Stratum Vc: Average size of 4 houses: 126.5 sq.m.
No. of houses in residential area: 116
Population estimate: 820.

Stratum Vb: Average size of 6 houses: 133.8
No. of houses in residential area: 157
Population estimate: 785.

Stratum Va: Average size of 25 houses: 105.48
No. of houses in residential area: 199
Population estimate: 995.

Average population: 870
Density over whole site: 248.5 per hectare.

Akkadian

Stratum IVb: Average size of 7 houses: 123.57
No. of houses in residential area: 170
Population estimate: 850

Stratum IVa: Average size of 9 houses: 192.55
No. of houses in residential area: 109
Population estimate: 545.

Average population: 698
Density over whole site: 199 per hectare.

Ur III/Isin-Larsa

Size of town: 250,000 sq. m. Residential area: 150,000 sq.m.

Stratum III: Average size of 4 houses: 147.5
No. of houses in residential area: 1017.
Population estimate: 5085.

Density over whole site: 203 per hectare.

Tell Harmal.

Size of site: 17,600 sq.m. Residential area: 10,560 sq. m.

Isin/Larsa—Old Babylonian

Average size of 16 houses: 72.5
No. of houses in residential area: 146.
Population estimate: 720.

Density over whole site: 415 per hectare.
Nippur
Size of site: 1,057,500 sq.m. Residential area: 634,500 sq.m.

Ur III
TB Level IV: Average size of 3 houses: 158.66 sq. m.
No. of houses in residential area: 3,999
Population estimate: 19,995.
Density over whole site: 189 per hectare.

Isin-Larsa
TB Level II: Average size of 3 houses: 172.66 sq.m.
No. of houses in residential area: 3,675.
Population estimate: 18,375.

TB Level I: Average size of 4 houses: 131.5 sq.m.
No. of houses in residential area: 4825.
Population estimate: 24,125.

TA Level XII: Average size of 3 houses: 99.33 sq.m.
No. of houses in residential area: 6,388
Population estimate: 31,940.
Average population: 22,436.
Density over whole site: 221.6 per hectare.

Old Babylonian
TB Levels E & D: Average size of 4 houses: 122.5 sq.m.
No. of houses in residential area: 5180
Population estimate: 25,900.

TA Levels X3-2: Average size of 5 houses: 65.4 sq.m.
No. of houses in residential area: 9702.
Average population: 37,205
Density over whole site: 352 per hectare.

Kassite
TA Level VI: Average size of 1 house: 44 sq. m.
No. of houses: 14,420
Population estimate: 72,100.

Density over whole site: 682 per hectare.

Assyrian
TA Level V: 1 house: 90 sq.m.
IV: 1 house: 182 + sq. m.
III: 1 house: 177 sq. m.
Average size: 150 sq.m.
No. of houses in residential area: 4230.
Population estimate: 21,150
Density over whole site: 200 per hectare.
Chagar Bazar

Size of site: 120,000 sq.m.  Residential area: 72,000 sq.m.

Old Babylonian

Average size of 5 houses: 78.5 sq.m.
No. of houses: 917
Population estimate: 4585.

Density over whole site: 382 per hectare.

Nuzi

Size of site: 45,000 sq.m.  Residential area: 27,000 sq.m.

Average size of 20 houses: 153.7 sq.m.
No. of houses in residential area: 176
Population estimate: 880

Density over whole site: 196 per hectare.

Ur

Size of site: 593,750 sq. m.  Residential area: 356,250 sq.m.

Isin-Larsa

Average size of 33 houses: 131.9 sq.m.
No. of houses in residential area: 2701
Population estimate: 13,505.

Density over whole site: 229 per hectare.

Kassite

Average size of 4 houses: 159 sq.m.
No. of houses in residential area: 2241
Population estimate: 11,205

Density over whole site: 190 per hectare.

Neo-Babylonian

Average size of 6 houses: 763.4 sq.m.
No. of houses in residential area: 467
Population estimate: 2335.

Density over whole site: 40 per hectare.

Nimrud

Size of site: 3,600,000 sq.m.  Residential area: 2,160,000 sq.m.

Neo-Assyrian

Average size of 4 houses: 137.5 sq.m.
No. of houses in residential area: 15,709
Population estimate: 78,545.

Density over whole site: 218 per hectare.

Uruk

Size of site: 5,060,000 sq.m.  Residential area: 3,036,000 sq.m.

800-600 BC

Average size of 6 houses: 213.4 sq.m.
No. of houses in residential area: 14,227
Population estimate: 71,135.

Density over whole site: 141 per hectare.
If the densities calculated above are put to the areas of settlement surveyed in the Diyala, Warka region and central Mesopotamia, it may be possible to gain an idea of the comparative size of the population. The settlement areas have been taken from the sizes of sites given in the regional surveys. For the Diyala Adams gave these sizes himself19 but for the Warka and central Mesopotamia regions the areas had to be calculated from the measurements published in the catalogues.20 The sites have been grouped into the main dating periods for which evidence was found on the surface. Problems here include the above mentioned difficulty of dating material and the fact that no variations in size could be made according to the extent of occupation. In other words a site of 50 hectares with dating material from the Early Dynastic to Kassite periods has had to be counted as 50 hectares for all these intervening periods, although it may only have been 10 hectares during Ur III and 2 hectares in the Kassite.

Where possible the population density is taken from a town (or average of towns) in the particular area. If this is not possible, then the density from the nearest town has been taken. In addition an average density per period has been worked out.

Diyala area
(The densities have been taken from an average of the figures for Tell Asmar and Khafajeh in the Early Dynastic period, from Tell Asmar in the Akkadian period, from an average of Tell Asmar and Tell Harmal in the Ur III/Isin-Larsa and Old Babylonian periods, from Nippur and Nuzi in the Kassite period and from Nippur in the Neo-Assyrian and Neo-Babylonian periods)

<table>
<thead>
<tr>
<th>Period</th>
<th>Settlement area</th>
<th>Est.Population</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Dynastic</td>
<td>384 hectares</td>
<td>97,920</td>
<td>255</td>
</tr>
<tr>
<td>Akkadian</td>
<td>403 &quot;</td>
<td>80,197</td>
<td>199</td>
</tr>
<tr>
<td>Ur III/Isin-Larsa</td>
<td>462 &quot;</td>
<td>142,758</td>
<td>309</td>
</tr>
<tr>
<td>Old Babylonian</td>
<td>380 &quot;</td>
<td>117,420</td>
<td>309</td>
</tr>
<tr>
<td>Kassite</td>
<td>230</td>
<td>100,970</td>
<td>439</td>
</tr>
<tr>
<td>Neo-Assyrian/Neo-Babylonian</td>
<td>75 &quot;</td>
<td>15,000</td>
<td>200</td>
</tr>
</tbody>
</table>
Warka area

(The densities for the Warka region have been taken from an average of Khafajeh and Asmar for the Early Dynastic period, from Asmar for the Akkadian period and Ur III period, from Ur for the Isin/Larsa and Old Babylonian periods and Kassite period, and from Warka itself for the Neo-Assyrian/Neo-Babylonian period. Estimated areas for Warka, Larsa and Shuruppak have been added to the settlement areas listed in the survey catalogue.)

<table>
<thead>
<tr>
<th>Period</th>
<th>Settlement area</th>
<th>Est.Population</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Dynastic III</td>
<td>1536.4 hectare</td>
<td>391,782</td>
<td>255</td>
</tr>
<tr>
<td>Akkadian</td>
<td>1420.5 &quot;</td>
<td>282,680</td>
<td>199</td>
</tr>
<tr>
<td>Ur III</td>
<td>2042 &quot;</td>
<td>414,526</td>
<td>202</td>
</tr>
<tr>
<td>Isin/Larsa</td>
<td>1831 &quot;</td>
<td>419,299</td>
<td>229</td>
</tr>
<tr>
<td>Old Babylonian</td>
<td>1440.6 &quot;</td>
<td>329,870</td>
<td>229</td>
</tr>
<tr>
<td>Kassite</td>
<td>1073 &quot;</td>
<td>203,870</td>
<td>190</td>
</tr>
<tr>
<td>Neo-Assyrian/Neo-Babylonian</td>
<td>1004 &quot;</td>
<td>141,564</td>
<td>141</td>
</tr>
</tbody>
</table>

Central Mesopotamia

(The densities have been taken from an average of Khafajeh and Asmar for the Early Dynastic III, from Asmar for the Akkadian period and from Nippur for all the others. An estimated area for Babylon has been added to Gibson's survey around Kish and Adams' survey in ancient Akkad.)

<table>
<thead>
<tr>
<th>Period</th>
<th>Settlement area</th>
<th>Est.Population</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Dynastic III</td>
<td>733.3 hectares</td>
<td>186,992</td>
<td>255</td>
</tr>
<tr>
<td>Akkadian</td>
<td>904 &quot;</td>
<td>179,896</td>
<td>199</td>
</tr>
<tr>
<td>Ur III</td>
<td>902 &quot;</td>
<td>170,478</td>
<td>189</td>
</tr>
<tr>
<td>Isin/Larsa</td>
<td>908 &quot;</td>
<td>201,212</td>
<td>221.6</td>
</tr>
<tr>
<td>Old Babylonian</td>
<td>1102 &quot;</td>
<td>387,904</td>
<td>352</td>
</tr>
<tr>
<td>Kassite</td>
<td>1804.5 &quot;</td>
<td>1,230,669</td>
<td>682</td>
</tr>
<tr>
<td>Neo-Assyrian/Neo-Babylonian</td>
<td>1267.6 &quot;</td>
<td>253,520</td>
<td>200</td>
</tr>
</tbody>
</table>

Population estimates based on average densities (from appropriate sites)

<table>
<thead>
<tr>
<th>Period</th>
<th>Cent.Mesopotamia</th>
<th>Warka</th>
<th>Diyala</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Dynastic</td>
<td>186,992</td>
<td>391,782</td>
<td>97,920</td>
<td>255</td>
</tr>
<tr>
<td>Akkadian</td>
<td>179,896</td>
<td>282,680</td>
<td>80,197</td>
<td>199</td>
</tr>
<tr>
<td>Ur III</td>
<td>177,968</td>
<td>400,232</td>
<td>90,552</td>
<td>196</td>
</tr>
<tr>
<td>Isin/Larsa</td>
<td>242,436</td>
<td>488,877</td>
<td>123,254</td>
<td>267</td>
</tr>
<tr>
<td>Old Babylonian</td>
<td>422,066</td>
<td>551,750</td>
<td>145,540</td>
<td>383</td>
</tr>
<tr>
<td>Kassite</td>
<td>642,402</td>
<td>381,988</td>
<td>81,880</td>
<td>356</td>
</tr>
<tr>
<td>Neo-Assyrian/Neo-Babylonian</td>
<td>190,140</td>
<td>150,600</td>
<td>11,250</td>
<td>150</td>
</tr>
</tbody>
</table>

(* The areas for the Ur III and Isin/Larsa in the Diyala regions are the same as they were lumped together by Adams.*)
Total population in survey areas (based on average densities)

<table>
<thead>
<tr>
<th>Period</th>
<th>Early Dynastic</th>
<th>Akkadian</th>
<th>Ur III</th>
<th>Isin/Larsa</th>
<th>Old Babylonian</th>
<th>Kassite Babylonian</th>
<th>Neo-Assyr. Babylonian</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>676,694</td>
<td>542,773</td>
<td>668,752</td>
<td>854,667</td>
<td>1,119,356</td>
<td>1,106,270</td>
<td>351,990</td>
</tr>
</tbody>
</table>

These population figures do not cover the whole of Mesopotamia nor even the whole of the alluvial plain. The most noticeable gaps in the south are the area around Bismaya between the Central Mesopotamian and Warka surveys, the Ur and Eridu areas and the Girsu-Lagash region, nor has there been any allowance for any nomadic population. However if the average density for all periods in the southern areas (264) is compared with the average density for Chagar Bazar (Old Babylonian), Nuzi (mid-second millennium) and Nimrud (Neo-Assyrian) (265) it can be seen that these are almost the same so that it is possible that the populations were also about the same. Thus if the population is doubled to cover the northern areas, and then a third of the southern population is added to cover other unsurveyed areas plus the nomadic population some idea may be gained of the population for the whole of Mesopotamia. It must be stressed that this is only tentative as the doubling of the population implies that periods of expansion and adversity in the south were mirrored in the north.

<table>
<thead>
<tr>
<th>Period</th>
<th>Early Dynastic</th>
<th>Akkadian</th>
<th>Ur III</th>
<th>Isin/Larsa</th>
<th>Old Babylonian</th>
<th>Kassite Babylonian</th>
<th>Neo-Assyr. Babylonian</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,578,953</td>
<td>1,560,421</td>
<td></td>
<td>1,994,223</td>
<td>2,611,831</td>
<td>821,310</td>
<td>2,581,297</td>
</tr>
</tbody>
</table>

Some points of criticism should be noted, while historically the end of the third millennium and the beginning of the second were prosperous with flourishing trade from all parts of Mesopotamia and many vigorous kingdoms in existence (Mari, Babylon, Rimah, Akkâr etc.) the following period is not usually considered to be so stable. The high population figures for the Kassite period may be biased by the high density figure found at Nippur for this period, which was based on the measurement of only one house and may therefore give a completely false impression. However the Kassite dynasty in the south was the longest reigning dynasty in the history of Mesopotamia and this alone should have provided some stability. This period is paralleled in the north by the rise of the Assyrian state. The drastic drop in population, between the end of the Kassite period (c.1220) and the 9th century may only apply to the south. The figures certainly seem low for the Assyrian kingdom in the north.
A contemporary population estimate exists for the city of Nimrud dated to around 875-867 BC. Ashurnasirpal gave a feast when the city of Nimrud was completed and set up a stele to commemorate the event. In this he states that his feast was for 69,574 people made up of 16,000 'citizens' of Nimrud, 47,074 workmen and women from all the lands under the king, 5,000 officials also from the neighbouring states and 1,500 officials from the royal palaces. Although it is not clear whether the 16,000 were the original inhabitants of Nimrud before the king began to build it as his capital city or whether the 47,074 workmen and women and all the officials had become permanent residents in the city, the figure of 69,574 compares well with the total of 78,545 estimated from the house plans. This large population is reflected in the Neo-Assyrian inscriptions recording the numbers of towns and villages listed as being conquered by their armies.

Before completing this appendix on population estimates mention must be made of Professor Gelb's comments that the average house size in Mesopotamia was 35.3 sq.m. or one šar, and that the estimated averages of the archaeologists based on the excavated plans are incorrect possibly because these houses were owned by nobility and high officials and did not cover a sufficient range of size. The average size of house in the above calculations is 159.29 sq.m. and the size of house measured varied from under 30 sq.m. to over 700. For example at Ur in the Isin/Larsa period two houses of 36 sq.m. (VI and VIII) on Straight Street and one of 28 sq.m. (VI) existed on Store Street. At the other end of the scale a house of 330 sq.m. (IV) was found on Paternoster Row. This variation in size was found at other sites: at Khafajeh (Houses 4, J42:2) a house of 35 sq.m. was measured while another was c.300 (XXXVIII) and in Houses I & 2 the sizes varied from 528 sq. m to 64 and 55 sq.m. A number of houses in the region of 12-48 sq.m. were found at Asmar, Stratum Va mixed with others of 248, 242, 154 etc., and this can be seen for all the sites where a number of houses could be measured. Thus it would seem that the houses excavated cover a wide range of size. It is
difficult to believe that there were enough houses under 35 sq.m. in size (a very small area indeed) to counteract the larger houses to bring the average down to one sar. Could it be that the documents of sale from which the average of one sar is taken refer not to whole houses but to rooms or groups of rooms?

If Professor Gelb's contention that the average size of house in Mesopotamia was 35.3 sq.m. is correct this would raise the population figures substantially. As examples, the population of Tell Asmar (Early Dynastic and Akkadian town) would be 3000, Nippur 90,642, Ur 50,893, Warka 431,714 and Nimrud 308,571. (Densities of 857 per hectare). The last two in particular would seem to be a little high.

At present the differences between the archaeological and philological evidence cannot be resolved and for the purpose of this study the figures on page 20 will be used to consider the agricultural resources and the ability of the land to supply the local population.
References and notes for Appendix II

1. Dossin G. 'Les noms d'années et éponymes dans les 'Archive de Wari'


3. Adams Diyala

4. Gibson M. 'City and Area of Kish including Appendix V 'Settlement and irrigation patterns in ancient Akkad' by R. Adams', 182.

5. Uruk Countryside.

6. Adams Diyala 41

7. Nuzi: HSS XVI No. 392 Average 4.5
   HSS XVI No. 402 " 5
   Nippur: BE XIV No. 58 " 4.33
   Assyria: Johns Doomsday Book: Nos. 1, 2, 3, 4, 6, 8, 11; Average 4.33
   Averages: 4.54 - rounded up to 5.

8. Delougaz P., Hill H.D, Lloyd S. 'Private Houses and Graves in the Diyala', 276, Table II. Details of plans for Khafajeh and Tell Asmar sites taken from Plate 1 and Plate 23.

9. ibid., 196 and Plate 22 re the excavation of a pre-Larsa wall.


11. McCown D, and Haines R. 'Nippur I, Temple of Enlil... Plates 5, 59, 61, 62, 64, 708, 74 A & B, 75 A & B.


15. UE VIII Plate 63 A & 63 B.

16. UE IX Plate 71.


18. UVB 21, Plates 27 & 28.


20. Gibson M. 'City & Area of Kish', 118-158, 182-208. Uruk Countryside

22. Luckenbill D.D. *Ancient Records of Assyria and Babylonia*,
I, 57, para. 164: Tukulti-Ninurta Year 1:
28,800 Mitite warriors captured.
146, para. 445: Assurnasirpal Year 1:
City of Kinabu, 600 warriors slain and 3000 captives burned.
149, para. 448: Assurnasirpal Year 3:
1,460 warriors slain, 12,000 soldiers captured east of the Tigris.
153, para. 455: Assurnasirpal Year 3:
6 forts and 150 'towns' listed for the state (?) of Amena in the campaign against Zamua.
II, 129 para. 257: Sennacherib's 1st campaign:
80,000 bowmen in the army of Merodach Baladan of Babylon.

APPENDIX III

Selected Vocabulary

<table>
<thead>
<tr>
<th>Word 1</th>
<th>Word 2</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>abût nûri/UBI.TD.DA.KU</td>
<td></td>
<td>River-UBI-fish (type of barbel)</td>
</tr>
<tr>
<td>abût tûmti/UBI.A.AB.BA.KU</td>
<td></td>
<td>Sea-water-UBI-fish - Polydactylus tetradactylus</td>
</tr>
<tr>
<td>agâgarû/AGARGARA, NUM.KU</td>
<td></td>
<td>shad (Hilsa ilisha)</td>
</tr>
<tr>
<td>aj(j)alu/DûRA.BAR</td>
<td></td>
<td>fallow deer</td>
</tr>
<tr>
<td>akalu, aklu/NINDA, NINDA.ME, NINDA.HI.A.</td>
<td></td>
<td>bread</td>
</tr>
<tr>
<td>alappânu/KASU-SA ZÎZ.A.AN</td>
<td></td>
<td>special beer</td>
</tr>
<tr>
<td>alpu/GU</td>
<td></td>
<td>ox</td>
</tr>
<tr>
<td>appânû</td>
<td></td>
<td>type of chick pea</td>
</tr>
<tr>
<td>apsâsû/AB.ZA.ZA</td>
<td></td>
<td>?water buffalo</td>
</tr>
<tr>
<td>arsânu/GIS.HAŠHUR.KUR.RA</td>
<td></td>
<td>'apricot'</td>
</tr>
<tr>
<td>arsânu</td>
<td></td>
<td>?burghul-like product</td>
</tr>
<tr>
<td>arsuppu/ZSTUB.KU</td>
<td></td>
<td>Barbel (Barbus (Puntius) sharpeyi Gunther)</td>
</tr>
<tr>
<td>amupîru/Â.UR.SAG</td>
<td></td>
<td>?saffron</td>
</tr>
<tr>
<td>bappîru/BÂPPIR</td>
<td></td>
<td>beer bread</td>
</tr>
<tr>
<td>billatu/KASU-SA (DIDA)</td>
<td></td>
<td>common beer</td>
</tr>
<tr>
<td>buqlu/MUNU</td>
<td></td>
<td>green malt</td>
</tr>
<tr>
<td>burîsû/GIS.(ŠIM).LI</td>
<td></td>
<td>pine-nut</td>
</tr>
<tr>
<td>butuntu/GIS.LAM.GAL</td>
<td></td>
<td>pistachio nut</td>
</tr>
<tr>
<td>DAR.RA</td>
<td></td>
<td>dried</td>
</tr>
<tr>
<td>diskîptuhû/KASU-SA ZÎZ.A.AN</td>
<td></td>
<td>?sweetened beer, made from emmer wheat</td>
</tr>
<tr>
<td>dispu/LÂL</td>
<td></td>
<td>honey, also date syrup</td>
</tr>
</tbody>
</table>

Page in Volume I

<table>
<thead>
<tr>
<th>Word 1</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>River-UBI-fish (type of barbel)</td>
<td>172</td>
</tr>
<tr>
<td>Sea-water-UBI-fish - Polydactylus tetradactylus</td>
<td>172</td>
</tr>
<tr>
<td>shad (Hilsa ilisha)</td>
<td>173</td>
</tr>
<tr>
<td>fallow deer</td>
<td>161</td>
</tr>
<tr>
<td>bread</td>
<td>124</td>
</tr>
<tr>
<td>special beer</td>
<td>144</td>
</tr>
<tr>
<td>ox</td>
<td>99</td>
</tr>
<tr>
<td>type of chick pea</td>
<td>261</td>
</tr>
<tr>
<td>?water buffalo</td>
<td>103</td>
</tr>
<tr>
<td>'apricot'</td>
<td>210</td>
</tr>
<tr>
<td>?burghul-like product</td>
<td>111</td>
</tr>
<tr>
<td>Barbel (Barbus (Puntius) sharpeyi Gunther)</td>
<td>170</td>
</tr>
<tr>
<td>?saffron</td>
<td>222</td>
</tr>
<tr>
<td>beer bread</td>
<td>137</td>
</tr>
<tr>
<td>common beer</td>
<td>141</td>
</tr>
<tr>
<td>green malt</td>
<td>136</td>
</tr>
<tr>
<td>pine-nut</td>
<td>217</td>
</tr>
<tr>
<td>pistachio nut</td>
<td>217</td>
</tr>
<tr>
<td>dried</td>
<td>174</td>
</tr>
<tr>
<td>?sweetened beer, made from emmer wheat</td>
<td>143</td>
</tr>
<tr>
<td>honey, also date syrup</td>
<td>225</td>
</tr>
</tbody>
</table>
DUO.BIG.DUB.BUR fermenting vat with draining hole at bottom.

dupnu, tuhnu millet

ejiy vegetable oil (see žamnu)

enyu/GZ she-goat, goat

ejinnu/GIS.APIN seeder plough

ejdu type of cheese

erbu/SURU 5 locust

gAIR cheese

GA.ŻAR KAS (GAZI) ?spiced cheese

gaj(j)atu type of cereal

GA.ŻE.A ?cheese mixed with barley or barley & milk gruel

GA.SIG.7.A dairy product

GIR.LAM ?cake

gukkallu/GUKKAL (UDU.JUL) fat-tailed sheep (Type ?)

GU madlute ?salted beef or stuffed beef rolls?

GU.SAR ?dried or green pulse

habbu/GIS.ŽENNUR (XIB) GAL ?plum

halžu to press

hallrü/GU.GAL chick pea

JA.MUS ?eel

harbu/GIS.APIN.TUK.KIN, GIS.APIN.ŠU.KIN plough used to break up soil (see maj eru)

hasšu/GI.IS.SAR lettuce

hasšuru/GIS.HAŠHUR apple

haš/G.ŽAR.ŽAR ?thyme

hašanmu onion, or garlic

himėtu/X.NUN ghee
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>bimri</td>
<td>fermented drink made from barley and fruit at Mari.</td>
<td>291</td>
</tr>
<tr>
<td>HI+SUHUR</td>
<td>type of barbel.</td>
<td>172</td>
</tr>
<tr>
<td>`I.AB</td>
<td>?cream</td>
<td>198</td>
</tr>
<tr>
<td>`I.GIš sirdi</td>
<td>olive oil</td>
<td>204</td>
</tr>
<tr>
<td>`I.KU</td>
<td>fish oil or a type of fish</td>
<td>198</td>
</tr>
<tr>
<td>isqūqu/`IZ.KUM</td>
<td>semolina or burghul-type product</td>
<td>113</td>
</tr>
<tr>
<td>kakkG/GU.TUR</td>
<td>lentils</td>
<td>192</td>
</tr>
<tr>
<td>kakkullu/OAKKUL</td>
<td>mash tub (see namsitu)</td>
<td>147</td>
</tr>
<tr>
<td>kamiššaru/GIS.GENNUR(KIB).KUR.RA</td>
<td>pear</td>
<td>215</td>
</tr>
<tr>
<td>kamūnu/Ú.DIN.TIR, GA.MUN</td>
<td>cumin</td>
<td>220</td>
</tr>
<tr>
<td>karānu/(GIS).GEŠTIN</td>
<td>grapes, wine, vine</td>
<td>227</td>
</tr>
<tr>
<td>karāšu/GA.RAŠ(.SAR)</td>
<td>leek</td>
<td>190</td>
</tr>
<tr>
<td>karš/GAZI</td>
<td>?mustard</td>
<td>221</td>
</tr>
<tr>
<td>KAš.GIČ</td>
<td>dark beer</td>
<td>140</td>
</tr>
<tr>
<td>KAš.KAL</td>
<td>strong beer</td>
<td>140</td>
</tr>
<tr>
<td>KAš.SI4</td>
<td>red-brown beer</td>
<td>140</td>
</tr>
<tr>
<td>KAš.SUR</td>
<td>filtered beer</td>
<td>140</td>
</tr>
<tr>
<td>kibtu/GIG</td>
<td>'bread-wheat'</td>
<td>42</td>
</tr>
<tr>
<td>ki.KAxSAR.KU6</td>
<td>sea-fish (Pampus argenteus) (Arab. subeldi)</td>
<td>172</td>
</tr>
<tr>
<td>kisibirru/(Ú).S(IL).SAR</td>
<td>coriander</td>
<td>219</td>
</tr>
<tr>
<td>kuddimmu</td>
<td>plant used to produce salt or alkali.</td>
<td>225</td>
</tr>
<tr>
<td>kunēšu/ZIZ</td>
<td>emmer wheat</td>
<td>42</td>
</tr>
<tr>
<td>KU6.NE</td>
<td>fresh fish (KU6.BIL), masgoof (smoked fish)(KU6.IZI)</td>
<td>175</td>
</tr>
<tr>
<td>kuniphu</td>
<td>onion</td>
<td>190</td>
</tr>
<tr>
<td>kuppū/GU.BÍ.KU6</td>
<td>?eel</td>
<td>173</td>
</tr>
<tr>
<td>kurangu/Ú.SE.LI.A</td>
<td>?rice</td>
<td>43</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>kurgi / KUR.GI.MUSHEN</td>
<td>goose</td>
<td>179</td>
</tr>
<tr>
<td>kusụpu / NINDA.MEŠ</td>
<td>bread</td>
<td>125</td>
</tr>
<tr>
<td>leptu / LU.UB.SAR</td>
<td>turnip</td>
<td>195</td>
</tr>
<tr>
<td>leptu / SE.SA</td>
<td>roasted barley</td>
<td>110</td>
</tr>
<tr>
<td>lipu / L.UU</td>
<td>mutton fat</td>
<td>198</td>
</tr>
<tr>
<td>littu / AB</td>
<td>cow</td>
<td>99</td>
</tr>
<tr>
<td>lulụmu / LULIM</td>
<td>?red deer</td>
<td>161</td>
</tr>
<tr>
<td>mafuru / GİŞ.APIN.SU.KIN</td>
<td>plough used to break up soil (see ḥarbu)</td>
<td>68</td>
</tr>
<tr>
<td>GIS.APIN.TUK.KIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>malẹku</td>
<td>out of meat</td>
<td>150</td>
</tr>
<tr>
<td>mundu / NİG.Â.RA</td>
<td>semolina (see simdu)</td>
<td>110</td>
</tr>
<tr>
<td>mutequ / NINDA.KU7.KU7</td>
<td>'sweet pastry'</td>
<td>127</td>
</tr>
<tr>
<td>nebam / i.ŠAY</td>
<td>pig fat</td>
<td>198</td>
</tr>
<tr>
<td>namittu / OAKKUL</td>
<td>mash tun (see kakkullu)</td>
<td>147</td>
</tr>
<tr>
<td>nappittu / GI.MA.AN.SIM</td>
<td>reed sieve</td>
<td>118</td>
</tr>
<tr>
<td>naptan ħarrin / NİG.DU.LUGAL</td>
<td>meal for the king</td>
<td>244</td>
</tr>
<tr>
<td>naspanu / GİŞ.ÜR.ÜR.RA</td>
<td>harrow</td>
<td>71</td>
</tr>
<tr>
<td>nassabu</td>
<td>?artioboke</td>
<td>195</td>
</tr>
<tr>
<td>NINDA emsu</td>
<td>'sour' bread</td>
<td>125</td>
</tr>
<tr>
<td>NINDA KUM</td>
<td>flat tannour-type bread</td>
<td>125</td>
</tr>
<tr>
<td>NINDA merešu / NINDA.İ.DE.A</td>
<td>'sweetened bread'</td>
<td>126</td>
</tr>
<tr>
<td>NINDA mutq0 / NINDA.İAL.İAL</td>
<td>'sweet cake or bread'</td>
<td>127</td>
</tr>
<tr>
<td>NINDA sammičatum</td>
<td>bread from semolina</td>
<td>111</td>
</tr>
<tr>
<td>niụt /.KUR</td>
<td>Bishop's Weed (Ammi Visnaga)</td>
<td>222</td>
</tr>
<tr>
<td>nurma / GİŞ.NU.ÜR.MA</td>
<td>pomegranate</td>
<td>209</td>
</tr>
<tr>
<td>papasasu</td>
<td>coarsely crushed grain from which malted dishes or bread can be made.</td>
<td>113</td>
</tr>
<tr>
<td>paspasu / UZ.TUR.MUSHEN</td>
<td>duck</td>
<td>179</td>
</tr>
<tr>
<td>puradu / SUPUR.KU6</td>
<td>barbel (Barbus esocinus ( Heckel))</td>
<td>171</td>
</tr>
<tr>
<td>qadu / MUSHEN.HUL.A.MUSHEN. URU.HUL.A.MUSHEN</td>
<td>sandgrouse (Pterocles alchate)</td>
<td>180</td>
</tr>
<tr>
<td>gẹmu / ẑ1</td>
<td>flour</td>
<td>117</td>
</tr>
<tr>
<td>Original Text</td>
<td>English Translation</td>
<td>Page</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
<td>------</td>
</tr>
<tr>
<td>raqqu/BAL.GI.KU₆</td>
<td>turtle/tortoise (see ṭeleppû)</td>
<td>173</td>
</tr>
<tr>
<td>sahlu/ZAG.HI.LI.SAR</td>
<td>cress</td>
<td>194</td>
</tr>
<tr>
<td>sañdu</td>
<td>to grind</td>
<td>111</td>
</tr>
<tr>
<td>sañdu/NAGA</td>
<td>plant whose ashes are used as a salt replacement</td>
<td>224</td>
</tr>
<tr>
<td>saaq=G/A.TIR (ESÀ)</td>
<td>dish made from semolina, mixed with water, milk or oil.</td>
<td>112</td>
</tr>
<tr>
<td>samdu/NIG.Â.RA</td>
<td>semolina (see mundu)</td>
<td>118</td>
</tr>
<tr>
<td>sukannInu/TU.KIL(GUR₄)</td>
<td>dove or pigeon</td>
<td>180</td>
</tr>
<tr>
<td>sulumbûl/UX.SIG.SUD</td>
<td>wool-coated sheep (Type 2)</td>
<td>96</td>
</tr>
<tr>
<td>suluppû/îU.LUM</td>
<td>date</td>
<td>205</td>
</tr>
<tr>
<td>summatu/TU.MUSEN</td>
<td>dove or pigeon</td>
<td>180</td>
</tr>
<tr>
<td>SU.SU</td>
<td>smoked</td>
<td>175</td>
</tr>
<tr>
<td>sabîtu/MÃ.S.Â</td>
<td>gazelle</td>
<td>160</td>
</tr>
<tr>
<td>sabîtu</td>
<td>to press</td>
<td>201</td>
</tr>
<tr>
<td>sulásu, sallântu/ DAR.MELU.GA.MUSEN</td>
<td>domestic hen</td>
<td>180</td>
</tr>
<tr>
<td>šahû/GIR.KU₆</td>
<td>sea-fish (Caranx sexfasciatus)</td>
<td>171</td>
</tr>
<tr>
<td>šâhû/SAH, ŠAH</td>
<td>pig</td>
<td>154</td>
</tr>
<tr>
<td>šakâku</td>
<td>to harrow</td>
<td>71</td>
</tr>
<tr>
<td>šâliâru/GIS.SENNUR (KIB)</td>
<td>plum</td>
<td>215</td>
</tr>
<tr>
<td>šamakkilum/SUM.SIKIL</td>
<td>onion (or garlic)</td>
<td>190</td>
</tr>
<tr>
<td>šamakkamû/SI.GIS,l</td>
<td>linseed</td>
<td>199</td>
</tr>
<tr>
<td>šambalâltu/CJULLIM.SAR</td>
<td>fenugreek</td>
<td>222</td>
</tr>
<tr>
<td>šammu/CJ.GIS</td>
<td>vegetable oil (see ellu)</td>
<td>199</td>
</tr>
<tr>
<td>šebêru</td>
<td>to level</td>
<td>71</td>
</tr>
<tr>
<td>šeâleppû/BAL.GI.KU₆</td>
<td>turtle/tortoise (see raqqu)</td>
<td>173</td>
</tr>
<tr>
<td>še+SUGUR</td>
<td>sea-fish (Polydactylus dactylus)</td>
<td>172</td>
</tr>
<tr>
<td>šešu/SE</td>
<td>barley</td>
<td>42</td>
</tr>
<tr>
<td>šikâru/KAS</td>
<td>beer</td>
<td>136</td>
</tr>
<tr>
<td>šimru/Ĝ.GA</td>
<td>fennel</td>
<td>223</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>3izbu/šA</td>
<td>milk, sour milk</td>
<td>30</td>
</tr>
<tr>
<td>šumu/SUM</td>
<td>garlic (or onion)</td>
<td>185</td>
</tr>
<tr>
<td>tarlugallu/DAR.LUGAL.</td>
<td>male of domestic hen?</td>
<td>190</td>
</tr>
<tr>
<td>MUSEN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tarru/DAR.MUSEN</td>
<td>?domestic hen</td>
<td>180</td>
</tr>
<tr>
<td>tinūru/IM.SU.NIGIN.NA,</td>
<td>ovens</td>
<td>180</td>
</tr>
<tr>
<td>UUXUN.MUHALDIM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>titīpu/TITAB</td>
<td>malted beer-bread</td>
<td>134</td>
</tr>
<tr>
<td>tittu/GIŠ.PES(NA)</td>
<td>fig</td>
<td>137</td>
</tr>
<tr>
<td>ġanttu/MUN</td>
<td>salt</td>
<td>208</td>
</tr>
<tr>
<td>uḫinnu</td>
<td>green dates</td>
<td>223</td>
</tr>
<tr>
<td>UKUŠ</td>
<td>cucumber</td>
<td>212</td>
</tr>
<tr>
<td>ulušinnu/KAš.ZIZ4i</td>
<td>beer with emmer-wheat in it.</td>
<td>195</td>
</tr>
<tr>
<td>KAS.DIN .DIG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>urīsu/MAŠ</td>
<td>goat</td>
<td>98</td>
</tr>
<tr>
<td>3izbu/Š.DIN.TIR.ČE6</td>
<td>black cumin (Nigella sativa)</td>
<td>220</td>
</tr>
<tr>
<td>ZI.JUTU</td>
<td>milk and flour gruel</td>
<td>185</td>
</tr>
<tr>
<td>zimzimmu/SUM.ŠUŠ.A</td>
<td>type of onion</td>
<td>190</td>
</tr>
<tr>
<td>ZI sammiDATUM</td>
<td>flour from semolina</td>
<td>111</td>
</tr>
<tr>
<td>ZIZ.ŠA</td>
<td>kushuk - wheat and milk porridge</td>
<td>185</td>
</tr>
</tbody>
</table>
Figure 1 NUTRITION CHART FOR MESOPOTAMIA

Barley rations for a 30-day month: daily intakes

<table>
<thead>
<tr>
<th>Barley</th>
<th>SÌLA p.m. SÌLA p.d. Litres</th>
<th>Kgs.</th>
<th>100g.</th>
<th>Calories</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vit.A R.E.*</th>
<th>Thiamin</th>
<th>Riboflavin</th>
<th>Vit.C</th>
<th>Niacin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>g</td>
<td>m.g.</td>
<td>m.g.</td>
<td></td>
<td>micr.g</td>
<td>m.g.</td>
<td>m.g.</td>
<td>m.g.</td>
<td>m.g.</td>
</tr>
<tr>
<td>90</td>
<td>3</td>
<td>3</td>
<td>2.295</td>
<td>23</td>
<td>8280</td>
<td>223</td>
<td>1150</td>
<td>92</td>
<td>8.74</td>
<td>4.6</td>
<td>8</td>
<td>165.6</td>
</tr>
<tr>
<td>80</td>
<td>2.66</td>
<td>2</td>
<td>2.66</td>
<td>2</td>
<td>7200</td>
<td>194</td>
<td>1000</td>
<td>80</td>
<td>7.6</td>
<td>4</td>
<td>8</td>
<td>144</td>
</tr>
<tr>
<td>65</td>
<td>2.16</td>
<td>2</td>
<td>1.65</td>
<td>1.53</td>
<td>5400</td>
<td>145.5</td>
<td>750</td>
<td>60</td>
<td>5.94</td>
<td>3.3</td>
<td>8</td>
<td>118.8</td>
</tr>
<tr>
<td>60</td>
<td>2</td>
<td>2</td>
<td>1.53</td>
<td>15</td>
<td>5400</td>
<td>145.5</td>
<td>750</td>
<td>60</td>
<td>5.7</td>
<td>3</td>
<td>8</td>
<td>108</td>
</tr>
<tr>
<td>50</td>
<td>1.66</td>
<td>1.66</td>
<td>1.27</td>
<td>12.5</td>
<td>4500</td>
<td>121.25</td>
<td>625</td>
<td>50</td>
<td>4.75</td>
<td>2.5</td>
<td>8</td>
<td>90</td>
</tr>
<tr>
<td>40</td>
<td>1.33</td>
<td>1.33</td>
<td>1</td>
<td>10</td>
<td>3600</td>
<td>97</td>
<td>500</td>
<td>40</td>
<td>3.8</td>
<td>2</td>
<td>8</td>
<td>72</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>1</td>
<td>.765</td>
<td>7.5</td>
<td>2700</td>
<td>72.75</td>
<td>375</td>
<td>30</td>
<td>2.85</td>
<td>1.5</td>
<td>8</td>
<td>54</td>
</tr>
<tr>
<td>25</td>
<td>.83</td>
<td>.83</td>
<td>.63</td>
<td>6</td>
<td>2160</td>
<td>58.2</td>
<td>300</td>
<td>24</td>
<td>2.28</td>
<td>1.2</td>
<td>8</td>
<td>43.2</td>
</tr>
<tr>
<td>20</td>
<td>.66</td>
<td>.66</td>
<td>.5</td>
<td>5</td>
<td>1800</td>
<td>48.5</td>
<td>250</td>
<td>20</td>
<td>1.9</td>
<td>1</td>
<td>8</td>
<td>36</td>
</tr>
<tr>
<td>15</td>
<td>.5</td>
<td>.5</td>
<td>.383</td>
<td>4</td>
<td>1440</td>
<td>38.8</td>
<td>200</td>
<td>16</td>
<td>1.52</td>
<td>.8</td>
<td>8</td>
<td>28.8</td>
</tr>
<tr>
<td>14</td>
<td>.466</td>
<td>.466</td>
<td>.356</td>
<td>3.5</td>
<td>1260</td>
<td>33.95</td>
<td>175</td>
<td>14</td>
<td>1.33</td>
<td>.7</td>
<td>8</td>
<td>25.2</td>
</tr>
<tr>
<td>10</td>
<td>.33</td>
<td>.33</td>
<td>.25</td>
<td>2.5</td>
<td>900</td>
<td>24.24</td>
<td>125</td>
<td>10</td>
<td>.95</td>
<td>.5</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>.16</td>
<td>.16</td>
<td>.12</td>
<td>1.2</td>
<td>432</td>
<td>11.6</td>
<td>60</td>
<td>4.8</td>
<td>.45</td>
<td>.24</td>
<td>8</td>
<td>8.6</td>
</tr>
<tr>
<td>4</td>
<td>.133</td>
<td>.133</td>
<td>.1017</td>
<td>1.02</td>
<td>367</td>
<td>9.89</td>
<td>51</td>
<td>4.08</td>
<td>.39</td>
<td>.2</td>
<td>8</td>
<td>7.3</td>
</tr>
</tbody>
</table>

(1 SÌLA = 1 litre: 1 litre = .765 kgs. weighed barley grains)

| 96     | 3.2                          | 2.66 | 2    | 20      | 7200    | 194     | 1000 | 80          | 7.6     | 4          | 8      | 144    |
| 72     | 2.4                          | 2    | 1.53  | 15      | 5400    | 145.5   | 750  | 60          | 5.7     | 3          | 8      | 108    |
| 48     | 1.6                          | 1.33 | 1    | 10      | 3600    | 97      | 500  | 40          | 3.8     | 3          | 8      | 72     |
| 36     | 1.2                          | 1    | .765  | 7.5     | 2700    | 72.75   | 375  | 30          | 2.85    | 2          | 8      | 54     |
| 24     | .8                           | .66  | .5    | 5       | 1800    | 48.5    | 250  | 20          | 1.9     | 1          | 8      | 36     |
| 18     | .6                           | .5   | .383  | 4       | 1440    | 38.8    | 200  | 16          | 1.52    | .8         | 8      | 28.8   |
| 12     | .4                           | .33  | .25   | 2.5     | 900     | 24.25   | 124  | 10          | .95     | .5         | 8      | 18     |

* = Retinol equivalents
## Figure 2  EXCERPTS FROM THE FAO RECOMMENDED TABLES OF INTAKES: HANDBOOK ON HUMAN NUTRITIONAL REQUIREMENTS

**FAO Nutritional Series No.28, 1974, Table 1**

<table>
<thead>
<tr>
<th>Age</th>
<th>Calories</th>
<th>Protein</th>
<th>Vit.A</th>
<th>Vit.D</th>
<th>Thiamin</th>
<th>Riboflavina</th>
<th>Niacin</th>
<th>Ascorbic acid</th>
<th>Calcium</th>
<th>Iron</th>
<th>Folic acid</th>
<th>Vit.B12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g.</td>
<td>mc.r.g.</td>
<td>mc.r.g.</td>
<td>m.g.</td>
<td>m.g.</td>
<td>m.g.</td>
<td>m.g.</td>
<td>m.g.</td>
<td>g.</td>
<td>m.g.</td>
<td>m.c.r.g.</td>
<td>m.c.r.g.</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1</td>
<td>820</td>
<td>14</td>
<td>300</td>
<td>10</td>
<td>.3</td>
<td>.5</td>
<td>5.4</td>
<td>20</td>
<td>.5-.6</td>
<td>5-10</td>
<td>60</td>
<td>.3</td>
</tr>
<tr>
<td>1-3</td>
<td>1360</td>
<td>16</td>
<td>250</td>
<td>10</td>
<td>.5</td>
<td>.8</td>
<td>9.0</td>
<td>20</td>
<td>.4-.5</td>
<td>5-10</td>
<td>100</td>
<td>.9</td>
</tr>
<tr>
<td>4-6</td>
<td>1850</td>
<td>20</td>
<td>300</td>
<td>10</td>
<td>.7</td>
<td>1.1</td>
<td>12.1</td>
<td>20</td>
<td>.4-.5</td>
<td>5-10</td>
<td>100</td>
<td>1.5</td>
</tr>
<tr>
<td>7-9</td>
<td>2190</td>
<td>25</td>
<td>400</td>
<td>2.5</td>
<td>.9</td>
<td>1.3</td>
<td>14.5</td>
<td>20</td>
<td>.4-.5</td>
<td>5-10</td>
<td>100</td>
<td>1.5</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adolescents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-12</td>
<td>2600</td>
<td>30</td>
<td>575</td>
<td>2.5</td>
<td>1.0</td>
<td>1.6</td>
<td>17.2</td>
<td>20</td>
<td>.6-.7</td>
<td>5-10</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>13-15</td>
<td>2900</td>
<td>30</td>
<td>725</td>
<td>2.5</td>
<td>1.2</td>
<td>1.7</td>
<td>19.1</td>
<td>30</td>
<td>.6-.7</td>
<td>9-18</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>16-19</td>
<td>3070</td>
<td>38</td>
<td>750</td>
<td>2.5</td>
<td>1.2</td>
<td>1.8</td>
<td>20.3</td>
<td>30</td>
<td>.5-.6</td>
<td>5- 9</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adolescents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-12</td>
<td>2350</td>
<td>29</td>
<td>575</td>
<td>2.5</td>
<td>.9</td>
<td>1.4</td>
<td>15.5</td>
<td>20</td>
<td>.6-.7</td>
<td>5-10</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>13-15</td>
<td>2490</td>
<td>31</td>
<td>725</td>
<td>2.5</td>
<td>1.0</td>
<td>1.5</td>
<td>16.4</td>
<td>30</td>
<td>.6-.7</td>
<td>12-24</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>16-19</td>
<td>2310</td>
<td>30</td>
<td>750</td>
<td>2.5</td>
<td>.9</td>
<td>1.4</td>
<td>15.2</td>
<td>30</td>
<td>.5-.6</td>
<td>14-28</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>Adult male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderately</td>
<td>3000</td>
<td>37</td>
<td>750</td>
<td>2.5</td>
<td>1.2</td>
<td>1.8</td>
<td>19.8</td>
<td>30</td>
<td>.4-.5</td>
<td>5- 9</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>active</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderately</td>
<td>2200</td>
<td>29</td>
<td>750</td>
<td>2.5</td>
<td>.9</td>
<td>1.3</td>
<td>14.5</td>
<td>30</td>
<td>.4-.5</td>
<td>14-28</td>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>active</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Figure 3**

NUTRITIONAL VALUE OF BARLEY FROM FOOD COMPOSITION: TABLES FOR USE IN THE MIDDLE EAST, SECTION I,

COMPOSITION OF FOODS, 100 grams, edible portion

<table>
<thead>
<tr>
<th>Food Energy Content</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Retinol equiv.</th>
<th>Thiamin</th>
<th>Riboflavin</th>
<th>Niacin</th>
<th>Vit.C</th>
<th>Waste</th>
<th>Fibre</th>
<th>Fat</th>
<th>Ash</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARLEY</td>
<td>360</td>
<td>9.7</td>
<td>50</td>
<td>4</td>
<td>.38</td>
<td>.20</td>
<td>7.2</td>
<td>ø</td>
<td>0</td>
<td>6.5</td>
<td>1.9</td>
<td>2.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>
## Figure 4. COMPARISON OF SELECTED PROFESSIONS (Daily barley rations in litres)

<table>
<thead>
<tr>
<th>Professional</th>
<th>Chagar Bazar</th>
<th>Mari</th>
<th>Rimah</th>
<th>Nusiri</th>
<th>Nippur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpenter</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td>B 163</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpenter</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td>B 163</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanner</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanner</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td>B 163</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brewer</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.99</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brewer</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.5</td>
<td>2.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardener</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardener</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.7</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpenter</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.3</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpenter</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shepherd</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.7</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shepherd</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upholder</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upholder</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.94</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.123</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.43</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.43</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.43</td>
<td>.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.50</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.18</td>
<td>.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tailor</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scribe</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaver</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.17</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaver</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.7</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>F 108</td>
<td>1 (f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>G 1997.44</td>
<td>1.33 (f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porter</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>A p.5</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porter</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
<td>Reference Amount</td>
</tr>
<tr>
<td>C 34</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**A** = Or.34/35 - Lagas  
**B** = MAD I - Asmar  
**C** = Westenholz Jena - Nippur  
**D** = CTH 3 - Ur  
**E** = TCS I  
**F** = SACT II  
**G** = Iraq 7  
**H** = ASH IX  
**J** = Bailey  
**K** = BSS IV  
**L** = BE XV  
**M** = BE XIV  

*Female*
Fig. 6
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright

Fig. 13

Image removed due to third party copyright

Fig. 14
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright
Fig. 26

Image removed due to third party copyright.

Fig. 27
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright

Fig. 40

Image removed due to third party copyright

Fig. 41
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright
Image removed due to third party copyright
References and Notes for Chapter I (pages 6-39)

1. Flora I, Fig. 8.


3. 200 mm rainfall is the theoretical minimum rainfall necessary for dry-farming but this often proves insufficient because it can be unreliable.

4. Oates D. Studies in the Ancient History of Northern Iraq. Fig. 1.

5. Flora I, Fig. 5.


8. Dorrell P. 'Note of the Geomorphology of the country near Umm Dabaghiyah' Iraq XXXIV, 1972, 70.


11. Butzer K.W. 'Climatic changes in arid regions since the Pliocene' in History of Land Use in the Arid Regions (ed. D. Stamp), 41-42.

12. ibid., 43.


16. Adams R.M. Appendix V 'Settlement and Irrigation patterns in Ancient Akkad' in The City and Area of Kish (M.Gibson)

17. Adams R.M. & Nissen H. The Uruk Countryside


20. Van der Waerden B.L. 'On Babylonian Astronomy I: the Venus Tablets of Ammisaduqa' Ex Oriente Lux III, 1944-48, 41-42. c.f. Landsberger, Jahreszeiten, 250-251. Landsberger finds that the large number of dated texts dealing with delivery of barley in the Ur III and Old Babylonian periods accord with those of the Neo-Babylonian period. However the delivery of dates in the Old Babylonian period was generally
carried out in Month VII while in the Neo-Babylonian period it took place in Months VII & VIII. He suggests that the date harvests in the Old Babylonian period were about three weeks earlier than in the Neo-Babylonian.


24. ibid., 268; CAD H Vol. 8, ḫamurrum (kind of cedar), 147; AHw. ḫamurrum, type of cypress, 335.


26. e.g. Gadd Stones Plate 20; British Museum, Assyrian Sculpture in the British Museum, Salmanesar to Sennacherib Plates XXXI, LVI; Barnett R.D. Assyrian Palace Reliefs Plates 79, 117.


29. Iraq Handbook has been used, together with Ionides M. The Regime of the Euphrates and Tigris, as the main source books for the geomorhology and geography of Iraq.


31. Gibson M. City and Area of Kish, 16 & 17.


34. Le Strange G. The Lands of the Eastern Caliphate, 26.


37. ibid., 4.

38. ibid., 1.


40. Buringh Soils, 186.

41. Iraq Handbook, 35.
See the reconstructions by Gibson (City and Area of Kish, Fig. 69) and Adams (Appendix V, City and Area of Kish, Fig. 68) which differ slightly in the number and alignment of channels in the Sippar to Nippur area.

Jacobsen T. 'Waters of Ur' Iraq XXII, 179.

Uruk Countryside, 35-39, Fig. 17.


Jacobsen T. 'Waters of Ur' Iraq XXII, 179.

ibid., 183.


Oates D. 'Euphrates History', Encyclopaedia Britannica Vol. 8, 826-27.

Adams Diyala, 3.

Iraq Handbook, 49.

Oates D. 'Tigris History' Encyclopaedia Britannica, Vol. 21, 1146.


Ionides M. The Regime of the Euphrates and Tigris, 176.

Adams Diyala, 11.

ibid., Figs 2 & 3.


Thureau-Dangin F. Les Inscriptions de Sumer et d'Akkad 66-68. (Entemena Cone iii 38-vi 10)

Oates D. 'Euphrates History' Encyclopaedia Britannica Vol. 8, 826-27.

Buringh Soils, 184 & Fig. 94.

Mallowan M.E.L. 'Development of Cities' Cambridge Ancient History, Fascicle 58, part 1, 29ff.


67. British Museum Assyrian Sculptures in the British Museum Plates XLIX-LII.


70. Buringh Soils, 218-221.

71. ibid., 225-242.

72. ibid., 37-38.


75. ibid., 115.

76. Flora I, 10-11.

77. Buringh Soils, 143.

78. ibid., 145, Fig. 65.

79. ibid., 146, Fig. 66.

80. ibid., 151-156.

81. see Gibson M. City and Area of Kish

82. see Uruk Countryside.


84. ibid., 155-56.

85. Gibson M. City and Area of Kish, 31.

86. Adams Diyala, 9; Gibson M. City and Area of Kish, 31.


88. Gibson M. City and Area of Kish, 44 No. 117 - he remarks that the effect of the wind on tells must be similar to the effect it has on rock formation in the desert.

89. Flora I, 9-10.

90. Yahia H.M. Soils and soil conditions in the Sediments of the Ramadi Province, 119 quoting the U.S. Salinity Laboratory Staff, glossary 1954.

92. Yahia H.M. Soils and soil conditions..., 120.

93. ibid., 85.

94. ibid., 123-125, quoting J.C. Russell's lecture notes on general soils for Iraqi Students (College of Agriculture, University of Baghdad).

95. ibid., 125, quoting A. A'far 'Reclamation of Saline Soils in Iraq' (in Arabic).


97. ibid., 185, Table 1; dates given for the sites tested were:

<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kish</td>
<td>3200-3000</td>
</tr>
<tr>
<td>Nippur</td>
<td>4500-3800</td>
</tr>
<tr>
<td>Warka</td>
<td></td>
</tr>
<tr>
<td>Ur</td>
<td></td>
</tr>
<tr>
<td>Tel es-Sawwan</td>
<td>6000-5000</td>
</tr>
<tr>
<td>Tel Harmal</td>
<td>2400-2000</td>
</tr>
<tr>
<td>Aqar Quf</td>
<td>1600-911</td>
</tr>
<tr>
<td>Tello</td>
<td>4500-3800</td>
</tr>
</tbody>
</table>

No details are given of the buildings from which the bricks were selected so that it is difficult to comment on the accuracy of the dates. Those given for Nippur, Ur and Tello in particular would seem to be rather early.

98. ibid., 186.

99. Yahia, H.M. Soils and soil conditions..., 133.

100. Buringh Soils, 170.

101. These soils contain salts of deliquescent calcium and magnesium chloride and are not related to any alkaline soil. A characteristic of these soils is that they remain moist even in the hot dry summers of Iraq. Buringh Soils, 92 & 89.

102. Fernea R. Shaykh and Effendi, 148-149.

103. Figures for all the crops and livestock in this section (unless otherwise stated) are taken from the Results of Agricultural and Livestock Census in Iraq for the year 1958/59 published by the Ministry of Planning, Central Bureau of Statistics, Baghdad 1961. Here the figures are from the old liva of Mosul which covered from the Sinjar across the Tigris to the Greater Zab into the mountains to the Turkish and Iran border, and south to the Little Zab.

104. Iraq Handbook 463.

105. Buringh Soils, 224.

106. Davies D. Hywel, 'Observations on Land Use in Iraq,' Economic Geography, 33, 1957, 123, Fig. 1.
107. Buringh Soils, 211.
108. Warriner D., Land and Poverty in the Middle East, 97.
110. Davies D. Hywel, 'Observations on Land Use in Iraq,' Economic Geography, 33, 1957, 123, Fig. 1.
111. Musil A., Middle Euphrates, 1-29, 73-82.
112. Adams Diyala, 13-14 and Table 3.
115. ibid., 130.
117. Yahia H.M., Soils and soil conditions..., 164.
118. Davies D. Hywel, 'Observations....' Economic Geography, 33,
120. Poyck A.P.G., Farm Studies..., 39.
121. Fernea R., Shaykh and Effendi, 39.
122. Salim S., Marsh Dwellers of the Euphrates Delta, 90-91.
123. ibid., 84-88.
124. Dowson V., Dates and Date Cultivation of the 'Iraq, 9-15.
Barley remains have been found on many archaeological sites. The following are examples dating from 3000BC on.

Ur: Broken grains of six-row barley were recovered, with other grains, from 2 graves, PG/208 and PG/296, at the Royal Cemetery (mid-third millennium). 92 complete grains of hulled barley were found near some papsukkal figures in a building probably dating to the time of the governorship of Ur by Sin-balatsu-ibim in the mid-first millennium. The measurements obtained from these grains show that the first millennium barley was larger than the third millennium material. (R. Ellison, J. Renfrew, D. Brothwell and N. Seeley 'Some food offerings from Ur...' Journal of Archaeology Science, 1978, in press)

A study of ceramic material provided imprints of barley from the 'Ubaid period to Isin/Larsa. (Helbaek H. 'Ecological effects of Irrigation' Iraq XXII, 1960, 94-95)

Tell Chragh (Shahrzor Valley): A sample of carbonized material mainly consisting of hulled two-row barley, probably H. distichnum, dated to the Later Ubaid/early Uruk period. The average length of the grains was 6.22 mm. (Helbaek H. 'Ancient Croix in Shahrzor Valley in Iraqi Kurdistan' Sumer XVI, 1960, 79-80)

Kish: 2 samples of grain were found 'one metre below the "Red earth stratum" and 3 metres northeast of the "witness" or portion of Monument "Z" temporarily left standing by Mr. Watelin'. These, (together with a sample from Jemdet Nasr) were sent for identification. The grain was found to contain seeds of six-row hulled barley - no kernels could be identified as 'hull-less' or two-row. (Field H. 'Ancient Wheat and barley from Kish' American Anthropology, 34, No.2. April/June, 1932, 307)

The description given of the find-spot of the barley samples suggested that they date to the late Early Dynastic II. (Gibson M. City and Area of Kish, Reconstructed section, Fig. 61)

Khafajeh: Barley (identified as H. vulgare) was found in House D, K.43:5, Temple Oval, mid-third millennium. (Delougaz P. Temple Oval at Khafajeh, 154.)

Tell Brak: Grain from this site was examined by Professor J. Percival of Reading and identified as H. vulgare (H.hexastichon) The material came from Naram-Sin's Palace (Rooms 10, 13 & 16) dating to the Agade period and from the HH area which continued until c.1500-1300 BC. (Mallowan M.E.L. 'Excavations at Brak and Chagar Bazar' Iraq IX, 1947, 12)
Tell Taya: Barley remains (R. vulgare) were found in Akkadian and early second millennium levels. In the Akkadian levels barley (together with wheat grains, Lathyrus sativus, Lens esculenta and Pisum sativum) were found in ovens. (J. Giles Waines, Appendix 6 'Plant Remains from Tell Taya, Iraq' in 'Tell Taya (1972-3): a summary report' (J. E. Reade) Iraq XXXV, 1973, 185-87.)

Nippur: Carbonized barley (species not specified) was found in TB Level IV, House H, Room 214, on the lowest floor level, to the north and east of the hearth, under a heavy layer of black ash and debris. This level can be dated to the late Ur III period. (McCown D and Haines R. Nippur I, Temple of Enlil, Scribal Quarters and Soundings, 52.)

Bazmosian: Two-row hulled barley (R. distichum) (average length 6.65 mm) was found in samples from Isin/Larsa and Hurrian levels. (Helbaek H. 'Isin Larsan and Hurrian Food Remains at Tell Bazmosian in the Dokan Valley' Sumer XIX, 1963, 27-30.)

Nuzi: An impression was found in the bitumen lining of a large pot in the GA.SUR level (Agade), Pavement IV. (Starr Nuzi I, 22). Carbonized grain was found in large heaps on the floors and sometimes in storage pots, for example it was found in C.49-D.11, associated with fragments of large jars and in the Palace L.22 in storage jars. (Starr Nuzi, 198, & 148) The specialists who examined this material could not always say what type of grain was found but barley was positively identified in many cases, e.g. L.22, so that 'it seems probable that all of the samples were the same'. (Starr Nuzi, 493.)

Nimrud: Hulled 6-row barley and hulled two-row barley occur in samples dating to the 7th century BC. In Sample VII (TW 53, Room 19) the average length is 6.15 mm—about the average for carbonized ancient barley from the Near East. Most was two-row, but a very small proportion was the nodding six-row variety Bere (Sample date c.666-626). A complete cast of a fresh spike of two-row hulled barley was found in the well in NW, dated to between 705 and 640 BC (Sample III). Sample IV (TW 53, Room 9) in the large storage jar, is irregular in grain size; the average is 5.6 mm but many grains do not reach 4 mm. Most of these grains are two-row, a few are Bere. (Helbaek H. Appendix 6, in Mallowan Nimrud II, 613.)

Assur: Barley was found in the Anu-Adad Temple, dated to the late Assyrian period. (MDOG No. 28, 1905, 18)

Flora IX, 194-208.
Wheat remains have been found on many archaeological sites. The following are examples from 3000 BC on.

Ur: Some broken wheat grains and fragments of wheat glumes were found in grave PG/208 in the Royal Cemetery (mid-third millennium). They were found together with barley grains, some pea seeds, and seed pods of Medicago sp., a common weed. The wheat appears to be a free-threshing type but the fragmented condition of the material has made a more specific identification impossible. It is thought that the sample may be the remains of crop-processing, although how this got in a grave is unclear. (R. Ellison et al. 'Some food offerings from Ur...' Journal of Archaeological Science in press)

Emmer imprints were found in pottery dating from the Ubaid period. (Helbaek H. 'Ecological effects of Irrigation. Iraq XXII, 1960, 194-195.)

Tell Taya: Grains of Triticum aestivum were found in Early Dynastic, Akkadian and early second millennium levels. T. dicoccum was found in Akkadian and early second millennium levels. Small amounts of T. dicoccum and T. aestivum were found with larger amounts of barley and a few seeds of grass pea, lentils, and field pea, in ovens in the Akkadian levels. (Waines J. Giles, Appendix 6, 'Plant remains from Tell Taya, Iraq' in 'Tell Taya (1972-3): a summary report' (J. E. Reade) Iraq XXXV, 1973, 185-187.)

Tell Chragh (Shahrzor) 1 grain of T. dicoccum was identified (length estimated at 6.65 mm), dating to the late Ubaid/early Uruk. (Helbaek H. 'Ancient Crops in the Shahrzor Valley' Sumer XVI, 1960, 79-80)

Jemdet Nasr: An imprint of a grain of T. vulgare was found on a pottery lid, and dated to c.3000 BC. (Helbaek H. 'Isin Larsan and Horian remains at Tell Bazmosian' Sumer XIX, 1963, 31.)

Field, during excavations at Jemdet Nasr, found some grains in a painted pottery jar. The jar was described as Type Susa II and this type of jar was found in association with 'pictographic tablets in linear script'. This suggests a date in the late fourth millennium. The grain was identified as a species of wheat. Professor Percival of Reading considered it to be T. turpidum, the Botanical Department of the Field Museum determined it as T. vulgare or T. compactum and Dr. Stapf of the Botanical Magazine, Kew, identified it was T. compactum. (Field H. 'Ancient Wheat and Barley from Kish' American Anthropology, 34, No. 2 April/June, 1932, 304-305.)
Tell Brak: T. dicoccum and possibly some T. compactum or T. turgidum were found in rooms 10, 13 & 16, of Naram-Sin's palace, dating to the late Agade period. (Mallowan M.E.L. 'Excavations at Tell Brak' Iraq IX, 1947, 12.)

Tell Qurtas (Shahrzor): Some 35 fragments of wheat were found: most of the identifiable fragments were emmer but there was one grain of Club or Bread wheat. These date to Ur III/Isin-Larsa. (No barley was found in this sample.) (Helbaek H. 'Ancient crops in the Shahrzor Valley' Sumer XVI, 1960, 80-81)

Tell Harmal: A small amount of carbonized grain was found in the Isin/Larsa levels. The remains were mainly emmer although 1 or 3 grains of einkorn were identified. (Helbaek H. 'Isin Larsan and Horian remains at Tell Bazmosian' Sumer XIX, 1963, 35.)

Ishchali: 10% of grain imprints on pottery found here were emmer wheat, dating to Isin/Larsa levels. (Helbaek H. 'Ecological effects of irrigation' Iraq XXII, 1960, 195)

Khafajeh: Emmer wheat imprints on pottery made up 40% of the grain imprints dating to the Old Babylonian levels. (Helbaek H. 'Ecological effects of irrigation' Iraq XXII, 1960, 195)

Bazmosian: Both T. dicoccum and T. vulgare were found at this site. In the Isin/Larsa levels the emmer wheat varied in length from 5.67 mm to 6.59 mm and the bread wheat from 4.21 mm to 5.67 mm. Helbaek's frequency chart suggests slightly more bread wheat than emmer wheat. In the Hurrian levels the emmer wheat was 4.95 mm to 7.14 mm long and the bread wheat was 3.84 mm to 5.49 mm long. (Helbaek H. 'Isin Larsan and Horian remains at Tell Bazmosian' Sumer XIX, 1963, 27-29.)

Nimrud: Most of the wheat in the citadel appears to be bread wheat. A few grains and spikelet fragments can be identified as emmer wheat. In the samples from Fort Shalmaneser (Nos. XIV-XII, N-S corridor S40 C7) were bread wheat and No. XV was a mixture of bread wheat and emmer wheat. The average length of the bread wheat in sample XII is 4.93 mm. All these samples date to the 7th century BC. (Helbaek H. Appendix 6 in Mallowan Nimrud, 614-615.)

7. DAB 87.
10. Hrozny Getreide e.g. 173 & 54.
11. ibid. 55 & 18.
13. Hrozny Getreide, 75.
14. ibid., 73-75.
15. Helbaek H. Appendix 6 in Mallowan Nimrud, 615.
16. MDOG No. 31, 1906, 10.
18. PBS 2/2 No. 102, line 3.
19. DAB 106.
20. CAD Vol. i, K. kurangu, 556.
21. AfO 18, 328, line 23.
22. Postgate Archive, 205, No. 207, line 11.
23. Flora IX, 48.
24. Adams Diyala, 16, Table 5; But note Iraq Handbook, 456, which gives February-April as sowing months and July-September for harvest.
25. Diyala Report, 25, Appendix 5 (RSS X No. 30, 31, 33, 34 & 36) Averages calculated from the combined fields and not from the average of the percentage of each field as done in this appendix.
27. Sheffer C. Agronomy for the anthropologist, unpublished preliminary Doctoral thesis, 41, Table IX.
29. Ministry of Planning, Department of Agricultural Statistics, Estimates of Net area, average yield and production of wheat and barley in Iraq, 1969: 1970, Table VIII. It must be noted that the sowing dates of these fields are not given so that the actual growing season involved cannot be calculated. The number of selected fields under wheat are 4001 and 3051 under barley.
30. Ministry of Planning: Results of the agricultural and livestock census in Iraq for the year 1958/59, Table 9 in each liwa section.
31. Flora I, Fig. 5
33. Adams Diyala, 16, Table 5.
34. Ministry of Planning, Estimates of net area..., Table VIII
35. Dowson V. Dates and Date cultivation of the 'Iraq, 20 - 23
36. Parrot Sumer No. 231.
37. Layard II, Plate 15; see discussion in Laessie J. 'Reflexions on modern and ancient oriental water-works' JCS VII, 1953, 17-22.


40. Laessie J. JCS VII, 1953, 14 (Gautier J.E. Archives d'une famille de Dilbat...temps de la Première Dynastie de Babylon, No. v, 29ff. (1908)).


42. ARMT vi Nos. 5-9 for example.

43. e.g. Ungrad 'Datenlisten' RLA, 134; Gudea e: 'The year the Canal Ningirsu-aumgal was dug'; 149, Ur-lukiuga, of the Dynasty of Isin: 'The Year he dug the Canal Imgar-Nininsina'.

44. e.g. Thureau-Dangin F. Inscriptions de Sumer et d'Akkad, 74, Cone A.; Luckenbill D.D. Ancient Records of Assyria and Babylonia I, 60, para. 173.

45. see Adams Diyala.

46. Adams R.M. Appendix V 'Settlement and Irrigation patterns in Ancient Akkad', 182-208 in The City and Area of Kish (M. Gibson). (The completed survey of the area, is, I understand, now under study.)

47. see Uruk Countryside.

48. Gibson M. The City and Area of Kish


50. Adams Diyala, 121.

51. ibid. 50-55.

52. ibid., Fig 2 and the Catalogue.

53. The split between Agade to Ur III and Isin/Larsa may be slightly misleading owing to the problems in precise pottery dating in these periods. Adams and Nissen (Uruk Countryside) have preferred to lump Agade to Old Babylonian together on their distribution map (Fig. 17) only indicating by identifying letters, the dates of settlements.


55. Fernea R. Shaykh and Effendi, 148-149. There was an increase in salinization over twenty years in the Daghara region, probably because of the increase in water supply which meant that ditches and canals could hold water all year round.
56. ibid., 159-162.
58. e.g. Sauren H. Topographie der Provinze Umma...
59. Bauer No. 3
60. ibid., 69, kūš = c.50 cm in length.
61. Bauer No. 2, i 1-3.
62. Bauer No. 1
63. Sauren H. Topographie der Provinze Umma... , 40-65.
64. Eames Coll. G 26 and I 35.
65. A SAR is approx. 36 sq. m. 60 GIN = 1 SAR so 7.5 GIN is c. 4.5 sq.m.
66. Eames Coll. W. 81
67. These divisions into third, second and first millennium are not precise but have been used to give some sort of chronological framework on which to consider changes in irrigation. Settlement and irrigation patterns overlap these arbitrary boundaries.
68. Harris R. 'Archive of Sin Temple in Khafajeh' JCS IX, 1955, 47 (No. 11).
69. Simmons S. 'Early Old Babylonian Tablets' JCS XIII, 1959, 81.
70. Ungnad A. 'Datenlisten' RIA, 2, 181, para.140.
71. Adams Diyala, 34.
72. Uruk Countryside, 37. Adams has advised caution in dealing with gross numbers of sites which are occupied in any one period because of the possibility of certain index-fossils being continued from one historical period into another thereby obscuring changes in settlement patterns but his impression is that the number of occupied sites fell away during the Old Babylonian period.
73. Gibson M. City and Area of Kish, 50.
74. Uruk Countryside, 39-41, and Fig. 18.
75. Diyala Report, 7 (e)
76. Ungnad A 'Datenlisten' RIA, 156-157, Nos. 122 & 126, 158 No.150.
78. e.g., ibid. the Etellum canal, No. 3; No. 14; the Isin Canal project: No. 102, 103.
79. ibid., 14.
80. ibid., No. 30; see also Rowton M. 'Water courses and water rights in the official correspondence from Larsa and Isin' JCS XXI, 1967, 267-274, for discussion on state involvement with irrigation.


82. ibid., 16 No. VIX, I No. 5.

83. ibid., 18 No. VII, I No. 4. This text is damaged. line 10) miq-ti-ša u-su-ub/ ha-mi-ša ṣu-ut-bi/ šu-te-še-u-ir-š mištu and hāmi are probably reeds and waterplants which are to be removed. ṣmıtu: CAD Vol. 6, 73; mištu: AHw, 657.

84. ibid., 188 No. VII, II No. 95.

85. ARMT III, 112.


87. ARMT III No. 1

88. ARMT III, No. 79, obv.7 – rev.2'

89. ARMT III No. 4, lines 6-8

90. ARMT III, No. 2 and ARMT VI No. 8

91. ARMT VI No. 2.

92. ARMT VI No. 3.

93. ARMT III No. 77.

94. ARMT III No. 5.

95. ARMT III No. 5, lines 48-50; No. 79, lines 4'-7'.

96. ARMT VI No. 7, line 9.

97. ARMT VI No. 6.

98. ARMT VI No. 9 & No. 4.

100. ARMT VI No. 1, line 12.

101. ARMT VI No. 5, line 5.

102. ARMT III No. 9, line 6.

103. ARMT III No. 75, line 5.

104. Adams Diyala, 58-59, and Table 16.

105. Gibson M. City and Area of Kish, 159.

106. Uruk Countryside, 55-57, and Fig. 19.


108. Most of the following details are from J.C.Russel Tillage Practices in Iraq, 4, 13 following, written in 1957 for use in class.
109. Ministry of Planning: Estimates of Net Area... harvest dates Table VIII.
110. Lambert RA 59, 125 No. 51.
111. Langberger Jahrezeiten, 278 ff.
113. Amiet P. Glyptique Susienne No. 621, Plate 14 & 78. It is possible however that these may be used instead of ploughs for the breaking of the ground before soaking.
114. Farmers Almanac lines 13-29.
115. UET VI, 6 and Plate LI, Nos. 42-43. Text found in domestic quarters apparently copied by scribes and kept in ordinary houses. (?Kassite)
117. Watelin L. Ch. & Langdon S. Excavations at Kish Vol. IV, Plate XXXIII, 3.
119. Kramer F.L. Breaking Ground, Fig. 35a.
120. ibid. Fig. 3.
121. ANEP No. 91
123. McCown D & Haines R. Nippur I, Temple of Enlil and Scribal quarters..., Plate 154, No. 23.
126. See Salonen Agricultura, 40-70, for a full discussion on words for ploughs.
128. Salonen Agricultura Plate 3, 1.
129. Şak F. 'Proposal for the classification of pre-industrial tilling implements' Tools and Tillage I/1, 1968, 10.
130. Cylinder Seals, Plate XIIj.
131. Parrot Sumer No. 234.
132. Cylinder Seals Plate XXIV e.
133. Salonen Agricultura Plate VIII 1.
134. Cylinder Seals Plate XXXVII g.


136. Cylinder Seals Plate XX d.

137. Salonen Agricultura Plate V, 1 & 2, and Plate VI, 1 & 2.

138. ANEP No. 520.

139. Loud G. Khorriabad I, 94-96 and Fig. 104.

140. ANEP No. 88.

141. Note that Russel believes that the plough is an artist's impression and unworkable. (See below Vol.1, p.84, Note 206)

142. Farmers Almanac lines 30-40.

143. Civil M. 'Song of the Plowing Oxen', 89, lines 120-121, A.O.A.T. 25. The harrow appears to be a drag fitted with teeth.

144. Eames Coll. E. 20, but note that Salonen Agricultura, 164, gives TUK.SE.KIN as a variant of SE.KIN/niggallu, sickle.

145. SLB 1/2 (Larsa), 66-71, Nos. 45 & 46.

146. Goetze A. 'Fifty Old Babylonian letters from Harmel' Sumer XIV, 1958, no No. 17, lines 16-22. zarzaru (zanzarni) is a vegetable. CAD Vol.21, Z. 73-74. It is not clear whether it is required for planting in the fields. The amounts involved are carefully specified.

147. Driver and Miles The Babylonian Laws, 26-27.


149. Farmers Almanac lines 41-62.

150. Bauer No. 9 i 1- ii 1, iii 3 - iv 2.

151. Bauer No. 9 iv 2.

152. TCS I No. 109

153. SLB 1/2 (Larsa) No. 46.

154. Farmers Almanac lines 42-47; 1 NINDAN = c6 m. 1 GAN = o.36 sq.m.

155. Pettinato G & Waetzoldt H. 'Saatgut und Pflanzenabstand beim Getreideanbau' Studia Orientalia XLVI, 1976, 272, Table 1.

156. ibid. Table 2a.
This equation does not work out exactly through this text especially see Table 1a, c in Pettinato-Waetzoldt, 272.

158. Farmers Almanac lines 64-72.

159. Adams Diyala, 14.

160. Driver and Miles The Babylonian Laws, 30-31, CH 57 & 58.

161. Farmers Almanac lines 73-93.

162. Examples of sickles found on excavated sites:

Clay sickles have been found on many sites and were once thought to be a dating indicator for the Ubaid (e.g. Uqair: Lloyd S. 'Tell Uqair' JNES II, 1942, Plate XVIII B). Recent work suggests they were in use in the Uruk period as well. (Smith P.E.L. & Young T. Cuyler 'Greater Mesopotamia, a trial model' In Population Growth (ed.B.Spooner), 46.)

Kish: A thin blade, c.1.55 mm thick, the lower half of which is broken was found lying in debris near a group of graves in the 'A' Cemetery. One edge of the blade is roughly serrated and it could have been part of a saw or a sickle. (Mackey E. 'Report on the excavations of the 'A' Cemetery at Kish, Plate XVIII No. 16). The blade probably came from a disturbed grave, dated to c.2400-2300 B.C. (Moorey P.R.S. 'Cemetery A at Kish, grave groups and chronology' Iraq XXXII, 1970, 104)

Approximately 4 serrated flint blades, c.3 cm long, were found on or just below the surface of the Palace mound. Some of the bitumen by which they were fastened in position still existed on No. 917 and 1291. Impressions found on this bitumen suggests these blades could have been fastened to a pottery tool - possibly a pottery sickle. The position of these blades above the Palace and the graves could suggest an Agade/Ur III date but it is impossible to give a precise date and they could have been earlier or later. (Mackey E. 'A Sumerian Palace and the 'A' Cemetery at Kish, 205 and Plate XLII)

Nippur: In SGIV flint teeth set in bitumen and adhering to a wooden handle were found. The curved shape of the object and the fact that there is only one cutting edge suggests it was used as a sickle. Early Dynastic. (McCown D and Haines R. Nippur I...., Plate 161, No. 13)

Flint blades with saw-teeth on one or both edges, and sometimes with a silica polish were found in Levels TB IV-I (Ur III-Isin/Larsa, ibid., Plate 154, No. 2 & 1) and TA X (Old Babylonian, ibid., and II (Neo-Babylonian; ibid., 102-103) which suggests that this type of tool - flint teeth set in wood, was in use throughout the period, probably used as a sickle.
Bronze blade, one profile crescent shaped and tapering to a narrow end; the other profile slightly concave, the other end thickened. The narrowed end could have been inserted in a wooden handle and lashed in place. The slightly concave profile would be the cutting edge. (TB IV, locus 216; ZN 462, Length 18 cm., ibid., Plate 154, No. 2, Ur III)

A similar blade was found (dated c. Isin/Larsa Period) The outer side of the tool has a fuller curve. It has not got the traditional crescent curve of a sickle but could have been used in harvesting. It was found in TBI, House D, Room 4; ZN 379; its presence inside a house does not mean it could not have been used for agricultural purposes but its shape suggests it could also be used as a chopper of some sort. (16 cm long) (ibid., Plate 154, 1)

A curved single-edged blade of iron was found in TA Level III/1, Room 58. The blade was probably hafted by inserting into a handle and tied. (15 cm long) (ibid. Plate 155, No. 3, Neo-Assyrian)

Tello: A possible sickle, with three rivets, was found in the Maison des Fruits (probably Early Dynastic, de Genouillac Fouilles de Telloh 1989, Plate 71, 2)

AlQur: A copper sickle was found in the old Ištar-Temple, north-east of the long passage to the North-West tower, against the North-West wall high in Level G floor. The tool has a small rib on the back. The cutting edge is smooth and it has a short tang for fastening to a handle. (Andre W. Die Archaischen Ischtar Tempel in Assur, 83, No. 118, Fig. 63)

Another blade which has a little curve (also copper) was found high in Level E, above the Level E cult room. The blade is 24 cm. long but the actual cutting edge - which is on the outside edge - is 24 cm long. (Ur III, ibid., 108, No. 158, Fig. 82)

Warka: A probable sickle blade (W.1983?a) was found in DdXIV2, 3, Room 6 of Sinkašid's palace, in a robber's hole over a tomb. It was found with an arrowhead and was in fragments. It is said to be of bronze and is 16 cm long and 5.3 cm at its greatest width. (Similar fragments were found in DdXIV 2, Room 6 in the rubbish near the door from Court 28, (W.20037a)). This sickle blade is an unusual shape; it is narrow at the hafting end but swells out on one side to a depth of 5.3 cm. The other side is very slightly concave. One end is missing. The blade is wider than usual in sickles and it may actually have been used to cut other substances than grain, e.g. reeds. (probably Isin/Larsa, UVB XVIII, 37, Plate 17 H)
Fuzi: Copper sickle blades were common and found in the Palace, temple and in private houses. The most common type is banana-shaped with a tang at one end for hafting, and narrowing into a very small tang or knob at the other. A cache below G-54, Temple E, contained several sickles; two had serrated edges, and one had a thicker blade. This last has a dedicatory inscription (The god-name U₃₄₆₄₆₄₆ - possibly to be interpreted as the goddess Dilbat or Ishtar.) (early to mid-second millennium, Starr Nuzi II, Plate 124, C, D & E, and I, 471 & note 37.)

Nimrud: A crescentic iron blade (ND 6165) with a triangle section was found in Fort Shalmaneser, NW 15, together with a similar blade (ND 6166). ND 6165 is 26 cm long, its tang is missing. ND 6166 is 13 cm long. They are probably sickles. (Neo-Assyrian, Stronach D. 'Metal Objects from the 1957 excavations at Nimrud' Iraq XX, 1958, 175, Plate XXXV No. 8)

An iron sickle, ND 3360, was found in Room 19, of the Private houses and an iron blade, which may be an axe or a sickle, (ND 1631) was found in level 2, Room 42, length 15.8 cm. (Neo-Assyrian, Mallowan M.E.L. 'Excavations at Nimrud (Kalhu) 1953' Iraq XVI, 1954, 142 and 149.

Khorsabad: A curved iron blade was found in the Nabu temple forecourt, DS 591. In its illustration it appears to be broken, but one end narrows as if for a hafting-tang. It is probably a sickle. (Neo-Assyrian, Loud G and Altman C.H. Khorsabad II, Plate 62, No. 195.)

163. ANEP No. 91
164. TCS I, No. 173.
165. Salonen Agricultura, 423-426.
166. UET III Nos. 1446 and 1407.
167. SLB 1/3 (Lagaba), 38-43 Nos. 95, 96 & 97, p.61, No. 125.
168. Farmers A manac lines 84-108.
169. MAD 4 e.g. Nos. 48, 49, 66 & 97.
171. For a list of occurrences see Salonen Agricultura 412-413.
172. ANEP No. 89.
173. Farmers Almanac lines 95-98.
174. This method was seen by me at Malayar, Hamadan, Iran in 1970. Patty Jo Watson has also seen it in use in Western Iran, together with the use of animals trampling the grain. 'Clues to Iranian Prehistory in modern Village life' Expedition 8, No. 3, 1966, 11.
175. MSL 6, 16, Rh.VII B, 8.; MSL 6, 110 Hg. 91; CAD Vol. 21 Z, zaru B, winnower, 72.

176. Darby W.J., Ghalioungui P, Grivetti L, Food: the Gift of Osiris II, Fig. 12.1.

177. Salim S.M. Marsh Dwellers of the Euphrates Delta, 87-88

178. Landsberger Jahrezeiten, 248-297, especially the Table on 284.

179. Adams Diyala, 16, Table 5.

180. Russel J.C. Tillage Practices in Iraq, 14-15


182. AASOR XVI (1936), Pfeiffer R.H. and Speiser E. 'One 100 new selected Nuzi texts', 33 & 95, No. 41.

183. Zaccagnini C. 'The Yield of the Fields at Nuzi' Oriens Antiquus XIV, 1975, 210-214. Out of 7 fields with a rate yield of 10:1, 4 were irrigated or on watercourses; out of 21 with an 8:1 ratio 14 were irrigated or on watercourses.

184. Iraq XIV, 41, lines 36-40.

185. Information about this canal comes from Oates D. Studies in the ancient History of Northern Iraq, 41-49.

186. ibid., 48.


188. Jacobsen T & Lloyd S. Sennacherib's Aquaduct at Jerwan, 6-18


192. Buringh Soils, 217-218, and Fig. 21.


194. Postgate Archive, 98-100, No. 64, especially notes on lines 8 & 9.


196. Dowson V.H.W. Dates & Date Cultivation of the 'Iraq, 20-23

197. Layard II, No. 15 (discussed in Laessöe J. JCS VII, 17-22)
198. Oates D. Studies in the ancient History of Northern Iraq, 47.
201. Adams Diyala, 16, Table 5, Note that Russel says July and August (Tillage... 10). These dates seem very late and may only apply to certain mountainous areas.
203. Parker B. 'Economic Tablets from the Temple of Mami at Balawat' Iraq XXV, 1963, 93, Nos. ET 112, line 10, and 99 ET 126, line 12. Plate XXIV.
204. Dalley et al. No. 294.
207. Place V. Ninive et l'Assyrie, III, Plate 1, 2 & 3. I, 87.
208. Grohmann C.J. Principles and Practice of Statistics, 16-18 The larger the sample is the greater the chance for accuracy so that it would be desirable for more texts to be examined, particularly in the Early Dynastic and Agade periods.
209. Bauer No. 9, ii 1. seed allocated for sowing.
210. Diyala Report, 37. Appendix XVI (averages corrected to SILAS per iku.)
212. ibid. No. 40 iii 1 - iv 2.
213. RTC No. 195 1-4.
214. Pinches Amherst No. 13. This text and RTC No. 195 give details of the yields of fields which grow barley, emmer wheat and 'bread wheat'. But the areas allotted to the different cereals are not given. As the amounts of emmer wheat and 'bread wheat' are so small when compared with barley yield (in Pinches Amherst No. 12 there is over 41 times as much barley as emmer wheat and 64 times as much barley as 'bread wheat') the three cereals have been lumped together as barley.
It should be remembered that this alters the yield per iku slightly.
215. Pinches Amherst No. 32. This text gives a list of land areas with the amount of barley to be sown in each EUR. Four different seeding rates are given:
1 CUR 240 SILA per EUR - 30 SILA per iku.
1 CUR 195 " " 27.5 " "
1 CUR 150 " " 25 " "
1 CUR 60 " " 20 " "
The sizes of the areas to be sown vary from 21 EUR 5 iku to 1 EUR. The year is given as Sulgi 44.
216. "Saatgut und Furchenabstand beim Getreideanbau" Studia Orientalia XLVI, 273, Table 1a.
27.5 1\textit{ik\textbar} 389.5 SILA 5 GIN = 14.16 SILA per 1\textit{ik\textbar}.
63 " ; 948 " = 15 "
32 " ; 392.22 " = 12.29 "
50 " ; 730 " = 14.6 "
Average 14 SILA per 1\textit{ik\textbar}.

217. ibid., Table 2a. 594.24 \textit{ik\textbar}; 9966.5 SILA = 16.79.

218. TCS I No. 93, possibly from Lagaš, but area uncertain.


220. ibid., 15 (TUT 1) Tables 6 & 7. But note that Diyala Report, 38, gives the average for all the fields as 402 SILA.


222. ibid. 26, Table 10. Amar-Sin 8.

223. ibid., 27-40. Table 11.

224. TCS I No. 339, line 3.

225. ibid., line 11.

226. ibid., line 12.


228. ibid., line 2.

229. ibid., line 3.

230. ibid., line 7.

231. ibid., line 8.

These two letters give details of small fields, with interest in silver and yields in barley. No. 339 also lists the issue of barley to individuals, the purpose for this is not given. It is not certain whether the yield refers to the previous harvest or is the estimate for the following one; if it is the latter it is presumably based on a previous harvest. In No. 339 the sizes of the fields vary from 1 \textit{ik\textbar} to 1 burru while those in No. 340 vary from 1.5 \textit{ik\textbar} to 13 \textit{ik\textbar}. They may have been allotted to individuals as plots to help in their support – the items are said to be debited to the domestics of the temple of Šulgi. The yields per \textit{ik\textbar} vary from 75 SILA (in a field of 4 \textit{ik\textbar}) to 1 BUR 100 SILA (1000 SILA) on a field of 1 BUR. The differences in the yields between these different parcels of land, some at least which come from the same field (the field of Ungamu, No. 340 line 12) is probably due to the different positions of the parcels; some will have been easier to irrigate than others, some will have more saline soil, some will be in depressions etc.

232. UTT III No. 1358 lines 1-3, 7-8 (Šu-Sin Year 6)
This text, from Rimah, is a long table divided into three columns on each side. The columns are made up of a list of personal names beside which a measurement of land and a capacity measure is given. There are running totals throughout and these show that the entries refer to land and barley, and sometimes burrum-wheat, belonging to different towns. Only one town name can be read - Qatara.

The ratio between the land and seed usually works out at 10 SILA per iKT and the amount of burrum-wheat seed appears to be the same as that of barley seed. The table is badly damaged.

The rate of seed for fields varies from 1 GUR 3 PI to 1 GUR 1 B(N per BUR - 26-27 SILA per iKT.

Diyala Report, 41, Appendix XIX, taken from CT 33 No. 42; CT 33, No. 45; CT 33 No. 48; CT 6 Nos. 41, 44 & 48; VAS 9 Nos. 158 & 159.

Diyala Report, 41, Appendix XIX, taken from CT 4, No. 42; CT 6 Nos. 24; CT 8 Nos. 10, 11, 14, 40; VAS 7 Nos. 59, 68, 69, 90, 95, 101, 102, 103, 125, 130, 145.

Birot M. Tablettes économiques et administratives d'époque Babyloniennne ancienne, 8-37 Nos. 1-11.

Zaccagnini C. 'The yield of the fields at Nuzi' Orient Antiquus XIV, 1975, 194. Average of figures.

ibid., 214-215; CAD 5, G, gajjîtu, 11.

Diyala Report, 5. (Refs. Nikoloski 31, DP 573.)

ibid., 5. (DP 577)

ibid., 6 (for Lagâq see HSS IV No. 27; for Ur, UET III Nos. 1369, 1367 & 1357.)

The Isin/Larsa yields are the average of the Ur III and Old Babylonian yields. The Kassite are the late Old Babylonian figures. The Neo-Assyrian figures are taken from the average of the Nuzi yields and the late Old Babylonian figures.

Ministry of Planning: Results of the agricultural..., Tables 4 & 9.


Ministry of Planning: Results of the agricultural..., taken from Table 9.

Iraq Handbook, 455.

ibid., 352. These population figures are based on totals 90% of which have been registered and to which local estimates were added. They are not reliable. The figures for 1935 were 3,180,523.

251. Ministry of Planning: Results of the agricultural..., Tables 7 & 8, Table 9 for yields.


253. Leemans W. Foreign Trade during the Old Babylonian period, 19-21, 47, 128-9.

254. e.g. Gadd Stones Plate 29b.


256. R.Acc. 'Le Rituel du Kali' 3-9 ff.

257. Maxwell G. A Reed shaken by the Wind, 61.

258. VR No. 234; Barnett R.D & Faulkner M. 'Sculptures of Aššurnasir-\v\pal II...", Plate V.

259. e.g. professions given in An.Or.2; 5, 2) Nik.13; 3, 1) STH 1,5; 61, 32) Dv 171.


262. Adams Diyala, 14 and 169, Note 2.

263. Bauer No.4, vii, 4-6, and p.83.


265. ARMT IX, 207, para. 3, No. 38.

266. e.g. see Lagaš: Early Dynastic: Both wool and fat-tailed sheep and goats kept for their coats were given 1 SILA and 6 SILA barley per day respectively. (Bauer No. 42, iv 10; No. 42, v 9 - vii 9); Pigs (SAU and SAG.GIS.GI) were given 6, 14 and .2 SILA per day. (Bauer No. 41 iv 9 - v7)

Ur III: Lagaš; Pinches Amherst No. 29: oxen received 8 SILA and 5 SILA per day.

Umma; Eames Coll. C 5: sheep received 3,3 SILA and .3 SILA per day.

Old Babylonian: Mari: ARMT VII No. 263, 14: plough oxen received 5 SILA per day; ARMT IX No. 242, is a male sheep was fattened with emmer-wheat.

Chagar Bazar; AOAT I No. 22, 3-5: oxen received 10 SILA and 3 SILA per day at the fattening house and a male sheep received 1 SILA. ibid., No. 2, 3-5: calves received 4, 3 & 2 SILA per day (aged 3, 2 & 1); ibid. No. 32, 3-4: pigs received 3 SILA per day.

Mid-second millennium: Nuzi: HSS XIII No. 78, 1-2: pigs were fed barley.

267. CAD Vol. 8, K. kissatu, chopped straw, fodder etc., 427-28.

268. Postgate Archive No. 195, lines 6-9, ND 462.
269. Postgate Taxation, 381-83; ND 2495 lines 22-26.
270. Iraq XIV, 43 line 106.
271. e.g. BE XIV No. 48 where the male goats (34) and the male sheep (47) are the most numerous in comparison with the 31 nanny goats and the 38 ewes.
272. Bauer No. 99 i 5, ii 4 passim.
273. ibid., 301.
274. CAD Vol. 2 B bbru B, 266, but note discussion.
276. Hilzheimer M. Animal Remains from Tell Asmar, 33-34.
277. Parrot S.,mer Nos. 87 & 89.
278. Heinrich E.H. Kleinefunde aus den archaischen Tempelschriften In Uruk, Plate 19a. (W145971)
279. Moortgat Art No. 17 & No. 18.
280. Hilzheimer M. Animal Remains from Tell Asmar, 33 Note 58.
281. Frankfort H. Stratified Cylinder Seals Plate 7, No. 39
282. ibid. Plate 42, No. 462.
283. ibid., Plate 31 No. 315.
284. Frankfort H. Sculpture in the Diyala Plate 111 No. 197.
287. Stone heads: UVB XI, Plate 33 a-c (W.17834, W.17875) Inlay: ibid., Table 34 a-e.
288. Mackay E. A Sumerian Palace and the 'A' Cemetery at Kish, Mesopotamia, Plate XXXVI No. 1.
289. Parrot Sumer No. 177.
291. Starr Nuzi II, Plate 57 W (also Plate 112 A)
293. Epstein H. Origins of the Domestic Animals of Africa, 167, 169, Fig. 211.
294. Parrot Sumer No. 177.
295. Gadd Stones Plate 29a, 46; Barnett R.D. & Faulkner M.
Sculptures of Ašurnāṣirpal II... Plate V; Barnett R.D. Assyrian Palace Reliefs, Plate 151.


297. UET II, 6, A, 161 6.


299. CAD Vol. 5 G gukkallu 126-7.


301. ibid., line 16 and note 19.

302. Parrot Sumer No. 88.

303. UE II/2, Plate 87, 88 & 89, Plate 119.

304. Parrot Sumer No. 158, C.

305. UVB XIX, 40, Table 28 (W.20067)

306. Barnett-R.D. Assyrian Palace Reliefs Plate 146; British Museum Assyrian Sculpture in the British Museum..., Plate XXII; Barnett-R.D. & Faulkner M. Sculpture of Ašurnāṣirpal..., Plate VI.


308. ibid., line 215; CAD Vol. 4 E enzu 180-183.


310. Mallowan M.E.L. 'Excavations at Tell Arpachiyah' Iraq II, 1935, Fig. 55.


312. ibid. No. 108.

313. Frankfort H. Stratified Cylinder Seals, Plate 6 No. 33.


315. UE II Plate 115.

316. Heinrich E. Kleinefunde... Plate 14a.


318. ibid., No. 185.

319. Parrot A. Le Palais, Peintures murals II, 19-21, Fig. 18, Plates V2 and Ba.
320. Moortgat Art, Plate 274.
321. Goff B.L. Symbols of Prehistoric Mesopotamia, Fig. 474.
322. UEI Plate XXXI.
324. ibid., 535.
326. Zeuner F. A History of domesticated animals, 217, Fig. 8:15
328. Parrot Sumer No. 360.
329. Starr Nuzi I, 388; II, Plate 65 D & E.
331. VR No. 431 & 459.
333. Gadd Stones Plate 9 & 11a.
334. ibid., Plate 14.
335. ibid., Plate 34.
336. ibid., Plate 11.
337. Loud G & Altman C.B. Khorsabad I, Fig. 104.
338. King L.W. Bronze Reliefs from the gates of Shalmanezer, Carcemish, Plate XXXIV; source of the Tigris Plate LIX.
339. Hatt R. Mammals of Iraq, 68; Lloyd S. 'Iraq Government Soundings at Sinjar' Iraq VII, 1940, 16, Plate II, Fig. 5, No. 9.
340. UE III Plate 31 No. 537.
341. Boehmer No. 232; for other examples of water buffalo see Boehmer Nos. 202, 223, 231 etc.
342. Van Buren E. Fauna of Ancient Mesopotamia, 74, para. 29B
349. e.g. Pinches Amherst No. 4.
351. Boehmer R.M. 'Das auftreten des wasserbuffels in Mesopotamiens.' ZA LXIV, 1975, 10ff.
References and Notes for Chapter 3. (pages 105-148)

1. Weinstein M. 'Household structures and activities' Anatolian Studies 23, 1973, 275 - it is apparently difficult to distinguish between burghul and badly preserved wheat although grains which have been sieved can be recognised.

2. McCown W.E. and Haines R.C. Nippur I: Temple of Enlil, Scribal quarters and soundings. TB Level IV House I, Room 197 and 192, 50-53 and Plate 59; TA IV House C, Room 73; House H, Room 214, 38 and Plate 75A.


7. Van Buren E.D. 'Places of Sacrifice' Iraq XIV, 1952, 80-81

8. ibid., 79-80.

9. Delougaz P.& Lloyd S. Presargonic Temples in the Diyala, Nintu temple: 89 and Fig. 83; Plate 16; 6th building period P 44: Court 53, Sin II East Wall of Court 5 Q42:3, 61 and Plate 11 (This survives from an earlier period.)

10. Parrot A. Le Palais - architecture, II, 313, Fig. 382.

11. Peterson N. Wheat, 321. 'Endosperm: the nutritive tissues formed within a seed which has the function of nourishing the embryo during germination and early growth.', 400.

12. CAL Vol. 9, L. 96-7, lastu B: roasted barley.

13. An.Or.2, 25-26 No. 2 (RTC 52); 27-29 No. 4 (VAT 4660)


15. AFO 18, 328, lines 30 & 31, CAD Vol. 5, G, 118, gubbu to roast; CAD Vol. 8, K, 2, kabilbu to burn, scorch etc.

16. Iraq XIV 43: col. iii lines 121 & 129.

17. see Salonen A. 'Die Ofen der Alten Mesopotamien' Baghdader Mitteilungen III, 104-106.

18. CAD unpublished M. Vélume, consulted in draft in Chicago. AFw, 273, mundu a fine meal.

19. AFO 18, 330 line 193.
20. Lambert RA 59, 119 No. 16.
21. ibid., No. 15.
22. MAD 5, No. 107, line 9. Linear numbers are used in this text which probably dated to the later part of the Sargonic period. The figures in the text do not add up to the total given in line 16.
23. Pinches Amherst No. 65, line 2.
24. ibid., No. 102, line 7.
25. BE III/1 Plate 57, No. 126, line 9.
26. ARMT XIX e.g. Nos. 213-222.
27. ARMT XI No. 1 lines 3 & 10; No. 3, lines 2 & 10; No. 4, lines 2 & 9; all date to the 'Assyrian Epoque'. ARMT XI No. 250, line 6. (Tanat).
28. AOAT I Nos. 9, 10, 20, 24 & 27.
29. AHw 1016 samādu to crush, grind.
30. AFO 18, 330, line 193.
31. BE XV No. 169 (Torczyner Tempelrechnungen No. 63) (Note that Torczyner has left out the amount of BAPPIR-bear bread.)
32. HSS XIII No. 81, 2 and HSS XIV No. 611,1, respectively.
33. Gadd C. 'Tablets from Kirkuk' RA 23, 1926, 132, No. 60, lines 9-10. (see also Wiseman D. 'Ration lists from Alalakh VII' JCS XIII, 1959, 20, No. 242, line 1, where barley was used for mundu at Alalakh also.)
34. Oppenheim Beer, 27, note 28a and 52, note 92.
35. AFO 18, 330, line 193.
37. Hrozny Getreide, 105 Note No. 1; DAB 99, note 2.
38. MAD 5, No. 107, line 8.
40. e.g. ARMT IX No. 121 Col. ii, line 33, where aršânu is recorded once in 22 days.
41. AFOAT I Nos. 20 & 25.
42. BE XV No. 169 (Torczyner Tempelrechnungen No. 63, see also note 33.)
43. HSS XII No. 406, line 46.
44. AFO 18, 328, line 32.
45. Oppenheim Beer, 26, line 25 & 52, Note. 82.
46. SET No. 181, line 5, 107 Note 5.
47. BE III/1, Plate 57, No. 126, line 3 and line 16.
48. see references listed in Hrozny Getreide, 123-4; and HUCA 38, 1967, Levine B. & Hallo W.W. 'Offerings to the Temple Gates at Ur', Table A, Fig. 1. Al 26 (UET III No. 270) passim. (Note that UET III No. 270 may be post-Ur III, 19.)
49. CT 32, plate 3, VIII 8 ff. in Hrozny Getreide, 123.
50. ARMT XII No. 1, lines 11 & 12.
51. See the list of years at Mari in Dossin G. 'Les noms d'années dans les "Archives de Mari"' Studia Mariana, 1950. Texts come from ARMT VII, IX, XI & XII (see note 123 in Chapter 4.)
52. ARMT IX, No. 98, col. v lines 29-32; ARMT XII No. 432 & 437.
53. AFW, 824, pappasu = barley porridge or pudding.
55. ibid., 104.
57. AFO 18, 23, line 168.
58. King L.W. Chronicles concerning the Early Babylonian Kings II, 16, lines 4 & 5; Ungnad A. 'Woran starb König Era-imitti von Isin?' Or. (NS) 12, 1943, 194-195 - here pappasu is translated as BRM; Hrozny Getreide, 106.
59. Pinches Amherst No. 102, line 3; SET No. 181, 3, 31.
60. ARMT IX No. 121, col. iii lines 37-38, col. vi lines 5 & 6.
61. B E XV, Plate 13, No. 44, line 23.
62. HSS XVI No. 120, 5; HSS XIV No. 51, line 4. See also Cassin. E. 'A Propos des archives administratif de Nuzi' RA 52, 1958, 20.
63. Chambers Encyclopaedia No. 5, 742.
64. Personal letter from Dr. N.L. Kent, of the Flour Milling and Baking Association (12th September 1973.)
66. Starr Nuzi I: mortars: 462 (pestle found in mortar in Shil.26); 218, grinding stone F.21; II, Plate 122, A (Shil.14), B (P.302), & E (Shil.26); Plate 121 FF (small hand mortar).
   von Oppenheim, M. Tell Halaf Vol. IV (ed. B. Hrouda), 51,
   Plates 38 a, c, Plate 39, a, b, c; Childe V.C. 'Rotary
   querns on the continent and in the Mediterranean Basin'


70. CAD Vol. 4, E elItu, 98-99, No. 2 upper millstone; AHw 1172,
   Kamilitu 'das Untere'.

71. CAD Vol. 4, E eru B and listed examples, 323-324, grinding
   slab.

72. King L.W. Bronze reliefs from the Gates of Shalmaneser,
   Plate VI, Band I, 6, upper register, and XXX, Band V, 6,
   lower register.

73. AHw, 913, ZI/šepšu, flour.

74. Hronzy Getreide, 102; Oppenheim Beer, 28, line 25; CAD Vol.7
   I, isqṭu 202-203; Pinches Amherst No. 90, line 1 & 20, No
   81, line 1, (Lagash, Ur III); MAD 5, No. 107, lines 3, 5 etc.
   (Kish, Agade); AOAT I No. 1, line 1, (Chagar Bazar, Old
   Babylonian).


76. Hronzy Getreide, 118 and 127, and index.

77. e.g. Tello: de Genouillac H. ITT/II/2, 3 (Catalogue list)
   (No. 2857); 10, (catalogue list) (No. 2979).
   Umma: Lambert RA 59, 123, No. 40 iii lines 37.
   Kish: MAD 5, No. 113, lines 3 & 7.
   Nippur: BE III/2, plate 57, No. 126, lines 8 & 18.

78. mirq and marāqu, to crush finely. CAD unpublished volume
   M, consulted in Chicago in draft.

79. BE XV Plate 44, No. 140, line 3.

80. CAD Vol. 7, I isqṭu, 202-203; ATO 18, 330 line 167.

81. ARM VII, 262, para. 9.

82. CAD Vol. 6, H šašlu, crushed, 141.


84. Puzriš-Dagan: Keiser C.E. Neo-Sumerian Account Texts from
   Drehem Nos. 393, 1, 394, 1.
   Tello: STT No. 181, 4, 22; ITT II/2, No. 4393 Plate 65, R
   2'-3'.

85. Umma: STT No. 188, 40, 64 (also Agade: Lambert RA 59 No. 40,
   line 39, 123).
   Tello: STT No. 210, 1; Pinches Amherst No. 67; ITT II/2 Nos.
   2857 & 2979 - these latter two texts include a flour
   ZI.GAZ: GAZ = šašlu to crush (CAD Vol. 3 šašlu 137/8)
   This may be a similar flour to D1.KUM.
86. Tello: SET No. 181, 4, 6, 32; Bauer No. 42 iv 3, 4.
   (Ur: Levine B & Hallo W.W. H.J.C.A. 38, 1967. Table A, UIT III No. 270)

87. AOAT I No. 9, line 2; 10, line 2; 20, line 2; 27 line 2.
   AOAT I No. 1, lines 7 & 11.

88. ZL.KUM/jeqNu: References for the month of Uruham, the Year
   Zimri-Lim counted the land: ARMT IX No. 105, No. 107, 109;
   ARMT XI Nos. 176 & 1978; ARMT XII Nos. 404, 408, 409, 413,
   417; ARMT VII No. 134.
   ZL.GU: ARMT VII No. 263, col. 1 8 & 12 (this text is damaged.)

89. BE Xv No. 140, 2.

90. AFO 18, 31, line 167.

91. Salonen A. Die Hausgeräte der Alten Mesopotamien I, 71;
   SACT II No. 203, 1, 2.

92. Worder Lord T.J., Dodds Sir C., Moran T, Bread, 113.

93. Burkitt D.P. Cancer 28, 1971, 2. In a personal letter
   (15th November 1976) Dr. Burkitt confirmed his own
   opinion that fibre depleted diets played a part in the
   development of cancer of the bowel.

94. Layard A. Early Adventures in Persia, Susiana and Babylonia
   I, 66.

95. ibid., 297.

96. Musil A. Manners and Customs of the Rawala Bedouins, 91-92.

97. CAD I/1 A akālu, 239a lexical section. (CT 17, 6 iii 7-9;
   BE 311, 6: 10)

98. Parker B. ' A Middle Assyrian Seal Impression' Iraq XXXVI
   1974, 185.

99. Barnett R.D. Sculptures from the Northern Palace of Aššurbanipal
    At Nimrud, Plate LXVI e.

100. Aykroyd W.R. & Doughty J. Wheat in Human Nutrition, 56.

101. Renfrew J. Palaeoethnobotany, 69; Bulleid A. Lake Villages

102. Helbaek H. 'Early crops in southern England' Proceedings
     of the Prehistoric Society 18, 1952, 212.

103. Aykroyd W.R. and Doughty J. Wheat in Human Nutrition, 68.

104. King L.W. Bronze Reliefs from the Gates of Shalmaneser..., Plate VI, Band 1, 6, upper register.

105. ibid., Plate LI, Band IX, 4, upper register.
ibid., plate XII, Band II, 6, lower register.

ANEP, 52, Plate 191.

Cylinder Seals, Plate XV k.

Boehmer, Plate XXXII No. 387.

Voergt Art, Plate 175 & Plate 176; and Währen M. Brot und Gebäck im Leben und Glauben des Alten Orient, Fig. 23. (Note however that Währen takes the round bun-shaped loaves to be small jars.)

Barnett R. D. Sculptures from the Northern Palace..., Plate LXV


Rawlinson G. Five Great Monarchies II, 214; Meissner BuA, 439 Fig. 136.

Bonavia E. Flora on the Assyrian Monuments, 25.

Starr Nuzi, I, 148 & 493, II Plate 33 F.

CAD Vol. I/1, A akālu, 228.

NINDA ŠU: Pinches Amherst No. 102, line 6 (Tello, Ur III); Hoffner H. Alimenta Theaerorum, 147. (It is possible that this bread is similar to that portrayed like 'fans' on Assyrian reliefs).


e.g. issued to messengers along with beer and oil, at Lagash, Ur III; Pinches Amherst No. 61, line 2, 5 etc.; as rations at Mari and T rqa, ARMT IX, Nos. 24 & 25, Old Babylonian; as part of the provisions for his feast, Aṣurnaṣirpal, Iraq XIV 42, line 115, Neo-Assyrian.

CAD Vol. 8, K. kuṣāpu, 583-4; AFO 18, 329, line 148.

e.g. at Chagar Bazar AOAT I No. 11, line 4. (Old Babylonian)

ARMT IX, 278, para. 10.

Mari: e.g. ARMT VII No. 151, line 2; Chagar Bazar: AOAT I No. 9, line 2; No. 20, line 3.

CAD Vol. 4. E. ĕmsu (A), 152-153, sour.

e.g. ARMT IX No. 98: sub-total (including NINDA.KUM, NINDA ĕmsu, āsīpu, appānu and kakkū) ii, 26038; grand total: v ,l.

e.g. ARMT XI No. 157.

e.g. ARMT IX No. 223 (šE, burrum and ZIZ listed together i 5-7); ARMT IX No. 237 (here burrum and a type of ZIZ appear together.)
128. ARMT IX No. 121, iii 37 - 38.
129. HSS XIV Plate 181, 4.
130. § 444/68; but see Landsberger Date Palm, 37, No. 2 where he rejects 'cake' and says GIR.LAM is a small basket.
131. Landsberger Date Palm, 37 No. 2 and note 126 - quoting Nikolski II, 343: 15 SILA ZU.LUM GIR.LAM, 40 SILA ZI.A.TIR GIR.LAM.
133. SET No. 198, 1 passim.
134. UET III No. 102 line 12.
135. For varieties see MSL XI, 119, line 24-35; 149, lines 122-126; 155, lines 195-201; 159, lines 1-6; 163, 1 8-17. AHw 646 mersu: cake made by creaming method (rührkuchen). This translation is perhaps too specific. (See von Soden, 'Zu den Politischen Korrespondenzen des Archives von Mari' Or. 21, 1952, 86.)
137. ARMT IX, 278, VII, 259.
139. ARMT IX No. 238, line 13.
140. ARMT XII No. 743, lines 2-8, also No. 741.
141. UET V No. 504, line 6.
142. CT 36, plate 7, line 6.
143. AFO 18, 330 line 161.
144. CAD unpublished volume M, consulted in draft in Chicago. mutqā sweet cake or bread; AHw 698 mutqā sweet bread; in ARMT XI, No. 3 line 9, No. 4 line 10, No. 52 line 2, Burke translated NINDA mutqā as 'spiced bread'.
145. ARMT IX, 278, 40, No. 221, iii line 5, vi line 3; ARMT VII No. 94, line 4.
146. HSS XIV No. 181 line 7 plate 81; see also Casson E. 'Quelques remarques a propos des archives administratives de Nuzi' RA 52, 22.
147. CAD unpublished volume M, consulted in draft in Chicago. mutqā sweetmeats; AHw mutqā 'sweet pastry', 687.
148. BE XIV No. 148, 5.
149. Hrozny Getreide, 126. It was also used with SE.GIS.I in the Neo-Babylonian period.
<table>
<thead>
<tr>
<th>Page</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>152.</td>
<td>ibid., 50-51, figs. 42, M1154, 43, M1159.</td>
</tr>
<tr>
<td>153.</td>
<td>Haller A. <em>Die Gräber und Gräfte von Assur</em> WDOG 65, Grave 20, Plate 10b, 10j, 104, Tomb 21, Plate 21a f. The 'handled pans' have also been associated with metal working. (Calmeyer P, 'Das Grab eines altassyrischen Kaufmanns' <em>Iraq</em> XXXIX, 1977, 90 and Plate II)</td>
</tr>
<tr>
<td>157.</td>
<td>Delougaz P &amp; Lloyd S. <em>Presargonic Temples in the Diyala Region</em>, 26, and Fig.21, 2 &amp; b.</td>
</tr>
<tr>
<td>158.</td>
<td>ibid., Small Temple, 9th building period, 112, Fig. 104 Plate 171.</td>
</tr>
<tr>
<td>160.</td>
<td>WO VII, 6-7, 60-61.</td>
</tr>
<tr>
<td>161.</td>
<td>Fernea E. <em>Guests of the Sheikh</em>, 99-100</td>
</tr>
<tr>
<td>163.</td>
<td>ibid., 215-217, Figs 251 &amp; 252.</td>
</tr>
<tr>
<td>165.</td>
<td>Perkins A. <em>Comparative archaeology of Early Mesopotamia</em>, 174</td>
</tr>
<tr>
<td>166.</td>
<td>OIC No.17, Iraq <em>Excavations of the Oriental Institute</em> 1932/33, 15 and Fig. 12.</td>
</tr>
<tr>
<td>168.</td>
<td>McCown D. and Faines R. <em>Nippur I, Temple of Enlil...</em>, 48, Plate 54; 58 and Plate 62; 67 and Plate 72A; 71 and Plate 75 b.</td>
</tr>
<tr>
<td>169.</td>
<td>Woolley L. <em>Excavations at Ur</em>, 170</td>
</tr>
<tr>
<td>170.</td>
<td>ibid., 186; Woolley L. <em>Excavations at Ur 1930-1931</em> <em>Antiquaries Journal</em> XI, 1931, 359-374.</td>
</tr>
<tr>
<td>171.</td>
<td>Starr Yuzi I, 20-21</td>
</tr>
<tr>
<td>172.</td>
<td>ibid., 53-54.</td>
</tr>
<tr>
<td>173.</td>
<td>ibid., 193.</td>
</tr>
<tr>
<td>174.</td>
<td>e.g. ibid., 207 (17), 215 (P37), 307 (S144)</td>
</tr>
</tbody>
</table>
175. Wallowan Nimrud, 186-187
176. Gadd Stones Plate 29a.
177. King L.W. Bronze Reliefs from the Gates of Shalmaneser...
   Plate VI Band 1, 6, upper register.
178. ATO 18, 306-309, iv lines 12-18; Kocher F. 'Ein Inventarste
   aus Kar-Tukulti-Ninurta' 300-313.
179. A'w missiru 1) Middle Assyrian, an oven flue, 678.
180. For discussion and a list of different terms for ovens see
   Salonen A. 'Ofen der Alten Assyrien...' Baghdader Mitteilungen 3, 1964, 100-124; FSL VII, 5, line 339, 87,
   lines 368-370.
181. These ovens mainly occur in the middle and south of Mesopotamia.
   They are probably not direct descendants of the ovens at Jarmo
   and Umm-Dabaghiyah, evidence for chimneys is rare save for
   the one at Nari, but the principle of working through one entrance
   is the same.
183. Platt B.S. 'Some traditional alcoholic beverages and their
   importance in indigenous African communities' Proceedings
   of the Nutritional Society 14, 1955, 117 ff.
184. Platt B.S. and Webb R.A. 'Fermentation and Human Nutrition'
   Proceedings of the Nutritional Society 4, 1946, 130 ff.
185. Oppenheim Beer.
186. Civil M. 'A Fynm to the Beer Goddess' Studies Oppenheim 67-80
187. Civil M. Beer, 26 iv, lines 3-12.
188. ibid., 24-26, iii, 27 - iv 2.
189. ibid., 24, iii 15-25.
190. ibid., 26-28, iv 25 - v 33.
191. ibid., 24, iii 8 - 14.
192. Civil M. Studies Oppenheim, 70 & 73, lines 33-36.
193. ibid., lines 38-40
194. ibid., lines 40-48
195. Fælbaek M. "Prehistoric farming products at Eketorp on Öland,
197. Platt B.S. & Webb R.A. Proceedings of the Nutritional Society
   4, 1946, 135.
198. Civil M. Studies Oppenheim, 81. preparation of the wort.

199. AFw šik'ru, 1232

200. Oppenheim Beer, Fig. 6; Boehmer No. 557.

201. Delaporte Catalogue Louvre I, Plate 50, No. 5(D21)

202. Oppenheim Beer, 55, correction to 8.

203. Boehmer No. 549

204. An.Or. 2, 25 (VAT 4414), 26 (RTC 52)

205. Bauer No. 153, xiii, 3 and No. 154 xi, 1. (cf. Oppenheim Beer 14)

206. Lambert RA 59, 119 No. 16


208. Iraq XIV, 43, line 119.


210. MS 11, 114-116, 2.1, 1-2.3; line 55; 150 iv 167-208; iv 153, 45-100.

211. Bauer No. 58, line 2, 3. c.f. Nos. 41, 42 & 43. Barley is listed for KAPPIR-bread, MUNU, and TITAB for the making of KAŠ.GIG and KAŠ.KAL

212. ibid., No. 59

213. ibid., No. 60. For KAŠ.SUR see Gi'ril M. Studies Oppenheim, 81. SUR = to perform an action from which liquid results.

214. Pinches Amherst No. 102, i 1, ii 7-iii 1, iii 5 - iv 1 etc.

215. STT No. 177, 55 (written KAŠ.GIG.GIZ.AN dark ulušinu) ii 1, ii 1

216. UET V No. 507, discussed in Levine B & Fallo W.W. UCA XXXVII 1967, Table B, Fig.3.


218. Waterman L. Royal Correspondence of the Assyrian Empire II No. 1405, rev.3.

219. CAD Vol.2, B billatu, 225-228

220. Pinches Amherst No. 101, 1 & 3.

221. An.Or. I, no. 103

222. Pinches Amherst No. 68, 1.
223. SACT II, e.g. No. 295, lines 1 & 5.
224. ARMT IV No. 81, line 25. Letter from Išme-Dagan to Yasmah-Addu.
225. ARMT VII No. 263, ii 13, iii 1-12.
226. SLB 1/3 No. 1'6, line 1 (Lagaba)
227. CAD Vol. 2 B billātu, 228
228. Pinches Amherst No. 56, line 3. Pinches reads the sign as GIN but it would seem to be US.
229. AOAT I No. 23, line 3.
230. Ibid., No. 36, lines 5, 6, 10, 11 & 16-18; No. 43 lines 1-10, 141-6; No. 46, lines 1-8, 11-13; Cadd C.J. 'Tablets from Chagar Bazar and Tell Brak' Iraq VII, 1940, A.926, A944.
231. BE XIV Plate 24, No. 56, line 4.
232. Iraq XIV, 43, line 122.
233. CAD Vol. 3 D dīqiptubu, 160; Hrozný Getreide, 144-145.
234. Hrozný Getreide, 147.
236. CAD Vol. I/1 A alarpanu 335-336.
237. DAB 314.
238. ARMT IX No. 98, vi 2 & 3.
239. ARMT XII No. 740, lines 5 & 7, No. 742 lines Rev. 7., and Nos. 743, lines 13-18.
241. E.g. ARMT XII Nos. 378, 390; ARMT IX No. 103; ARMT IX No. 98 iv 1-12.
242. Frankfort H. Stratified Cylinder Seals, Plate 35, No. 359
244. U2 II Plate 194, No. 22 (U 12374)
245. Frankfort H. Stratified Cylinder Seals, Plate 58, No. 613
246. Porada I, Plats XVIII No. 112, cf. UE III Plate 30 Nos. 523, 524 and Plate 194 No. 22.
248. UJ II Plate 193, No. 17 (U 10871)
249. Moortgat Art No. 42.
250. ibid., No. 47
251. Porada I, Plate XXIX No. 250E, 252.
252. e.g. Porada I, Plate LVII Nos. 315 E, 320 E & 327; Cylinder Seals Plate XVII b e.
254. ibid., 9-10 (see E XIV Plate 20, No. 42, line 3 - Torczyner Tempelrechnungen No. 64 - for the Kassite example)
255. Oppenheim Beer 55, correction to 11.
256. see above Vol. 1, pp.138/9, and notes 200, 201 203, especially Bohmer No. 549.
257. Salonen "suagerite I" Plate LXXXV No. 4, Tepe Gawra VIII B-C (Jemdet Nasr)
Delouge P Pottery from the Diyala Plate 195, D556.540a, Rousses J, Khafajeh. (Early Dynastic III)
ibid., Plate 194, D555.5105. Tell Asmar (Early Dynastic III/ A "A"")
"McCorm D & Waines R. Mippur I, Temple of Enlil...., Plate 80, No. 8 (Ur III)
Andr\'e A. Die Archaischen Inachtan Tempel in Assur Plate 25a. Level C (Agade)
Lenzen J. Excavations in Uruk-Merka UVB 19, 40 Plate 27c. Sin-Kashid'ir Palace. (The hole is here said to be caused by burning) (Isin/Larsa)
Mallowan "J. L. 'Excavations at Tall Chagar Bazar' Iraq III, 1936, Fig. 28 No. 1, Fig.16 No. 2 (Both these are flat-bottomed and the hole is central). Level I (mid-second millennium)
Starr Nuzi II, Plate 82A, Plate 81 F, S.153, Plate 68 M, K.189. (mid-second millennium)
258. Mallowan "J. L. 'Excavations at Tall Chagar Bazar' Iraq III 1936, 28, No. 18, Fig.28, 1.
259. Civil M. Studies Oppenheim, 82-83.
260. Mallowan "J. L. 'Excavations at Tall Chagar Bazar' Iraq IV 1937, 151, and Plate XIV C. For examples of drinking tubes dating to the third millennium see: OIC 17, 29, Fig. 35 (Asmar); and UE III, 70/800, contents list, 444, 81-82, 91 (U10450, U10915, U10911)

262. SACT I, No. 128, 5 & 6.

263. ibid. No. 163, 4, 5.

264. ibid., No. 175, 4, 5, 10, 11.

265. e.g. Eames Coll. Nos. H13, K6, N6

266. UET III Nos. 89 & 1229.

267. ibid., No. 1303.

268. ibid., No. 102 lines 1, 4-12.

269. TCS I No. 325, lines 3-4: 30 carcasses of sheep for captives to eat.

270. SACT I No. 245.

271. Walters S.D. Waters for Larsa No. 21 lines 1-4.

272. Goetze A. 'Thirty tablets from the reigns of Abi-eSuh and Ammiditana' JCS II, 1948, 73 & 79, Nos. 1 lines 1 & 2, 8, lines 2-4.

273. ARMT XIX e.g. Nos. 195, 192 etc.

274. ARMT II No. 82, line 22.

275. ARMT VII 256-7, para. 70.

276. CAD unpublished volume M, consulted in draft in Chicago. malûku (cut of meat); AHw 593.

277. Parrot Sumer No. 171B

278. Eisen G.A. Ancient Oriental Cylinder Seals & Other Seals 47, No. 48 Plate VI.

279. Layard I, Plate 75.

280. Layard II Plates 35 & 36.

281. Gadd Stones Plate 29a.

282. Layard I, Plate 30.


286. SACT I No. 171, lines 4-5: šu.gid gir.ta ba.ši9 mu.aqa.úš.e/ ni.se 'for the "general dues"(for the kitchen) were roasted in the -ven as provisions for the troops.' CAD Vol.2. B 135-137.
In conjunction with GIR4/kIrU (baking oven) it suggests roasting or baking rather than boiling the meat.

Van Driel, 92, vii lines 47-48, viii line 2'. Van Driel translated ka-nu-ni as 'hearth' but CAD Vol. 8, k. 393-395 gives kinni (kinnu in Neo-Assyrian) as 'kiln, stove, brazier'. See also Salonen A. Bagh.Mitt.3, 168.

Van Driel, 94, line 19.

ibid., 202, line 148; 194 lines 8', 12'-20'

ibid., 194, lines 8' ff.

Layard II Plate 36.

SACT I No. 171, lines 1-7


Iraq XIV, 43 line 122.

CAD unpublished volume M consulted in draft in Chicago.

madlute salted: CAD Vol. I/1 A alpu 372, 3. 'Salt beefes'; but note that AHw 666 gives muddulum as a 'kind of meat (with stuffing??)'. If the root of this word is connected with 'filling' then GU'EZ madlute may be rolls of stuffed beef and not salted beef.

Dalley et al. No. 79

ARMT III No. 29, lines 7, 17 & 21.

ARIT XIII No. 32, lines 5-9.


Bauer Nos. 41 iv 9 – v 1; 42 v 7 – vi 4; 43 viii 3 – ix 9.

Lambert RA 51, 117, No. 7 (Umma); MAD 5, No. 69, i 8. (Kish area)

Lambert M. 'La vie economique d'un quartier de Lagash' RA 55, 139, No. 8 & No. 9 (Lagash); UST III No. 102, lines 5 & 6; (see also SACT II No. 247 (Warka) and Eames Coll. E3 (Pušriš Dagan))

Gadd C.J. Iraq VII, 1940, 50 A941, 52 A961 & A963 (Chagar Bazar); SLB 1/3 81, No. 150 line 9 (SAH(?), GUŠ - red swine?)

e.g. HSS XIII No. 78, 1-2.

OIC No.20, 64 & 65, Figs. 50 & 51.

'Mallowan M.E.L. 'Excavations at Tell Chagar Bazar & Brak' Iraq IX, 1947, Plate XIII no. 9.
308. UET IV, 31 Plate 37, U14459.
309. Mallowan M.E.L. 'Excavations at Tell Chagar Bazar,’ Iraq IV, 1937, Fig. 10 No. 10.
310. Parrot A. Tello, 251 Fig. 51d.
312. Starr Nuzi I, 427-428, 99-100 (thought to be lions here), II, Plate 102 (L2), 104 (A & B), 105 (A1, A2, B), 106 (A).
313. Delaporte Catalogue Louvre II, Plate 72, No. 11 (A.137)
315. Layard II Plate 12a.
316. Gadd Stones, 194 and Plate 42.
317. Maxwell G. Reed shaken by the Wind, 72-73.
318. Lambert BWL No. 215, line 16.
319. ibid., line 18.
321. ibid., 132, line 172.
322. Landsberger Jahrezeiten, 274.
323. UE II/1, e.g. 130-133 (PG/1631), 151 (PG/333) and grave contents lists 412-509.
324. Ellison R et al. 'Some food offerings from Ur...' Journal of Archaeological Science, in press.
325. Porada I, Plate XLVIII No. 320e, Plate XLVI No. 300, Plate XLVII No. 305 e. (Old Babylonian /Isin-Larsa) ibid., Plate CXVIII No. 776 (Neo-Assyrian) Cylinder Seals, Plate XV c; Porada I, XVII No. 106 e. (Early Dynastic)
326. UE II/1, 60 (PG/779), 421, grave contents list (PG/203)
327. UE II/1, 409.
328. Hilzheimer M. Animal Remains from Tell Asmar
329. ibid., 48.
330. Details taken from ibid., 27-46, and Table VIII, 49-51.

In some archaeological studies the relative importance of domestic animals in the diet has been calculated by estimating the probable weight of the usable meat coming from animals excavated. This is done by counting the numbers of individuals found in the site; calculating the
live weight by means of similar living modern animals and
subtracting the weight of usable meat. It has not been
possible to do this for the Diyala region as there is
insufficient information on the modern weights of domestic
animals kept in similar circumstances to those at Tell
Asmar. See for fuller particulars regarding the method of
calculating weights and the problems involved: White T.E.
'A method of calculating the dietary percentage of various
food animals utilized by aboriginal peoples' American Antiquity
No.4,1953 396 ff.; Smith B.D.'Toward a more accurate
estimation of the meat yield of animal species at
archaeological sites', in Archaeological Studies (ed.
A.T.Clason), 99ff.

Details of bones found at Tell Asmar:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Site/Deposit</th>
<th>Various Body Parts</th>
<th>Individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Early Northern Palace, variety of bones</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Northern Palace, Court: F17:6 &amp; 17:7 left humerous &amp; thighbones</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single Shrine II/III left humerous</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>House VI, Level Va, R.20:8 horn cores</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J.18:20, House Level IV ulna</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First Imp. / 'Inter.Imp.' J.19:10, IV/III ulna</td>
<td>1?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inter- Imperial K.119:2, Room in House II, level III phalanx</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sheep/Goat</td>
<td>Single Shrine I (annex D17:2)</td>
<td>various body bones</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Early Northern Palace, J15: 14 &amp; 15:2 various bones, teeth, goat horn core.</td>
<td>2+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Northern Palace F17:7 radii from 2 diff. aged animals + other bones.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single Shrine II/III, 17:1 jawbones &amp; other bones</td>
<td>1+</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R.20:8 House VI Level Va 2 left horn cores</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J.19:10, House area, levels IV/III</td>
<td>2 fragments of left jawbones</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>J.19: Level III pelvis</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Pigs

EDIII  
Single Shrine I  
Early Northern Palace  
E.15:23, room below  
E.15:1  

House area below J.20:16  
Level V.  

Proto-Northern Palace  
E.16:18  

Court Fl7:6  
Street E of North.Pal.  
F.15:9  
Room, House VI, Level Va  
Single Shrine II/III  
D17:1  

First Imp./Inter-Imp. House Levels IV/III  

Isin/Larsa  
Gimilasin Complex,  
Bililama level.  
S.of South.Palace,  
P.34, Street.  

Comparison

<table>
<thead>
<tr>
<th></th>
<th>Cattle</th>
<th>Sheep/goat</th>
<th>Pigs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIII</td>
<td>1</td>
<td>3+</td>
<td>4+</td>
</tr>
<tr>
<td>Proto-Imperial</td>
<td>4</td>
<td>5+</td>
<td>7</td>
</tr>
<tr>
<td>First &amp; Inter Imperial</td>
<td>2/3</td>
<td>2/3</td>
<td>2</td>
</tr>
<tr>
<td>Isin/Larsa</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
</tbody>
</table>

105

331. Sṭarr Nuzi I 492-493.
332. ibid., 181, 199 & 493.
333. ibid., 492.
335. Moortgat Art Plate 14.
336. ibid., Plate D2 & 4, El, Plate G 9 & 10, Plate K 1.
339. ibid., 336.
340. Moortgat VR, Plate 1 No. 1; note that van Buren identified this as ibex, Fauna in Ancient Mesopotamia 50-51, & Fig. 10
341. VR Plate 11, Nos. 65 & 67.
342. Cylinder Seals Plate XII C.
343. Boehmer Plate LXI, Fig. 721.
106

344. Opitz D. 'Die Siegel Ninurta-Tukul-Ašur und seiner Frau Rimeni' *AfO* X 1935, 36, 49, Fig. 4.


346. CAD Vol. 16, s sabitu gazelle, 42-44.


348. SACT I - taken from the dates on texts, e.g. No. 136, 7.

349. ibid., No. 134, 4-5.


351. ibid. Puzriš-Dagan, F.10, Šulgi, 4th month of 42nd year; C2, Umma, Šu-Sin, 1st-12th month of year 8.


353. Iraq XIV, 42, lines 110.


357. Moortgat A. 'Assyrische Glyptik des 13. Jahrhunderts' *ZA(NF)* XIII (47), 1941, 54, Fig. 4.


360. Parrot Sumer No. 11.

361. Mallowan M.E.L. and Davies L.G. *Ivories Assyrian Style* Plate XXXIV No. 141, Plate XXXV No. 144 & 145.


363. UE I Plate 6.

364. Parrot Sumer No. 199.

365. ibid., No. 119.

366. ibid., No. 162.

367. ibid., No. 361, see also Parrot A. *Le Palais: Documents et Monuments*, 35 & Plate XVIII No. 1032.

368. Gadd Stones Plate 39.
107
369. Hatt R.T. The Mammals of Iraq, 64.
370. Moortgat A. ZA (NF) XIII, 1941, Fig. 29 66, and Fig. 46, 72
373. Barnett R.D. Assyrian Palace Reliefs Plate 101, Nineveh. (This method is reminiscent of the one used at Umm Dabagiyah for hunting onagers, c.6000 - Kirkbride D. 'Umm Dabghiyah; fourth preliminary report' Iraq XXXVII, 8-9) Note that Van Buren, Fauna in Ancient Mesopotamia, 40, identified these as red-deer.
375. Mallowan M.E.L. & Davies L.G. Ivories in Assyrian Style Plate XXXIV No. 140. Note however that there is dappling on the coat and it may therefore be some sort of fallow deer.
377. ibid., Plate 1B
379. see also Eames Coll. L.17
380. CAD Vol. 9, L. lulimu 1) red deer, stag, 241; Salonen A. Jagd und Jagdtiere..., 210-212.
381. e.g. Eames Coll. H37 and E5; and SACT I No. 175.
382. Calvot D. 'Deux Documents inedits de Selluš-dagan' RA LXIII, 1969, A)19550 and A) 19548.
383. SET No. 86 (only monthly summaries given due to the fragmentary nature of the text.)
384. CAD Vol. 1/1, A. aijalu stag, deer, 225-226; Salonen A. Jagd und Jagdtiere..., 159-162.
385. AOAT I No. 22, lines 6 & 7.
386. Iraq XIV, 42 line 110.
387. CAD Vol. 1/2 arnabu hare, 294; Salonen A. Jagd und Jagdtiere..., 181-182.
388. Van Buren, E.D. Fauna in Ancient Mesopotamia, 26-28 and fig. 31.
390. Layard II Plate 9a.
392. SACT I No. 23.

393. e.g. SET No. 86, Month 1, 2 AMAR. AZ, Month 6 1 AZ passim.

394. ARMT VII No. 91, lines 1 & 2.

395. CAD Vol. 4, E erbu locust, 256-258.


398. ibid., 257 (CT 29 11a: 7-9).

399. ARMT III No. 62, lines 15-17.

400. Layard II, Plate 9.

401. UET III No. 1303, line 1. Fish as food for servants. *ARMT* IX No. 251 (fish for king's meal) Rev.17 1-8.

402. Waterman L. *Royal Correspondence of the Assyrian Empire* No. 1405, line 5. (include as food for an illness).

403. Lloyd S. & Safar F. *Fridu* *Sumer* III, 1947, 94, 104-5.

404. See also Van Buren E.D. *Places of Sacrifice...* *Iraq* XIV, 1952, 76, and *Fish Offerings in Ancient Mesopotamia* *Iraq* X, 1948, 103.


408. UE IV, 82.


410. UE II, 410, PG/610 & PG/1232.

411. e.g. UE II, 148, PG/55, 65 PG/789.

412. Field H. *Fish at Jemdet Nasr and Kish* Field Museum News May 1932, 26; and *Fish in Mesopotamian "Flood Deposits"* *Man* 75, March 1936.

413. e.g. Grave 9, Mackey E. *Report on the Excavations of the 'A' Cemetery at Kish*, 15 and *A Sumerian Palace and the 'A' Cemetery at Kish*, 152.

414. Hilzheimer M. *Animal Remains from Tell Asmar*, 46 and 49-51


109

109

417. Personal communication from J. Boessneck, 8th January 1976.
419. de Gouville H. *Fouilles de Tello I*, 89-90, and Plate 50, 2a and 2c.
420. Mackey E. *A Sumerian Palace and the 'A' Cemetery at Kish* 166, Plate LXI No. 15 and No. 6.
421. O.I.C. 13, 91-93, Figs. 41-42.
422. Frankfort H, Lloyd S and Jacobsen T. *The Gilimilin Temple and the Palace of the Rulers at Tell Asmar*, Fig. 106g.
424. UE II Plate 230, U 8672.
425. ibid., Plate 230, U 17926 (PG/850, Burial 9), U 9004 (in inhumation grave near PG/494; near ground surface.)
426. UE II/1, 160, II/2 Plate 154.
427. UE VIII Plate 36 (note that spear-heads found at Ur have not been included as fishing implements because they could be used for hunting as well as fish-spears.) U16215 A, U 161215 C.
429. Amiet P. *La Glyptique Mesopotamienne Archaique* Plate 13 bis G
430. Amiet P. *Glyptique Susienne*, 78 Plate 14 No. 622.
431. VR Plate 22, No. 146.
432. Parrot A. *Tello*, 94, Fig. 22a.
433. ibid., 252 and Fig. 53d.
434. UE III Plate 16, Nos. 303 (SIS4-5), No. 302(SIS 4) The man is carrying one pair and one trio of fishes.
435. Parrot Sumer No. 177.
436. UE II, Plate 142, U.10945 & U 10944.
437. Boehmer Plate XXIV No. 280
438. ibid., Plate XLIV No. 525.
439. Barnett R.D. and Faulkner M. *Sculptures of Assurnasirpal II...* Plate CXX
440. Layard I, Plate 67b.
442. Botta P.E. & Flandin E. Monument de Ninive V, Plates 33 & 34
443. Paterson A. Palace of Sennacherib, Plate X
444. Bauer Nos. 132-151.
445. UET III No. 1294, lines 1-18
446. Boyer Contribution, 33.
447. ARMT I, No. 89, 7.
448. ARMT I No. 139, 5.
449. ARMT IX No. 250, 1-4.
450. ARMT III No. 9, 9
452. Iraq Handbook, 204-205
453. Khalaf K.T. The Marine and fresh-water fishes of Iraq, 28
454. ibid., 32.
455. Salonen A. Die Fischerei im alten Mesopotamian, 160-166
This book covers the textual evidence for fish in Mesopotamia in detail.
456. Bauer Nos. 135 lines i 3 & iii 3 (480 and 9600 fish); 148 ii 1 (60 fish)
458. ARMT IX No. 251, 1
459. Salonen A. Die Fischerei..., 212-221; ATw 880
460. Civil I. 'Fome of the Fish' Iraq XXIII, 1961, 170
461. ibid., 161, line 69.
462. Bauer Nos. 134 iv 4 (50 fish), 135 i, 1 (15 fish) and 148 i 1, 2, 5, ii 3. (250 fish)
463. ULT III No. 1294
464. Eames Coll. 015.
465. ARMT IX No. 250 line 13.
466. Boyer Contribution 33 41 113, line 12.
467. Khalaf K.T. Marine and fresh water fishes..., 28-29
Salonen A. Die Fischerei..., Plate XXXIX, 1.
468. Khalaf K.T. Marine and fresh-water fishes..., 32;
Salonen A. Die Fischerei..., Plate XXXIX, 2.
469. Parrot Sumer No. 343

470. ANEP, 223, No. 706, 216 No. 665.

471. Salonen A. Die Fischerei..., 179, AHw. 1133.


473. Bauer No. 146 i 1, ii 1, vi 1 (4660), No. 134 v 5 (4380) No. 140 i 1, 4 (1380) etc.


475. Bauer No. 134, i, 3 passim, No. 144 i 1, ii 2, No. 149 ii 3.

476. Khalaf K.T. Marine and fresh-water fishes... 72.


478. e.g. Bauer Nos. 133, i 3, ii 2 & 8 passim (8520), 146 i, 2, ii 5 (2160), 136 ii 12, ii 5 (960); Pinches Amherst No. 1, 1, 4 passim.

479. Salonen A. Die Fischerei... 150, 228, 232.


481. MSL 8/2, 85, 96, 101, lines 11-3.

482. ARMT IX No. 250, line 2.

483. Salonen A. Die Fischerei..., 151-156.


485. Bauer Nos. 133 iii 2, 131, ii 1, 149 ii 4, iii 1; ITT/I 1081 R.- line 2; ITT II/2, 4361, 4449 (catalogue only); Pinches Amherst No. 1, ii 2 passim.

486. UET III No. 1294, i 11.

487. Khalaf K.T. Marine & fresh-water fishes..., 148-149.

488. Paterson A. Palace of Sinacherib Plates X & XIV


490. MSL 8/2, 87.

491. Salonen A. Die Fischerei..., 197.

492. ARMT IX No. 250, line 4.


495. Salonen A. Die Fischerei... Plate XII, No. 4.

496. ibid., Plate XIII, No. 1.
ibid., Plate XII No. 8

Paterson, A. Palace of Sinacherib, Plate X; Gadd Stones, Plates 9 & 14.

Salonen, A. Die Fischerei..., 167-68, 214, 253; AHw, raqqu 958, Sekerpig 1210.

Bauer No. 133 i 6, iii 3.

Boehmer No. 280, Plate XXIV.

Gadd Stones, Plate 14; Paterson, A. Palace of Sinacherib, Plate X.

Details of preservation methods from Food Industries Manual, Drying, 345, Salting, 396, Smoking 393.

FAO, Fish in Nutrition, 38.

e.g. Bauer Nos. 133 DAR.RA i, 4; MUN i 5 passim, 133 DAR.RA i 1-14, 126 DAR.RA i 4-9.

Bauer No. 134 ii 2.

see for example GIR.KU6 in Bauer No. 133, i 4-5.

ibid., No. 134 i 5 and p.381, No. 135 ii 3, iv 1.

CT 50, No. 154 lines 1, 3-5.

Eames Coll. G.15.

For discussion see Salonen, A. Die Fischerei ..., 193-4.

UET III, No. 1294, line 18, No. 1303, line 1.

Eames Coll. G.15.

Lambert, M. 'Textes Commerciaux de Lagash', RA 47, 1953, 64, XI (VAT 4762), 66 X5 (DP 332) & 116, LA5 (VS 14, No. 64) LA 5 (DP 322). Lambert takes DAR.RA as fendus - split, and SU+SU as dépeuillées - skinned.

Dalley et al., No. 130 line 7 and No. 42.

Waterman, L. Royal Correspondence of the Assyrian Empire, I No. 568, 9-10, 20-21, 3', 4', 6', 8'-11'. Altogether 107 lamkarte-vessels, 34 strings of fish and 2400 fish are listed in details of receipts for the palace and for members of the Royal family.

B. Parker, 'Administrative tablets from the North West Palace, Nimrud', Iraq XXIII, 1961, 42, ND 2672, lines 26-27, Plate XXII. 3 lamgarae-jars and 1000 fish are included in year tribute with horses from Girzanu, Nisibin, and Askelon, but it is not clear whether the fish are from the same area as these horses. Note also that fish form part of the provisions for Assurnasirpal's feast (Iraq XIV 42, line 114).
517. Amiet P. Gyrptique Susienne Plate 148, No. 624 78, Plate 194 195 No. 2216.


519. see quantities such as 4380 GIR.KU. A.DÉ (Bauer No. 134 v 5) and SE.SUÉR.KU. g (Bauer No. 134, v 4.) 1560.

520. see Waterman L. 'Royal Correspondence of the Assyrian Empire No. 568, lines 9-10, 20-21, 31-4', 6', 81-11', Parker B, Iraq XXIII, 1961, 42 ND 2672, lines 26-27 and Plate XXII.


523. Peters J.P. Nippur or explorations and adventures on the Euphrates II, 123.

524. OIC No. 20, 64-65, Figs 50 & 51.

525. Bauer No. 176 vi 13, ix 2, xi 5.

526. ibid., No. 177 v 10.

527. Thureau-Dangin F. Inscriptions de Sumer et d'Akkad, 128 lines 8-11.

528. UET III No. 102, lines 4, 8-10.

529. SACT No. 58, 61.

530. ARMT IX No. 251, Rev. 2-8.

531. AOAT I Nos. 15, 4; 29, 4; 40, 13.

532. Iraq XIV, 34, lines 111 ff.

533. Delaporte Catalogue Louvre I, Plate 34, No. 10 and Plate 50 No. 13.

534. Moortgat VR Plate 78, No. 654.

535. Porada I, Plate CIV No. 700.

536. Salmnan A. Vögel und Vogelfang im alten Mesopotamien Plate LXXVIII.

537. Layard II, Plate 9a.


539. Salonen A. Vögel und Vogelfang... 216-222, CAD Vol. 8 K. kurkú goose, 561-63.
540. Woolley C.L. 'Excavations at Ur 1925-26' Antiquaries Journal VI, 1926, Plate LII b, 381; for another depiction of a goose (in Early Dynastic III) see Cylinder Seals Plate XVII.

541. Parrot A. *Tello*, 239 and Fig. 49c.

542. Salonen A. *Vögel...*, 217-240; AHw *pasparu* 839.


545. Salonen A. *Vögel...* 250-258.

546. Moortgat Art Plate 124.

547. Salonen A. *Vögel...* 241-243. It should be noted that both AHw 892 *gaddu* I. and CAD Vol. I/1 *akku* 275 take this to be a kind of owl.


549. ibid., 386.

550. Salonen A. *Vögel...*, *tarru* 151-153; AHw 1331. *tarlugallu*: Salonen A. *Vögel...* 154-56; AHw 1330; CAD Vol. 8 K *kadarramū* (a crested bird), 494; Personal communication from Dr. S. Dalley (28th February 1978)

551. Personal communication from I.J. Gelb, September 1975.

552. WDOG 65, 125 Abb. 161, and Plate 29.


554. VR No. 755, Plate 88.


557. Kon S.K. Milk and milk products in Human Nutrition 1-3
Note that milk is low in iron and Vitamin D.

558. Musil A. The Rwala Bedouins 87 ff.

559. Kon S.K. Milk and milk products... 7-10.

560. Main sources: Kon S.K. Milk and milk products.....
Davidson, Passmore and Brock; Food Industries Manual, 461-647

561. Susa: Parrot Sumer No. 107; Khafajeh: sheep/goats:
Frankfort F. Stratified Cylinder Seals, Plate 31, No. 315;
Kish: sheep: Moortgat Art No 40; al 'Ubaid: cows: UET I
Plate XXI, 91; see also Amiet La Glyptique Mesopotamienne
Archaique cows: Plate 87, No. 1146; goat: Plate 87,
No. 1146; Ur: cow?: UET VI, 54, Plate 45f.

562. Cylinder Seals Plate VIII f & d; Porada I No. 13.

563. Cylinder Seals Plate XXIV g & h; Moortgat Art Plate F6.

564. Cylinder Seals, 139.

565. e.g. Early Dynastic: Bauer No. 67, i4, 5, ii 3, 5;
Ur III: Eames Coll. E24 (Umma); UET III No. 377, 1, 4 (Ur);
Old Babylonian: UET V Nos. 737, 1-2, 5-6 etc., No. 783, 786 -
see Figulla (Iraq);
Neo-Assyrian: Parola S. Letters from Assyrian scholars to
Kings Esarhaddon and Assurbanipal, No. 218, 14.

566. e.g. Agade: MAD 1 No. 89 (Asmar);
Ur III: JCS I No. 21, 3; 57, 4-5; & 169, 5, 6 & 11.
Old Babylonian: UET V Nos. 510, 1 ff; 511, lff; 509, 1. (Ur)
ARM XII No. 541, 10; 548, 7. (Mari)
Neo-Assyrian: Iraq XIV, 43, line iii, 120-121. (Nimrud)

567. CAD Vol. 6, E. hinétu ghee 189-190.

568. JCS I, 133, No. 57, 4.

569. Ur III; Ur: UET No. 1214: 22 AB: 1.NUN in totals (rev. i 7
& ii, 17);
Gelb J.J. 'Growth of a herd of cattle in ten years' JCS 21,
1967, 64-9. In TCL II No. 5499, Gelb has calculated the
cows produce sufficient milk for about 5 SILA 'ghee' and
7.5 SILA cheese a year. In UET No. 1214, Gelb has
computed that the annual output per cow is 5 SILA 'ghee'
and 5 SILA cheese.
Kassite: Nippur: BE XIV No. 99a (Torszyner Tempelrechnungen
No. 21).
This text gives details of cows (with male and females)
together with the amount of 1.NUN 'produced' by each group
of cows. If only the adult cows are counted, the average
1.NUN per cow is 9 SILA — there is a slight variation
between the groups of cows. It is not clear whether
these returns are annual (in which case the amounts
involved are small) or whether the 1.NUN is produced by
all the mature cows in each group. I.NUN is produced by the cows and is not an issue to the herdsman. (The text also gives the numbers of sheep and goats and the weight of wool produced.)

It takes about 25-30 parts of milk (Chambers Encyclopaedia Vol.2, butter, 723 b.) to produce 1 part of (modern) butter so presumably 25-30 SILAS of milk might be needed for each SILA of butter and more for a SILA of ghee - because of the second loss of liquid in preparation - but it would be very risky to calculate milk output of the cows on this basis.

570. see e.g. Old Babylonian: Figulla (Iraq) - where it is one of the most frequent food offerings in the Ningal Temple at Ur.
      Mari: ARMT IX No. 192, ii 16, 26, iii 14 passim., including issues of the king's meals.

571. Early Dynastic: Lagashi: Bauer No. 119, 1 3, where it is included with various scented oils from trees and plants to mix as an ointment or salve for Baragnamtara.
      Old Babylonian: Mari: ARMT XI No. 191 1 & 3, where it is given to the king's daughter for anointing.

572. BE XIV No. 138, 1 passim. (Teoczyner Tempelrechnungen No.53): 1 BAN 1.NUN and 5 SILA I.NUN given to adult men and boys per year in the measure of the oil ration (GIS. BAN 10 SILA I.BA)


574. ARW 1253, GA/sizbu: milk.

575. Figulla (Iraq) e.g., 91, No. 7, line 2.

576. e.g. SACT I No. 67, 1-3.

577. Bauer No. 67, ii5; No. 68 x 2.

578. ibid., No. 177 xi 4.

579. ibid., No. 156 i2, 6 passim.; CAD Vol. 3 D diktu, a dairy product 138-139.


581. UET III No. 1067 obv.ii 15-18; No. 1214 obv. ii 6-8; No. 1215 rev. vii? 16-17; No. 2216 rev. iii 12-15; where GA is translated as 'skim milk' of cheese, and GA.SIG.7.A as 'green cheese'.

582. Figulla (Iraq), 120 No. 50 16-17 and note l; No. 51 13-14, 25-26. Figulla gives GA.SIG.7.A as 'yellow, green or skimmed milk'.
583. Eames Coll., Index, 232.
584. Pinches Amherst No. 10 rev.3.
585. UET III No. 1215 rev.ii, 5; No. 1216 rev.iii, 14.
586. Figulla (Iraq) No. 7 and following.
587. ibid., No. 17 line 16: 1 PI 4 BAN 2 SILA 5 GIN ghee;
      1 PI 4 BAN 2 SILA 5 GIN GA.HAR
588. SET No. 188 i 15-16.
589. GA.SA.A is also recorded in Early Dynastic, Lagaš, Bauer
      No. 177, xi 3.
591. AFO 18, 329, line 120.
Sources for these remains are:
Ur: R. Ellison et al. 'Some food offerings...' Journal of Archaeological Science in press.
Nuzi: Starr Nuzi I, 493.

Note that the lentils and chickpeas at Bazmosian, Isin/Larsa and 15th century levels were mixed with sizeable quantities of barley, bread wheat, emmer wheat; the chickpeas were less common than grain at Nuzi; and the vegetable remains at Nimrud were also less common than barley, bread wheat and emmer wheat.


AHw 1155 Mamaškil!um onion; AHw 1275 kumu garlic; DAB 53-54; CAD Vol. 8 k karašu B leek 212-214.

Gelb I.J. 'Philadelphia Onion Archive' Studies Landsberger 57

Lagaš: Bauer No. 4 iv 2 - vii 8: SUM.SAG₂, SUM.ZA.ḪA.TI, SUM.SIKIL.GAL.GAL, TUD.SUM.SIKIL, SUM.GUD.
Bauer No. 69 i1 - ii 4: SUM.SIKIL.GAL.GAL, SUM.GUD, SUM.DILMUN, TUD.SUM.SIKIL, SUM.ZA.ḪA.TI.
Umma: Lambert RA 59, 123 No. 42: SUM.ZA.ḪAT.TI, SUM.TUD.DA, SUM.GUD.
Nippur: Gelb I.J. Studies Landsberger, 57, SUM.GAZ, SUM.SIKIL.SAR.
Umma?: James Coll. S33: SUM.GAZ, SUM.SIKIL.SAR, SUM.ḪAD.DIN
Lagaš: Pinches Amherst No. 54, 7: GA.RAŠ.
Rimah: Dalley et al. No. 28, 5: baazannu
Larsa?: Boyer Contribution 27, 111 HE lines 13-15: SUM.SAR ZA.ḪA.TIN.SAR, SUM.SIKIL.LUM.SAR.
Mari: ARMT IX No. 238 1 & 9, XII No. 733, 1 & 6: Mamaškil!um, baazannu.
Nimrud: Iraq XIV 43, lines 125-127, 126: SUM.SAR, SUM.SIKIL.SAR, kuniḫu, andaḫšu
Waterman L. Royal Correspondence of the Assyrian Empire No. 1405, 5: SUM.SAR, SUM.SIKIL.SAR.

Bauer No. 4, iv 1 - vii 8.

Bauer No. 69, i3 & ii 4.

Dalley et al. No. 29, kabulum = dried, ratbutim = undried—in the sense, opposite to kabulum, of 'not dry' or 'fresh' rather than 'moist'.

CAD Vol. 1/2, azannu bitter garlic, 526.

603. see Gelb I.J. Studies Landsberger, 60, unpublished texts.


605. ARMT XII No. 714, 1 7 2, No. 733, 6; ARMT IX No. 238, 7-9; ARMT XII, 7 and note 7. ZA-Ba.TI(SAR)/suhatunu.

606. ARMT XII No. 729 1 & 2.

607. Dalley et al. No. 29, 10; No. 129, 5 passim.

608. Waterman L. Royal correspondence of the Assyrian Empire No. 1405, 5. SUM, karsdu.

609. Iraq XIV 43, lines 125-7, 140. kunirbu is translated as a pungent garden plant. CAD Vol. 8 K, 539; zinzime as a type of onion, CAD Vol. 21, Z zinziimu (a type of onion) possibly a shallot, 122.

610. CAD Vol. 6 H balluru chick pea, 47-48.

611. CAD Vol. 8 K kakkä lentil (or small bean), 58.

612. Bauer No. 4 iv 5, v 6; No. 70 i2, iv 3, v 1.

613. Bauer No. 4

614. UET V No. 573 (headings)

615. U.NAP.HI has been translated as Chrysantheum segatum or Ch. coronarium possibly used in the same way as Chamomile. DAB 120-125.

616. BE XIV No. 18 (Törczyner Tempelrechnungen No. 1), headings The quantities of šibSUM and mikSU taxes include SE (see Ellis Agriculture, 110, 152)

617. Pinches Amherst No. 69 i 7, ii 14, iii 12, iv 2.

618. e.g. ARMTIX Nos 215, 214, 193, etc. passim.

619. e.g. ARMT XII Nos. 70, 4-5; 107, 7; 180, 8-9; 181, 5-6; 249 6-7; ARMT XII, 7 na-GA-BI 'descicated, dried' from the root ngl to dry, as in the desert Negeb.

620. see Note 123 in Chapter 4, and Dossin G. Les noms d'années et éponymes dans les 'Archive de Mari'.

621. ARMT XII No. 696, lines 3 & 14.

622. e.g. The year Zimri-Lim counted the people:
Lilitum: ARMT IX No. 85 (kakkä), No. 87 (balluru);
Belit-biri: ARMT XI No. 377 (balluTrum), ARMT XII No. 280 (kakkä);
Kiskissum: ARMT IX No. 98 (balluru), ARMT XI No. 98 (kakkä)
Sibirum: ARMT IX No. 109 (balluTrum), ARMT XII No. 143 (kakkä)
Frubum: AR'' IX No. 109 (ballûrum)
Malkanum: ARMT IX No. 114 (ballûrum)
Abum: ARMT XII No. 438 (ballûrum) ARMT XII No. 441 (kakkû)
Hibîrtum: ARMT XII No. 445 (ballûrum & kakkû)
Dagan: ARMT XII No. 466 (ballûrum & kakkû)
The year Zimri-Lim built Dur Yaḥdun-Lim:
IGI.KUR: ARMT IX No. 181 (ballûrum)
Labbum: ARMT VII No. 158 (ballûrum), ARMT XII No. 572 (kakkû)
Kim: ARMT XI No. 247 (ballûrum)
Malkanum: ARMT XII No. 548 (kakkû)

So that taking the two years together ballûrum appears in
Liliatum, Bâlêt-biri, Kiskissum, Eburum, Uruhum, Malkanum,
Abum, Hibîrtum, Kim, Dagan, Labbum, IGI.KUR (12 months);
kakkû appears in Liliatum, Bâlêt-biri, Kiskissum, Eburum,
Abum, Hibîrtum, Dagan, Labhu, Malkanum. (9 months)

623. e.g. ARMT XII No. 363, 6.
624. CAD Vol. I/2 A appânu (a leguminous plant) 179
625. Dalley et al. No. 191, 1-2; No. 192, 1.
626. AOAT I No. 11, 7 & No. 25, 7.
627. Figulla (Iraq) e.g. No. 18, lines 25 & 27, U.EZINU is translated as 'lentils'. The signs are U.SE.TIR; SE.TIR is connected with the deity Ašnan, a cereal deity DAB 96, which could mean that SE.TIR is a cereal rather than a legume - see also CAD Vol. I/2 A ašnan 450-52.
628. Brouk B. Plants consumed by man, 103
629. Platt B.S. Foods used in tropical countries No. 105.
630. DAB 56.
631. Pinches Amherst No. 69 i 3, iii 2-3, iv 11.
632. HSS XIV No. 69, Plate 36 1, 7-10.
633. Postgate Archives No. 183, 3.
634. Iraq XIV, 43, line 126.
635. Brouk B. Plants consumed by man, 104-105.
636. U.WAB-III appears to take the place of ZAG.GI.LI as a field crop at Ur in the Old Babylonian period.
637. DAB 81-82. Note that Thompson does not give the diacritical-this is given in Labat Manual No. 550.
638. An.Or. 2 7-8, 1) DP 124.
639. A possible reference appears at Ur III Ur in a list of provisions for Ibbie-Sin, year 4: UETIII, No. 96, 3, 1.
640. DAB 84.
642. Layard II Plate 8, but note that Bonavia E. *Flora of the Assyrian Monuments*, 68, Fig. 30, identifies this as a citron.

643. DAB 51; CAD Vol. 9, *L laptu A*, 96.


645. *Iraq XIV*, 43 line 126.

646. Meissner B. *'Babylonische Pflanzennamen'* ZA 6, 291 iii 295.

647. Brouk B. *Plants consumed by man*, 68.


649. *nassabu* in CT 14, 50, 43 (ZA 6) translated as artichoke in Levey M. *'Food and its technology in Ancient Mesopotamia'* Centaur 6, 1959, 42. See also DAB 83 and A&W *nassabu* 757-758.

650. *Iraq XIV*, 44 line 129.

651. DAB 72.

652. e.g. *AfO* 18, 329 line 85; Meissner B. *ZA* 6, 293 *hi-is*; CAD Vol. 6, *F bessar* lettuce, 128.

Lagâš: CT 50, Plate 47, No. 174 3 & 4: i.SAE. & i.UDU
Umma: Lambert RA 59, 121, No. 32, 7: i.SAE
Amar: MAD 1 No. 287, 3: i.SAE
Lagâš: Pinches Amherst, No. 105, rev. 3: i.UDU
RA 58, 104, No. 75 1: i.SAE
'Tannunna': AASOR 31, LE 1, 2: i.SAE
Ur: UET V No. 508, 6, 8, 10: i.SAE
Chagar Bazar: AOAT I, No. 6 1 & 4: i.SAE
Rimâ: Dalley et al. No. 204, 3, 4, 12, 15, 17 & 18: i.SAE & i.UDU
Nipnur: BE XIV No. 48 line 18: i.UDU
Postgate taxation 136, ADD 1095, 10: i.SAE

Bauer No. 117, e.g. iv 1 & 2.
Bauer No. 133, ii 4, No. 135 ii 1.
UET III No. 1305, 1 KA.MAR.KU 6 : UET V Nos. 32, 10, and No. 24, 6. kamāri
Salonen A. Die Fischerei..., 175-176.
AFO 18, 329 lines 135 & 139.
Helbaek H. in Mallowan Nimrud, 618. Note that a 'lump of sesame' was found at Harappa (late third-early second millennium), Allochin F. 'Early cultivated plants in India and Pakistan', The Domestication and Exploitation of Plants and animals (P. J. Ucko & G. W. Dimbleby eds.), 324.

CAD Vol. 4, E allu B, 106.
Pinches Amherst No. 50 i 6-8.
e.g. ARMT XII Nos. 480, 6 & 8; 495, 7 & 9; 507 7 & 9; ARMT IX No. 145 7 & 9.
Dalley et al. No. 23, 11-18: i.GIS ma-at-qu sweetened vegetable oil, 11-14: Sz.1.GIS ma-at-qu-tum sweetened linseed or sesame oil.
Iraq XIV, 43, line 117 cuttings (?) or (Bu̇) ŠE.GIS.1.MES, line 138: I+GIS.
Pinches Amherst No. 50 i 6-8; UET V No. 595, 1.
e.g. Pinches Amherst Nos. 70, 71, 72, 74, 105, 111 etc.
STT Nos. 203, 204, 213, 214 etc.
Helbaek H. 'Notes on the evolution and history of Linum', Kumr 1959, 103-110.

Sources include: Imperial Gazetteer of India Vol. III 37-38; Adams Diyala 16; Oil seeds in India, Appendix V, 79


ibid., 118 (Section F) suggests that the references to the seeds 'falling out' relate to a loss of seed due to carelessness on the part of the people harvesting the plants but it could also refer to the falling-out of seeds which is a part of the threshing process.

Sources include: Bearn J.G. The Chemistry of Paints, pigments and varnishes, 174; Encyclopaedia Britannica Vol. XVI 'linseed', 734; Tempany Sir H. 'The Tropics as sources of vegetable oils and fats' Chemistry and Industry July 18th 1953, 733; Guest E. The Cultivation and marketing of linseed.

suggested by the Research Nutrition Officer of FAO, personal communication, 8th January 1976.

Joshi A.B. Sesamon 19

STE.GIS.BAR.GA = (samaššammu) hal-su-ti AFO 18, 328
i.GIS.BARA.AG.A = hal-qu Hb.XXIV 16 in CAD Vol. 8 H halqu 50-51.
See also CAD Vol. 4 E ellu; Vol. 8 H halqu 1) to press to squeeze out, 40.

CAD Vol. 16 S saštātu, 60-1. CAD has extended the meaning of saštātu 'to press' to cover the process of obtaining oil from sesame seeds by boiling the seeds and skimming off the oil but this is not necessary as cold-pressing can be used on sesame and is the usual way to obtain linseed oil.

Pinches Amberst No. 83, 1-5.

ibid., No. 50 i 7-8

UBT V No. 595, 1.

Main sources for linseed and sesame oil are: Oilseeds FAO Pamphlet 22; letter from the Research Nutrition Officer, 8th January 1976; Food Industries Manual, 763; Chemistry of paints, pigments and varnishes, 174; Joshi A.B. Sesamon, 21.

Communication from Soviet Encyclopaedia, sent in answer to enquiry.

e.g. ı.ğiṣ: Umma: (Agade) Lamber+ RA 59, 123, No. 40, line 20. List includes ingredients for beer, pulses spices, fish etc.

Bagakš: (Ur III): Pinches Amberst Nos. 70, 71 etc. Messengers' rations.

SE.ğiṣ.I and ı.ğiṣ; Mari (Old Babylonian) e.g. ARMT XII No. 480, line 6 & 8; No. 495 7 & 9 etc. In the king's meals.

Nimrud (Neo-Assyrian) Iraq XIV, 43 lines 117 & 138, provisions for Aššur-nāṣirpal's feast.

Dalley et al. No. 23 lines 11, 13 & 14.

e.g. Layard Sir H. Early Adventures in Persia, Susiana and Babylonia I, 67, 103.

e.g. MSL XI, 119, lines 24, 28-31.

Joshi A.B. Sesamon, 2.

CAD Vol. 4 E emāmu, 148 (KAR 199:12) (note DAB 247 has sirdu bitter almond); ARw 1037 serdu

FAO No. 22 Oilseeds, 58.

Boardman J. 'The Olive in the Mediterranean: its culture & use', Early History of Agriculture, (Sir John Hutchinson), 188.


ARMT VII No. 238, 16 & No. 256, 5.

Iraq XIV, 44 line 140.
Pellet P.L. & Shadarevian S. Food Composition: Tables for use in the Middle East, No. 9 Arabic bread, 279 Kcals per 100 grams edible portion; No. 42 dried dates, 318 Kcals; No. 45 dried figs, 305 Kcals.

DAB 308, 302, 314, 302.

Grapes will not be discussed in this section but in section 8 under Wine.

Sources include: Dowson V.H.W. Dates and date cultivation of the 'Iraq; Popenoe P. The Date palm; Iraq Handbook 457-59.

Le Strange G. Lands of the Eastern Caliphate, 90, 98-99

Dowson V.H.W. Dates and date cultivation..., 29 (Iraqi Arabic)

Popenoe P. The Date Palm, 99.


Iraq Handbook, 469.


Main sources: Brouk B. Plants consumed by man, 152-155; Flora II, 107-110.

Brouk B. Plants consumed by man, 152.

Philby H. St. J. Heart of Arabia I, 343.


'Ellison R. et al. Journal of Archaeological Science in press'.

London Illustrated News Sep. 6, 1958, 389, Fig. 17

UVB X, 14-15, near the pillared hall.

Starr Nuzi I, 492.

Helbaek H. 'Plant remains at Nimrud', 616, in Mallowan Nimrud.
126

718. Starr Nuzi I, 493.

719. Helbaek N. in Mallowan Nimrud, 616.


721. e.g. Deimel A. Or.16 46-48; Bauer Nos. 91 & 92; de Genouillac V. Tabletes Sumeriennes Archaiques Nos. 42 & 43.

722. MAD 5, No. 106.

723. BE III/1, Plate 27, No. 75 (see also, 63 No. XV)

724. On the basis of 1 SILA = 1 litre this equals about 50 kg per tree which compares very well with the average yield in Iraq given by Dowson, see above. (Conversion to Kg based on a litre of dates weighing .6 Kg - this is only a rough measure because of the difficulty in weighing litres of dates.)

725. CAD G gašāsu (kašā), 53, to trim, mutilate.


727. SLB I/3 Nos. 71 7-11; 72, 1-10 (Lagaba)

728. ParrotSUMER No. 346


730. Moortgat Art No. 241

731. e.g. Gadd Stones Plates 9 & 11, 13 & 14, 26.

732. Moortgat Art No. 257, but note that Bonavia E. Flora..., 72-75, disagrees with this, considering that the trees are being sprinkled with holy water from pine cones.

733. Moortgat Art Nos. 283, 287.

734. Gadd Stones Plate 41 & 42.

735. Layard II Plate 14.

736. Gadd Stones, Plate 16, 18b, 20, 27, 36.

737. Bonavia E. Flora..., 12.

738. Layard II Plate 14.

739. ibid., Plate 22 and Barnett R. Assyrian Palace Reliefs in the British Museum (sampler) Plates IV & V.

740. Loud G. Khorsabad I, 93-98, Fig. 104.

741. e.g. An.Or.2, 8 No. 1 (DP 124) 9 No. 3 (Amberst 2)

742. e.g. An.Or.2, 15 No. 2 (RTC 61), 17 No. 4 (DP 134)
127

e.g. Ur: UET III No. 1033, line 17 (Mentioned in total only.); No. 1047 r i 13-17, rii 5; No. 1048, 27-29, 36; No. 1090 1 & 2; No. 1092 102; No. 1095 1-2; No. 1098 1-2.

DAB 302.

TCS I No. 162, 3.

UET III No. 96 2, 6-7.

James Coll. D.27 Note that Landsberger disagrees with the translation of GIR.1AN as 'cake' preferring to take it as a type of basket, Landsberger Date Palm, 37 para.2.

SET No. 198

UE II Plate 141 a.


DAB 304

Philby H. St.J Heart of Arabia I, 343.

MSL V, 96, line 33; CAD Vol. 8, K kamišaru, 122.

DAB 305; AHw 1149 šalltru

DAB 305; CAD Vol. 6, H šabbu (B), 29.

Flora II, 155-156.

e.g. Ur: UET V No. 505, 2 & 508, 1 & 12; SLB I/3 Nos. 82, 90 (Lagaba)

Figulla (Iraq) e.g. Nos. 24, 3; 25, 3; 26, 3; etc.

SLB I/3 No. 115, 1. (Lagaba)

e.g. ARMT XII No. 414, 6; IX No. 213 i 10, ii 9 passim; IX No. 214 ii 11, 24, iii 34 passim.

ARMT XI No. 13 1-3

ARMT XII No. 440 1-4; IX No. 115 1-3.

ARMT XI No. 93, 1-3; XII No. 739, 1-3.

ARMT XII No. 440, 2; XI No. 240 1-4.

ARMT IX No. 282 1-3.

ARMT XII No. 201, 1.

MSL V, 95 line 20a; ARMT XII, 8 note 5.

Dalley et al. No. 33, 6, 8-9. arumnu is taken as a variation for GIS.ḪASTUR.KUR.RA/armannu; CAD Vol. 1/2 armannu 291
Many varieties of pistachio grow in the Near East and it is difficult to assign bututtu to a particular variety. CAD takes bututtu to be the *Pistacia* vera tree and nut, but DAB prefers *Ginkgo biloba* bututtu to be the *P. terebinthus*. The identification is complicated by the similarity between bututtu and the Hebrew botnim, Arab. butm, and Syr. betm, and butma, all of which have been translated as different types of pistachio trees, e.g. butm is used in Iraq to describe the nuts of the *P. Khinjuk* and botnim has been translated as the *P. terebinthus*. In view of these problems, it is probably best to take *Ginkgo biloba* bututtu as a pistachio-type nut without assigning it to any particular type of pistachio-tree. Many varieties of the pistachio grew in Iraq at one time or another (see Flora I, 83-87) especially in the foothills and mountain regions, for instance *P. Khinjuk* has been found on the southern slopes of the Jebel Sinjar and *P. Atlantica* in the Kurdish hills.
789. ibid., 153.
790. Helbaek H. 'Plant economy in Ancient Lachish' in Lachish IV (O.Tufnell), 311.
792. Davidson Passmore & Brock, 209.
793. For a list of spices in the cuneiform texts see RIA
    'Gewürze', 340-244.
794. CAD Vol. 8 K *kisibirru* 420-421.
795. DAB 66
797. Bauer No. 4, iv 1, vi 3, vii 2 & 7.
799. SET No. 188, line 25.
800. Pinches Amherst No. 69, i3 & i9, iii 2, 3, 21, iv 10.
801. e.g. Figulla (Iraq), 98, No. 18 lines 11 & 30.
802. Dalley et al. No. 120 & No. 140.
803. HSS XIV No. 529, 2 passim; No. 601, 7-12, 16. Note that
    in the latter the spices are *ri-i-qu a-a-zi-1 a-a URU
ezi-ix-mi* (lines 8-10) 'spices for growing' *?asu to grow,
Sprout. CAD I/2 A, 365 (2).
804. Meissner B. ZA 6, 1891, 201, col.ii.
805. Iraq XIV, 44 lines 139.
806. ARMT IX No. 238, 6, 12, 17 - MU, abarakkatum & mersu;
    ARMT XII No. 733, 5-7 - abarakkatum XII No. 729, 3. king's
    meal.
807. ARMT XI No. 140 1-5.
808. Helbaek H. 'Late Cypriot Vegetable Diet' from Apliki'
    *Opuscula Atheniensia* IV, 1963, 183. (Note however that he
    does not mention this in Mallowan Nimrud.)
809. CAD Vol. 8 K *kamminu* 131-132, A. *U.DIN.TIR appears to be
    read GAMUN in the Sumerian period (See Hoffner H.
    *Alimenta Hethaerorum*, 103 and note 70). Cumin is also
    written GU.MUN and GA.MUN in Bauer No. 70 ii 4 and MAD 3,
    147. Care should be taken when considering this spice
    as many languages use 'cumin' when referring to 'caraway
    seeds' (name derived from Arabic *karauya*). For instance
    the German *Kummel* can mean caraway or cumin and in
    Swedish *kummin* is used for caraway seeds. This is partly
    because caraway seeds have recently almost completely
    taken over from cumin in Europe, and is an example of the
    transfer of a name from one type of plant to another
    because they fulfill the same purposes. (For discussion
    see Brouk B. *Plants consumed by Man*, 287-288 & 298)
810. Bauer No. 70 iii 4. Bauer translates GU.MUN as kamunu but it is possible that this is in fact another type of pea or bean.

811. UET III No. 900, 3 (Ú.TIR) see also Pinches Amherst No. 69, for Ú.TIR e.g. i 2.


813. ARMT XII No. 733, 3; No. 734, 3; IX No. 238, 4, 11, 16.

814. FSS XIV No. 539, 4; No. 601, 3 passim.

815. Iraq XIV, 43, line 135.

816. CAD Vol. 21, Z zid(A) 104-105.

817. DAB 71 & 72. I myself have bought hab essoda in the bazaar at Baghdad. The seeds are nothing like those of cumin and are small and black.

818. ARMT IX No. 238, 2, 10, 15; XII No. 729, 4; No. 733, 2; No. 734, 4.

819. ARMT XII No. 734, 8 with a query.

820. ATO 18, 337-338. Note that CAD Vol. 8, K kadi 248-250, simply says '(A native spice, specifically its pungent seeds)', and that its botanical identification is not established.


822. Loewenfeld C & Back P. The complete book... 186-188.


824. Pinches Amherst No. 69 i 4, iii 6 & 22, iv 12.

825. SET No. 188, i 15, ii 46, iv 2 passim.

826. Figulla (Iraq) No. 18 lines 8 & 29.

827. ARMT XII No. 734, 8.

828. HSS XIV No. 601, 1 passim.

829. CAD Vol. 8 K kadi 248-250; ibid. 248 Hg B VI 102 UTUL A GAZI.SAR = um-már me-e kasi-i soup made with kasi-juice; MSL 8/2, 120: Rh.XVIII 127 (fish preserved in GAZI.SAR)

830. CAD Vol. 8 K kadi, 249, (BE 8/74:1)

831. ITT 3, 5926 line 1; 2 GUR 1 PI 5 BAN 7½ SÍLA GAZI, listed with small amounts of cress seed and cumin (lines 2 & 3). Boson Tavolette 364, line 2: 1 ik GIZ.SAR yields 2 BAN GAZI;

YOS 2 152, 25. (see CAD Vol. 8, K kadi, section 2, 248): GAZI is associated with chick peas, lentils, garlic etc.
DAB 192-194, which suggests that kasia in Neo-Babylonian times was the husks of Carob pods (but of CAD Vol. 6, H šarūtu, 120-121)

DAB 67-69.

e.g. Pinches Amherst No. 69 i 2, iii 11, iv 13; HSS XIV No. 539, 5; AR 18, 129, line 61; Meissner B. ZA 6, 1891, 291 col. i.

ARMT IX No. 238, 3.

DAB 157-161.

CAD Vol. I/2 A azurîru 520-531.

Colin J. Herbs & Spices 146-47.

ARMT XIX No. 238, 5; XI No. 275, 4.

HSS XIV No. 539, 3.

Meissner B. ZA 6 1891, col ii and 204.

DAB 64-66.

Dalley et al. No. 38, 9.

Hølbaek H. in Lachis! IV (O. Tufnell), 311.

DAB 61-64; AHw 1238.

HSS XIV No. 539, 1.

DAB 74; note that CAD Vol. 6, H hašš B, 144-145, is not so definite in its identification.

Davidson Passmore & Brock, 84-85.

Rank Hovis & McDougal Foods Ltd., Research Centre—personal communication 9th December 1976.

Edzard D. O. Superior Rechtsurkunden, 28, note to 4 v 5.

Iraq Handbook, 475.

Bauer No. 133 i 5; No. 144 i 4; No. 147 i, 2; No. 149 iii, 2; (Early Dynastic) CT 50, 143, 1. (A-ade)

Westenholz A, personal communication 3rd January 1977. Text to be published in OSP II.

SET No. 181, 17.

Pinches Amherst No. 69 i 11, iii 16, iv 6;

Figulla (Iraq) No. 67 ii 3, iii 6 etc.
123

857. SLB I/2, 81-85 No. 55 but note Note 1 (p. 83) where Leemans refers to Torczyner Tempelrechnungen No. 63 for Kassite references to salt. BE XV No. 169 quoted by Torczyner as one of the texts listing salt. However the sign given by him as MUN/tabtu should read MUNU/buq1u, malt. This text also lists BAPPIR (not SEM as given by Torczyner.)

858. AASOR 31 LE No. 1.

859. Postgate Taxation, 399 (ND 3467), 9.

860. Iraq XIV, 43, lines 122 & 120; CAD unpublished volume M consulted in Chicago in draft. madlu salted.

861. Van Driel, 128, A125 col.v, line 12'. MUN ina UGU 
tak-me-es-a-ni salt on the pickled mutton. (cf. JNES IV, 160-161, line 96 & note 78)

862. DAB 31-36, see also Tamns Coll. No. A3; AASOR 31, No. 1, 25 Meissner B, ZA 6, 1891, 293.

863. RIA, 342 (under Gewürze)

864. e.g. Tames Coll. A3, B4, D12, G12; SET No. 215, No. 216.

865. AASOR 31, LE No. 1, 25.


867. Personal communication (11th October 1976) from Professor H. Limet; personal communication from Rank Hovis, McDougal Foods Ltd., 9th December 1976.

868. CAD Vol. 8, K. kuddimmu, 493.


870. Iraq XIV 43, line 120.

871. Postgate Taxation No. 339, 9 (ND 3467)

872. CAD Vol. 3 D dišpu 161-162.


874. Personal communication from Professor Limet (11th October 1976) He cites TCL 5, 5680 rev. ii (Plate XVIII); 6162, i 23 (Plate XLIX) (the quoted example) and YOS 4, 295.

875. ARMT VII No. 238, 15 & 21; No. 257, 2, 6 & 10.

876. MSL XI, 78, line 7.

877. CAD Vol. 2, D dišpu 161, lexical section, see Lugale XII 30 and 162, No. 51.'
878. CAD Vol. 3 D dišmu, 161 a); TCL 17 Plate XLII No. 53, lines 19-21.

879. ARMT XI No. 259, 1, 7, 12; No. 260, 1, 5, 8, 13; XII No. 502, 9; No. 504, 7; No. 505, 8 etc.

880. Dalley et al. No. 204, 2.

881. Figulla (Iraq), 98 No. 18 lines 14 & 24.

882. AtQ 18, 329, line 115.

883. ibid., 329, line 116 and CAD Vol. 3, D dišmu, 163.

884. Mallowan Nimrud, 152.

885. As for instance in the making of mersu — see WSL XI, 119, line 32.
Sources include: Sichel A. The Penguin book of Wines; Chambers Encyclopaedia Vol. VI, 479-480 'grape'; Iraq Handbook 462-463; Results of the Agricultural & Livestock Census in Iraq...

The numbers of vines tend to be few however. In each of the Amara Qadha and the Nasiriya Qadha only between 2000 and 3000 were grown in 1958/1959. (Results of the Agricultural... Tables 11a.)

Forbes R. Studies in Ancient Technology Vol. 1, 74-76 and Fig. 17.


ibid., Figs 19 & 20.

CAD Vol. 8, K kara 202-209.

de Genouillac H. Tablettes Sumerienne Archaique, 96-97, Nos. 42 & 43, Plate XXXVII, iii 4 & 7 passim; Bauer No. 92 iii 4 passim; Deimel A. Or. 16, 48 No. 8 (DP 107), 46, No. 2 (Nik.146)

Bauer No. 155 i 5, ii 1 passim.

ibid.,411.

Finches Amberst No. 54 line 3.

ibid., rev. line 7.

Copy by Dr. I.M. Price, Great Cylinder Inscriptions A & B of Gudea, Cyl. A. col. xxviii especially lines 10 & 11 and 23-24; transliterated by Thureau-Dangin F. Les Inscriptions de Sumer et d'Akkad, 172; see also Lutz H.F. Viticulture and Brewery in the Ancient Orient, 37.

e.g. Cylinder Seals Plate XV a, 5 & m; Parrot Sumer No. 178; Moortgat Art No. 42, No. 47.

ARMT VII No. 238, 14 & 20; No. 256, 1-4.

ARMT XIII No. 74.

ARMT IX No. 15, 272 para. 42.

ibid., No. 13.

ibid., Nos. 186 & 187.

ARMT IX No. 14, 1; No. 15, 2 & No. 17, 10.

ARMT IX No. 17, 7 & 9.

ARMT IX No. 15, 1-5; No. 17, 9-11.

ARMT IX No. 186.
908. ARMT IX No. 186, 1.

909. ARMT VII No. 199, 18-20.


911. BE XIV No. 56. Note that this should be read GES.TIN.GAL and not DUG.GAL as transaltered by Clay, 30 No. 12.

912. e.g. Porada I, No. 315 e, No. 316 Plate XLVIII; Cylinder Seals Plate XXVII b, g.

913. Starr Nuzi II Plate 62 S & T (late GA.SUR); Plate 76, M, N, ), P.

914. ibid., Plate 77 A-S, Plate 78, especially Q.

915. AFO 18, 330, lines 182-188.

916. ibid., 340, lines 9', 13'.

917. Iraq XIV, 42, line 116; 43, line 123.

918. Wilson, J.V.K., Nimrud Wine Lists; Wiseman D.J. 'Nimrud Tablets 1952' Iraq XV, 1953, 148 ND 3486.

919. Postgate Taxation No. 399,7(ND 3467) but note that only 1 SILA GES.TIN.ES is listed; ibid., No. 369, 2 (ND 451) - counted as DUG.SAB bowls; Thureau-Dangin F. Les relations de la Sixième Campagne de Sargon, 10 col.1 line 53.

920. Parpola S. Letters from Assyrian scholars No. 51, rev. 3

921. Postgate Taxation, 266 ABL 241, 5-6 - namertu for the month of Kanunu.

922. Parpola S. Letters from Assyrian Scholars, No. 30, 10 and 218.

923. Van D-iel. 88 BM 121206 vi 15'

924. Gadd Stones Plate 16.

925. ibid., Plate 18 b.

926. Parrot A. Nineveh & Babylon No. 49.

927. Layard II Plate 14.

928. Parrot A. Nineveh & Babylon, No. 60

929. Mallowan M.C.L. and Davies L. Ivories Assyrian Style, Nos. 74, 77 & 78. Plates XXIII & XXIV; Barnett R. and Faulkner M. Sculptures of Assurnasirpal II, Plates XX, XLVI, CXIV.

ibid., Plate 29; it is possible that some of the 'skins' represent sacks containing food rations and other belongings, see Gadd Stones Plate 35, where some prisoners have 2 'skins' one larger than the other.

Parrot A. Nineveh & Babylon Nos. 41 & 183; Mallowan M.E.L. & Davies L. Ivories Assyrian Style Plate V No. 7; Porada I No. 673 c Plate XCIX and No. 776 Plate CXVIII.

Parrot A. Nineveh & Babylon No. 60.

Botta P. F. Monument de Ninive Plate 112.

Oates J. 'Late Assyrian pottery from Fort Shalmaneser' Iraq XXI, 1959, Plate XXXV No. 7, Plate XXXVI Nos. 27 & 28; Lines J. 'Late Assyrian pottery from Nimrud' Iraq XVI, 1964, Plate XXXVIII Nos. 7 & 8. Only those quoted were calculated for capacity measures - calculations were made from the drawings.

Oates J. Iraq XXI, 1959, Plate XXXVI Nos. 37-48, Plate XXXVII Nos. 50-54, 60-62, 64, 78-80. (see also Chapter 4 and note 302 where the capacities were found by filling the vessels with water.)


Thureau-Dangin F. Une relation de la huitième compagnie de Sargon, 32, col.ii, line 205.

Layard II Plate 9b.

e.g. BBST, 129, No. 27, lines 10-11; CAD Vol. 8 K Karanu 203-204.

Levey M. Chemistry and Chemical Technology in Ancient Mesopotamia, 31-36.

Information supplied by Professor E.E.D.M. Oates.

Levey M. Chemistry and Chemical Technology... 36-38.
The unit of energy is the joule (J) which represents the energy used when 1 kilogram (kg) is moved 1 metre (m) by a force of 1 newton (N). Nutritionists now express amounts of energy in terms of kilojoule (kJ = 10^-3 J) and megajoule (MJ = 10^6 J) but formerly energy was expressed in units of heat—the kilocalorie (Kcal). This represents the amount of heat required to raise the temperature of a litre of water from 15°C to 16°C. Because the term 'Calorie' has become part of the common language and has an instant association with diet it has been decided to use it throughout this study when discussing the energy value of food etc. A quick conversion from Calorie to joules can be made by multiplying by 4.2 (more precisely 4.186) (Davidson, Passmore & Brock, 8).

2. FAO Nutritional Studies No. 15 'Calory Requirements', 11.

3. Clark C. & Haswell M. Economies of Subsistence Agriculture, 12 & 3. For instance calculations based on data from central Africa suggest that 2820 Calories would be required for a four hour day and 3402 for an eight hour day. The activities here include field work, house-building, walking to work etc., and the weight range is between 43-63 kgs. The FAO adjustment to African conditions gives a requirement of 2707 Calories/day.


5. Davidson Passmore & Brock, 34.

6. ibid., 38; This does not mean however that cereal grains are not essential in the diet; they contain proteins and when used whole have a reasonable supply of the B vitamins. This latter may be lost in milling. In addition it is believed that the part of cereal grains (whether whole or as bread) which can not be absorbed by the gut plays an important role in the health of the bowels and intestines and it may be due to this that there is comparatively little incidence of bowel cancer in Arab populations. (Burkitt D.P. Cancer 1971, 28, 2.)

7. Main source: Davidson, Passmore & Brock, chapter 6, 62-77.

8. ibid., 76-77.

9. ibid., 65, 72 & 323 ff.


11. Davidson, Passmore & Brock, 58.


14. FAO Nutritional Studies No. 28, 19


17. ibid., 125-128.

18. ibid., 132-137.

19. FAO Nutritional Studies No. 28 Table 1: intakes for Vitamin C, thiamin, niacin, riboflavin and iron.

20. Davidson, Passmore & Brock, 137-140.

21. ibid., 141-142.

22. ibid., 143-145.

23. ibid., 146-148.

24. ibid., 148-150.

25. ibid., 92-102.

26. ibid., 105-108.

27. ibid., 84-90.

28. ibid., 539.

29. ibid., 85-90.

30. ibid., 88-89.

31. ibid., 111-112.

32. Patwardhan V.N. & Darby W.J. Nutrition in the Arab Middle East, 277-278. Note that the study of Caughey and Follis in the Mosul area recorded an even higher incidence of goitre among school children.

33. Davidson, Passmore & Brock, 177.

34. Bauer Nos. 152-156.


36. UET III No. 122

37. These texts are mainly published in transliteration and translation in ARMT Vols. VII, IX, XI, & XII.

38. e.g. ARMT IX Nos. 163 & 168, ii 9-15.


40. e.g. 7th Kishimm, Year Zimri-Lim counted the land;
recorded in daily records in ARMT XI No. 168, and IX No. 95. Details given in No. 95 are included in the monthly record of ARMT IX No. 98, ii 1-10. See also 4th Urukham, same year, in monthly record ARMT IX No. 109, i 24-35. Different amounts are issued on 3rd Urukham in ARMT XI No. 175 and 4th Urukham in ARMT XI No. 176.

41. This would suggest that the scribe of ARMT IX No. 71 had in fact made a mistake in putting both meals down for 17th Malkanum.

42. ARMT IX No. 251, line 7.

43. ARMT XII No. 685, lines 2 & 6, No.686, lines 6 & 10.

44. Waterman, L. Royal Correspondence of the Assyrian Empire, I No. 5 obv. 14-15, rev. 15-18.

45. R.Acc., 74.

46. ibid., 61-85 'Le Ritual du temple d'Anu a Uruk'

47. Philby H.St.J. Heart of Arabia I, 88-89

48. Musil A. Manners and Customs of the Rwala Bedouin, 86-87

49. UE II Plate 193 No. 17 U.10871.

50. ibid., Plate 193 No. 18 U.10872.

51. Cylinder Seals Plate XVc. See also Plate XV f, here one figure drinks from tubes and in the lower register servants are carrying a large vessel suspended from a pole. The 'food' on top of the sideboard is very schematically drawn.

52. Parrot Sumer No. 177

53. ibid., No. 161 A

54. Moortgat Art, No. 47.

55. ibid., No. 49.

56. e.g. Boehmer Plate XXXII No. 387, Plate LIX No. 646; Cylinder Seals Plate XXIV f.

57. Philby H.St.J. Heart of Arabia, I, 88-89, II 98. Note that in Philby's time rice was common but bread or burghul was sometimes used instead.

58. Porada I Plate XXXIX No. 252.

59. Delaporte Catalogue Louvre II Plate 72, No. 6.

60. McCown D.J. & Reines R.C. Nippur I, Temple of Enlil... Plate 10, No. 12, level TB IV (Ur III); Plate 112 No. 6, level TAXII2 (Isin/Larsa)

62. Parrot Sumer No. 348 a & b (for discussion of the date see Moortgat Art, 72-74.
63. Du. Ry C.J. Art of the Ancient Near and Middle East, 123.
64. Moortgat Art No. 288.
65. e.g. Porada I Plate XCIX Nos. 673 & 674, Plate CIV No. 700; Buchanan B. Catalogue of Ancient Near Eastern Seals I, Nos. 592 & 593.
66. Barnett R.D. & Paulkner M. Sculptures of Ašurnasirpal..., Plate LX.
67. ANEP Nos. 633 and 630 respectively.
68. Mallowan Nimrud, 502-504. Figs 403 (holding a plant), 404, 405 (with a lotus? fruit).
70. Mallowan M.E.L. & Davies L.G. Ivories in Assyrian Style, Plate V, No. 7.
72. Moortgat Art, No. 277; Layard II Plate 8 & 9; British Museum, Assyrian Sculptures in the British Museum..., Plate LXVIII & LXIX; Gadd Stones Plate 46b.
73. Moortgat Art, Nos. 287 & 288.
74. Gadd Stones Plate 39, and p. 179-180 (para. 35)
75. Barnett R.D. Sculptures from the Northern Palace..., Plate LXVI Slab A.
76. Gadd Nos. 44 & 29b.
77. ibid., Nos. 36 & 35; it is also possible that the sack on the prisoners' shoulders may contain what personal belongings they were allowed to take with them.
78. I am ignoring the subject of whether the priests ate the consecrated food actually set out before the images of the gods.
79. Oppenheimer A. Ancient Mesopotamia, 190.
80. see Van Driel.
81. ibid., 94, BM 121206 col. viii, 18'
82. ibid., 202, 12'-14'
83. Postgate Royal Grants No. 54, 107; see discussion on p. 113 and col. vii, 15, col. vii-viii, lines 24 - end.
84. BBSt., 124-5, col. v, lines 8-38.
85. Bauer No. 67, i 1, 3, 5, ii 2, 3.
86. Bauer No. 68 x 2.
87. ibid., No. 156, i 2, 6 and passim.
89. Bauer Nos. 152-156.
90. ibid., No. 153 (and p.133) EZEM.ŠE.KU (This is a month name at Lagaš, see Landsberger Kult. Kalender, 45-61.)
91. This is not to be connected with mundu - semoulina. Bauer No. 153 i 8 and p.411.
92. 4 SÌLA write 2 KÛR. 1 KÛR = 2 SÌLA. (Bauer, 411)
93. e.g. Cylinder S-als, Plate XV c; Parrot Sumer No.197.
94. e.g. Philby H.St.J. Heart of Arabia, I, 88-89, II 98. Musil A. Palmyrenz, 17.
These beers are made from a variety of cereals of which maize is one of the most important, but malting and fermentation also increase the B.Vitamin content of wheat and barley beers.
96. See Chapter 3 pages
98. e.g. Bauer No. 67, i 5.
99. ibid., No. 68 x 2.
100. Davidson, Passmore & Brock, 280.
101. e.g. Bauer Nos. 131-149 for examples of texts dealing with fish.
102. Platt B.S. Tables of representative values of foods commonly used in tropical countries, No. 179, Note. 1.; 170 I.U. = 51 microg. retinol equivalent (based on 1 International Unit = .3 microgram RE). The dried fish tested was a freshwater specimen with edible bones.
104. U.E. II See grave contents lists 412-509 and descriptions of grains in main text.
This suggestion that each individual received a reasonable portion is made on the grounds that as the provisions were made for the king's household, sufficient quantities would be given to provide for all. The meat and 'pulse' being the largest items would presumably form the main part of each portion while the ghee, cheese, fish etc., would be available only in small quantities for each person. The number of people partaking in the meal is unknown nor whether more than one meal is involved.

A complication arises in the totalling with the use of the word šipku. This is sometimes given as the name of a specific item issued for a particular meal, and it is often kept separate in the totals, from the main NINDA totals. On occasions it is used to include such dishes as isqūgu, sasqāl and pappāsu. The word šipku seems to come from Šapāku, to store, so that its use in the naptān ṣarrīm records may simply mean foodstuffs brought from a particular store. (See also SLB I/2 No. 36, Larsa)


124. CAD Vol. I/2 A appânu (a leguminous plant) 179. Apparently found only at Mari. The similarity of the Hebrew appon, chick pea, is commented on by CAD.I/2, 172.

125. Not every month is equally well recorded and some months are only represented by one or two daily records.

126. e.g. ARMT XII No. 493, line 4; ARMT XII No. 602 line 4.

127. e.g. ARMT IX No. 173 line 6 (4 SILA); ARMT XII No. 584, 9 (1 SILA); ARMT XI No. 222, 9 (1 SILA), No. 230, 6 (2 SILA).

128. e.g. ARMT XII No. 729 lines 8; ARMT IX No. 238, line 13.

129. ARMT VII, 256, para. 70.

130. ARMT IX No. 251, rev. 5'-8'.

131. see Gadd C.J. Iraq VII, 1940, 22-61; AOAT I, 199-260.

132. AOAT I No. 11, lines 1 & 4.


134. Philby H. St. J. Heart of Arabia I, 124; Lady Anne Blunt Bedouin Tribes on the Euphrates, 158.

135. Pellett P.L. & Shadarevian S. Food composition... Section 1, Nos. 42 & 45. On this basis it might be supposed that dried apricots and other dried fruits also maintain their Vitamin A. value.

136. Greengus S. 'Old Babylonian Marriage Ceremonies and Rites' JCS 20, 166, 55-58.

137. see Van Driel.

138. ibid., 93, BM 121206, col.viii 1 & 2.
139. ibid., 194, I.A127 6'-9'.
140. ibid., 202, line 25' ND 1120.
141. Postgate Royal Grants, 110, No. 54 vii 12 - end (and p.113)
142. Iraq XIV 24-39;
143. Van Driel, 202, line 14' allocation of UZU ᅒ-(___)-____ (interior organs) to the cook.
144. ibid., 88, BV 121206, vi 14'-16'.
146. ibid., lines 35-40 & 48-49, obverse, 63.
147. ibid., lines 25-29 obverse, 62-63, and note 4, 81.
148. A number of studies have been made of these rations lists including Deimel A. 'Sumerische Temperwirtschaft zur zeit Urukagina und seinger vorganger' An.Or. 2 (see also Or. 34/35 & 43/44); Schneider Dr. A. Die anfänge der Kultervirtschaft die Sumerische Tempelstadt; Gelb I.J. 'Ancient Mesopotamian Ration Systems' (also including Sargonic and Ur III material) JNES 24, 1965, 230-243; Maekawa K. 'The Development of the E-MI in Lagaš during the EDIII' Mesopotamia, VIII/IX, 1973/74, 77-144.
149. see Or. 34/25, e.g. 2 (RTC 54) dated 6th year Lugalanda, month 2. The term SE.BA - barley rations but note Gelb, JNES 24, 1965, 231, that the term SE.BA can be extended to include other types of grain and even commodities such as oil and wool, also distributed regularly as rations. However this extension appears more common in post Early Dynastic III.
150. Deimel A. An.Or.2, 3 (STH 1, 5). This list includes both named individuals and those listed only as professions.
151. Bauer No. 41, iii 3, 4, vi 5, 6; No. 42 iii 8, 9; No. 42 iv 5, 8, 11, 12.
152. An.Or. 2, 3 (STH 1, 5) 10 (DP 128) 5 (Nik.13).
153. ibid., 12 (VAT 4735) 17 (DP 127)
154. ibid., 17 (DP 134) see also 15 (RTC 61)
155. LAK 490 - ?cheese. See Bauer No. 117, i 2 and 327.
156. An.Or.2, 9 (VAT 4858) 10 (DP 126) 8 (DP 216 & Amherst 2)
157. ibid., 7 (DP 124)
158. ibid., 24 (VAT44114)
The litres were converted in Kilograms by taking a litre of threshed barley grains and weighing them. This came to 7.65 Kgs. This figure can vary according to the size of the grains and how firmly they are packed into the litre container but a litre of barley was weighed on number of occasions and the same result was obtained. The equipment used was an ordinary kitchen measuring jug and scales. Once the conversion from litres to Kg. was established the daily rations were turned into Kgs., and then into numbers of 100 grams — that is 1 litre equals 7.5 '100 grams'. The Calorie and other nutrient value of the daily barley ration was found by taking the nutritional value of barley as shown in Pellett P.L. & Shadarevian S. Food Composition..., Section I, No. 1. The value of one '100 grams' was multiplied by the number of 100 grams in the daily barley rations.

Example:
100 grms of barley provides 360 Kcals., 50 mg Calcium, 4 mg Iron, 7.5 '100 grams' provides:
2700 Kcal., 375 mg Calcium 30 mg Iron and so on. (See Figures 1 - 4)

— See e.g. Maekawa K. 'The Development....' Mesopotamia VIII/IX, 1972/75, 88-91 and Note 19, Table STH I 7.

FAO Nutritional Studies No. 28, Table I 'Recommended Intakes of Nutrients'.

see e.g. Maekawa K. Mesopotamia, VIII/IX, 1973/5, 97, VAT 4612, STH I, 23.

: ibid., 97 (VAT 4612) and 98.

Davidson, Passmore & Brock, 134.

ibid., 122.

— e.g. Or. 34/35:
Lugalpae SIB.SAV: 72 SILA: 1) 2/3 RTC 54, Lugalanda 6, 2; 2) 5 STH 1, 6 (Up.1,2); 3) 7 STH 1, 7 (U2,2); 6) 16, STH 1, 8 (U3, 1); 48 SILA: 10) 25 DP 121 (V6, 6); 11) 27 STH 1, 13 (V6, 10)
Galatur NITÁ: 36 SILÁ, and Nin-bar-da-ri: 24 SILÁ.
1) 43 & 45 VAT 4416 (L6, 1); 2) 48 & 49 VAT 4628
(L6, 9); 3) 52 & 53 STH 1, 15 (Up.1,6) (here Ninbardari
gets 36 SILÁ); 8) 66 & 67 DP 113 (U2, 8) (Galatur now gets
72 SILÁ); 9) 71 & 72 STH 1, 17 (U3, 10) (Galatur drops
to 60 SILÁ); 10) 76, TSA 14 (U 4, 4); 14) 91 & 92 DP 114
(U5, 3); 17) 98 STH 1, 18 (U6 12) (only Galatur who now
has 48 SILÁ); 19) 110 DP 115 (U.6) (Ninbardari only); 20)
113 TSA 17 (U6...; Galatur now only 36 SILÁ); 20)
114 TSA 17 (U6...; Ninbardari.

Galatur's rations show a number of fluctuations. He
starts with 36 SILÁ and at first sight his rise to 72 SILÁ
2 years later suggests he has changed in age and status,
that is, from adolescence to full adulthood. However his
drop to 60 SILÁ the next year, and 48 and then 36 SILÁ
3 years later cannot be because of old age. The drop
to 60 SILÁ could have been because of a misdemeanor or
demotion in his work. The two drops in Urukagina's
final year (taken with Lugalpae's drop in that year)
may be because of the political problems of the period
or because of poor conditions in Lagas.

GIM.DUMU.TUR.TUR.IA.NE as GIM.DUMU.DI4.DI4.LA.NE.

173. This has been worked out on the basis of Y. Rosengarten's
reconstruction of the Lagat calendar Le concept Sumérien
de consommation dans la vie économique et religieuse. See also
Maekawa K. Mesopotamia VIII/IX, 1973/75, 105 and
note 27. It alters the month numbers given by Deimel in
Or 34/35.

174. Pellett P.L. & Shadarevian S. Food composition..., Section
I, 1, 7 (as example) 36, 42, 43 & 100.

175. Davidson, Passmore & Brock, 280 - germinated pulses are
used to provide Vitamin C in India.

176. Pellet P.L. & Shadarevian S. Food Composition..., Section
I, No. 125, Retinol equivalent 93, Vitamin C 30 mg.

177. Umma: Lambert RA 59, 22 No. 44 & No. 45;
Nippur: Vestenholz Jena Nos. 28, 39 & 34.
Kish: MAD 5, No. 9 rev. ii line 17 (silver distributions
are also mentioned in this text.)
Asmar: MAD 1, No. 3 vi line x+1 & No. 163 x line 26.

178. FSS IX No. 66

179. MAD 4, No. 47 - assigned to Umma.

180. e.g. OSP I No. 53

181. MAD 1 No. 229, rev. 14 & 15.

182. MAD 5, No. 85, tablet from Umm-el-Jir.
181. MAD 1, no. 7

184. ibid., ii:x+1 Mamasarat, also in No. 162, i 34; No. 53 r x+1 4. Note that oil may be used for industrial uses such as weaving and ointments as well as for eating and cooking, and lighting.

185. It is possible that the women with a son may have 6 SīLA each and one for the son. see ibid., 6 FPN 11) i 1 Dumu-

186. Lambert RA 59, 122, No. 36


188. ibid., No. 168, this is written as an account with a number of ENGAR followed by 1 KAS, 1 SAU.TA and the name of another man (presumably the foreman). The 25 Zīz.A.KU.DUG comes iv, 4, before the totals. No date is given.

189. ibid., No. 119.

190. see Appendix I.

191. see Gelb I. J. 'The Philadelphia Onion Archive' Studies Landsberger, 40.

192. see Chapter 3
Lambert RA 59 No. 35.

193. eg. TCS I Nos. 17, 51, 141, 27, 99, 101 & 151;
Pinches Amherst Nos. 43 & 47.

194. Pinches Amherst No. 90.


196. TCS I No. 107.

197. UET III, No. 1041 lines 1 & 3, No. 1045.

198. ibid., No. 1025 lines 18 - 25.

199. ibid., No. 1066 totals.

200. ibid., No. 1078.

201. ibid., No. 1040, children and old women appear only to receive oil. Totals: rev. v 1-16.

202. ibid., No. 1047. The total mentions fish also - rev. ii, 6.

203. 'ii?, No. 1048, totals lines 27-36.

204. ibid., No. 1125.

205. e.g. ibid., Nos. 1090, 1092, 1095. Note that in No. 1095 only 2 SīLA per person were issued so that dates were not the only monthly ratios for these workers. Presumably they were in addition to other items.
206. UET III No. 1431, totals 14-21.

207. UET III No. 1046, see also No. 982 where a man has 10 SILA barley counted for oil.


209. e.g. UET III No. 1047 rev.11 13: 19 men have 25 SILA barley, 10 SILA dates and 3 SILA oil; No. 1125, line 1; 2 men have 20 SILA bread and 5 SILA oil.

210. Ibbi-Sin Year 8, month 6: UET III No. 1025; Yr 9 month 4r No. 1066; Yr 9, month 5: Nos. 1047 & 1125; Yr. 9, month 9 No. 1041; Yr. 9 month 11: No. 1158; Yr. 9 month 12: Nos. 1420, 1144 & 1048.

211. SACT II, 313-315, No. 292 especially lines 24-26.

212. UET III No. 1419, lines 1 - 3.

213. SET, 280.

214. e.g. Pinches Amherst Nos. 70, 71, 72 & 74.

215. Details are taken from the following sources: SET Nos. 202-232; Pinches Amherst Nos. 61, 70-72, 74 & 77; Eames Coll. Nos. A3, B5, D13, G12.

216. Onions are sometimes issued by bunch (SA) - see e.g. SET No. 214.

217. These figures are calculated from the Old Babylonian texts from Chagar Bazar, AOAT I Nos. 36, 43 & 46. See also Chapter 3

218. Davidson, Passmore & Brock, 539-540.


221. ibid., Nos. 208, 210-212.

222. UET III No. 89, Ibbi-Sin Year 1, month 9; No. 88 Ibbi-Sin Yr.1 Month 12 (see also No. 1229)

223. ibid., No. 1303, Ibbi-Sin Yr. 8 month 9.

224. e.g. SACT I No. 138 (Šulgi 44) and No. 163 (Amar-Sin 8) and No. 175 (Su-Sin 7). The animals include sheep, goat and oxen.

225. TCS I No. 325 (Lagat)


227. See Appendix I.

228. UET III, No. 1039, line 10. The Calorie intake of dates is taken from Pellett P.L. & Shadaravien S. Food composition.. Section 1, No. 42.
229. UET V No. 502, Rim-Sin, Year 11, month 3.
230. ibid., No. 500, lines 1-5, Silli-Adad Yr 1, month 10.
231. ibid., No. 501.
232. ibid., No. 505.
233. ibid., No. 504: ZI:35E: Line 2, ZU.UUM line 3, I line 4, KAS line 5, I NUN line 29.
234. ibid., No. 509, note however that the sign may be KAS, line 1.
235. ibid., Nos. 511 & 616.
236. Walters S.D. Water for Larsa: an Old Babylonian Archive dealing with irrigation, 112 No. 82.
237. SLB I/2, No. 41 (Larsa)
238. ibid., No. 42.
239. ibid., No. 47.
240. ibid., No. 34.
241. The site of Lagaba has not yet been found but the evidence suggests it was in the region of Babylon and Kutha. SLB I/3, 1-3.
242. SLB I/3, Nos. 77, 79, & 86. (Lagaba)
243. ibid., No. 78, line 24.
244. ibid., No. 115, lines 1-5.
245. e.g. ibid., No. 82 lines 6 & 14'.
246. ibid., No. 88, line 23.
247. ibid., No. 90, line 18.
248. ibid., 165.
249. ibid., No. 167, line 1.
250. AASOR 31, 33-36, 40-49: See Laws Nos. 3, 4, 7, 8, 9, 10 & 11.
251. AASOR 31, 41 ff. LE 11: Law 9 includes the provisos that the man will be fired if he does not do the work and that his wages of barley will be stopped as (or when?) he is discharged and the barley, oil and wool will revert to the household. The last phrase suggests that the 15 SILA daily wages may have been split up as barley, wool and oil or that the wool and oil were additional payments - unless the 1 sheke' silver given to the hired man as hiring fee was used to cover this. It would seem that the hired man received both a hiring fee and his daily rations while he was working, in both Laws 9 & 11. In Law 9 the man will be fined 10 shekels of silver if he does not do his work.
Simmons S.D. 'Early Old Babylonian Tablets from Parnal elsewhere' JCS XIII, 1958, 107 No. 8, Archive A. Ibalpi-el II ?Tr. 10 (see JCS XIII, 75 g.)

Simmons S.D. JCS XIII, 1958, No. 9, Ibalpi-el II Tr. 1? (see JCS XIII, 75 h). (See also Simmons S.D. JCS XIV, 1959, 31 No. 65 for a similar rate although here there is no clause about retaining half of the barley until the end of the year.)

Lutz P. Legal and Economic Documents from Asbjaly, No. 58 (translation No. 7)

Driver C. & Miles J.C. The Babylonian Laws 88-89, CT 258; 92/93, CT 271, 272, 273, 274, 275.


ibid., 162, transliteration and translation (No. 188 J Sherntob CBS 77) Plate CXX lines 7 & 8.

ibid., 131-132, transliteration and translation (No. 153 N.7026 Plate XCVII – especially 19 & 20, line 19 is very doubtful.

ARMT IX No. 24.

ARMT IX No. 25.

ARMT IX No. 24, field workers iii 28; female weavers iii 40 – iv 14; young people iii 20-29.

Of course both the barley and bread may have been issued daily with the texts giving the monthly totals; if personal preference is the key between barley and bread this would presuppose that each person decided to have the same foodstuff every day for a month.


AOAT I: No. 13 (KIN.KUD), No. 21 (Magranim) No. 30 (Abum) No. 34 (Yammim) No. 41 (Tamhirum), No. 44 (Mammim), No. 42 (Nabri), No. 40(Kinum), No. 7 & No. 45; Gadd C.J. Iraq VII, 1940, A.949 (Alamrum) A.980 (Dumuzi)(1Imu Abisya) A.986 (Nikim) (1Imu ABsumalik). (except for the two latter texts, all the others come from 1Imu Adad-bani)

Gadd C.J. Iraq VII, 1940, A.944. Note that here 1 SIaA NE is equal to I SIaA NINDA but 1 SIaA KAS U3 equals .6 SIaA NE.

ibid., A. 943.

ibid., A. 941.

I.NUN line 4, I.SI2 line 9, ZU.LUM line 11

Goetze A. 'Thirty Tablets...' JCS II, 1947, 49, No. 8

ARMT VII Nos. 200-202, & 205.
ibid., No. 206.

ARMT IX No. 243

ARMT XII No. 5 (14 or 24 Kiskissum, limu Aššur-malik)
No. 10 (21st Urubum, limu Asqudim); No. 12 (5th Malkanum
limu Asqudim). For SILA as maintenance see Birot
ARMT IX, 257, 17, 4b.

ARMT XII No. 6 (30th Dagan, limu Aššur-malik)
No. 11 (30th Urubum, limu Asqudim)

ARMT XII No. 299, lines 5 & 7 (Year Zimri-Lim
dedicated (?) the statue of Ṣutta).

ARMT IX No. 216 v lines 47-48 (Birot ARMT IX, 287, 69 3a,
suggests this is an additional payment).

ARMT IX, 287, 69, 3d.

ARMT IX No. 121 iii 19-26.

e.g. ARMT XII No. 555, 4 (2 ugar barley); ARMT XI, 133,
No. 227 (2 ugar barley), No. 295 (1 ugar 8 kur 34 qa fruit
for the ašarākkatim, for Ṣimri.)

These texts are only examples taken from the named
sites but they cover the main rates of
rations issued.

ARMT IX No. 24: apprentices, lines i 47, 55, ii 43; young
girls e.g. iii 22-29, iv 44-45; ARMT IX No. 25: dependant
of Ewanikkir rev., 43, 45-47.

Dalley et al. No. 207, girl, iii 3, included in man's
(?father's) ration of 60 SILA – see sub-total, lines 12-13.

Shepherd: AOAT I No. 3, 1 & No. 21, 1 (ŠE.KIN.KUD and Maqrannum)
Gadd C.J. Iraq VII, 1940, A.949 (Airum), A.958 (Nabri)
Groom: Gadd C.J. Iraq VII, 1940, A.946 (Airum);AOAT I No. 30
(Abum)
Farmer & family: AOAT I No. 34, 7-10, (Mammitum), Gadd C.J.
Iraq VII, 1940, A.977 (ŠE.KIN.KUD)
(All from limu Adad-bani)

B.E XIV 91a (Torkyżner Tempelrechnungen No. 39); BE XIV No.
56 a (Torkyżner Tempelrechnungen No. 54); BE XIV No. 60
(Torkyżner Tempelrechnungen No. 40)

BE XIV No. 58 (Torkyżner Tempelrechnungen, 66)

HSS XIX No. 593, 59.

e.g. HSS XIV No. 597, 1-5, 37-40; see also Nos. 606 &
654 for issues of bread wheat.

HSS XVI Nos. 421b and 423.

A) BE XIV No. 58 (Torkyżner Tempelrechnungen No. 66) 13th
year of NasiMarrattash.
B) BE XIV No. 91a (Torkyżner Tempelrechnungen No. 39) 3rd
year of Kadašmunturgi.
Some of the rations (e.g. HSS XIII Nos. 128 & 214) were made in bread-wheat (GIG). The Calory value of this is lower than that of barley (see Pellett P.L. & Shadarevian S Food Composition..., Section 1 Nos. 1 & 7, barley: 360 Calories, wheat 354 Calories. All the listed nutrients are a little lower in wheat except for thiamin.

Helbaek W. in Mallowan Nimrud, 614.

Postgate Archives, 184, No. 185 lines 5-13.


ibid., 369 ND 453, lines 2-5. The tablet is damaged and most of the figures are restored.

Thureau-Dangin F. Une relation de la Huitième campagne de Sargons I, Plate III & 10, col.i line 53.

Parker B. 'Administrative tablets from the North West Palace, Nimrud' Iraq XXIII, 1961, 55 ND 2803.

ibid., 56-7, obv. col.i lines 17'-31' and rev. col.i 11-21.

see Appendix I

Published in Wilson J.K. Nimrud Wine Lists.

ibid., 117 and forward xiv.

This amount of wine suggests that these rations were meant for about 10 men for one day but as that would mean that each man had 9 SILA flour for 1 day, this seems unlikely.

Nimrud pots, in the Institute of Archaeology, University of London: Nos. ND 3028, 3139, 3119, 3024, 9007, 3103, 3137, 614, 658, 639, 613, 661, 1264.

Gelb I.J. 'On the alleged temple and state economies in Ancient Mesopotamia' Studio in Onore di Eduardo Volterra, 6, 1969, 148-9; Ellis Agriculture, 81-85.

Ellis Agriculture, 57.


Postgate J.N. 'Land tenure in the Middle Assyrian period: a reconstruction' BSOAS XXXIV, 1971, 496-52; Ellis Agriculture, 130-132.

Ellis Agriculture, 146.

see Chapter 2

Schneider Dr. A. 'Die Anfänge der Kulturwirtschaft...' Staatswissenschaftliche Beiträge, IV, 110, Table IV (STH I, 40); Maeckawa K. Mesopotamia 1973/74, VIII/IX, 88 note 19 (STH I, 7)
154

309. See Chapter 2

310. USDA, FAS - M 108. No. 4 Table 4.

311. Diyala Report, 41 Appendix XIX

312. ibid., see CT 33, No. 43 (Sippar)

313. Appendix 2.


315. B: Table IV

316. A: 118-121.


318. Pellatt P.L. & Jamalian J. 'Observations on the protein-calorie value of Middle Eastern foods and diets' in Man, Food and Agriculture in the Middle East (T. E. Stickley et al. eds), 635, Table 5.

319. SET Nos. 218-220, 230-232; Pinches Amherst Nos. 61, 70-71; Eames Coll. Nos. A3, D13; SACT II Nos. 302, 303 etc.

320. ARMT XIX, Nos. 351, 352, 356.

321. UET VIII Plate XV, no., 72 lines 50-55, p.15. Sollberger gives line 55 as UZU.NI.KU.E SUB.BA but cannot readily explain it.

322. ibid., 15. Bread issues alone equal 4185 Calories plus barley, beer and oil.

323. USDA FAS-M 108 No. 4 Table 4; J. Fac. Med. (Baghdad) 14, 1950 98 Table 2; J. Fac. Med. (Baghdad) 5, 177 Table 2; Or-34/35 43 VAT 4416; Westonholz Jena Nos. 29 & 34 (only restored figures used); TCS I Nos. 17 & 335; SACT II No. 21; ARMT IX No. 25; SLB I/3 No. 86; BE XIV No. 58; HSS XIII Nos. 19 & 113; HSS XIV No. 593.

324. The texts for the averages were selected in order to include as wide a cross section of ration rates as possible and to avoid as much as possible any weighting in favour of any one rate of ration.

325. As J. Fac. Med., (Baghdad) 14, 93.

326. Davidson, Passmore & Brock, 213.

327. ibid., 236.

Compare Figure 1 and J. Fac. Med (Baghdad) Vol. 5, 175 and 177 Table 2.

FAO Nutritional Studies No. 28, 43; Davidson, Passmore & Brock, 143-144.

J. Fac. Med. (Baghdad), 14, 102-103; Davidson, Passmore & Brock, 97.

Sources: Davidson, Passmore & Brock, 92-102, 125-128, 267-272; FAO Nutritional Studies No. 28, 28-32, 49-52.

e.g. Parrot Sumer No. 152; Moorgat Art Nos. 95, 97, 98.

e.g. Gadd Stones No. 36.

Driver G.R. & Miles J.C. The Assyrian Laws, 127 and Nos. 4, 6, 8 (Tablet A, para. 40).


Dudley Buxton, L.H. 'Appendix on the Human Remains excavated at Kish' in Excavations at Kish I (Langdon S.) 125 (only 8 crania were examined here).

Swindler D.R. Study of the Cranial & Skeletal material excavated at Nippur, 11-12.


None of the studies were carried out with a view to discovering nutritional diseases. Such a study would be desirable.


The translation is not without challenge. Professor F. Kocher considers nu4ana to have similar symptoms to diphtheria. (Personal communication, 18th April 1977)

Wilson J.K. RA 60, 53-54.

FAO Nutritional Studies, No. 28, 35.

Davidson, Passmore & Brock, 136 - these studies were on lactating Indian women who showed losses of Vitamin C in milk and urine far in excess of the dietary intake.

e.g. Bauer No. 44 ii 3, No. 47 i 3, No. 48 i 2, No. 51 i 3 and p. 194; RA 47, 1951, 68 UK4 (DP 339); Or. 34/35, 55 No. 4 (STH I, 16); (Gelb I.J. 'Prisoners of War in Early Mesopotamia' JNCS 32, 1972, 87); AOAT I, 42 iii 3 & 4, No. 45 iv 34-36.

e.g. Moorgat Art Nos. 27, 57, 60 & 61.
References and Notes for Chapter 5, pages 315-335.

1. Ministry of Planning Results of the Agricultural... Amara liwa Table 9.

2. Ebeling E. 'Ein rezept zum Würzen von Fleisch' Or. (NS) 18, 1940, 171-72.

3. Gordon Sumerian Proverbs, 65 line 48, 144 line 192, 63 & 458 lines 46 & 47.
BIBLIOGRAPHY

Abdulnabi M, Abutrab U, Dhia L.Y, Kamil F, Shukri S and Yahya A. 'The Nutritional values of some Iraqi Food Stuffs' Journal of the Faculty of Medicine, Baghdad I (NS) (1959), 173-177.

-- 'The Nutritional values of some Iraqi Food Stuffs' Journal of the Faculty of Medicine, Baghdad, 3 (NS) (1961), 10-16.

Abdulnabi M, Shukri S and Dhia L.Y. 'The Nutritional values of some Iraqi Food Stuffs' Journal of the Faculty of Medicine Baghdad 4 (NS) (1962), 22-25.


Adams R.McC. 'An Ancient Uruk Threshing Sledge or Hayrow?' Sumer 31 (1975) 17-19


-- 'Settlements in Ancient Akkad' Archaeology 10 (1957) 270-274.


---


Amschler J.W. 'Goats from Ur and Kish' *Antiquity* 11 (1937) 226-228.


---


---


---


Artzi P and Malamat A. 'The Correspondence of Ṣibtu, Queen of Mari' Orientalia (NS) 40 (1971) 75-89.


---


---


---

Baradi T.A. 'Date Growing' *Tropical Abstracts* 23 No.8,(1968) 473.


---


---

'Une "construction enigmatique" a Tello' *Iraq* XXVIII (1965) 100-18.


---


---

'Le sens du NIG.DU dans les textes de Mari et de Chagar Bazar' *Revue d'assyriologie* 52, (1958) 177-82.

---


'Textes economiques de Mari (ii) Tablette C' Revue d'assyriologie, 50 (1256) 57-74.

'Trois textes economiques de Mari' Revue d'assyriologie 47 (1952) 121-130 and 161-174.


Boeckx R.M. 'Das Auftreten des Wassenbaffels in Mesopotamiens in historischer Zeit und seine Sumerische Bezeuchnung' Zeitschrift für Assyriologie 64 (1975) 1-19.


Boson G. Tavoletto Cuneiformi sumere degli archivi di Drehem ere di Djoha dell'ultima dinastia di Ur Milam, Società Editrice 'Vita e pensiero', 1976.


Boyer G. Contribution à l'Histoire Juridique de la 1st Dynastie Babyloniene, 6-14, Geuthner, 1928.

---


---


Buringh P. 'Living conditions in the Lower Mesopotamian Plain in Ancient Times' Sumer 12 (1957), 30-57.

Soils and soil conditions in Iraq, Baghdad, Ministry of Agriculture, 1960.


Calmeyer P. 'Des Grab eines altassyrischen Kaufmanns' Iraq XXXIX (1977), 87-98.


Cardascia G. 'Faut-il éliminer GIŠ.APIN = Hartamu?' Revue d'a-assyriologie 60 (1966), 153-164.

Carter T.F. 'Early Assyrians in the Sinjar' Expedition 7 (1964) 34-42.

Cassin E. 'Quelques remarques a propos des archives administrative de Nuzi' Revue d'assyriologie, 52 (1958), 16-28


Chaplin R.E. 'Animals in Archaeology' Antiquity 39 (1965), 204-11


-- Selected temple accounts from Telloh, Yokha and Dreham Philadelphia, University of Pennsylvania, 1921.

Childe V.G. 'Rotary Querns on the Continent and in the Mediterranean Bash' Antiquity 17 (1943) 19-26.


Civil M. 'Home of the Fish' Iraq XXIII (1961) 154-75.


Legal and Commercial Transactions dated in the Assyrian Neo-Babylonian and Persian periods chiefly from Nippur Babylonian Expedition of the University of Pennsylvania VIII/1, Philadelphia, University of Pennsylvania, 1908.


Conteneau G. 'Textes et Monuments. Tabletes de Kerkouk du Musée du Louvre' Revue d'assyriologie 28 (1931) 27-39


Curtis J.B. and Hallo W.N. 'Money and merchants in Ur III' Hebrew Union College Annual 30 (1959) 103-129.


Deimel A. 'Die Altsumerische Baumwirtschaft' Orientalia 16 (1925) 1-57.

'Fischtexte der Zeit Urukaginas' Orientalia 21 (1926) 40-82.
'Die GAR-texte der Urukagina Zeit' Orientalia 32 (1928), 1-83.

'Der Gemäebau bei den alten Sumeren' Orientalia 17, (1925), 1-33.


'Die Lohnlisten aus der Zeit Urukaginas und seines Vorgängers' Orientalia 34/35 (1928), 41-128.


'Die Vermessung der Felder bei den Sumeren um 3000 v. Chr.' Orientalia 4 (1924) 1-43

'Studien zu CT I, III, V, VII, IX und X' Zeitschrift für Assyriologie 22 (1909), 17-53


The Temple Oval at Khafajeh Oriental Institute Publication LIII, Chicago, University of Chicago Press, 1940.


'Family food consumption survey of workers belonging to the Brick Industry.' Journal of the Faculty of Medicine Baghdad 5 (1963) 173-178.


Dickson V. *The wild flowers of Kuwait and Bahrain* London, George Allen & Unwin Ltd., 1955.


Dorrell P. 'Note of the Geomorphology of the country near Umm Dabaghiyah' *Iraq* XXXIV (1972), 69-72.

Dossin G. 'Les archives économiques du Palais de Mari' *Syria* 20 (1939), 105-113.

- Correspondence de Šemši-Addu et ses fils I *Archives royales de Mari (texts in transliteration and translation)* I, Paris, Imprimerie Nationale, 1950.

- Correspondence de Šemši-Addu et de ses fils II *Archives royales de Mari (texts in transliteration and translation)* IV, Paris, Imprimerie Nationale, 1951.

- *Lettres de la Première dynastie Babylonnaïenne Textes cuneiformes du Louvre, Paris, Geuthner, 1933."

- *Les noms d'années et Éponymes dans les "Archives de Mari" Leiden, E.J. Brill 1950."


Dowson Sir Ernest An enquiry into Land T-\textit{nure} in Iraq and related questions Letchworth, England, Garden City Press Ltd. 1930.

Dowson V.H.W. \textit{Dates and date cultivation of the 'Iraq Part 1.} Cambridge, Heffer, 1921.


Eisen G.A. \textit{Ancient Oriental Cylinder and other seals Oriental Institute Publication XLVII}, Chicago, University of Chicago Press, 1940.

Ellis M de J. \textit{Agriculture and the State in Ancient 'esopotaria Occasional Publications of the Babylonian Fund I, Philadelphia, University Museum, 1976.}

\textit{Old Babylonian economic texts and letters from Tell Harmal} \textit{Journal of Cuneiform Studies} 24 (1971/2) 43-69.


Evreinoff V.A. 'Le Grenadier' Fruit d'Ou+re-'er 4, No. 5 (1959) 161-170.


Farber H. 'A price and wage study for northern Babylonian during the Old Babylonian period' Journal of the Economic and Social History of the Orient, 21, (1978) 1-51.


Field H. 'Ancient wheat and barley from Kish, Mesopotamia' American Anthropologist 34, (1932), 303-309.


-. 'Fish at Jemdet Nasr and Kish' Field Museum News, III, No. 5, May 1932.

-. 'Fish in "esopotamian "Flood" Deposits' Man 36, (1936) 56, para No. 75.

Business Documents of the Neo-Babylonian Period


Flannery K.V. and Wright R.J. 'Faunal remains from the "Hut sounding" at Eridu' Sumer 22 (1966), 61-63.


'Bread grains in Human Nutrition in the Near East Region' FAO Conference on cereals and bread technology for the Near East Region. CBT 66/5, 26th January 1966, Rome 1966


Current Development of prospects for agriculture in the Near East. (2nd Near East regional meeting) FAO/51/7/1280, Deir el-Balah, Syria, 1951.

Economic aspects of the location of oilseed crushing Study group on oilseeds, oil and fats. CCP 0:66/12 Rome 1966.


Tillage and Seeding Practices and machines for crop production in semi-arid or as FAO Agriculture Development Paper No. 92, Rome 1971.


'Tablets from Chagar Bazar' Iraq IV (1937) 178-85

'Tablets from Chagar Bazar and Tell Brak' Iraq VII (1940) 22-66.

'Tablets from Kirkuk' Revue d'assyriologie 22 (1926) 49-161.


Gibson V. 'The Archaeological Use of cuneiform documents: patterns of occupation at the city of Kish' Iraq XXXIV (1972) 113-123.

The City and Area of Fish Coconut Grove, Field Research Projects, 1972.


'Violation of fallow and engineered disaster in Mesopotamian Civilization' In Irrigation's Impact on Society (eds. T.C.Downing and Gibson) Tucson, University of Arizona, 1974. Pp.7-19


Glob P.V. 'The Oman Adr Tools and Tillage' 2 (1974) 1\textsuperscript{1}1-168.

'Early kings of Kish' Journal of Cuneiform Studies 15 (1961) 105-111

'Fifty Old Babylonian letters from Harma' Journal of Cuneiform Studies 14 (1958) 3-78.


'An Old Babylonian prayer of the Divination Priest' Journal of Cuneiform Studies 22 (1968) 25-29

'Thirty tablets from the reigns of Abi-esuh and Ammunitana' Journal of Cuneiform Studies 2 (1948) 75-112


Goor A. 'History of the Fig in the Holy land from ancient times to the present day' Economic Botany 19 (1965) 124-133


'The place of the olive in the Holy land and its history through the ages' Economic Botany 20 (1966) 223-225

Gordon C.W. and Lacheman E.T. 'The Nuzu menology' Archiv für Orientforschung 10 (1928)


Gragg G. 'The fable of the heron and the turtle' Archiv für Orientforschung 24 (1973) 51-72


Guest E. The cultivation and marketing of lineeed, Baghdad, Government Press, Agric. latural Bulletin No. 21, 1930.


Harlan J.R. 'The plants and animals that nourish man' Scientific American Vol. 235, No. 3 (1976) 89-97


Fishing News (Books) Ltd., 102.


Felbaek H. 'Ancient crops in the Ch'or valley in Iraqi Kurdistan' Sumer 16 (1960) 79-51


'Early crops in Southern Scandini' Proceedings of the Prehistoric Society 18 (1952) 194-231.

'Ecological effects of irrigation in Ancient Mesopotamia' Iraq 22 (1960) 186-196.

'Iain Larsen and Norian food remains at Tell Bazmosian in the Dokan Valley' Sumar 12 (1962) 27-35.

'Late Bronze Age and Byzantine crops at Beycesultan in Anatolia' Anatolian Studies 11 (1961) 77-98.

'Late Cypriot vegetable diet at 'Inili' Cypriaca Atheniensia IV (1962) 171-186.

'Orauballemanders idste multid' Luni 1958 (81-116)

'Notes on the evolution and history of Linum' Luni 1959 101-129.


Yeuzey L and Thureau-Dangin F. "Le vallée de Fouilles de Tello (Le Commandement Gaston Crv')", 1915.

Hills E.S. (ed.) Arid la "Le vallée de Fouilles de Tello (Le Commandement Gaston Crv')", 1915.


'Sheep' Antiquity 10 (1936) 1750225.


Tell Halaf, IV die kleinflande in historischer Zei Berlin, de Gruyter 1969.

Trostny B. Das Getreide in alten 'Ulyon' Vienna, Kaiserliche Akademie der Wissenschaften, I 13.


Hulin P. 'A Hemerological text from 'Ur' Iraq XVI (1959) 42-53.


Indian Government: Oilseeds in India Economic and Statistical Advisor, Directorate of Economics and Statistics, Ministry of Food and Agriculture (Department of Agriculture) 1956/7.


- 'The Artichoke in the Spotlight' Vol. 22 (1962) 3-24
- 'The Fig in the Spotlight' Vol. 21 (1962) 3-22
- 'The Grape in the Spotlight' Vol. 17 (1956) 3-31
- 'The Melon in the Spotlight' Vol. 20 (1961) 2-20


Jacobsen T. 'La géographie et les voies de communication du pays de Sumer' Revue d'assyriologie 52 (1950), 127-129

- 'Salinity and Irrigation Agriculture in Antiquity' Diyala Basin Archaeological Project, Report on 'Essential Results June 1, 1957- June 1, 1958' (unpublished)
- 'Summary of report by the Diyala Basin Archaeology Project; June 1st 1957- June 1st 1958' Sumer 14 (1958) 79-89.
- 'The Waters of Ur' Iraq XXII (1960) 174-185


Jacobsen T and Lloyd S. Sennacherib's Aqueduct at Jerwan Oriental Institute Publication 3, Chicago, University of Chicago, 1925.

Jalili M.A. Georges F and Falhil A-S 'The State of Nutrition in Iraq' Journal of the Faculty of Medicine (Baghdad) 14 (1959) 73-141.
Jean C.F. Contrats de Larsa Textes du 15 s. de notre ère X.
Paris, Geuthner, 1925.

--

Jestin R. Textes économiques Sumeriens de la 11e dynastie d'Ur


Jones T.B. 'Ancient Mesopotamian Agricultural History', Agricultural History 26 (1952) 46-57.

--
'By the rivers of Babylon set we down' Agricultural History, 25 (1951) 1-9.

--


Joshi A.B. Sesamun Hyderabad-i, Deccan, Indian Central Oilseeds Committee published by Dr. Conkanar, 1961.


--

Keen B.A. The Agricultural Development of the Middle East London H.M.S.O. 1946


Kilmer A. D. 'The Mesopotamian concept of over-population and its solution as reflected in the 'yt olor'- Orientalia (NF) (1972) 160-177.


The Bronze reliefs from the gate of Shalmaneser, king of Assyria BC 860-825 London, British museum 1915.


Cuneiform texts from Babylonian tablets in the British Museum XXXII. London, British Museum, 1912.

Cuneiform texts from Babylonian tablets in the British Museum XXXIII. London, British Museum, 1912.

Letters and Inscriptions of Hammurabi, King of Babylon about 2200 B.C. London, Luzac 30. 1898, 1900

Kirkbride D. 'Umm Dabaghiyah 1972, a second preliminary report' Iraq XXXV (1973) 1-7

'Umm Dabaghiyah 1974, a fourth preliminary report' Iraq XXXVII (1975) 1-10

Knudsen E. 'Fragments of Historical texts from Ur (2) Iraq XXXIX (1967) 49-69

Kocher F. 'Ein Inventartexte aus Uruk' Archiv für Orientforschung 18 (1955/56) 300-313


Das Ischtar-Tor in Babylon wissenschaftlichen Veröffentlichungen der Akademie der Wissenschaften zu Berlin, Abteilung für Orient- und Orientalische Forschung 32. Cenabreck, Otto Zeller 1912.
181

---

Die Königsburgen von Babylon I: Die ärztere
Wissenschaftlichen Veröff. der Orient-Gesellschaft, 5'. C. Seibt, 1959

Yvon S.K. Nubia and mill pro. cts in h, F. Theoretical Studies No. 27. 01, 1972.

Kraeling C.H. and Adams R.oC. City Invis. 1 Chicago, University of Chicago, 1960

Kramer F.L. Bursing Ground sec. 7, Ohio State College, 1966

Kramer S.N. Sumerian Mythology Pile dutch a, c on Philosophical Society, 1944.

---

The Sumerians Chicago, University of Chicago, 1961

Kraus F.R. Nippur und Isin nach elchto "logos" of "rants (1957)

---


Kraus P. 'Altbabylon briefe' Journal of the American Oriental Society 57 (1957) 35-53


Krušina-Černý L.J. 'Two Prague collection of the Sumerian Tablets of the third Dynasty of Ur' Arch. Orientalia 27 (1959) 357-378

Kupper J.R. Le Calendrier de Mari Leiden, 1961, 1973

---


---


---


Lassoe J. 'Irrigation system at Tell, 9th cent ry BC' Journal of Cuneiform Studies 5, (1951) 21-22.


'Textes commerciaux d'Lash' Revue d'assyriologie 47, 1953, 57-69, 105-120.

'La vie économique à Uruk a l'époque l'asade' Revue d'assyriologie 59 (1965) 61-70, 115-130.

'La vie économique l'univers de Tarsash' Revue d'assyriologie 55 (1961) 7-9, 125-147.


Landsberger B. The Date Palm and its products according to cuneiform sources. Archiv für Orientforschung Beheft 17 1967.


Materialen zum Sumerischen Lexikon I Rome, Pontificus Instituti Biblici 1927.


Materials for the Sumerian Lexicon III. Rome, Pontificum Institutum Biblicum, 195*.


Landsberger B and Ourney C. 'Practical Vocabulary of Sumer', Archiv für Orientforschung 18 (1957/58) 328-341.


Foreign Trade in the Old Babylonian period. Leiden, Brill, 1960.

Legal and Administrative documents of the time of Hammurabi and Samba'iluna (mainly from Lagaba), Studia ad tabulas cuneiformes collectas a F.M.Th.de Liagre Böhl pertinentia (SLB) I/2. Leiden, Brill, 1960.

Legal and economic records from the Kingdom of Larsa, Studia ad tabulas cuneiformes collectas a F.M.Th.de Liagre Böhl pertinentia (SLB) I/2. Leiden, Brill, 1954.
The Old Babylonian Merchant, his business and his social position. Leiden, Brill, 1950.

'The role of landless in Mesopotamia in the early second millennium BC' Journal of Economic and Social History of the Orient 18 (1975) 134-145.

"Le Synchronisme Šamši-Addu-Hammurabi d'après certains textes du Louvre" Revue d'assyriologie 41 (1955) 202-4


Lemaistre J. 'Le Pistachier' Fruits 14 (1959) 57-77.


Levey M. Chemistry and Chemical Technology in Ancient Mesopotamia Amsterdam, Elsevier Publishing Co. 1959.

'Food and its technology in Ancient Mesopotamia, the earliest chemical processes and chemicals' Centaurus 6 (1959) 36-51.

Levine B.H. and Hallo W.W. 'Offerings to the Tarple Gate at Ur' Hebrew Union College Annual 38 (1967) 17-58

Lawy E. 'Assyro-Babylonian and Israelite Measures of Capacity and rates of seeding' Journal of the American Oriental Society 64 (1944) 65-73


'Studies in Assyro-Babylonian Mathematics and Metrology' Orientalia (NS) 20 (1951) 1-12

'The titenmutu texts from Nuzi' Orientalia (NS) 10 (1941) 313-336.


Linton J. 'Late Assyrian Pottery from Nimrud' Iraq XVI (1954) 164-7.

Lloyd S. 'Iraq Government soundings at Sinjar' Iraq VII (1940) 13-21

'Tell Uqair' Journal of Near Eastern Studies 2 (1943) 131-158.

Lloyd S and Safar F. 'Eridu: report on first season's excavations' Sumer 2 (1947), 84-111


Viticulture and Preying in Ancient Orient Leipzig, 1922


Mackay E. Report on excavations at Jemdet Nasr, Iraq Anthropology Memoirs I/3. Chicago, Field Museum of Natural History, Chicago-Oxford University, Joint Expedition. 1921

Report on excavations of the "A" cemetery at Kish, Mesopotamia anthropological Memoirs I/2. Chicago, Field Museum of Natural History, 1925.

A Sumerian Palace and the "A" cemetery at Kish, Mesopotamia anthropological Memoirs I/2. Chicago, Field Museum of Natural History, 1929.

Masakawa K. 'Agricultural Production in Ancient Sumer' Zinban 13 (1974) 1-60

'The Development of the E.M.1 in Lagash during the Early Dynastic III' Mesopotamia VIII/IX 1973/4. 77-144

'The ERIN-people in Lagash of Ur III times' Revue d'assyriologie 70 (1976) 9-44.

Mahoney M.J. A study in Sumerian administrative history of the Third Ur Dynasty Ann Arbor, University of Michigan, 1965.


Excavations at Brak and Chagar Bazar' Iraq IX (1947)

Excavations at Tall Chagar Bazar and an archaeological survey of 'Abar region 1934-5' *Iraq* III (1936) 1-86

'Excavations at Tall Chagar Bazar and an archaeological survey of Fabur region, second campaign, 1936' *Iraq* IV (1937) 91-177.


'Noah's Flood reconsidered' *Iraq* XXVI (1964) 62-81


Mallowan M.E.L. and Cruikshank J. 'Excavations at Tell Arpachiyah' *Iraq* II (1935) 1-178


'Some explanatory lists and grammatical texts' *Revue d'assyriologie* 17 (1920) 117-206.


Leissner B. 'Babylonische Pflanzenamen' *Zeitschrift für Assyriologie* 6 (1891) 289-298


Neo-Babylonian Documents in the *University of Michigan Collection* Ann Arbor, University of Michigan Press, 1927.

Moorby P.R.S. 'Cemetary "A" at Kish' *Iraq* XXXII (1970) 86-128

'Terracotta plaque from Kish and Earsagkalama, c.1850-1650 BC' *Iraq* XXXII (1975) 79-100

'The Loftus Hoard of Old Babylonian tools from Tell Sifr in Iraq' *Iraq* XXXIII (1971) 61-86.
188

Hoortgat A. Art of Ancient Mesopotamia London, Phaidon, 1967

-. Assyrische Glyptik des 13. jahrhunderts Zeitschrift für Assyriologie 47 (1942)

-. Vorderasiatische Rollnigel Berlin, Mann, 1940.

Munier P. 'Sur l'Origine du Palmier-Dattier' Fruits 8 (1953) 47-52

Musil A. The Manners and Customs of the RUTIL Pederjina New York, American Geographical Society Oriental Exploration and Studies No. 6, 1928.


-. Palmyra - a topographical itinerary New York, American Geographical Society Oriental Exploration and Studies No. 4, 1928.

Mustafa M.A. 'Soundings at Tell al Dhiba' Sumer 5 (1949) 173-185


Nelson H.S. 'An abandoned irrigation system in Southern Iraq' Sumer 18 (1962) 67-72


Norris T. Dietary surveys - their techniques and interpretation Washington, USA, FAO 1949


-. 'Excavations at Ninrud (Kalhu)' Iraq XXIII (1961) 1-14, Iraq XXIV (1962) 1-25, Iraq XXV (1965) 6-37.


Oates D. and Reid J.H. 'The Burnt Palace and the Nabu Temple' Iraq XVIII (1956) 22-39

Oates J. 'The background and development of the early farming communities in Mesopotamia and the Zagreb' Proceedings of the Prehistoric Society 39 (1973) 147-161

Oates J. Davidson T.C., Kamilli D and O'Kerrell H. 'Seafaring merchants of Ur?' Antiquity 51 (1977) 221-234.

Opificius R. Das Altbabylonische Terrakottarelief Berlin, de Gruyter 1981.

Opitz D. 'Die Siegel Minurta-Tukul-Abkur und seiner Frau 'Imeru' Archiv für Orientforschung 10 (1925/36) 48-52


'Archives of the Palace of Mari: review article' Journal of Near Eastern Studies 11 (1952) 129-39

(Editor in Charge) The Assyrian Dictionary Chicago, University of Chicago 1956-


'Etude sur la toponomie de Nuzi' Revue d'assyriologie 35 (1933) 135-55.


'Notes Géog.' Revue d'assyriologie 68 (1974) 95 No.11

'Siege-documents' from Nippur Iraq XVII (1955) 67-89


Osten H.E. von der, Ancient Oriental Seals in the Collection of Mr. A. Baldwin Pretz Oriental Institute Publication XXXVII, Chicago, University of Chicago 1926.

---

Ancient Oriental seals in the Collection of Mr. Edward Tellermell Oriental Institute Publications XXII, Chicago, University of Chicago, 1934.


---


---


Parker B. 'Administrative tablets from the North-Western Palace, Nimrud' Iraq XXIII (1961) 15-67

---

'Economic tablets from the Temple of Nabu at Balawat' Iraq XXV (1963) 86-103.

---


---


---


---

'Nimrud tablets 1956: economic and legal texts from the Nabu Temple at Nimrud' Iraq XIX (1957) 125-38


Parrot A. 'Fouilles de Larsa (Senkereh) 1967' Sumer XXIV (1968) 39-44.

---

'Fouilles de Larsa, 2e and 3e campagne (1967)' Syria 45 (1968) 205-239.

---

'Les Fouilles de Nafari, premiere campagne (1933/34) Syria 16 (1925) 1-28.'
Les Fouilles de Mari, deuxième campagne 1934-35' *Syria* 17 (1936) 1-31


Les Fouilles de Mari, 10e campagne 1954' *Syria* 32 (1955) 185-211.

Les Fouilles de Mari, 14e campagne, 1964' *Syria* 42


Pech H.  'Le Pistachio en Syrie' *Fruits d'outre mer* 8 (1953) 479-487


Pellett P.L. and Shadarevian S.  *Food Composition - Tables for use in the Middle East* Beirut, American University of Beirut, 1970 (2nd edition)


Peters J.P. Nippur or explorations and adventures on the Euphrates--New York, Putnam's, 1898.

-- 'Some recent results of the University of Pennsylvania excavations at Nippur, especially of the Temple Fill' Journal of Archaeology 10 (1895) 13-46.


Pfeiffer R.H. and Speiser E.A. 'One Hundred new selected Nuzi Texts' Annual of the American Schools of Oriental Research 16 (1936).


Pinches T.G. The Amherst Tablets London, Bernard Quaritch, 1908.


-- 'Some traditional alcoholic beverages and their importance in indigenous African Communities' Proceedings of the Nutrition Society 14 (1955) 115-123.


-- 'Sumerische Untersuchungen IV XV zu den alkoholischen Getränken in Gudea Zyl.3 Kol.6, 22ff.' Zeitschrift für Assyriologie 39 (1929/30) 145-164.

Popenee P. The Date Palm Coconut Grove, Field Research Projects, 1972.


---


---


---

'Syrian seal impressions on tablets dated in the time of Hammurabi and Šamma-iluna' Journal of Near Eastern Studies 16 (1957) 192-197


---


---

'An inscribed jar from Tell al-Rimah' to be published in Iraq

---


---


---

'Some Old Babylonian Shepherds and their flocks' Journal of Semitic Studies, 20 (1975) 1-21

---


Prest R.L. and Ross A.A. 'The Fig' Queensland Agricultural Journal 81 (1955) 137-143.

Price Dr. I.N. Great Cylinder Inscriptions A & B of Gudea Leipzig, Hinrichs, 1899.


---


---


Powell M.A. Jr. 'Sumerian area measures and the alleged decimal substratum' Zeitschrift für Assyriologie 62 (1972) 165-221.


Sach F. 'Proposal for the classification of Pre-Indus+ril Tilling Implements' Tools and Tillage 1 (1968-71) 1-27.

Safar F. 'Eridu' Sumer 6 (1950) 27-38

-- 'Sennacherib's project for supplying Erbil with water' Sumer 3 (1947) 22-25.

-- 'Soundings at Tell al-Laham' Sumer 5 (1949) 154-164.


-- The Greatness that was Babylon London, Sedgwick & Jackson 1962.


Salonen A. Agricultura Mesopotamica Helsinki, Soumalainen Tiedehatemia Toimituksia, 1968.

-- Die Fischerei im alten Mesopotamien Helsinki, Soumalainen Tiedehatemia Toimituksia, 1970.


-- 'Die Ofen der alten Mesopotamier' Bachhader Mitteilungen 3 (1964) 100-124.


Scrimshaw N.S. and Young V.R. 'The Requirements of human nutrition' Scientific American 235 (1975) 51-64.


Skinner F.G. Weights and measures in their ancient origins and development in Greece within up to c. 1000 B.C. London, P. S0, 1967.


Sollberger E. Business and Administrative Correspondence under Kinda of Ur Texts from Cuneiform Sources I New York, Augustin, 1966.


Steensberg A. Ancient Harvesting Implements - a study in archaeology and human geography Copenhagen, National museets skrifter Arkeologisk-historisk Sække 1, 1943.

-- 'Drill sowing and threshing in southern India compared with sowing practices in other parts of Asia' Tools and Tillage 1 (1968-71) 241-5.
Stickle Y.T.S. (ed.) 'AgricuItur in the Middle East' Beirut, American University of Beirut, 1956.


'Survey of Iraq Fauna' reprinted from Journal of the Bombay Natural Historical Society (1916-1922) survey of mammals, birds, reptiles etc., made by members of the 'Mesopotamian Expeditionary Force' 1915-1919.


Szlechter C. 'Quatre textes administratifs de Lagas' Revue d'assyriologie 59 (1965) 111-14.

Tempany Sir F. 'The tropics as sources of vegetable oils and fats' Chemistry and Industry July 16th (1952) 731-735.

Thompson R. Campbell 'Assyrian Medical Prescriptions for diseases of the stomach' Revue d'assyriologie 26 (1929) 47-92


-, Ú kurmanu and Ú lal(l)anu as possible "rice" and "indigo" in cuneiform Iraq VI (1939) 180-183

-, Late Babylonian Letters London, Luzac, 1906.


Thompson R. Campbell and Hutchinson R.W. 'Site of the palace of Aššur-nāṣir-pal at Nineveh excavated in 1929-30 on behalf of the British Museum' Liverpool Annals of Archaeology and Anthropology 18 (1931) 79-147.


Thureau-Dangin F. 'La correspondance de Hammurapi avec Šamaš-hārir' Revue d'assyriologie 21 (1924) 1-58.
'Le "grain" mesure de surface' Revue d'assyriologie 35 (1938) 156-7


'La mesure des volumes d'apres une tablette inédite du British Museum' Revue d'assyriologie 32 (1935) 1-28

'La mesure du "Qa"' Revue d'assyriologie 34 (1937) 80-86

'Rituel et astrologie sumériennes' Revue d'assyriologie 13 (1921) 123-142

Recueil de Tablettes Chaldéennes Paris, Leroux, 1903.

Una relation de la huitième campagne de Sargon Paris Geuthner 1912.

Innumération et astrologie Sumeriennes Revue d'assyriologie 13 (1921) 123-142

Recueil de Tablettes Chaldéennes Paris, Leroux, 1903.

Une relation de la huitième campagne de Sargon Paris Geuthner 1912.

Rituels accadiens Paris, Leroux, 1921


Torozyner H. Altbabylonische Tempelrechnungen Vienna, Alfred Hölder, 1923.


Ucko P.J. and Dimbleby G.W. The domestication and exploitation of Plants and animals. London, Duckworth & Co.Ltd., 1969

Ucko P.J., Tringham R and Dimbleby G.W. Man, Settlement and Urbanism London, Duckworth, 1972


United States Department of Agriculture, Foreign Agriculture Service, Food Balances in Foreign Countries Part IV, Estimates in Foreign countries of Africa and Western Asia, FAS—108 February 1951.


- "Fish offerings in Ancient Mesopotamia" *Iraq* X (1948) 101-21.


Von Soden N. "Zu den politischen korrespondenzen des Archivs de Mari" *Cantabria* (NS) 21 (1952) 75-86.


Waines J. *Plant remains from Tell Taya, Iraq* *Iraq* XXIV (1973) 185-187.


Warriner D. Land and Poverty in the Middle East London and New York, Middle East Economic and Social Studies, 1978.

....

Watelin L.C. Land Reform and Development in the Middle East study of Syria and Iraq London and New York, Royal Institute of International Affairs, 1957.


....

Waterman L. Royal Correspondence of the Assyrian Empire (5 volumes) Ann Arbor, University of Michigan Press, 1930-36.

Watson P.J. 'Clues to Iranian Prehistory in modern village life' Expedition 8 (1966) 9-19

Weidner E.F. 'Aus den Tagen eines assyrischen Schattenkönigs' Archiv für Orientforschung 10 (1935/6) 1-48


Weinstein Y. 'Household structures and activities' Anatolian Studies 23 (1973) 271-276.


Weiss H. and Young T. Cuyler 'Merchants of Susa: Godin V and plateau-lowland relations in the late 4th millennium BC' Iran 13 (1975) 1-17


Weitmeyer. Some aspects of the hiring of workers in the Sippar region at the time of Tamrumbi Copenhagen, Munksgaard 1932.


....


....


....


White T. E. 'A method of calculating the dietary percentage of various food animals utilized by aboriginal peoples' American Antiquity 18 (1953) 296-308.


Williams J. 'Modern agricultural technology in Assyria' Anatolian Studies 23 (1973) 277-279.


Wilson J. V. Kinnier 'Nimrud catalogues of medical and physiognomical Omina' Iraq XXIV (1962) 52-62.


"Two medical texts from Nimrud" Iraq XVIII (1956), 130-146, Iraq XIX (1957) 40-49.


"A new stele of Aššur-Nāṣir-pal II" Iraq XIV (1952) 24-44

"Nimrud tablets 1952" Iraq XV (1953) 125-60

"Ration lists from Alalakh IV" Journal of Cuneiform Studies 13 (1959) 50-60


"Tell al-Rimah Tablets 1966" Iraq XXX (1968) 175-205.

Wiseman D.J. and Wilson J.V. Kinnier "Nimrud tablets" Iraq XIII (1951) 102-22.


The Royal Cemetery Ur Excavations II (2 volumes) London, British Museum, 1934.


Excavations at Ur London, Benn 1954.


Yahia Y.N. Soils and soil conditions in sediments of the Ramadi Province (Iraq) Amsterdam, University of Amsterdam, 1971.


Zeist W van 'Late quaternary vegetation history of Western Iran' *Review of Palaeobotany and Palynology* 2 (1967) 301-311.


Zeist W van, Hoorn van T.C., Bottema S and Wolbring H. 'An agricultural experiment in the unprotected salt marsh' *Palaeohistoria* 18 (1976) 111-143.


Zimmern H. Beiträge zur Kenntnis der Babylonischen Religion. Leipzig, 1901.

Zohary D and Hopf M. 'Domestication of pulses in the Old World' *Science* 182, No.4115 (1972) (30th November) 887-897.
