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Identification and Interpretation of Long Term Price Fluctuations in Babylonia: More on the History of Money in Mesopotamia*

1. Introduction. Originally, I began this investigation with the idea that diachronic study of prices might provide some insight into Babylonian agricultural productivity. Thus, in the first phases of my work I devoted most of my efforts to defining the overall contours of the price of barley from the mid-third millennium to the 5th century B.C. However, as my work progressed it became clear to me that any diachronic investigation of prices must come to grips with the problem of *money*.

As a result, the agriculture problem and other questions which initially seemed so important to me, namely, whether long-term prices changes could be traced and whether plausible causes for these could be inferred, have receded somewhat into the background. It seems obvious to me now–perhaps I err–that Ur III and early OB agriculture cannot have been *less* productive than earlier periods, that significant movements and the general direction in which prices are moving can be discerned, and that sometimes probable causes for these movements can be inferred. Of course, the problem of what is really happening in detail remains so complex that I do not pretend to have gotten to the bottom of it. Nevertheless, I cheerfully leave the themes of *salinization* and *redistribution and reciprocity* to those who still have the energy, time, and faith to pursue them and here devote proportionately more effort to metal monies and similar problems.

2. Scope of inquiry, methodology, assumptions.

2.1. Scope. To make such a study feasible I have focussed on the price of barley in Babylonia and I have relied primarily upon previous collections of data.[1] I have not, however, ignored other commodities and other areas, nor have I

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[1] The most comprehensive work on prices is D. C. Snell's study of Ur III balanced accounts: Ledgers and Prices. Early Mesopotamian Merchant Accounts, New Haven – London 1982 (YNER 8), where most of the collections of price data are cited (p. 2–9); cf. also the critical review by H. Waetzoldt, in: Or. 55 [1986], 327–336. For Babylo-

simply taken over the statements, deductions, and calculations of my predecessors but have tried to rethink key arguments and evidence in detail, because price data rarely occur in simple $x=y$ form but are usually embedded in a documentary context that can be extremely difficult to interpret, with the result that the literature on the subject contains numerous minor errors and not a few serious ones.

2.2. Methodology. The barley price curve which I give in Figure 1 (below § 4) is in some respects intuitive, a hypothetical, explanatory paradigm for the data as it now appears. The curve tries to represent the movement of "standard prices", which–at any given time and place–I have assumed to be roughly the same as mode (most frequent) values. For the pre-Ur III period, new evidence may make the slope of the curve appear somewhat less dramatic. In particular, it may show that the mean price of barley in the Fara period was not as high as the curve would seem to indicate. However, unless the sparse Fara data is completely atypical, new evidence is not likely to change entirely the shape of the curve.

Constructing a price curve based on mean (average) values of actually attested prices fails, because the presently available price data are usually inadequate for statistical analysis. The mean of a handful of values in a hundred years is not statistically significant. Mode values on the other hand probably are significant, as most Assyriologists tacitly assume when they prefer "standard" values like *1 gur of barley = 1 shekel of silver*. Sometimes, however, the data is insufficient to even discern a mode value. Where the data were too sparse to establish mode values with any certainty, I have made "educated guesses" with five primary factors in mind: (1) minima and maxima; (2) mean values; (3) the context of the price data; (4) prices of other commodities; (5) the metrological-monetary systems.

Mean values would probably be fairly close to mode values, if we had sufficient data. This is indicated by the Ur III evidence, where the mean price is very close to the mode price: *1 gur of barley = 1 shekel of silver*.[2] However, the evidence is usually so scant that *calculated mean values* are of little use as an index of *real mean prices*. Calculated mean values are merely the "average" of our, usually very unrepresentative, samples of data, whereas real mean prices would be the true mean price of a particular commodity at any particular time and place. We rarely have the kind of evidence necessary to calculate *real mean prices* to any acceptable degree of precision. In most cases, the only useful thing our *calculated mean values* tell us is whether a specific price is in the upper or lower range of attested values. The significance of *specific location* in the price range (e.g., above or below the mean or median) can only be determined from

nia, the most important additions are O. R. Gurney, The Middle Babylonian Legal and Economic Texts from Ur, Oxford 1983, 14–16 and H. P. H. Petschow, in: Die Sklavenkaufverträge des *šandabakku* Enlil-kidinnī von Nippur (I), in: Or. 52 [1983], 143–155, esp. n. 16f. and p. 154; H. Waetzoldt, Rotes Gold?, in: OrAnt. 24 [1985], 1–16 (gold prices); and M. A. Dandamaev, Wages and Prices in Babylonia in the 6th and 5th Centuries B.C., in: AoF 15 [1988], 53–58. – For abbreviations used cf. The Assyrian Dictionary of the University of Chicago (CAD), Chicago – Glückstadt 1956ff. and W. von Soden, Akkadisches Handwörterbuch (AHw), Wiesbaden 1965–1981.

[2] Data in Snell (s. n. 1) 138–143.

context. We can concretize part of these rather abstract arguments by using the example of Neo-Babylonian iron prices.

2.2.1. Neo-Babylonian iron prices.[3] In NB texts, silver:iron ratios run from c. 1:229 to c. 1:831.[4] The median between these extreme values is 1:530, the mean of the weights 1:542, but by themselves these data do not tell us much about the value of iron. If we add in a third text with the ratio of 1:624,[5] the mean ratio of the total weight of iron and silver changes to the rather uninformative 1:573.[6] However, context comes to our aid in the form of yet another document which records two distinct values for iron, one from Lebanon (Labnanu) as c. 1:361 and a more expensive iron from Cyprus (or perhaps Anatolia: Jamana) as 1:240.[7] With this evidence in hand, we must consider the possibility that our minimum (1:229) and maximum (1:831) may have been in part influenced by quality rather than solely by supply and demand factors.

If we look at this price picture from the standpoint of the metrological-monetary system, we can make an "educated guess" that sixth century Babylonian merchants reckoned *1 shekel silver = 4 minas of iron* (1:240) as a more or less "reasonable" price for an "expensive" iron and *1 shekel = 14 minas* (1:840) a "reasonable" price for a relatively "cheap" iron. One shekel per 9 minas (1:540) is the median between 4 and 14 minas and may be closer to the true mean of all iron changing hands than the value 1:378 calculated from the total weights in silver and iron of our five meager NB attestations for the value of iron.[8] However, how much of the price differential is to be attributed to quality, how much to supply-demand, and how much to other more intangible factors remain unknown variables which affect a much broader spectrum than the metals trade alone.

2.3. Assumptions. Two assumptions need to be stated explicitly. The first concerns *measure*, the second *quality*.

2.3.1. Measures. In order to be precise in analysing prices, one really needs to know the absolute values of each metrological unit involved in any price equivalence. This, however, is impossible, because Mesopotamian units of weight

[3] For NB iron prices, see B. Meissner, Warenpreise in Babylonien, Berlin 1936 (APAW 1936/I), 31; W. H. Dubberstein, in: AJSL 56 [1939], 33f.; and Dandamaev (s. n. 1) 57f. (for minimum and maximum).

[4] The c. 1:831 ratio (from F. Joannès, Textes économiques de la Babylonie récente [TEBR], Paris 1982, p. 238 no. 59:5) is 8 2/3 shekels silver = 2 talents of iron, of which the silver value may be rounded from a silver:iron ratio of 1:840. The low value of this iron may be due in part to the fact that the 2 talents of iron are treated as the equivalent of the 8 2/3 shekels of silver, which forms c. 0.62 % of the silver capital of a gold buying venture. The extremely high silver values for iron cited by F. Joannès (TEBR p. 255) are slips of the pen.

[5] BIN 1, 162:11f. (1 gú.un 44 ma.na an.bar *a-na* 10 gín kù.babbar; correctly read in Meissner [s. n. 3] 31 n. 4).

[6] 26 2/3 shekels of silver = 15275 shekels of iron.

[7] YOS 6,168 + (duplicate) PTS 2098 (translit. by A. Sachs in A. L. Oppenheim, in: JCS 21 [1967], 236 n. 1). For the iron from Labnanu, YOS 6, 168: 17f., has a ratio c. 1:361 (257 minas = 42 2/3 shekels). The variant reading in PTS 2098: 13f. (257 minas = 52 2/3 shekels) is probably an error, in view of the regular ratios 1:180 (twice) for copper, 1:40 for tin, and 1:240 (iron from Jamana). The "target" price was probably 1:360.

[8] 101.8333 shekels of silver = 38495 shekels of iron. One also has to ask oneself what *form* the iron was in. The striking parallels in weights in the two texts (YOS 6, 168 and TCL 12, 84) studied by A. L. Oppenheim, JCS 21, 237f. suggest some regular form.

and measure with identical names have variants across time and space and even variants within a very limited time and space.

Nevertheless, we conventionally equate a "shekel" or a "sila" in a Fara text with a "shekel" or a "*qû*" in a text from other periods down through the end of the cuneiform tradition. This is essentially the same as saying that "all minas are c. 500 grams and all sila/*qû* are c. 1 liter". Both assumptions are methodologically and metrologically justifiable, if one keeps in mind that these are working hypotheses and that they represent approximations. As *methodological postulate No. 1*, I have assumed for Babylonia that all shekels, minas, and sila/*qû*-measures are "identical", with the tacit understanding that we cannot draw fine distinctions because we have to reckon with c. ± 5 % (and in some cases more) as a margin of error in the systems of both weight and capacity.[9]

2.3.2. Qualities. Quality is a basic and pervasive problem for a study of Babylonian prices in any era. It is a well-known fact that the documents normally do not tell us whether the person being sold is a beautiful female slave of sixteen who is also an accomplished spinner and weaver or a grandmother of forty who is still functional but "over the hill", whether we have before us a fat, sleek ox capable of working all day for at least five years to come or a poor creature with his ribs standing out and yoke-burns on his neck who might, with a bit of luck and a lot of care, last one or two more seasons of plowing. One could multiply these examples ad libitum. We tacitly agree to ignore them because we cannot deal with them. However, there is one problem of quality that no study of prices can ignore entirely, namely the quality of metals used to define the values of other things.

3. Metals as indices of value. In Babylonia, aside from barley, silver seems to have served in all eras as the primary index of value. It is first attested in this role in the Fara period (c. 2600 B.C.), where it is used together with copper in a kind of bi-metallic system (see below § 3.3.). Copper may have been used rather widely in the role of "cheap metal" money, because, although in Ur III and OB, barley seems largely to have replaced copper as "cheap" money, copper nevertheless surfaces again in the same function and in the same silver:copper ratio in the Laws of Eshnunna.

Following the end of OB (conventionally c. 1600 B.C.) comes the well-known gap in documentation over about two centuries, after which we find both silver and gold as means of valuation, with gold seeming to predominate down to the end of the Bronze Age (at least in the surviving sources), when silver emerges once again as the standard metal money. Exactly what this "gold interlude" means is still unclear. However, one point is worth noting: prior to the Chaldean period, silver, when used as money, is normally not differentiated as to quality, whereas, in the Ur III, OB, and Kassite periods, gold is differentiated both in nomenclature and in silver valuation. The very fact that gold is differentiated as to quality in Kassite texts, whereas silver is not, suggests that silver–not gold–is still the primary index of value.

[9] I have discussed these problems in more detail in other publications, for which see Maße und Gewichte, in: RlA 7 (in corrected galleys, July 1988).

3.1. Silver. Silver alloys seems to have been used as money only in the Chaldean-Achaemenid period, where the expression *ina ištēn šiqli bitqa* probably denotes, in our terms, a silver that is 21 carat (i.e., 87.5 % pure. As *methodological postulate No. 2*, I have assumed that silver, when used as money, remained relatively pure throughout Babylonian history. This assumption—made tacitly or otherwise by everyone who has attempted to deal with Mesopotamian economic history—is probably true if one understands "relatively pure" to mean 18 carat silver or better. The general lack of qualifiers for silver, its use as an index for gold, and the relatively stable silver equivalences for a whole range of objects over most of the history of ancient Babylonia suggest that, under normal circumstances, silver, when used as money, would have been between 21 and 24 carat.

3.2. Gold. In contrast to the relative stability of silver, gold varies significantly in value, even in one and the same document. This phenomenon had already been recognized and clearly described about fifty years ago, primarily on the basis of Neo-Babylonian evidence, by both C. Fossey and B. Meissner, who plausibly interpreted the varying values of gold as a function of *quality*.[10] About a decade ago, G. Young showed that silver:gold ratios in the Ur III period ranged from at least 7 : 1 to 20:1 and also inferred that this wide range of prices reflected not "price fluctuations" but the quality of the gold itself.[11]

More recently, H. Waetzoldt[12] has brought new evidence and arguments to bear on this problem, showing, in particular, that Ur III gold prices move in a silver:gold value spectrum that ranges from 6.5:1 to 21:1, in which the ratios 7:1, 10:1, and 15:1 predominate. He further observed that kù-GI ḫuš-a, traditionally interpreted as "red gold", is attested in Ur III texts as worth between 15 and 21 times the value of silver and, by combining this valuation with the appearance of modern gold alloys, argued that kù-GI ḫuš-a must denote an almost pure gold with a yellowish-gold color. He also deduced, from the Ur III use of kù-GI ḫuš-a together with "normal" gold (kù-GI si-sá) to make "mixed" gold (kù-GI ḪI-da) and from repeated sequences of (1) ḫuš-a gold, (2) "mixed" gold, and (3) "normal" gold that these corresponded to three descending levels of purity: ḫuš-a gold being most pure with silver: gold ratios ranging from 21:1 to 15:1, "mixed" gold being next with silver ratios ranging probably from 14:1 to 11:1, and "normal" gold being at the bottom with silver ratios from about 10:1 to 6.5:1.

In the late Kassite period we find a system somewhat analogous to that of the Ur III administrative texts, but the range of prices is much narrower. We have a silver:gold ratio of 4:1 for "bright" gold (kù.GI babbar) and 8:1 for kù.GI SA_5, conventionally translated "red" gold.[13] Since SA_5 gold is twice as

[10] C. Fossey, in: RES 1935/IV, p. I–IV and RES 1937, 42–45; Meissner (s. n. 3) 26–28.

[11] G. Young, A Merchant's Balanced Account and Neosumerian Gold, in: Fs. T. B. Jones, Kevelaer–Neukirchen-Vluyn 1979 (AOAT 203), 195–217, esp. 208–213.

[12] OrAnt. 24, 1–16. For additional evidence on gold:silver ratios, see M. Van De Mieroop, in: Or. 55 [1986], 131–151.

[13] See Gurney (s. n. 1) and Petschow (s. n. 1). The rudiments of this system seem to have already been in existence in OB: at Mari the ratios between silver and "bright" gold (kù.GI babbar) approximate 1:4; cf. J.-M. Durand, Textes administratifs des salles 134 et 160 du palais de Mari, Paris 1983 (ARMT 21), 194f. +no. 219.

expensive as "bright" gold, it is clear that we have here a color and value problem analogous to that discussed by H. Waetzoldt.[14] If we assume that kù.GI SA_5 represents a gold of roughly the same purity as the Ur III kù-GI ḫuš-a, then the silver value of pure gold would be only c. 40 % of the value of pure gold in the Ur III period.

This is a bit strange, because outside of Ur III, during the entire Bronze Age, silver:gold ratios attested in documents range from 2:1 to 10:1, about the same range attested in the ancient bilingual "dictionary" ḪAR-ra=*ḫubullu*.[15] NB ratios are somewhat higher (c. 5.5:1 to 15:1)[16] but still not as high as the Ur III ratios. Since the general movement of prices from Fara through OB does not suggest a sudden abundance of silver in the Ur III period, we must ask ourselves: (1) is the evidence for other periods incomplete and were prices corresponding to the Ur III 21:1 silver:gold ratio actually paid? (2) was gold relatively more scarce in the Ur III period or more plentiful in other periods? (3) did only inferior gold circulate in other periods? (4) do the Ur III ratios signify something besides purity?

Of these alternatives, the last seems more likely to be correct. If Kassite "red" gold is more or less pure, then it must be essentially the same quality as the ḫuš-a gold of Ur III texts. The very use of gold as an index of value in Kassite texts points to the existence of some standard of quality control, and, since 8:1 stands very close to the top of the scale for silver:gold values in the Bronze Age, it seems rather unlikely that the Ur III silver:gold ratios 15:1 to 21:1 can be explained as a function of either supply-demand or of purity alone. Thus, the Ur III gold:silver ratios remain an anomaly.[17]

[14] Especially in: OrAnt. 24 [1985], 9–11, where SA_5/*sāmu* is explained by the "ganz leicht rötlichen Schimmer des reinen Goldes".

[15] MSL 7, 166f. +238f. (silver:gold ratios of 9:1 to 2:1). For Old Akkadian ratios (7.5:1, 8:1), see I. J. Gelb, Glossary of Old Akkadian, Chicago 1957 (MAD 3), 133. For OB (10:1 to 3:1), see W. F. Leemans, in: RlA 3, Berlin 1969, 512; H. Farber in: JESHO 21 [1978], 3. For OB Mari (6:1 to 2:1), see J.-R. Kupper, in: J. Quaegebeur (ed.), Fs. Naster II, Leuven 1982 (OLA 13), 118f.; Durand (s. n. 13) 194f. For comparisons between Ebla (6.37:1 to 2:1), Ur III, Mari, and OB, see Waetzoldt OrAnt. 24, 13–16. For MB rates (8:1, 4:1), see the works by Gurney (s. n. 1) and Petschow (s. n. 1). In Old Assyrian contexts "gold" usually seems to mean *pure* gold. This is indicated by the fact that silver prices hover closely around 8:1 and by business orders to purchase gold or sell something for gold, as, e.g., "he will not take less than 1 mina of gold for my (talent of) tin" (TCL 4,17: 19–21). For Old Assyrian gold prices, see H. Lewy, in: JAOS 67 [1947], 309 n. 21 (9:1–4:1); A. Goetze, Kleinasien, München 1957, 79 n. 3 (8.8333:1–6.5:1); P. Garelli, Les Assyriens en Cappadoce, Paris 1963, 268f. (9:1–4:1). K. R. Veenhof (s. n. 29) ("ca. 8:1"), cf. AoF 15 [1988], 256.

[16] I have excluded a number of egregious blunders in the literature. For NB gold prices, see Meissner (s. n. 3) 27f.; Dubberstein AJSL 56, 23 n. 8; Leemans RlA 3, 513; Dandamaev AoF 15, 57 n. 29; and Joannès (s. n. 4) 236–245. Every number in the important gold text AO 19929 (=TEBR 59), studied by F. Joannès (s. n. 4) 238–243 needs to be collated, as the individual entries and totals do not agree.

[17] H. Waetzoldt's point (OrAnt. 24, 16) about the difficulties involved in explaining differences in gold prices through labor costs is well taken. For merchants and accountants, weight is the "bottom line", because this is the base value of any metal object. Whether one can always *exclude* workmanship as a factor in price is another matter. Many records of metals in weight may well refer to objects in the form of jewelry or instruments; and gold jewelry, like copper instruments, are most notable in the Ur III

One final point about the Kassite gold system: using gold as a means of valuation is not a problem as long as it does not change hands, but once that happens a material like gold becomes immediately impractical, because, unless huge purchases–or merchants/goldsmiths who know their trade–are involved, gold is too expensive to make fine distinctions and because the margins of error in ancient weighing procedures were simply too great for this kind of precision. This is obviously the reason why one finds definitive evidence for "cheap metal" monies in the Assyrian area from the Old Assyrian period onward and similar systems of "cheap metal" valuation in early Italic and Greek contexts: "small change" was a much simple matter with such means of valuation, and the margin of weighing error was greatly reduced in the relatively rare case when metal money (as opposed to commodities like barley) really had to change hands. Thus, in all probability, Kassite gold rarely ever changed hands. *Why* it was even used as an index of value remains an unanswered question.

3.3. Copper, tin, and other "cheap metal" monies. In Babylonia itself, copper is attested as money in the silver: copper ratio 1:180 in both the Fara period (see § 4.1) and in the OB period, with the obvious function of "small change". Most remarkable is the occurrence of the identical ratio in both Fara and OB (at least 500 years apart).

Though it is not clear why this identical ratio occurs at two so distant points in time, the motives for using copper as a definition of value are simple enough. First, the ratio 1:180 is obviously based on the monetary equation *1 še of silver* = *1 shekel* (= *180 še*) *of copper*. Second, copper is used as "small change", because silver is too valuable to exchange using the primitive weighing technology available.

In most transactions neither copper nor silver will have changed hands but rather commodities defined in terms of copper or silver. However, far from indicating a primitive state of exchange, the very use of copper as a means of valuation reflects a developed state of exchange in which the means of valuation really do change hands in some circumstances. By using copper as an index of value, the participants in these transactions tacitly recognize both the reality of Money changing hands and that their balances are inadequate to measure small units of mass precisely.

The need for standard means of valuation capable of making "small change" is clearly what lies behind such legal prescriptions as the so-called tariff at the beginning of the Laws of Eshnunna.[18] There, along with a number of other commodities, "copper" (urudu) is defined in two value ratios to silver. Simple "copper" has the same silver value (1:180) as in the Fara "transfer deeds", whereas "worked copper" (urudu *epšum*) has the silver: copper ratio 1:120. J. D. Muhly, the leading historian of Bronze Age metallurgy, has quite reasonably asked whether this "worked copper" refers to "work-hardened copper or to copper

merchant accounts by their absence. It is quite true that labor costs were, in general, negligible, but whether this rule of thumb would always have functioned for imports and luxury items is not clear.

[18] See R. Yaron, Laws of Eshnunna, Jerusalem 1969, 20–23 with refs. to literature. The purpose of these price definitions are monetary rather than an attempt to fix "maximum" prices (*contra* Yaron 147 with lit.). Legal commentators have ignored the technological side of the issue; cf. my comments, in: Fs. Jones (s. n. 11) 83–86.

fashioned in some form".[19] The answer is: probably neither of these. Labor costs are not a likely explanation for the fact that "worked copper" is 150 % the value of simple "copper". Rather urudu *epšum* probably denotes another type of metal. The only likely candidate at this price range is bronze,[20] and this inference finds support in an identical valuation of bronze (silver:UD.KA.BAR = 1:120) in a nearly contemporary letter of Šamši-Adad from Mari.[21]

The same silver:copper ratio 1:180 may occur in the NB period. Two lots of zabar (UD.KA.BAR) from Cyprus or the Aegean area (Jamana) consisting of 10 talents (=10 ingots?) and 295 minas (=5 ingots?) are recorded in duplicate texts from the time of Nabonidus,[22] both with the silver valuation 1:180, but one is left wondering: is it copper or is it bronze? The metals terminology used by the ancient documents is often impenetrable.

The most extensive evidence for "copper" (urudu) prices comes from the Ur III period, but the picture which emerges is rather peculiar. Ur III silver: "copper" ratios range from 1:40 to 1:140. However, there is a remarkable sequence of closely differentiated ratios that seem to be based on the following calculation values (unit of urudu per 1 of silver): 40, 80, 90, 100, 110, 120, 125, 130(?), 140, with the most common values being 90 and 120.[23]

The first thing that strikes the eye is how expensive these prices are. Even if we exclude the apocryphal 1:240 and 1:200 and the uncertain 1:180 ratios alleged for Old Akkadian,[24] silver:copper ratios of 1:360 and 1:240 are attested

[19] In: T. A. Wertime—J. D. Muhly (eds.), The Coming of the Age of Iron, New Haven — London 1980 (cf. n. 81) 39.

[20] If we assume, as in LE § 1:17, that 2 minas of urudu *epšum* = 1 shekel of silver and further that urudu *epšum* denotes a "standard" bronze of 1/8 tin, then, in 120 shekels of bronze, the copper:tin proportions would be 105:15. Since 1 še of silver buys 1 shekel of pure copper (i.e., 1 shekel = 3 minas, as per LE §1:16), this means that the 15 shekels of tin would cost 75 še, i.e. a silver:tin ratio of 1:36. This seems a rather low price for tin, though it is the same silver:tin ratio deduced from the Middle Assyrian evidence (see below with n. 36–41). However, there the ratio between tin and "bronze" is 1:1.25, whereas here it would be 1:3.333. The Eshnunna ratio certainly fits the attested values for tin and copper better, strengthening the suspicion that Middle Assyrian zabar does not mean simply "bronze".

[21] ARM 1, 38: 12–14. Compare the 1:120 silver: ZABAR ratio in the Nuzi text cited in n. 42 below. At Mari, the price of "mountain copper" is once given in the ratio 1:150, and silver:tin ratios are 1:10, 1:11, and 1:14; cf. Kupper (s. n. 15) 119f.

[22] Cited in n. 7 above.

[23] For Ur III copper prices, see Snell (s. n. 1) 150 and H. Limet, Le travail du métal au pays de Sumer au temps de la III[e] dynastie d'Ur, Paris 1960, 105f.

[24] The silver:copper ratio 1:240 inferred by F. Thureau–Dangin, in: RA 8 [1911], 93, from ITT 1, 1422 (and since often cited) rests upon a misinterpretation. The text contains the reckoning for a merchant journey to Magan (obviously to buy copper) and in rev. 3′–6′ records: 1 ma-na lá 10 gín, sag urudu 3 gú 20 ma-na šè, é-gal-šè mu-DU-a íb-ta-z[i], "1 mina minus 10 shekels, as the excess (sag) of the 3 talents 20 minas that were brought into the palace, have been deducted". This probably means that the weight standard with which the merchant recorded his goods was 1/4 shekel per mina *less than the standard used by the accounting agency*. Nothing is said about silver values. The silver:copper ratio 1:200 inferred from PBS 9/1 33 by Limet (s. n. 23) 106f. and taken over by W. Röllig, in the article Kupfer, in: RlA 6, Berlin–New York 1983, 347, also rests, alas, upon a misreading ("602 mines", whereas the photo shows 12,0 minas to be correct), a miscalculation (if 602 were correct, the ratio would be c. 181:1), and a misinterpretation (it is not a price equivalence; D. O. Edzard's interpre-

from southern Babylonia in the time of Rim-Sin.[25] Second, although the Ur III copper prices appear to have a range similar to the Anatolian prices in the Old Assyrian period,[26] the basis of the "price fluctuations" seems not to be the same. Even if we can assume that *werium*/URUDU always denotes copper in Old Assyrian texts (which requires a major act of faith), it is reasonable to assume that, at least part of the range of Anatolian prices, is to be attributed to supply and demand factors. That does not seem to be a likely explanation for the Ur III prices, which create the impression of having been *assigned* on the basis of some abstract scheme of values. But what *qualities* in copper could have produced such an elaborate scale of distinctions?

As H. Waezoldt has recently shown, the term urudu can also denote copper alloys.[27] The question raised by the Ur III evidence is: does urudu perhaps conceal far more than it reveals? Ur III merchant accounts are notably lacking

tation, Sumerische Rechtsurkunden des III. Jahrtausends aus der Zeit vor der III. Dynastie von Ur (SRU), München 1968, no. 67 is clearly correct; and even if it were a price equivalence the ratio would be 1:216). H. Limet, in: JESHO 15 [1972], 31 could be correct in inferring a 1:180 silver:copper ratio from ITT 2/2, 5798 i 1′–3′; however, all that survives is: [. . .], kù-babbar 25 ma-na, *in* 3 ma-na ta, "[75 talents of copper?], its silver: 25 minas, at the rate of 3 minas (per shekel of silver)".

[25] TCL 10, 17 r. 2f. (1:360) and UET 5, 367:15 (1:240). Cf. W. F. Leemans, Foreign Trade in the Old Babylonian Period, Leiden 1960, 36f., 121–123. CAD S 296b interprets urudu.zabar in TCL 10, 17 r. 2 as "bronze", but this is uncertain because 1:360 is only 50 % of the standard value of copper (1:180) in the Laws of Eshnunna, and bronze would certainly have been more expensive than copper.
A potentially important text for the problem of OB silver:copper ratios is Boyer Contribution 9, a division of inheritance into 7 shares dated to the first year of Ḫammurapi, which seems to use the silver:copper ratio 1:190. CAD E (323b *erû* g) seems to be correct in interpreting this text as evidence for a silver:copper equivalence but is incorrect in stating this to be 1:180. The total silver is 25 shekels 15 še; total copper is 79 1/3 minas. Each of these divide exactly into 7 equal parts consisting of 3 shekels + 105 še silver and 11 1/3 minas copper. Since 190 times each silver share = 11 1/3 minas + 5/6 shekel, it looks as though the 5/6 shekel of copper has been systematically dropped: it was worth less than 1 še of silver, and *dropping* 5/6 shekel from the approximate value of each share in copper is more likely than rounding *up* the silver (*ex nihilo nihil*!). Thus, it looks as though the estate has been *defined in silver and equated with copper*, probably to facilitate purchase of shares by one or more of the heirs. If this is correct, then we have another case of copper functioning as a "cheap metal" money and also another conversion rate for copper that is about 5 % (0.0555) cheaper than the Eshnunna 1:180 ratio.

[26] Goetze (s. n. 15) 78 (1:46–1:200); Garelli (s. n. 15) 294–298 (1:30–1:240). K. R. Veenhof, in his 1986 paper (s. n. 29) p. 11, gives "ca. 80–120 shekels for 1 shekel of silver (better qualities ca. 60:1)". Some of the Old Assyrian "coppers" are specifically qualified, and the range of prices alone indicates that we are not dealing with simple copper. By comparison, the standard silver:copper ratio in the Hittite Laws (§ 181) would have been 1:160, if the Hittite mina indeed contained 40 shekels as generally assumed. For this assumption, see H. Otten, in: AfO 17 [1954–1956], 128–131. It is accepted, e.g., by Goetze (s. n. 15) 121 n. 2; by A. Archi, in: Annali di Ebla 1 [1980], 6 n. 14; and by N. F. Parise; in: A. Archi (ed.), Circulation of Goods, Rome 1984 (Incunabula Graeca 82), 127–129 (with lit.), but N. F. Parise's remark (n. 11) "Ingiustificate perplessità di A. Ben-David" does not respond to the legitimate concerns raised by A. Ben-David, in: UF 11 [1979], 31–33.

[27] In: OrAnt. 23 [1984], 1–10. H. Waetzoldt has made a strong case for a-gar$_5$-gar$_5$ as "pure copper" at Ebla. It is therefore worth noting that a-gar$_5$-gar$_5$ seems to occur in this usage in an Old Akkadian text from Susa (MDP 14, 35), which seems to record a 7:1 (copper:tin) alloying ratio.

not only in bronze (zabar) but in such things as copper tools, instruments, or ornaments, and this is rather characteristic of cuneiform merchant accounts in general. Just as in the case of gold, one wonders what could account for such a wide range of copper prices and such a finely graded price scheme. If it is not easy to explain the differences in price by the quality or intricacy of workmanship (see above n. 17), it should also be candidly admitted that "price fluctuations" and "grades" or even consciously created alloys of copper are equally hypothetical solutions. To sum up, the wide range of prices, the fine set of gradations, and the technological problems involved in assaying the purity of metals leaves us with many unanswered questions about Ur III "copper".

Use of "cheap metal" monies is better attested for Assyria, beginning with the Old Assyrian period, where tin especially is used for paying small business expenses incurred in the Anatolian trade.[28] For determining the silver value of tin, Old Assyrian evidence is of central importance.[29] What we find there is two levels of silver:tin ratios. One level is ca. 1:14±15 % and the other is c. 1:7± 15 %. The first level represents the normal price range that Assyrian merchants were willing to *pay for tin*, while the second level is the normal price range at which Assyrian merchants were willing to *sell their own tin*. In other words, in selling they aimed at c. 100 % markup of the normal cost in Assyria, and, in buying in Anatolia they tried to buy for 50 % of the price in Assyria. Maximum and minimum silver:tin ratios (c. 20:1 to 6:1) do not therefore tell us much about the dynamics of the tin trade, but they do provide us with some rules of thumb concerning what tin might bring on the market in the early 2nd millennium.

Even in the NB period, more than a millennium later, tin prices are not radically different from the Old Assyrian prices. Two NB texts show silver:tin ratios of 1:20 and 1:40.[30] Here, if this "tin" is essentially the same as the Old Assyrian "tin", the price seems to be about half of the Old Assyrian prices, though the 1:40 ratio is probably a "wholesale" rate, bought elsewhere and intended for resale in Babylonia.

The silver:tin ratios attested in Ur III merchant accounts fall into this same price range: 1:12, 1:20, 1:30; and perhaps 1:15 and 1:40 are also attested in what seems to be a smiths' account.[31] However, there is an Ur III protocol from Nippur in which tin is used as money and which specifically states the silver:tin

[28] See K. R. Veenhof's discussion of "loose tin" (*annak qātim*), in Aspects of Old Assyrian Trade and its Terminology, Leiden 1972, 257–264, 298–301, and CAD A/II 128a (used to pay for lodging and wages).

[29] Old Assyrian tin prices: Gǿetze (s. n. 15) 78 n. 2 (buying prices: 1:20 – 1:12.5), n. 3 (selling prices: 1:10 – 1:6); Garelli (s. n. 15) 280 (buying: 1:17 – 1:12; selling: 1:10 – 1:5.5). I have also studied with great profit K. R. Veenhof's 1986 paper for the Ninth International Economic History Congress (Prices and Trade. The Old Assyrian Evidence), cf. AoF 15 [1988], 243–263.

[30] Dandamaev, AoF 15, 57 (GCCI 1, 228, 336; YOS 6, 168+JCS 21, 236 n. 1).

[31] Snell (s. n. 1) 147. CT 7, 20b (=13132) is also cited there as evidence for a 1:240 ratio, but this is not a likely price for tin. I do not fully understand the text, but it concerns metalworking, and, if 1 gín-kù-babbar an-na 4 gín ta šè (in r. 15) is to be interpreted as a statement of price, then it probably means that the silver:tin ratio is 1:15. However, ud-ba an-na 1 1/2 gín ta-àm (in r. 3) seems to mean "at that time each (mina of) tin was 1 1/2 shekels (of silver), i.e., 1:40.

ratio as 1:14.5.[32] Now, Ur III kù-an almost certainly means "silver-tin", i.e., a tin of high purity, perhaps even "money tin",[35] and kù-an is attested at Nippur in the silver: kù-an ratios 1:10, 1:11, and 1:13.75.[33] The most expensive of these (1:10) is called kù-an sig_5, "good silver-tin".

Thus, it appears that Ur III prices for tin when used as money were not very different from those being paid a bit later in Aššur by Old Assyrian merchants, i.e. c. 1:14. And, since an OB text seems to have the silver:tin ratio 1:8,[35] we can make the plausible inference that the value of tin in Babylonia was probably about the same as it was in Assyria and Anatolia.

It is in the light of the evidence for tin prices above that we must try to interpret the rather elaborate system of "cheap metal" money that was demonstrated for the Middle Assyrian period a few years ago on the basis of a previously unpublished text from Aššur.[36] In this system "tin":"bronze":"lead"[37] have the ratios 1:1.25:15. Silver is not explicitly attested in this scheme, but, of course, this does not mean that silver was absent from the money system.[38]

There is a single Ur III attestation of what appears to be a silver: lead (a-bar_5. urudu; *nota bene* the use of urudu with lead"!) ratio, namely 1:540.[39] If we make the plausible assumption that AN.NA *abāru* in the Middle Assyrian text is indeed "lead", then we arrive at the scheme silver:"tin":"bronze":lead=

[32] BE 3,70. In line 2, read probably kù-bi 2/3(!) ma-na ⌜7⌝ gín igi-4-gál. Since 6 1/4 shekels are explicitly identified as KUD-a (≈*miksu*?), this would leave 41 shekels in line 2, and 41×14.5=594.5, i.e., this is probably the 10 minas of tin in line 10. Lu-Suen in this text is probably the same person who is trafficking in kù-an in NRVN 1,314 and 317 (dated to Amar-Suen 6 and 7; see below with n. 33–34).

[33] For references to kù-an, see A. Vaiman, in: H. Hirsch–H. Hunger (eds.), Vorträge gehalten auf der 28. Rencontre Assyriologique Internationale in Wien, 6.–10. Juli 1981, Horn 1982 (AfO, Beih. 19), 33–37 (kù-an is, of course, not iron as there argued), and Waetzoldt, Or. 55, 335. kù-an (probably "silver-tin") and an-na both seem to have been used as "money" at Ur III Nippur.

[34] NATN 617 iii 7'f.; NRVN 1, 315 and 314.

[35] This often cited and usually misinterpreted text (CT 6, 25a: 8) reads igi-6-gál kù-babbar ša 1 1/3 gín an-BAR. Pinches' copy has "(?)" after BAR, which should probably be emended to na(!) and the word interpreted as an.na, "tin". In any case, the silver: "an.BAR" ratio (1:8) clearly shows that iron cannot be intended. Obviously, if iron had been selling at 1 shekel of silver for 8 of iron in Babylonia, the Assyrian traders would not have been going all the way to Kaneš to pay about 300 times as much for it. For the price of iron, see below § 5.2.

[36] See H. Freydank, Fernhandel und Warenpreise nach einer mittelassyrischen Urkunde des 12. Jahrhunderts v. u. Z., and M. Müller, Gold, Silber und Blei als Wertmesser in Mesopotamien während der zweiten Hälfte des 2. Jahrtausends v. u. Z., in: Societies and Languages of the Ancient Near East (Fs. I. M. Diakonoff), Warminster 1982, 64–75 and 270–278.

[37] "Tin" =AN.NA or AN.NA BABBAR; "bronze" =ZABAR; "lead" =AN.NA or AN.NA *a-ba-ru*; see Freydank (s. n. 36) p. 68f.

[38] Just as the use of copper in the Fara period or the use of gold in the Kassite period does not necessarily mean that these are the primary standards of value. The methodological *sine qua non* for Mesopotamian economic history is the candid recognition that the documents frequently do not mean what they appear to mean.

[39] Snell (s. n. 1) 146. Use of urudu with a-gar_5 is unusual, and, if the Mari "lead" prices (below, with n. 40) are typical, a-gar_5. urudu could denote a rather high quality of lead, which would fit the Middle Assyrian use of it as money in the same silver ratio (1:540).

1:36:45:540. This text involves the purchase of horses, slaves, and oxhides, and, if the posited ratios are correct, a horse would have cost c. 25 shekels of silver, a slave exactly 30 shekels, and an oxhide exactly $1^1/_3$ shekels. Other silver:"lead" ratios are known. Mari texts attest two: 1:1200 and 1:1800,[40] but these would mean that a Middle Assyrian horse cost only 11.25 or 7.5 shekels and a slave only 13.5 or 9 shekels of silver, in other words, prices lower than those attested in the third millennium. Not likely.

Moreover, once we bring these prices into diachronic perspective, we see that the silver:tin ratio 1:36 is, though within the bounds of Mesopotamian prices, unusual. It means rather cheap tin, and one must ask whether AN.NA BABBAR is indeed *pure tin*, i.e., of the same purity as Ur III kù-an or Old Assyrian tin. Even more remarkable is the "tin": "bronze" ratio (1:1.25) attested in the Middle Assyrian text, which is entirely out of line for silver:copper and silver:tin ratios. In other words, unless this "bronze" is primarily tin with a small admixture of copper (or something else), it is difficult to explain these prices, because never in the history of Mesopotamia is there a bronze that costs only 80 % of the price of tin. Further indication that something is amiss is the contrast between the incredibly cheap Mari "lead" (silver:"lead"=1:1200 and 1:1800) and the quite normal Mari silver:copper (1:150) and silver:bronze (1:120) ratios, where bronze and copper stand in the ratio of 1:1.25.[41]

That a great deal remains to be sorted out in the use of "cheap metal" monies, can be seen from Nuzi texts from the Middle Bronze Age that use silver, "bronze", and AN.NA as indices of value. However, AN.NA clearly cannot mean tin here, because legal or quasi legal formulas show the silver:AN.NA ratio as 1:216, while other Nuzi texts that prescribe ratios of payment show a silver:AN.NA ratio of 1:180 or a silver:bronze:AN.NA ratio of 1:120:240.[42]

Thus, in those cases where silver values of "cheap metal" monies can be reckoned, we can make the following, reasonably certain, inferences: (1) ZABAR is probably "bronze" in Nuzi context but is doubtful in Middle Assyrian; (2) AN.NA could possibly be "lead" in Nuzi contexts, but it seems rather expensive; (3) AN.NA when used as money cannot mean tin in Nuzi contexts. We can therefore eliminate the anomalous "cheap tin" from the picture of Bronze Age metallurgy.[43]

[40] For Mari metal prices, see: Kupper (s. n. 15) 118–120; Durand (s. n. 13) 190f., 194f.

[41] See n. 40 for references.

[42] The *terḫatu* ("brideprice") and other Nuzi texts discussed by M. Müller ([s. n. 36] p. 273 with lit. in n. 42–51) show these silver equivalents: 1 ox=10 shekels, 1 ass=6.666 shekels, 10 sheep=13.333 shekels. Since HSS 5,79 substitutes 36 minas of AN.NA for the ox and 24 minas of AN.NA for the ass, it is clear that the silver:AN.NA ratio must be reckoned at 1:216. Now, HSS 19, 127 specifies the silver:AN.NA ratio 1:180, while HSS 14, 37 prescribes the silver: ZABAR:AN.NA ratios 1:120:240, and since 210 is both the mean and the midpoint between 180 and 240, it is probable that 1:216 represents a customary "compromise" value. That any of these values represent *pure tin* is improbable.

[43] In his major study Copper and Tin, Hamden 1973 (Connecticut Academy of Arts and Sciences, Transactions 43), 244, J. D. Muhly states: "The evidence [for an-na=tin] is now overwhelming and there is no longer any need to carry on the old tin-lead controversy." This same view is maintained in his Supplement to Copper and Tin, Hamden 1976 (Connecticut Academy of Arts and Sciences, Transactions 46), 102 and in Wer-

4. Relative values of barley and silver. Barley and silver are the only commodities attested in a paired value relationship throughout most of the history of the cuneiform tradition. From c. 2600 to c. 400 B.C., they occur in value relationships with one another and repeatedly as independent measures of the values of other things. Barley seems in fact to have functioned throughout most of Babylonian history as the "small change" *par excellence*. Of course, neither silver nor barley can be assumed to have maintained absolutely stable values, but, as a tentative step toward investigation of the problem of Babylonian prices, we may observe that the sparse data we have seem to imply a value curve like that shown in Figure 1.

Figure 1

Long-term movement of barley prices
from the Fara period through the Achaemenid period

sila per shekel	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5
	CENTURIES BC																				
90	*														*	*					*
120																					
150												*									
180																			*	*	
210																					
240			*																		
270																					
300					*	*	*	*													

4.1. Fara barley prices. Silver:barley ratios are attested indirectly through silver:copper and barley:copper ratios. Barley seems to be the most common *means of payment*.[44] The scribal fee section of Fara contracts[45] presupposes a 1:180 silver:copper ratio, from which we can posit the set of conceptual unities (one-to-one ratios) shown in Table 1.

Table 1

Value ratio of silver to copper in Fara texts

silver	copper
1 še (barley corn)	=1 gin (=180 še)
1 mana tur (=60 še)	=1 mana (=60 gin)

The 1:90 (shekel:sila) ratio entered in the curve is calculated from the following facts. Two Fara contracts[46] state the price ratio: 1 mana copper=30 sila barley (ud-ba še ma-na 0.0.3), i.e., 1 sila cost 2 shekels of copper. Since the silver:copper ratio appears to be relatively stable,[47] we may set up the equiva-

time-Muhly (s. n. 19) 47f., where both the Middle Assyrian and Nuzi material is treated as evidence for abundance of tin. As M. Müller (s. n. 36) 272 has aptly noted "*the adventures of the vocable annaku* haben . . . noch kein Ende gefunden".

[44] See Edzard SRU (s. n. 24) pp. 21f., 54.

[45] Evidence collected by Edzard SRU p. 20 ad no. 1 viii 5 and p. 22 Tabelle 3.

[46] SRU 1 (land sale), 23 (house sale).

[47] Unitary ratios between land and scribal fees in silver suggest that the conceptual basis of the fee lies in silver:land ratios rather than in copper:land ratios. Thus, 1 silver shekel per eše (600 sar) of land or 1 gintur (3 še) per 10 sar is somewhat more probable than the 1 gin of copper per 3 1/3 sar or 1 mana of copper per 2 iku. The scribal fee in silver

lences shown in Table 2 (ratio actually stated in the ancient documents is shown in boldface).

Table 2

Fara ratios for silver, copper, and barley, where 1 mana of copper = 3 ban of barley

silver	copper	barley
2 še (1/90 shekel)	= 2 gin	= 1 sila
1 manatur (1/3 shekel)	= 1 mana	= 30 sila
3 manatur (1 shekel)	= **3 mana**	= **90 sila**
8 manatur (2 2/3 shekel)	= 8 mana	= 240 sila = 1 gur

A third contract[48] has a higher price: 1 mana copper = 20 sila (ud-ba še ma-na 0.0.2 še), i.e., 1 sila cost 3 shekels of copper. Translated into silver: copper: barley equivalences, this is 4 shekels silver = 12 mana copper = 1 gur barley. This seems remarkably high, and initially I suspected that this ratio was a copy error, i.e., that the text should read 3 ban instead of 2, but the tablet has exactly what A. Deimel copied,[49] and, in fact, this may also be based on the conceptual unities shown in Table 3 (ratio actually attested in boldface).

Table 3

Fara ratios for silver, copper, and barley, where 1 mana of copper = 2 ban of barley

silver	copper	barley
1 še (1/180 shekel)	= 1 gin	= 1/3 sila
1 gintur (1/60 shekel)	= 3 gin	= 1 sila
1 manatur (1/3 shekel)	= **1 mana**	= **20 sila**
1 gin (shekel)	= 3 mana	= 60 sila = 1 bariga
4 gin	= 12 mana	= 240 sila = 1 gur

More difficult than discerning unitary ratios is explaining the meaning of these high prices for barley. All our usable data derive from documents pertaining to sale of land. Since hard times is always a possible factor when land is sold in a predominantly agricultural society, the stated prices of barley may represent significant deviations from both mean and mode values. One is naturally predisposed to believe that economic hardship, perhaps linked with poor harvests, lies behind these remarkably high prices. However, it should be candidly admitted that we do not know what any of these "sales" really mean any more than we know what ud-ba, "at that/this time", means. The time expression could refer to the time of the final transaction and transfer of ownership or it could refer to some previous period of time when the barley mentioned actually changed hands. And the sales themselves need not necessarily represent short-term hardship brought on by a series of bad harvests. In some cases, they may represent the end result of long-term borrowing, which could itself be the product of a combination of indolence and lack of foresight. The "foolish Perses" character type is hardly unique to Hesiod's *Works and Days*.

is attested in 5 documents (SRU 1, 3, 4, 7, 8); copper is attested in 3 (SRU 2, 6, 9). The scribal fee is identical in value (1 shekel of silver per eše) to the most common fee charged on Presargonic and later properties as maš ašaga; see K. Maekawa, in: Zinbun 14 [1977], 1–54 and P. Steinkeller, in: JESHO 24 [1981], 113–145.

[48] SRU 11 (preliminary draft for a land sale contract).

[49] VAT 12589 = WF 40 = SRU 11; collated 19.XII.85 by M. A. Powell with thanks to Dr. E. Klengel and J. Marzahn.

In the Fara sales, the "buyer" (or creditor) may sometimes have even been a member of the extended family and the sales themselves could reflect the break-up of extended family property after the decease of the family head.

Land prices in Fara texts are especially intractable sources because the stated "price of land" ($ŠÁM.GANA_2$) and its *real value* are two different things altogether. Nevertheless, a system of conceptual values clearly underlies both the "price of land" and its real value. For example, by using the 1:180 silver:copper equivalence, we can see that the silver "price" of 1 gin (=3 manatur, "little minas") of silver per iku in one document[50] is probably identical with the copper "price" of 3 mana per iku in another document.[51] Or again, that the "price" of 2 mana of copper per iku in four other documents[52] is probably conceptually identical to 2 manatur of silver per iku, and that the higher "price" of 4 mana of copper per iku in another document[53] is probably conceptually identical with 4 manatur of silver. Thus, land sales, in spite of the many uncertainties associated with their interpretation, provide a limited control for Fara barley prices.

When one compares the *stated prices* of land in Fara transfer deeds with the standard 10 manatur of silver per iku (=1 mana per bur) in the Maništušu Obelisk,[54] it looks as though the price of land was very low in the Fara period. However, when one adds in the values (insofar as they can be calculated) of the additional payments and goods that are also transferred, the prices turn out to be rather close to those in the Maništušu Obelisk.[55]

Methodologically, in order to infer truly higher barley prices in the Fara period we must demonstrate the *probability* that the higher prices are not due to a greater abundance of the means of valuation. *Quality*, of course, remains an unknown variable; however, nothing in these "deeds of transfer" suggests that we are dealing with unusual qualities of land. In any case, the "standard" price used in the Maništušu Obelisk, namely 1 mina per bur, is still the mode price in northern Babylonia in the Old Babylonian period.[56] Thus, land prices, even if

[50] SRU 6. [51] SRU 5. [52] SRU 1, 2, 4, and 9. [53] SRU 3.

[54] V. Scheil, MDP 2, Paris 1900, 6–52. See also the data for land prices collected by F. Pomponio, in: OrAnt. 17 [1978], 254ff.

[55] Cf. also the evidence collected by J. Krecher, in: ZA 63 [1967], 183–185. I have excluded texts of doubtful interpretation; e.g., SRU 10, where the reliability of the text is in doubt; SRU 13, because the 11 shekels of silver looks suspiciously like the "price" of the 22 bariga of barley (še UR_5) that immediately precede it and which itself may represent an unrepayable barley loan for which the silver is merely a statement of equivalence and for which the land is being transferred as payment (if so, then 1 shekel silver = 120 sila, a lower price than the other specifically stated ratios). Another early text which seems to point to higher value of barley is the Enḫeĝal land purchase (SRU 114), where payment is in both copper and grain (barley and, in one case, emmer). Only two of the 11 transactions have copper prices as high as the lowest Fara price, and the amounts of additional grain are small. This probably means either the price of the land itself is low because of the large tracts being bought or the values of copper and grain are higher than in the Fara texts. In the Lummatur text (SRU 117), the "stated price" is 2 gur saĝĝal of barley per iku. If this is the gur saĝĝal of 144 sila, this means that 1 iku cost 288 sila, as opposed to 800 in the Maništušu Obelisk. Since barley appears to constitute the bulk of the payment in the Lummatur text, this again suggests either a lower value of the land or a higher value of grain relative to the prices in the Maništušu Obelisk.

[56] At least 12 of the 80 sales collected by Farber, JESHO 21, 47–49, represent the *1 mina*

equivocal, do not suggest an unusual abundance of silver in the Fara period, and the same general picture is reflected by the more solid evidence for copper prices.[57] So the few Fara barley prices that we have do indeed seem to be genuinely high.

4.2. Presargonic barley prices. A. Deimel's arguments for the stable price ratio *1 gur barley = 1 gin silver* throughout the 3rd millennium, which were based primarily on the Obelisk of Maništušu and Ur III data,[58] have not, as we have already seen, found support in documents earlier than the Presargonic period. Though a rather lively trade and exchange of silver is attested in the Presargonic period,[59] our only evidence for the silver value of barley is a telegraphic notation in a house sale from the lifetime of Enentarzi (24th century B.C.): ud-ba še kug gin_2-1-a-am_6, "at that time (one gur of) barley was (worth) 1 shekel of silver."[60]

A. Deimel's generalization of the Maništušu/Ur III formula *1 shekel of silver = 1 gur of barley* for the Presargonic period rested primarily upon two texts from Girsu – VS 14, 170 and RTC 75–recording rent payments in barley and in silver. He thought that these texts showed that renters were obliged to pay 1/6 of their rent in silver and 5/6 in barley and that the total rent payment of both barley and silver was intended to be the equivalent of 1 gur of barley or 1 shekel of silver per iku. If this were true, then *1 gin of silver = 1 gur of barley* would indeed be a "standard" (scil. mode) equivalent. However, upon detailed analysis, this hypothesis turns out to be improbable, and the rental system seems to have functioned in quite another way.[61] Thus, Girsu land rents cannot be used as evidence for barley prices.

4.3. Akkad period barley prices. The silver:barley ratio entered in Figure 1 (1 shekel = 240 sila) rests primarily upon the Obelisk of Maništušu, which assumes throughout the following set of unities:[62]

Table 4

Unitary ratios in the Obelisk of Maništušu

land		silver		barley	
1,0 (=60)	bur =	1 talent	(=3600 shekels)	=1 guru	(=3600 gur)
1	bur =	1 mana	(= 60 shekels)	=1,0 gur	(= 60 gur)
(30 sar	=)	1 shekel		=1 gur	(= 240 sila)

= 1 bur mode; moreover, 11 additional examples are integer multiples (2, 3, 4, 5, 9, 12) of this mode value.

[57] See above § 3.3.

[58] ŠL 468,4; A. Deimel, in: Or. 4 [1924, 2nd ed.] 3f.; Or. 5 [1922], 24f.; Or. 7 [1923], 27f.; A. Deimel, Šumerische Tempelwirtschaft zur Zeit Urukaginas und seiner Vorgänger, Rome 1931 (AnOr. 2), 81.

[59] Most of the evidence is collected by M. Lambert, in: RA 46 [1953], 57–69, 105–120, and in: ArOr. 23 [1955], 557–573.

[60] SRU 31 vi 1–3. This has not been entered in the curve, though it generally fits the posited movement of prices.

[61] The problem is complex and cannot be discussed in a paper already overburdened with numerical arguments. My conclusions in brief are: (1) the gur-of-2-ul is used as the basis for calculating yields and rents; (2) the rental system is not based on proportional division of the harvest; (3) the currently accepted *mean* for grain yields in the state of Presargonic Lagaš must be lowered accordingly.

[62] Scheil MDP 2, 6–52. Modern approximations of the ancient units are: bur ≈6.48 ha.; sar ≈36 sq.m.; mana ≈500 g.; sila ≈1 liter.

The ratio *1 shekel of silver = 1 gur of barley* is also attested elsewhere.[63] Higher prices do occur: 1 shekel = 180 sila (or *1 1/3 shekel = 1 gur*);[64] and 1 shekel = 120 sila (or *2 shekels = 1 gur*).[65] However, Akkad period prices are notably lower than the Fara prices discussed above (§ 4.1), and, occasionally, in a "year of abundance", one could get 3 gur of barley for 1 shekel.[66]

4.4. Ur III–Old Babylonian barley prices. For Ur III and early OB, we have rather good evidence that the mean price of barley was close to *1 shekel per gur* (300 sila). This is indicated by this ratio being: (1) the standard calculation value and most frequently encountered rate in Ur III texts;[67] (2) a standard of valuation in the Laws of Eshnunna;[68] (3) the standard calculation value in OB mathematical texts.[69]

OB barley prices are subject to considerable fluctuation, some of which is clearly due to seasonal and to other factors.[70] Absence of a specific silver: barley equivalence from the Code of Ḫammurapi may be a tacit recognition that the ideal equivalence, *1 shekel of silver = 1 gur of barley*, no longer corresponded to reality.[71] In any case, it seems clear that, at the end of OB *mean barley prices* were substantially higher than Ur III and early OB prices.[72]

OB encomiastic citations of low prices as evidence of good times and divine

[63] SRU 55 = BIN 8,39; ud-ba 1.0.0 še gur al-ág.

[64] SRU 54 = BIN 8,175 (from Nippur?): 0.2.0 še gur kug.manatur.2.kam, wr. kug $NINDA_2 \times ŠE + 2$-MA-NA kam, i.e., *60 še silver = 60 sila barley.*

[65] SRU 81 = BIN 8,169 (provenance uncertain): ud-ba še kù-ga 0.2.0 gur al-ág; MAD 4,151:5 (Umma area): ud še kug-ga 0.2.0 gur al-ag_x (text: $NINDA_2 \times ŠE$)-gá; cf. OIP 14,168 (probably Adab): six calculations where *1 gur = 2 shekels.*

[66] SRU 54 = BIN 8,175: 6.0.0 še gur kug.gín.2.kam mu ḫé-gál-la, "6 gur of barley (the exchange value) of 2 shekels of silver, year of abundance." Most "fluctuations" are probably to be explained by supply/demand factors about which the documents give us next to no information. See also the material collected by F. Pomponio OrAnt. 17, 255 n. 14, and cf. n. 70 below.

[67] This striking fact has been repeatedly observed by scholars, e.g., W. Schwenzner, Zum altbabylonischen Wirtschaftsleben, Leipzig 1914 (MVAG 19/III), 21; A. Falkenstein, Die neusumerischen Gerichtsurkunden, 2, München 1956, 12 ad no. 7: 6–8. For data, see Snell (s. n. 1), 138–142.

[68] LE § 1:8.

[69] E.g., in the compensation rates for excavations (O. Neugebauer – A. Sachs, Mathematical Cuneiform Texts, New Haven 1945, 59–89), where 6 še of silver and 10 sila of barley are used as equivalents for identical daily work quotas.

[70] The OB data for barley prices are sparse, and much of it simply defies statistical analysis. For example, 10 shekels of silver is the "price" (ŠÁM) of 20 gur of barley in VS 22,30 (transliteration and translation by H. Klengel, in: AoF 10 [1983], 30f.). Arithmetically, this looks like barley is cheap, but this is not the case. The transaction was made in August in Samsuiluna's 25th year against the next harvest even before the barley had been planted (for the season, see P. J. Huber, Astronomical Dating of Babylon and Ur III, Malibu 1982 [Occasional Papers on the Near East 1/4], 44 and 58). The "buyer" is obviously a merchant/moneylender, which means that the "seller" probably badly needed 10 shekels of silver (or something else) and sold 20 gur of his future crop at a rather low rate.

[71] It is perhaps significant that CH § 273 defines compensation for labor during months 1–5 *only* in terms of silver (6 še per day), whereas the mathematical texts (see n. 43) use both silver and barley.

[72] See in general, Farber, JESHO 21, 1–51 and, in support of higher barley prices at the end of OB, H. Petschow, in: JESHO 30 [1987], 114f.

favor, often referred to erroneously as "tariffs"[73], also support in a limited way the picture of relatively low barley prices during the early OB period. Perhaps more important, these "year of abundance" encomia shed some light on another dark area: namely, whether "low" prices reflect temporary shortages in the supply of silver or increased availability of commodities. In the case of the encomia, it is clear that "years of abundance" were regarded as signs of special favor of the gods toward the king and that a given amount of silver purchased much more in "years of abundance" than in other years.[74] Thus, the encomia are especially valuable, precisely because they belong to the literary rather than documentary tradition, as witnesses to the native consciousness of the effects of supply and demand upon the economy and as evidence for the stable value of silver.[75]

4.5. Kassite and Post-Kassite barley prices. Between the end of OB and the resumption of relatively good documentation in the Chaldean period, there is a period of about a millennium, over which the movement of prices can be traced only in a tenuous and tentative fashion. There is no documentation from c. 1600 to c. 1400 B.C. When documentation resumes in the 14th century, the silver price of barley seems to have approximately doubled from the early OB period, i.e., now *1 shekel* ≈*150 sila*. Silver and gold, when used as money, seem to be stabilized at two silver:gold ratios (8:1 and 4:1), and the most commonly used

[73] Interpretation of the encomia as "tariffs" or "price regulations" stems originally from misinterpretation of the Sumerian ḫe- forms as precative rather than affirmative. The distinction ḫe + *marû* ≈precative vs. ḫe + *ḫamṭu* ≈affirmative was first clearly drawn by D. O. Edzard, in: ZA 61 [1971], 213–216. That affirmative, not precative, is meant in the "year(s) of abundance" encomia is shown not only by the use of ḫé + sa_{10} (= *ḫamṭu*, as opposed to sa_{10} − sa_{10} = *marû*), but also by *inūma . . . lū iššâm* in the Šamši-Adad encomium (E. Ebeling–B. Meissner–E. Weidner, Die Inschriften der altassyrischen Könige, Leipzig 1926, no. 24 iv 3) and the NB "abundance encomium" in L. W. King, Babylonian Boundary Stones, London 1912, no. 37 (discussed by W. Röllig, in: ZA 56 [1964], 247–249), where divine favor, abundance, and past tense (i.e., *descriptive* not *prescriptive*) are all linked together, just as one expects from the Sumerian parallels. References to a representative sample of such encomia (mixed together with references to entirely different types of price statements) can be found in A. L. Oppenheim, Ancient Mesopotamia, Chicago–London ²1977, 359 n. 31, and E. Sollberger, UET 8/2, London 1965, p. 15f. The significance of this basic grammatical distinction for interpreting the "year(s) of abundance" encomia has still not percolated through to the profession as a whole.

[74] E.g., in the Sinkašid "year(s) of abundance" encomium, a shekel of silver purchases about three times as much as it normally did: še gur.3.ta siki mana.12.ta urudu mana.10.ta iğiš ban.3.ta ganba madanaka kug gin.1.e ḫebdasa muani mu ḫeğala ḫea, "verily, in the market (-price/place) of his land, 1 shekel of silver bought 3 gur of barley, or 12 minas of wool, or 10 minas of copper, or 3 ban of sesame oil! May (all) his years be years of abundance!" [transcribed, with numbers rearranged in correct syntactical order, after F. Thurean-Dangin, Die sumerischen und akkadischen Königsinschriften, Leipzig 1907, 222 c: 16–21].

[75] This same picture of prices reacting to supply and demand and a stable silver market is evidenced by an Ur III royal letter (OECT 5,27: 11–13), in which Ibbi-Sin, last king of Ur, writes to his self-interested subordinate Išbi-Erra complaining that Išbi-Erra had received 20 talents of silver (the equivalent of some 6000 man-years of labor) to buy barley, but, whereas Išbi-Erra had purchased at the rate of 2 gur per shekel he had sent Ibbi-Sin the equivalent of only 1 gur per shekel.

gur for exchange of barley seems to be that of 150 sila, which may point to an *ideal* equivalence between this gur and 1 shekel of silver. But a lot of uncertainties remain.[76]

The price of barley may have risen to around *1 shekel* ≈ *90 sila* in the post-Kassite period. In any case, two *kudurrus* record this level, but one of them also records what must be the famine price of *1 shekel* = *12 sila*.[77]

4.6. Neo-Babylonian barley prices.[78] In the Chaldean period barley prices seem to have stabilized around *1 shekel* ≈ *180 sila*. This is indicated, above all, by documents which assume that *1 month's wages* = *1 gur of barley (* = *180 sila)* = *1 shekel of silver*.[79] By the late 5th century prices seem to have at least doubled (i.e., mean prices must have been at least 1:90), but the evidence is equivocal, and mean prices may have been even higher.

5. Continuity and discontinuity in price structure: the contrasting cases of slaves, iron, and wages.

5.1. Slaves. Slaves are particularly subject to the uncertainties of *quality*; sex is normally indicated, age only in general terms if at all, condition and skills very rarely. Nevertheless, in contrast to the up-down-up movement of barley prices, the cost of adult slaves seems to rise gradually from about 10–20 shekels in the third millennium (Presargonic-Ur III) to 20–30 shekels in OB, moving above 30 shekels in MB to around 1 mina (60 shekels) in NB.[80]

[76] For prices in this era, see the works by O. R. Gurney and H. P. H. Petschow (s. n. 1). For the gold problem, see above § 3.2, and for the fluctuating size of the gur, see Maße und Gewichte § IV.6, in: RlA 7 (s. n. 9).

[77] The price *1* shekel = *90 sila* is recorded in King (s. n. 73) no. 7 (Marduk-nadin-aḫḫe, 1098–1081) and no. 9 (Nabu-mukin-apli, 977–942); *1 shekel* = *60 sila* seems to be recorded in a text from the time of Nabu-šumu-libur (see n. 91). King (s. n. 73) no. 9 iv A 13–15 also records what must be the famine price *1 shekel* = *12 sila*, which I quote in full because of its significance for interpretation of the word "gold" (kù.GI = *ḫurāṣu*) in this era: [10 gín] kù.GI *Buraša iddinma* 4.0.0 še ^{giš}bán 6 sila$_3$ *ki* 1 + *šu* kù.babbar *imḫurma ana Zēr-ukīn iddin ina ūmēšu ša* 1 gín kù.GI [0.0.2] še.bar ḲI.LAM.MEŠ kur uri^{ki} *naphar* 240 kù.babbar.meš, "Burašu gave (2 slaves, 1 ox, 1 ass as the equivalent of 170 shekels of silver and) 10 shekels in cash (=kù.GI), and he also bought 4 gur of barley (measured) in the 6-sila ban for 60 shekels of silver and gave it to Zer-ukin; at that time the market rates in the land of Akkad were 2 ban per 1 shekel of money (=kù.GI); total: 240 shekels of silver". As L. W. King observed (s. n. 73 p. 66 n. 11), the total indicates that kù.GI must mean, not gold, but "metal, or currency, as opposed to payment in kind", and this was also the opinion of B. Meissner (s. n. 3, p. 5 n. 7f., p. 26 n. 9), who thought this was a common meaning in the late Kassite and post-Kassite era. The dictionaries do not address this question. AHw does not treat it at all, and CAD has not understood the context, because it simply repeats L. W. King's error of 20 sila in line 15 for the correct 12 sila (CAD Ḫ 246b; M/1 95a).

[78] See Meissner (s. n. 3) 5f.; Dubberstein AJSL 56, 26; Dandamaev AoF 15, 54f.

[79] For NB wage norms, see n. 93 below. Most NB silver wages seem to lie in the 1 to 3 shekel per month range, though extreme—and rare—values ranging from 1/3 to 8 shekels per month also occur. Significant deviations from the rule are probably to be explained by special circumstances not explicitly noted in the documents and by age and type of skill.

[80] These are "educated guesses"; the range of prices is, of course, much greater (2/3 she-

5.2. Iron. Iron is a very rare, indeed precious, metal in the Bronze Age.[81] One of the earliest objects attesting use of iron for tools (as opposed to use for ornamentation, cult, or display–iron "weapons" from the Bronze Age appear to fall into these categories) is a steel pick discovered in 1976 in northern Palestine and dated archaeologically to the 12th century, which revealed upon analysis the metallurgical processes of carburization, quenching, and tempering.[82] That iron was regarded as a precious metal in the Middle Bronze Age has long been known from Old Assyrian texts from Kaneš in Anatolia, where a silver : iron ratio as high as 40 : 1 is attested.[83] To this we can add an OB mathematical text that gives a silver : iron ratio as 90 : 1 and a gold-iron ratio as 10 : 1.[84] By contrast, in NB texts we find silver:iron ratios ranging from 1 : 229 to 1 : 831, which means that, even for "expensive" iron, silver purchased thousands of times the amount of iron that it did in the OB period.[85]

This striking exception to the gradual upward trend in prices is the result of a metallurgical revolution. The price ratios alone are witnesses to its magnitude. J. Muhly has already emphasized the importance of price data for measuring the magnitude of this revolution by comparing the 40 : 1 silver : iron ratio in an Old Assyrian text with the weight ratio between the early silver drachma ($\sim$6 g.) and six iron spits ($\sim$ 6 obols $\sim 6 \times 2$ kg.) where the silver : iron ratio is c. 1 : 2000.[86] This would mean that iron in Greece in the late 7th century BC was 80000 times cheaper than in Anatolia in the 19th century BC. If we allow for a certain amount of imprecision in calculating the weight correspondence between the drachma at c. 6 g. and 6 iron spits at c. 2 kg. and for the relatively sparse data on Old Assyrian silver : iron prices, it becomes clear that the ratio 90 : 1 (silver : iron) of the

kel in Ur III to 3 minas or more in NB). For slave prices, see for pre-Ur III: Edzard SRU p. 87; for Ur III: A. Falkenstein, Die neusumerischen Gerichtsurkunden, 1, München 1956, p. 88–90; for OB: Schwenzner (s. n. 67) 110 + Farber, JESHO 21, 41–43 + Kupper (s. n. 15) 121, and also CH §§ 116, 214, 252; for MB: Gurney (s. n. 1) 15 and Petschow (s. n. 1) 148f.; for NB: M. A. Dandamaev, Slavery in Babylonia from Nabopolassar to Alexander the Great (626–331 B.C.), DeKalb 1984, esp. 200–202, with additional refs. under "Slaves, prices" p. 831.

[81] Two complementary overviews of use und cost of iron are: J. D. Muhly, The Bronze Age Setting, in: Wertime–Muhly (s. n. 19) 25–67, and H. Klengel, Zur Rolle des Eisens im vorhellenistischen Vorderasiens, in: J. Herrmann–I. Sellnow, Produktivkräfte und Gesellschaftsformationen in vorkapitalistischer Zeit, Berlin 1982, 179–189.

[82] D. Davis–R. Maddin–J. D. Muhly–T. Stech, A Steel Pick from Mt. Adir in Palestine, in: JNES 44 [1985], 41–51.

[83] *amūtum:* BIN 6, 28 (34.8 + :1) and KTS 39a (40:1). Discussions: Muhly (s. n. 19) 35, 59 n. 55; Klengel (s. n. 81) 181 n. 7 (with earlier lit.).

[84] MKT 3 pl. 5 YBC 4698. I owe knowledge of this text and its importance for prices to J. Friberg. The pertinent problem (i 12–16) reads: 1,30-bi an-bar, 9-bi kù-GI, 1 ma-na kù-babbar sum, an-bar ù kù-GI, 1 gín-*ma* ŠÁM. This seems to mean: "its (=silver's) 90 is iron, its 9 is gold. 1 mana silver is paid (and) it buys (a total of) 1 shekel of iron and gold". If this interpretation is correct, then 56;40 shekels of silver are spent on 0; 37,46,40 shekel of iron, and 3;20 shekels of silver are spent on 0; 22, 13,20 shekel of gold. The problem assumes that for each of the 60 shekels silver expended, 10 še per shekel is spent on gold and 170 še is spent on iron.

[85] For the NB evidence see § 2.2.1; for the problem of quality see § 3.2 and § 3.3.

[86] Muhly (s. n. 19) 34f., 53. The comparison with early Greek units is based on P. Courbin, in: Annales 14 [Paris 1959], 209–233.

OB mathematical text must be close to the real one and not merely imaginary. Moreover, the implied 10:1 ratio of gold : iron in the mathematical text should be viewed in the light of the Old Assyrian letter where an offer to purchase iron (*amūtu*) at a rate of 8:1 (gold:iron) is turned down because it is held to be too low.[87] Indeed, if all qualities were identical, the offered price would have been only 80 % of the Babylonian price.

We can also remove two anomalies in J. Muhly's panoramic picture of iron as a rare metal before the end of the Bronze Age. First, the "cheap" OB iron is probably tin and, in any case, the price rests upon AHw's misreading of the text.[88] Second, the "scale armor for a horse with scales made of iron" rests upon CAD's misreading of "iron" for "bronze".[89] These egregious blunders of AHw and CAD are reminders of the importance of price data for lexicography and ought to caution us that, although prices do indeed "fluctuate", they are subject to limitations that become much more clear when we look at the diachronic movement of prices as a whole.

5.3. Wages. I do not propose to undertake here the impossible task of defining precise wage levels in every era of Babylonian history. Rather I would like to focus attention on what all Assyriologists know but to which few give attention, namely that in the OB period a day's wages are defined as 10 sila of barley whereas in the NB period wages are defined as 6 sila of barley per day.

That this remarkable fact has attracted so little attention is probably due to the considerable uncertainty that has long prevailed about the absolute size of the OB and NB capacity measures.[90] There is nothing, however, in the metrological evidence which suggests that the differing structures of the OB gur and the NB gur are to be explained by variation in the size of the sila/*qû*; rather, all the evidence points toward continuity of size for this basic measure. Most of the Babylonian sila/*qû* measures from the Ur III period through NB are probably in the 1 ± 5 % liter range, whereas the NB gur contains only 60 % of the *number* of sila/*qû* that are in the Ur III/OB gur. This percentage gap alone shows that the different structure is not likely to be the result of variation in the absolute size of the sila/*qû*.

Whereas there is no evidence for radical variations in sila/*qû* norms in Babylonia from the Ur III period onward, there is good evidence suggesting that agricultural factors were important in determining the size of the 240-sila gur and that metrological-arithmetical factors played a major role in determining the size of the 300-sila gur. The meaning of the various Kassite gur is still unclear, but when sufficient evidence becomes available we shall probably discover that they are due, on the one hand, to an attempt to establish a 1:1 ratio between

[87] CCT 4 4a (context quoted *in extenso* CAD A/2 97f.).

[88] Muhly (s. n. 19) 39, 61f. n. 92, speaks of a "silver/iron ratio of 12:1 (16 1/6 shekels being equal to 1 1/3 shekels of iron)," but this is merely repetition of the misreading by AHw (837 *parzillu* 1c); see above n. 35.

[89] HSS 15,145:8f. (cited by Muhly [s. n. 19] 50, 66 n. 156, from CAD *binâtu* 237b) speaks of "bronze", not of iron; *ša parzilli* in CAD *binâtu* is a transcription error for *ša siparri* (correctly quoted by CAD M/2 p. 73 under *mīlu* B.).

[90] I have discussed (with lit.) the evidence for Mesopotamian capacity units in Maße und Gewichte § IV–§ IV B.2.g., in: RlA 7 (s. n. 9).

silver and basic commodities and, on the other, to administrative factors.[91] Thus, the gur of 150 sila which is equated with 1 shekel of silver in the late Kassite period[92] and the Chaldean gur of 180 sila, likewise equated with 1 shekel of silver,[93] may both be responses to the age-old need to define equivalences for legal purposes in a pre-coinage money system where commodities change hands at least as often as metal monies.

This tendency to seek 1:1 ratios in defining "standard" wages is apparent in both OB and NB systems, as one can see from Table 5. Of course, these are abstractions: real wages in both OB and NB documents show considerable divergence from these norms.[94] Nevertheless, the contrast between the OB and NB rules of thumb is instructive: *the NB norm for compensation in barley is 40 % lower than the OB norm.* This can hardly be without significance for the history of prices. It fits the diachronic movement of prices which we have posited for barley: the silver value of barley is clearly *higher* in the NB period than it was in the OB period. One therefore expects higher silver wages in the NB period, and that is exactly what one finds.

Unfortunately, the nature of the evidence inhibits meaningful discussion about whether the lower NB norm of "standard compensation" denotes a decline in real wages. Most NB documents which specify both length of hire and wage level are those that specify the level of the wage in silver (whether the employees always received these wages in silver is a moot point). Corresponding statements of compensation in goods are much rarer, and the NB evidence, although relative-

[91] The late 11th century land-purchase from the time of Nabu-šumu-libur published by S. Lackenbacher, in: RA 77 [1983], 143–154, with corrections by J. A. Brinkman and C. B. F. Walker, in: RA 77 [1985], 72–75, suggests where some of these gur may have arisen. By combining all of the prices together and comparing the relative values of barley, sesame, and sesame oil with those known for Ur III (see H. Waetzoldt, in: Bulletin on Sumerian Agriculture [BSAg] 2 [Cambridge, 1985] 81f.), one can make the likely inference that the *sūt tabki* (RA 77, 144 : 21/29) has a function similar to the *sūt šibši* (see my discussion in Maße und Gewichte § IV A. 4; in: RlA 7 [s. n. 9]). Now H. Torczyner, Altbabylonische Tempelrechnungen, (ATR), Wien 1913, 6, long ago demonstrated that in late Kassite documents *rēš namkūri* (probably ≈ "yield" in these texts) and *šibšu* (probably ≈"rent" in these texts) stood in a 3:1 ratio for barley (ATR p. 16–19, 21, 23, 29f.) and in a 2:1 ratio for sesame (ATR p. 22). If we assume, in the Nabu-šumu-libur land-purchase, that the basic barley gur is the gur of 180 sila and that the basic gur for measuring both sesame and oil is the gur of 120 sila, then the *kur tabki* would be 240 sila for barley and 180 for sesame. In any case, the resulting price ratios make fairly good sense: 1 shekel of silver = 4 sila of sesame oil or 11.333 sila of sesame (perhaps the result of rounding to the nearest ban and shekel) or 60 sila of barley. Obviously, we need more evidence, but see n. 77 for nearly contemporary barley prices.

[92] Evidence in works by Gurney (s. n. 1) and Petschow (s. n. 1).

[93] Seen especially in the formula *1 gur barley ≈ 1 shekel silver ≈ 1 month's work.* That this formula was regarded as an acceptable rule of thumb in the mid-6th century is demonstrated by its application in a legal document (RA 12:5f.) from the time of Nergalšaruṣur. For this document, see Dandamaev (s. n. 80) 541–544, and, for wage norms in the NB period, see pp. 112–131, 140, 289, 294, 379–383, 575–577, as well as M. A. Dandamaev, Free Hired Labor in Babylonia, in: M. A. Powell (ed.), Labor in the Ancient Near East, New Haven 1987, (AOS 68), 271–279, and Dandamaev AoF 15, 54f.

[94] For NB see the works by M. A. Dandamaev (s. n. 93); for OB, see Farber JESHO 21, 30–40, 49–51, and above n. 69 and 71.

Table 5

Standard wages:
Ancient rule of thumb definitions

A. Old Babylonian

work period	barley equivalent	silver equivalent
1 day	1 ban (10 sila ~ 10 liters)	6 še
1 month (=30 days)	1 gur (30 ban ~ 300 liters)	1 shekel

B. Neo-Babylonian

work period	barley equivalent	silver equivalent
1 day	1 ban (=6 sila ~ 6 liters)	6 še
1 month (=30 days)	1 gur (=30 ban ~ 180 liters)	1 shekel

ly rich in comparison to most other periods, does not permit a sufficiently detailed picture of what silver bought at any one particular time and place. Thus, the data for wages do not help us much in answering a question that is fundamental to economic history: is the silver value of barley higher because barley is scarcer or because silver is more plentiful? Since not only barley but most other things have higher silver values in the NB period, and since coined silver begins circulating widely in the Mediterranean in the 6th century, increased availability of silver may account for the higher silver prices, especially in the Achaemenid period. But why the standard norm for compensation in barley should be *lower* remains a puzzling question.

6. Conclusions. Short-term fluctuations of prices in response to scarcity or abundance, particularly of food products like barley, are a well-known phenomenon of the Babylonian economy from the third millennium on. The evidence is less eloquent about long-term movements, but barley appears not to follow the pattern of gradual rise in silver values that characterizes most other commodities. On the contrary, it seems to be rather high in the mid-third millennium, reaching it lowest mean levels in the Ur III and early OB era, then rising over the second millennium up to the mid-third millennium levels and higher. After some very high levels in the early Iron Age, it drops in the Chaldean period to a level that is about 40 % higher than Ur III/OB and then rises again in the Achaemenid period to levels that are comparable to the high Fara period prices. Given the tenuous nature of the pre-Ur III evidence, no apodictic conclusions can be drawn. However, we can at least say that what evidence there is does not support the theory of agricultural decline in the Ur III and early OB era but rather the opposite.

Silver seems to maintain a remarkable stability through all periods. It is already the primary standard of value by the Fara period, where copper functions as its "cheap metal" companion, and silver seems to have retained this role throughout Babylonian history, even in the Kassite period, where it is used, for reasons still unknown, together with two kinds of gold. In Babylonia, the role of "cheap metal" monies seems to have been taken over primarily by barley. Northern Mesopotamia, on the other hand, used–along with barley and other standardly defined commodities which varied in value from period to period–a

number of "cheap metal" monies, which seem to have included lead, tin, copper, and alloys. The terminology for metals in all eras is often ambiguous, and price data is sometimes our only clue as to what is meant by such terms as urudu (copper and also alloys), zabar (bronze and probably copper itself in some eras), and an-na (tin, lead, and perhaps alloys of these).

In general, radical price "fluctuations", except for foodstuffs seem to have been rare throughout the history of Babylonia. Other than the response of food prices to war, famine, season, weather, and similar factors, most of what appear to us as "fluctuations" are probably to be explained by three types of factors acting together or singly: (1) merchandise of different *qualities* grouped in the ancient sources under a generic rubric, e.g., what we usually translate as "gold", "copper", "tin"; (2) differences between buying and selling prices, e.g., merchants, for sound economic reasons one will appreciate if one thinks about it a bit, tried systematically to sell for a 100 % markup; (3) unrecorded factors of a personal, social, or economic nature. The one truly radical change in prices is the case of iron, and it is especially significant, because it illustrates two important phenomena about Babylonian (and pan-Mesopotamian) economic history that deserve more attention than they have received: (1) the capabilities of the Babylonian economy for reacting to supply and demand factors and (2) the potentially radical effects of technological change on price structure.