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Source: *Journal of the Economic and Social History of the Orient*, 2000, Vol. 43, No. 2 (2000), pp. 132-161

Published by: Brill

Stable URL: <https://www.jstor.org/stable/3632489>

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# HOW INTEREST RATES WERE SET, 2500 BC-1000 AD:

*Máš, tokos and fœnus as Metaphors for Interest Accruals\**

BY

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## *Abstract*

The earliest interest rates in Mesopotamia, Greece and Rome were set not “economically” to reflect profit or productivity rates, but by the dictates of mathematical simplicity of calculation. The interest that was “born” calendrically did not take the form of young animals, but rather of the “unit fraction,” the smallest unit fraction in each of the above fractional systems: 1/60th in the Mesopotamia, 1/10th in Greece, and 1/12th in Rome. The “birth” or “calf/kid” metaphor for interest thus referred to “baby fractions”, not literally baby animals.

For economic historians, the Riddle of the Sphinx (if not the Holy Grail) has long been to explain how interest-bearing debts originated, and why interest rates differed from one society to the next. Interest rates are known to have been set in three primary civilizations at the outset of their commercial take-off—Bronze Age Sumer, classical Greece and Rome—and to have remained remarkably stable over the course of each society. On an annualized basis, the rate for each new society was lower than that for its predecessor: 20 per cent for Mesopotamia, 10 per cent for Greece and 8 1/3 per cent for Rome.

Many economists theorize that interest rates reflect productivity and profit levels, subject to the risks of lending. A century ago, for instance, the German economic historian Wilhelm Roscher attributed the long decline in interest rates since antiquity to the “advance of civilization.”<sup>1)</sup> He suggested that these rates declined because the riskiness of investment, for example, had been lessened by improvements in social stability, market efficiency and the security of credit. Also, shrinking profit margins and/or falling yields of cattle or crops would have reduced the ability of debtors to pay interest.

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\*An earlier draft of this paper has benefited from comments by William Hallo, the late W. F. Leemans, Johannes Renger, Piotr Steinkeller, Cornelia Wunsch and Norman Yoffee. For the points on which I was unable to convince them, I take full responsibility.

1) Roscher 1878, vol. II, p. 111 and vol. I, p. 270.

Following this approach, economic historians interpret the “kid” or “calf” words for interest (*máš* in Sumerian, *tokos* in Greek and *fœnus* in Latin) as reflecting the growth of herds. But this begs the question of why such growth would have declined from Sumer through Greece and Rome. Already a century ago, Böhm-Bawerk rejected such “naive productivity explanations” of interest rates.<sup>2)</sup>

We need not assume that interest rates were “economic” in the sense of being within the ability of most cultivators to pay. Abject need was the motive for agrarian debt. A key financial dynamic of ancient civilizations was precisely the problem of debt arrears (including unpaid tax collections) mounting up beyond the ability of many borrowers to pay. This is what led to the royal *amargi*, *andurarum* and *misharum* “Clean Slate” proclamations of Mesopotamia during 2400-1700 BC, cancelling agrarian debts (but not commercial obligations, that is, the placement of money with *tamkaru*-merchants to finance their trade ventures).

Not much is known about the early history of commercial credit. Little has changed since Leemans acknowledged that he was unable to find an explanation for the origin of the 20 per cent interest rate for silver loans.<sup>3)</sup> Steinkeller points out that “Loan documents are in general quite rare before Ur III.”<sup>4)</sup> Most recently, Renger has confirmed that, “Despite the appearance of a number of important articles and monographic studies covering particular periods and specific aspects connected with the problems of credit, no comprehensive investigation encompassing the vast amount of loan documents in their totality is available.”<sup>5)</sup> Why did some loans bear interest, and others not, he asks; and why did silver loans usually bear 20 per cent interest, in contrast to the Old Babylonian period’s 33 1/3 per cent for barley loans? He finds that the answer “cannot presently be ascertained,” but ventures his belief that interest probably began in agriculture, by virtue of the fact that early societies were agricultural.

The agrarian rate was not the most characteristic fixed rate of interest, however. That status belongs to the commercial rate of 1 shekel per mina (1/60th) per month. But to date, nobody has yet suggested its basis. This is partly because commercial profitability is a rather nebulous concept.

My approach—as a financial and cultural historian, not a philologist—is first to establish that a “normal” rate indeed existed. For if a logical pattern is to be

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2) Böhm-Bawerk 1890.

3) Leemans 1950.

4) Steinkeller 1981, p. 141.

5) Renger 1994, p. 192.

found over time, it should be based on official or normal customary rates, although we know that deviations were frequent in practice. Once basic rates are established for each ancient society, it becomes possible to compare rates among different societies.

The present paper argues that the decline in interest rates from Mesopotamia to Greece and Rome cannot be explained “economically” in terms of documented profit or productivity rates, much less the pastoral economics of herding. Such explanations are anachronistic when applied to early antiquity. On the basis of Mesopotamian evidence suggesting that the idea of birth of young animals is to be interpreted metaphorically rather than literally, I propose an explanation based on numerical simplicity of calculation. I then compare Greek, Roman and Byzantine evidence to show that subsequent societies adopted Mesopotamian ideas of setting interest rates in accordance with their local counting and measuring systems.

A comparison of Sumerian, Greek and Roman interest rates and their terminology reveals a pattern not readily apparent when these economies are viewed in isolation. In each region the customary rate reflected the local system of numerical fractions, and specifically the “unit fraction”: 1/60 per month in Mesopotamia’s sexagesimal system, 1/10 in Greece’s decimal system, and 1/12 in Rome’s duodecimal system. Ease of computation evidently played an important role. Instead of interest rates being set by economic factors such as productivity levels—and instead of payment being made in the kids or calves as suggested at first glance by the ancient words for interest—arithmetic considerations seem to be at play. Although the words for interest in Sumerian, Greek and Latin all have an association with “birth” or “newborn,” *what is meant seems to be the periodic accrual or birth of a unit fraction, not literally of young cattle or crops*. It was the local numeric system’s basic unit-fraction, that is, *the smallest unit of the sexagesimal, decimal or duodecimal system*: a 60th, 10th and 12th respectively.

Table 1

Region	Smallest Fractional Unit	Normal rate of Interest
Bronze Age Mesopotamia	1/60th	1 shekel per month per mina owed. In the decimal system, 1 2/3 per cent = 20 per cent per year.
Classical Greece	1/10th (dekate)	10 per cent per year

*(Table cont.)*

<i>Region</i>	<i>Smallest Fractional Unit</i>	<i>Normal rate of Interest</i>
Classical Rome	1/12th ( <i>uncia</i> )	8 1/3 per cent (1/12th) per year
Byzantium—before Justinian	1/100th lb. (1 <i>nomismata</i> )	12 per cent per year
“— Justinian	a <i>siliqua</i> per <i>solidus</i>	5 per cent + per year
“— after Constantine	1/72nd lb. (1 new <i>nomismata</i> )	8 1/3 per cent (1/12th) per year (= 6/72nds)

A widespread common denominator—the local fractional system and its corollary weights and measures—appears to explain how ancient interest rates were set. This principle begins with Sumer’s increments of a shekel per month, and continues down through the *dekate* in Greece and Rome’s troy ounce per pound. I conclude that the reason why interest rates declined through classical antiquity is to be found in the fractional arithmetic being used.

As late as the Byzantine epoch the 12 per cent rate worked out to a “penny per month.” Runciman observes that “When the currency was devalued by reducing the number of *nomismata* from 100 to 72 per pound of gold after Constantine, “the fixed rate of interest tended to adjust itself to the new figure, to the lender’s advantage: till by the Tenth Century 6 per cent had changed to be 6 *nomismata* a per 1 lb. of gold, that is to say 8.33 per cent; and the maritime speculation would bring in 16.66 per cent.”<sup>6)</sup>

More archaic interest rates remained relatively stable over the centuries because they were administered—along with prices and various types of fees—by the temples, palace, or in some cases simply by tradition. In the following pages I will suggest how this system of regulation did not respond fluidly to market supply and demand, but reflected a cosmology of nature and society first encountered in Bronze Age Mesopotamia.

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6) Runciman 1956.

*Who productivity explanations of ancient interest rates are anachronistic*

Economists define interest as the periodic payment of a stipulated rate of return on a capital obligation (the principal). The debt usually corresponds to an advance of money, but sometimes it simply accrues as an overdue tax obligation or other charge. Interest-bearing debts typically entail written contracts, pledges of collateral, witnesses and sureties. And often, the rate of interest is publicly regulated (although the degree of enforcement varies).<sup>7)</sup>

These formalities indicate arms-length transactions, usually among unequals (indeed, obligations among equals often are interest-free, as *e.g.* the *eranos* loans among classical Greek aristocrats), in contrast to the more free-floating gift-exchange obligations familiar to anthropologists. Neither gift exchange, dowries or fines bear stipulated interest rates. Gift exchange may involve customary overplus payments (often in the character of one-upmanship), but this is not interest in the formal economic sense of the term. Hence, the link between pre-station and the French word for loan, *prête*, is not well taken.<sup>8)</sup> A failure to add something to the reciprocating gift does not lead to legal foreclosure, nor are sureties or contracts involved.

Most economic historians seek to explain interest rates as a usufruct, reflecting the (marginal) productivity of capital. It is as if the debtor calculates just what the loan is worth to him, based on what he can earn with the borrowed money, and hence what he can afford to repay. This approach assumes that interest rates reflect the debtor's productive use of creditor assets. In his *Ancient Economic History*, for instance, Heichelheim believed that this kind of lending occurred as early as the neolithic age, with early "food-money" and credit being linked by about 5000 BC: "Dates, olives, figs, nuts, or seeds of grain were probably lent out . . . to serfs, poorer farmers, and dependents, to be sown and planted, and naturally an increased portion of the harvest had to be returned in kind." In addition to fruits and seeds, "animals could be borrowed too for a fixed time limit, the loan being repaid according to a fixed percentage from the young animals born subsequently. . . . So here we have the first forms of money, that man could use as a capital for investment, in the narrower sense."<sup>9)</sup>

Of course, profit expectations must be qualified for risk, and Heichelheim imagined neolithic peasants to have practiced an embryonic form of actuarial

7) It is important to recognize that charging interest is different from imposing a penalty for late payment of an obligation. Whereas ancient penalties often doubled the sum owed, interest typically represented only a small fraction of the debt obligation. For most ancient societies it was in fact the smallest unit fraction, hence its analogy with a "baby" number.

8) See especially for example Mauss 1925.

9) Heichelheim 1958, pp. 54f.

calculation: "Rich owners" who lent out their surplus stocks "had to demand a higher return in view of the possible losses from bad harvests or animal diseases." High rates of interest at the outset of civilization thus are explained in terms of compensation for risk, a reward for risk-taking rather than extortionate lending to needy families in emergency conditions.

This kind of reasoning has been carried to an extreme by Foster. Retrojecting modern principles of calculated risk-taking, he suggests that Sumerian and Babylonian debt cancellations led to higher agrarian interest rates, and hence to lower land prices. Assuming a modern supply and demand determination of interest rates, he suggests that a low price for land would ensue if interest rates were high and long-term credit short. This would occur if lenders expected that their land foreclosures might be voided by royal Clean Slates. "We need not be advanced economic theoreticians," he argues, "to suppose that there might be a relation between such high rates of interest [33 1/3 percent for barley loans and 20 percent for silver loans] and the possibility of an edict abolishing debt, although we may ask which was first, the risk or the rate."<sup>10</sup>)

But if the first interest-bearing debts were mercantile silver loans, it seems out of the question that the likelihood of debt cancellations came first, for these did not apply to commercial silver-debts. And Foster does not entertain the possibility that the barley-loan interest rate may initially have reflected the rent rate and remained fixed, willy-nilly.

What really is at issue is whether Mesopotamians thought of interest rates and asset prices as being interlinked. Did they view interest rates as a capitalized rate of return, net of risk, to the point of evaluating the likelihood of debt cancellation and setting their rates accordingly?

There is no evidence that archaic creditors took so *durchkomponiert* a view of their economy as being a thoroughly integrated, tightly articulated and interconnected system in which a change in risk levels would affect interest rates, and a change in these rates would affect asset prices. This was the Bronze Age, not modern Wall Street or the City of London. In the neo-Babylonian period we see prosperity rising the *misharum* or *andurarum* acts becoming a thing of the past, yet interest rates remained constant century after century. This suggests that there was no *tatonnement* between asset prices, changing risk premiums and interest rates.

Another problem of Foster's reconstruction is that he imagines debts as stemming mainly from advances of money by wealthy individuals to needy borrowers (and hence, facing risks of non-payment). Bust most debts accrued as arrears on various types of obligation, especially those due to royal collectors

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10) Foster 1995, p. 167.



as taxes or fees of various sorts. In such cases there was no advance of money, but an *absence* of crop payments to public collectors. When rulers cancelled these debts they were relinquishing payments owed ultimately to themselves (although proximately to their collectors).

Foster speculates as to whether “edicts were part of the problem or the solution. We might further wonder if the edicts did not in fact favor money-lenders in the long term, even if unintentionally—and thus, we might wonder whose benefit the edicts ultimately served.”<sup>11)</sup> His idea is that by threatening creditors with a loss of their financial claims, rulers kept interest rates high, making creditors yet wealthier. If this was the case, then what rulers tried to do—to preserve a free landed citizenry by annulling the economy’s debt overhead and restoring their land tenure—would be undone by the marketplace. This has become the customary free-market argument against state interference with market forces.

Assyriologists must beware that ideology is at work here. We are dealing with an economic logic designed by economists to dispute the efficacy of public shaping of market forces. This is made explicit by Morris Silver, editor of the volume in which Foster’s essay appears. Referring to the Levitical Jubilee Year, Silver insists on “the counterproductive nature of the prophets’ economic ideas from a real world standpoint,” that is, the standpoint of modern *laissez faire* urging governments to refrain from interference with market forces. The modern assumption is that no matter what governments do to steer the economy, the market will undo such efforts.<sup>12)</sup>

What *were* the Babylonians (and for that matter, the Judaeans and Israelites) thinking of? I think they knew something that modern economic theory does not acknowledge: if “market forces” are left to themselves, they lead to widening economic polarization and growing disequilibrium as financial claims *on* wealth and income tend inexorably to exceed the ability to pay (the Frederick Soddy principle). Interest rates exceeded profit and crop-surplus (“real rent”) rates.

One is reminded of Samuel Kramer’s complaint that Urukagina’s reforms were fruitless, for the usury and impoverishment problem simply began again.<sup>13)</sup> Of course it did—and when the economy’s financial balance veered too far out of an equitable equilibrium, or simply when a new ruler ascended the throne, the debts were cancelled yet again. This was how the Sumerian and Babylonian debt overhead was prevented from growing too far out of bounds (a counterpart to the “overgrowth” of hubris in Greek social-economic thought).

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11) Loc. cit.

12) Silver 1995, p. 180.

13) Kramer 1959, p. 49.



Leemans likewise followed the economic theorizing typical of his day by speculating that agrarian interest may have been charged for advances of seed, and hence could readily be paid out of the spectacular crop yields of Mesopotamia's rich alluvial soils. He observed that  $33 \frac{1}{3}$  per cent interest "seems outrageous to us," but if it were charged only on seed-grain—and assuming yields to have been 16 to 24 times the sowing-corn, or even more—then it would have amounted to just 1 per cent of the crop.<sup>14</sup>) But practically all agrarian debts stemmed from payment arrears, not from entrepreneurial borrowing. It was the failure of a crop rather than hopes for a prosperous bounty that forced most cultivators into debt. Under such circumstances many debtors lost their family members and, in time, their land rights to foreclosing creditors.

### *A pastoral origin of interest?*

Taking as their starting point the usage of pastoral words such as "capital." Greek *tokos* and Sumerian *máš* for lending and interest relations, some economists infer that credit started in herding economies. The idea is that cattle may have been lent out, producing calves that might have been paid as interest. Like the seed-grain theory, this would mean that early agrarian loans were economically productive. And indeed, there are a few scattered traditions of herd owners consigning cattle or other animals to shepherds and taking their compensation in the form of animals. Yet little trace exists in any archaic or modern tribal community of cattle being lent out, either for calf-interest or for a stipulated money payment. The very idea goes against the spirit of pastoral communities throughout the ages. Although insolvent debtors often are found pledging their livestock as collateral, cattle are not borrowed. In any event, the attested interest rates do not lend themselves to easy divisibility of living animals. (It would be hard to pay a twelfth, a tenth or a fifth of an animal as interest.)

Comparative anthropology indicates that speculations along these lines are confused about just whose livestock were involved. Heichelheim assumed that cattle were lent by creditors to debtors, and that it was out of their productivity that borrowers were able to pay the stipulated interest. But studies of tribal economies throughout the world indicate that the transfer of livestock invariably is from poor debtors to rich creditors. Stock and other assets are pledged in exchange for necessities, which are consumed or paid as taxes or fines rather than productively invested. It is the debtor's own productive asset that produces a usufruct. Such usury is a pure loss to debtors on the land. It is not paid out

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14) Leemans 1950, p. 32.

of income generated by the loan, nor out of profits earned on investing the loan's proceeds, but out of the debtor's own stock pledge as collateral. This is why, once ancient cultivators fell into debt, they rarely could get out of it without a royal Clean Slate proclamation.

Anthropologists studying tribal economies have found that when cattle or land are part of the loan process, *it is as antichretic collateral* (that is, a pledge) that produces a stream of services or usufruct for the creditor. *The essence of usury is that the usufruct is not produced by the borrowed capital itself.* The normal practice in herding economies is for debtors to pledge their cattle to their creditors, not to receive cattle and prosper by generating a usufruct. The only instances of productive lending (defined as that which provides borrowers with the means to repay their obligations) are commercial advances to merchants.

The preferred forms of collateral through the ages have been the debtor's cattle; his slaves, daughters, wives or sons to perform services in the creditor's household; and later, more public types of assets such as land rights, fishing privileges and mineral rights. But it is difficult to formally express the precise fraction of the debt principal that these antichretic yields represent. Cattle may give birth to calves and provide plowing services and milk, but no economist has come up with an explanation of how to translate the value of these activities into a precise rate of interest. We know that the Sumerians knew that herds do not grow at 33 1/3 per cent per year, for Gelb (1967b) has translated a tablet on the growth of a herd of cattle.<sup>15</sup> It hardly can be assumed that Sumerian livestock reproduced more rapidly than Greek livestock, or that the latter increased more quickly than those of Rome. Even at the Roman interest rate of 8 1/3 per cent, animal herds and crop yields hardly could have increased regularly at these rates. In periods of crop failure it must have been hard for many debtors to pay even when no interest was charged. Some other factor than calving rates therefore must have determined the earliest interest rates.

Schneider, Leemans, Diakonoff and Steinkeller have related interest rates in Mesopotamia agriculture to rental sharecropping rates.<sup>16</sup> There is a fungible equivalency at the heart of this interest/rent relationship (both rates were 33 1/3 per cent by the time documentation begins to appear in Ur III). Creditors were blocked by custom from taking outright ownership of the debtor-cultivator's field in the event of non-payment. The loan's value served as the field's effective price, with the debtor (acting as a proto-seller) turning over the equivalent of what the field would have yielded as rental property—a third of the crop.

15) Gelb 1967b. See more recently Nissen, Damerow and Englund 1993.

16) Schneider 1921; Leemans 1950, p. 30; Diakonoff 1974, p. 14, n. 12; and Steinkeller 1981, p. 141.

This yield implied a reciprocal land price of three years' purchase. *In effect, the rent rate set the agrarian interest rate, and hence the effective land price.* The idea was for the creditor-buyer to take as interest the same usufruct that could have been obtained by buying the fields outright and leasing them out to sharecroppers.

The first step making the land alienable was precisely to provide creditors with rights to the crop and to the debtor's labor services to harvest it. If cultivators could not yet pledge the land as collateral (and hence, forfeit it) on more than a temporary basis, at least they could give creditors the same yield that could have obtained by taking formal ownership. (Economists call such an arrangement semi-antichretic.)

The reason for this roundabout way of treating what was, in effect, a land transfer as if it were an interest-bearing loan was that land rights were not yet freely alienable and an agrarian labor market barely had developed. Leaving the debtor on the land as its cultivator served the creditor's interest, at least until grain cultivation was replaced by less labor-intensive olive oil and wine cultivation.

In sum, the history of ancient agrarian usury shows repeatedly that the usufructs—and increasingly, the collateral—were reaped by creditors. Instead of the interest being paid out of growth in the debtor's income by investing the loan proceeds productively, these charges devoured his already exhausted resources. Such borrowing out of absolute need represents a situation that economists call price-inelastic. The borrower is willing to pay virtually any interest rate as credit becomes a life or death matter. Borrowing was an act of desperation that only made the situation worse. In such cases there is little economic basis for charging one interest rate rather than another.

Ancient usury thus did not reflect the debtor's ability to pay, for a rising proportion of debts were *not* paid. Needy individuals borrowed out of abject necessity, not to earn a profit. This admission relating to the plight of the rural poor indicates how futile it is to try to explain interest rate levels in reference to productivity or profit rates. The proceeds of agrarian loans were not invested productively to generate an income out of which to pay interest to the creditor, but were consumed or paid out for taxes. And as for industry, it was self-financed throughout antiquity.

Roscher, Böhm-Bawerk and their contemporaries were not blind to this fact that archaic usury was an extortionate phenomenon consisting of "distress debts in contradistinction to acquisition-debts."<sup>17</sup>) A growing portion of the population fell into debt bondage and forfeited its lands to foreclosing creditors. Under the

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17) Roscher 1878, vol. II, p. 128; see also Finley 1973.

rule of oligarchies (ultimately that of Rome), more and more families lost the land rights and traditionally had been their guarantee of political freedom and citizenship.

The final problem of trying to reason economically to explain interest rates by assuming that they reflect pastoral and agricultural productivity rates or market conditions is the fact that interest rates have been administered by law throughout most of history. The rate of 1/60th per month—one shekel per mina—seems to have remained stable within Mesopotamia for over a thousand years, starting with the laws of the Third Dynasty of Ur, shortly before 2000 BC, and extending through the laws of Eshnunna and Hammurapi to Neo-Babylonian times.<sup>18)</sup> Also stable for many centuries was the Roman rate of 1/12th, that is, an *uncia* (ounce) of copper per year on every *as* (pound), except when public law (widely flouted, to be sure) cut it in half in the 4th century BC. Greek bankers typically paid a decimalized 1/10th (*dekate*) on deposits. Renger rightly observes that “the unchanging rate of interest throughout the centuries constitutes a strong argument against the existence of a credit market,” adding that “the same is true for rental dues which do not fluctuate, thus also indicating that they are not governed by the laws of supply and demand.”<sup>19)</sup>

*The evolving meanings of máš: from kid to fee, (periodic) payment and interest*

The relationship between early interest rates and young animals turns on whether kid- and calf-words for interest (and the corresponding words for capital) are to be understood literally or figuratively. Philologists who have examined the Mesopotamian and Indo-European evidence find the relationship to be an after-the-fact analogy—one that postdates the first charging of money-interest by many centuries, rather than underlying it from the outset. Instead of livestock being lent out in exchange for kids, calves or other young animals being paid as interest, it appears that kid- or “calf”-words for interest, like their agrarian relative “usufruct,” are relatively late pastoral analogies for interest-bearing credit.

Two decades before Steinkeller established this fact for the Sumerian language, the Indo-European philologist Emile Benveniste found that contrary to popular impression, the archaic Greek and Latin words for capital came to mean “cattle” relatively late. The Indo-European not *\*peku* (< Latin *pecus*) originally referred to “personal chattles, movables” in general, and only later narrowed to mean specifically livestock, then smaller livestock and sheep. “Similarly

18) Roth 1995, pp. 38, 61 and 97.

19) Renger 1994, p. 203.

the English term cattle, French *chapel*, goes back to Latin *capitale* 'principal property' . . ."20)

It is part of Near Eastern tradition that cattle are associated with words connoting *periodic payment*. The most important periodic payments were to the temples and their feasts, above all to the New Year festivals. Starting with Bernard Laum, monetary historians have attributed the origins of money to the donation of cattle offerings to such feasts.<sup>21)</sup> The Greek monetary spits (*oboloi*) and handfuls thereof (*drachmae*) suggest that cattle or some of the offspring were dedicated to the temple or other community institution annually as firstfruits, and that these proto-tax contributions became a kind of proto-money. But one must be wary of postulating a natural transition from such contributions to specified rates of interest owed on the advance of silver money.

It appears that a pecuniary standard was first introduced by the payment of fines (and perhaps of proto-taxes) in animals, silver or other capital items. This word *pecuniary*, meaning monetary or market-oriented, stems from Latin *pecus*, meaning cattle either singly or in herds. The word "fee" likewise derives from *pecus*, as does "feudal." To the extent that cattle were civilization's first pecuniary means of payment, it was not to buy market goods and services but to settle capital-type obligations, by paying reparations, fines (headed by manslaughter compensation), marriage debts and proto-taxes such as contributions to communal sacrifices. In this view, fines for personal injury were the earliest documented "prices," at least for Indo-European speaking societies. (Bridewealth and brideprice were akin to capital transfers in the sense that they completed the merging of families by creating a founding stock for young couples—the reverse of manslaughter fines.) But cattle hardly could have served as money as our epoch understands the term. Their value was higher than most exchanges of goods and services called for. Nearly the same could be said of gold and silver, but cattle were not as readily divisible as were metals.

It seems clear enough that the word *capital* derives from Latin *caput*, a head of livestock, while *chattel* has become a general term for property. But as Benveniste points out, this linguistic fact by itself does not prove that cattle were civilization's first economic capital. Rather, livestock seem to have been taken at some point as prototypical capital in that they produced calves. As Aristotle put it in his famous discussion of usury, silver produces interest for the moneylender as parents produce offspring; yet silver is sterile, not animate.<sup>22)</sup>

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20) Benveniste 1973.

21) Laum 1924.

22) Aristotle, *Politics*, Book I at 1256.

Sumerian economic records begin in readable detail in the Early Dynastic period, 2700-2435 BC. Around 2450, in the time of Urukagina and his “reform” text, Sumerians had to pay the temples or palace a regular *máš*-fee.<sup>23</sup>) It is not certain whether this was necessarily in the form of lambs or kids. Steinkeller reads the term *máš* literally in Ukg 4 iv.2-7: “the surveyors, the chief *bala*-priests, the chief stewards, the brewers, (and) and foreman had to pay silver” fees or “offerings” in the form of fleeces or young kids born to the herds pastured on public fallow lands. His reading is that “in the pre-Sargonic period *máš* was still used only in its literal sense.” But it is not clear why surveyors, brewers and others should make payments relating to the use of grazing lands.<sup>24</sup>)

Urukagina’s text describes royal collectors seizing the cattle of cultivators in arrears on their public obligations, which seem to have been due in silver or barley, and to be in the character of irrigation fees or proto-taxes, not interest on money advances. They were akin to debt-service payments mainly by being due periodically. (Rental payments in barley were due upon harvest, while irrigation fees, increasingly due in silver, were payable at the outset of the crop season.)

The term *fee* seems especially appropriate for such public obligations, inasmuch as its linguistic root is *pecus*, a semantic counterpart to Sumerian *máš*. However, the payments seem to have been denominated mainly in silver, sometimes in crops, but not in young animals (although collectors evidently seized these as capital items in lieu of silver or barley arrears). There is no direct confirmation of interest yet being charged on these fees on these arrears.

Steinkeller suspects that the earliest references to *máš* payments designate a tax on the growth of flocks, a tax probably paid in kind before being transformed into a silver obligation as Sumer’s economy became more commercially oriented. He suggests a derivation from *wašabum*, “to increase,” presumably referring to the growth of herds. But by the time the term *máš* can be documented in this new context, it seems to have taken on a broader meaning.

The fact that an interpretation seems reasonable to modern eyes does not by itself make it historically correct, of course. If the evolution of words were entirely reasonable, we would have many fewer riddles to untangle. It is at least as difficult to reconstruct social relations from the history of words as from archaeological ruins. The dice are loaded against any given guess hitting the mark, for language frequently evolves by making semantic leaps that often are idiosyncratic and extremely hard to reconstruct. Thus, is nothing that a word for interest literally signified a kid or calf, we must beware of assuming that the earliest interest actually was paid in young animals or that the first usufruct-

23) See e.g. Cooper 1986, pp. 71 ff.

24) Steinkeller 1981, p. 140.



producing capital consisted of cattle. Philological analysis is prone to the danger of taking words too literally and missing their often metaphoric dimension. Linguists may be especially prone to interpret too literally the archaic words for interest: *máš* in Sumerian, *tokos* in Greek and *fænus* in Latin. As noted above, many economists have gone along with the literal interpretation that kids or calves represent the prototypical interest payments, which later became monetized, largely because it is ideologically pleasing to imply a productive origin of interest-bearing debt, *i.e.*, that newborn animals appear to be a portion of the usufruct produced with the help of the creditor's loan, and hence were justifiably paid as interest.

But kids and calves are indivisible units. What happened to families that had only a few cattle to graze? It is known that rent was due in barley, and various fees in silver, rather than in calves. By the time documentation can be picked up in the 2300s, even grazing fees were due in silver. Steinkeller's telling point is that "The meaning 'interest' of *máš* is not attested before Ur III."<sup>25</sup>) This suggests that some prior meaning for the word was at work other than newborn animals being paid for borrowed cattle or grazing rights—the same point that Benveniste made with regard to the European languages.

Tracing how the term *máš* came to mean "interest," Steinkeller points out that "the pre-Sargonic tenant farmer delivered a tax in silver for the yearly increase in the number of his goats and sheep." This tax "actually represented a fee for the right to utilize the rented field for grazing. The usage of *máš* in a transferred sense is first attested in the Sargonic period, when *máš* came to denote the tax itself. Once this change had been accomplished, only one step remained: since the tax for the yearly increase in a herd of animals offered an obvious analogy to the interest yielded during one year by a loan, in Ur III *máš* acquired the meaning 'interest.'"<sup>26</sup>)

### *Why Sumer's monthly 1/60th rate of interest was a natural calendrical rate*

Only recently has it been recognized that the charging of interest is not a universally spontaneous phenomenon, but was invented in Sumer—yet another Sumerian "first," as Samuel Kramer would have said. No Early Bronze Age evidence for interest-bearing debt has been found in the Indus civilization or the Hittite kingdom. The Hittite debt cancellation edict of Tudhaliya IV refer to wergild-type compensation owed for personal injury, not interest-bearing debt.<sup>27</sup>)

25) *Ibid.*, pp. 131f.

26) *Loc. cit.*

27) Westbrook and Woodard 1990, and Westbrook 1995, pp. 158f.



The fact that no archaic Egyptian debt records exist might possibly be the result of destruction of the papyrus writing medium, but regions that used clay tablets for public administration, such as Crete and Mycenaean Greece during 1600-1200 BC likewise have left no hint of commercial credit, no pooling of money by partnerships, and—most telling of all—no agrarian debt cancellations. Egypt's *sed* festivals, unlike their Mesopotamian counterparts, did not allude to debts. The absence of such debt records outside of Mesopotamia prior to the first millennium BC thus does not seem simply to reflect the absence of written documentation. It is the very essence of such debt to be documented.

Where the charging of interest appears earliest outside Mesopotamia—as in Assyria's Asia Minor trade colonies—a comparative analysis of public and sacred laws shows these to derive from southern Mesopotamian practice. In any case, the role of debt was quite circumscribed outside of Mesopotamia, even in commercial economies such as Ugarit, the city-state with the closest ties to the Aegean during 1400-1200 BC. As for Europe's less centralized, tribally organized economies, the historian Tacitus noted as late as the first century of our era that the Germans, whose debts were mainly of the *wergild* type for legal restitution of damages, were not acquainted with loans at interest.<sup>28)</sup> This probably can be taken as applying to European tribal communities generally. It follows that the origins of interest are to be understood in terms of Sumerian economic institutions.

Monetary transactions, including the payment of interest, presuppose a system of fractional weights and measures. The first known examples were developed by Sumer's institutional households as part of their distribution of rations and other periodic flows.<sup>29)</sup> Given the general knowledge of arithmetic, calculations of rations, prices, quantities and interest had to be kept relatively simple. Round numbers were preferable. This was achieved by establishing the most important prices and fees, interest rates and associated "rulings" in round numbers and fractions.

The system of counting, measures and weights was calendrical, largely because of the need to coordinate disbursements on a regularized periodic basis. For periodic distributions such as rations, Mesopotamian (and also Egyptian) institutional households, *e.g.* the temples and palaces, achieved a standardized regularity by replacing the traditional lunar months, which varied in length from 28 to 30 days, by standardized administrative months comprising 30 days each.<sup>30)</sup>

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28) Tacitus *Germania*, at 26.

29) Gelb 1965 and 1972; Powell 1990.

30) Englund 1988.

Reflecting this administrative calendar composed of equal-length months, the sexagesimal (60-based) system of fractional measures and weights was developed. This made it easier to distribute rations to public dependents on a regular monthly basis. It enabled the temples (and the palaces that emerged out of their precincts after about 2800 BC) to regularize their disbursements of food, oil and other basic essentials. The upshot was that periodic disbursement and accruals—above all the distribution of rations and the calculation of interest and rent obligations—were relatively easy to compute, thanks to the sexagesimal system's great flexibility: The number 60 is divisible by eleven roots: 30, 20, 15, 10, 6, 5, 4, 3, 2 and of course 1.

The *gur* ("bushel") of barley was divided into 30 *sātu* = 300 "cups." The idea was to divide monthly barley rations into 60 or 30 equal units for daily consumption by adult males (Lambert 1963:83f.). Women and slaves received half this amount, and children still less, depending on their age. In this way, standardized economic relations were created in a way that integrated weights and measures, prices and ration levels into a single managerial system.

Crop obligations were denominated in barley, mainly because most cultivators had little silver. These barley debts were payable annually upon harvest. But one of the first things to strike the financial historian is that commercial debts (including some rural obligations and fees) were denominated in silver. Most silver was concentrated in the commercial sphere, in which merchants typically operated in association with the large institutions.

For internal temple and palace accounting purposes, the price of barley was set at one *gur* per shekel of silver. This enabled accounts to be kept simultaneously in silver and barley, creating a "bimonetary" standard. In times of crop failure the market price of grain outside of the public sector might rise substantially, but temple and palace accounts insulated themselves from market fluctuations by using standard "normal" or "book" prices.

The logic underlying these accounting practices provides a key to explain early interest-rate levels. Reflecting the sexagesimal measurement system, the standard weight for measuring silver, the mina, was divided into 60 shekels. Dovetailing into this system, the rate for commercial debts was set at one shekel per silver mina per month. As the shekel weighed 1/60th of a mina, this worked out annually to 12/60ths, but the point of reference was 60 months. Compounding did not begin until the mina of capital had fully reproduced itself by accruing 60 shekels. (It seems that only at this five-year doubling point did the Sumerians consider the principal to have become an "adult," and as we all know, only adults are capable of reproduction.)

In Sumer's sexagesimal system of weights and measures, monthly accruals

of interest at one shekel per mina were the simplest and most convenient fraction to compute.<sup>31)</sup> This simplicity would be emulated by the Roman *uncia* per *as*. In their own notational systems, each rate represents the basic unit fraction—a shekel per mina, a troy ounce per pound—although these rates are inconvenient to calculate in our modern decimal system. The commercial interest rate of 1/60th per month—1  $\frac{2}{3}$  per cent—is an irrational number (0.01666 . . . 7). Rome's troy ounce, 1/12th, is an equally awkward 8  $\frac{1}{3}$  per cent (0.081333 . . . 3).

Sumer's evolving terminology for interest rates throws out a few hints with regard to how financial evolution occurred. Steinkeller points out that “the pre-Sargonic term for interest was *kud-ra us-a*, from the verb *kud/kudr*, ‘to cut off,’ meaning ‘portion’ (cf. *nig.kud*, Akk. *miksum*).”<sup>32)</sup> This seems to have been more than just a natural usage signifying portion (as in the modern slang phrase, “What's his cut?”). Powell suggests a more concrete reference to silver rings and coils: The Middle Babylonian word for 1/8 shekel, *bitqu* (literally “cutting”), seems originally to have denoted “a piece of standard size cut off from such a silver coil.”<sup>33)</sup> Did this usage extend back into the third millennium?

The term “cutting” is semantically akin to the English shilling (from *skilja*, “to cut”) and the Russian ruble (from *rupit*, also meaning to cut). Grierson points out that words for cutting are widespread for payment, and at least in the Russian case “in the fourteenth century, when the word *rubl'* first occurs in the texts, the flans of Russian coins were cut from strips of wire hammered flat.”<sup>34)</sup> This probably was the meaning of Sumerian *kudr*, with interest being just one form of regular payment.

What is important is that the terminology suggests that interest was payable in silver (the commodity being cut), not barley or cattle. This suggests a commercial rather than agricultural context long before pastoral terms for interest came into use. Indeed, there is no indication of calf payments in this commercial sphere.

Also important is Sumer's written notation. Prior to the Ur III period a somewhat confusing set of symbols was used for integers and their fractions. The distinction between the single unit (“1”) and its unit fraction (1/60) originally was expressed by similar but different sized D-shaped symbols: The word *gesh* and the symbol D were used to signify 1, 60 or, alternatively, 1/60.<sup>35)</sup>

31) This fraction also was applied annually in cases where only a small public charge was deemed appropriate, e.g. the storage of grain as stipulated in §121 of Hammurapi's laws.

32) Steinkeller 1981, p. 142.

33) Powell 1978.

34) Grierson 1978, p. 14.

35) This notational characteristic may help explain why the archaic term for interest was

In the final century of the third millennium, this notational usage evolved into a place system that represented both the numbers 60 and 1 by  $\nabla$  (two perpendicular wedge indentations, crossing one another like a T), much as our 1 signifies 1, 10 or 100 depending on its placement. But inasmuch as cuneiform lacked the idea of zero, the same number symbol meant 1, 60 or  $60^2$  depending on its place value. Dilke observes that "The same symbols were also used for writing fractions. So 1 can be  $1/60$  or  $1/60^2$ , and so on. . . . The result could be confusing even for the Babylonians. . . . Everything depended on the order of the wedges, reading from left to right. So  $\nabla\nabla = 11$ . But it can also equal  $601$  ( $60 \times 10 + 1$ ).  $\nabla\nabla = 2$ , but  $\nabla = 61$ ; the difference depends only on careful writing and reading."<sup>36</sup>) Readers of cuneiform economic accounts therefore had to decide on the context to know whether a number referred to a fraction or a whole integer.

### *Birth metaphors for time, numbers and interest*

Diakonoff has defined an archaic language as one which, "on the lexical level, has no or only poorly developed means of expressing abstract ideas." Sumerian is a good example. The verb meaning "to kill" is composed of the roots "club, head, break." As an archaic language, it used metaphor and metonymy to convey abstract concepts. "There are no adequate means, either lexical or grammatical, to express such abstract ideas as 'time,' 'space,' 'subject,' 'object,' 'cause,' 'beauty,' 'liberty,' 'invention,' 'multiplication,' 'division' and many others, some of which appear to us elemental, as, e.g., the distinction between 'darkness,' 'calamity,' 'illness,' and 'plain,' etc., or be-tween 'good,' 'enjoyable,' 'kind,' 'happy,' 'useful,' 'luck,' etc. . . . In the absence of means to express general ideas, one resorts to generalization by tropes (metaphors and metonymies)."<sup>37</sup>) It follows that words for economic ideas such as interest likewise would be expressed in terms of concrete images.

Bronze Age cosmologies depicted nature anthropomorphically in terms of birth cycles. For instance, the birth metaphor was applied widely to the three basic measures of time: the month, the year and the day. As living beings, they had their respective points of conception at their darkest points; the narrow sliver of the new crescent moon, the winter solstice (December 21 in modern

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"kid." A number of ancient languages viewed the small unit fraction as a miniature model of the large unit. The Latin word *as* ("pound") is cognate to Greek *heis*, "one." Each of the 12 *unciae* (ounces) was also a "one" (from *unus*, 'unity').

36) Dilke 1987, p. 11.

37) Diakonoff 1983, p. 83.

calendars, which January 1 once sought to approximate), and the darkest hour of midnight.<sup>38)</sup>

The birth metaphor also was applied to numbers and their fractional “children.” For it time had a gestation period, so did the numerical cycles used to demarcate it. Indeed, the gestation and birth process provides one of the most common metaphors of human culture. The word *metaphor* itself means literally pregnant with meaning—“to bear” (*pherein*) and “beyond” (*meta*). It thus was natural for the archaic terminology for interest likewise to be based on a birth metaphor, as interest after all is a payment for time.

Numbers were conceived in terms of gender. Seidenberg cites by way of Aristotle the Pythagorean dictum that “odd numbers are male, even numbers are female.”<sup>39)</sup> In some Australian, South American and South African societies, he points out, counting begins with two. The logic seems to be that a coupling must precede the generation of “children.” A couple composed of a man, 1 and a woman, 2, gives birth to a child, making the number 3 (“many”). This trinity of numbers can then generate the modular patterns which form the basic higher number, *e.g.*  $2 + 3 = 5$  by addition and  $2 \times 3 = 6$  by multiplication. These in turn may generate as “offspring”  $5 \times 6 = 30$  and  $30 \times 12 = 360$ .

At least as early as the Old Babylonian period c. 1800 BC, and probably even earlier, each major deity was assigned a number which was a fraction of 60. As chief of the pantheon, Anu was symbolized by the sign for “1” (or alternatively 60/60ths), and was assigned 22 “children,” that is, fractional numbers that divide roundly into 60: 30, 20, 15, 12, 10, 6, 5, 4, 3, 2 and of course 1, and their reciprocals (in our notation a half, a third, a quarter, a fifth, a sixth, a tenth, a twelfth, a fifteenth, a twentieth and a thirtieth). The Sumerians called these fractions “children of 60” or sometimes the “children of Anu.”

Commenting in Roman times on the sexual anthropomorphism of numbers, Plutarch asserted that the ancient Egyptians knew the  $3 \times 4 \times 5$  “Pythagorean” right-angled triangle and the male and female deities associated with it. The upright perpendicular, measuring 3, represented Osiris.<sup>40)</sup> The base, measuring 4, (being an even number, as well as being horizontal, as a woman was supposed to be) signified Isis. Their offspring was Horus, the hypotenuse 5, a male odd number, which the Pythagoreans called “the marriage number,” reportedly following an old Near Eastern tradition.

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38) December 21 by rights should be our January 1. But in 46 BC, for auspicious—that is, superstitious—reasons, Julius Caesar delayed January 1 in his calendrical reform so as to make the first day of the new year fall on the new moon.

39) Seidenberg 1962b, p. 2, citing Aristotle, *Metaphysics*, at 986a.

40) Plutarch *Isis and Osiris*, at 56.

Plutarch called this triangle the Nuptial Figure. It probably had a long pedigree, for  $3 \times 4 \times 5 = 60$ , the basis for the sexagesimal system, while  $3 + 4 + 5 = 12$ , the number of months in the year. Stieglitz calls this line of reasoning *mathopoeic* to emphasize the ultimately numerical character of its abstractions: “the poet might say that the ‘One’ gave birth to a ‘Female’ (= 2) and a ‘Male’ (= 3), who in turn mated and thus begot successive generations of ‘sons’ and ‘daughters’ ( $2^p3^q5^r$ ), formed in the ‘image’ of their prototypes.”<sup>41)</sup> In Sumer’s sexagesimal system, cosmological significance thus was found in the fact that  $2^2 \times 3 \times 5 = 60$ , a number generated by multiplying twos and threes to generate “offspring.”

Once the gender of numbers was established, their ability to give birth to higher series of numbers, and also to fractions, followed naturally. So did the terminology for social processes using these fractions. The birth metaphor was a familiar way of conceiving of growth by incremental units, especially when this occurred on a periodic calendrical basis. In retrospect it is easy to see why a pastoral “birth” or “calf” metaphor would seem especially appropriate. The birthing of most animals occurs at a specific time of year—hence, the association between birth and calendrical regeneration.<sup>42)</sup> Likewise in the case of interest, a “baby” unit emerges from the full-sized “parent”. A mundane corollary of this cosmology was that, to the extent that payment of debts and the accrual of interest became important social phenomena, their timing was set a key calendrical renewal points. In the case of commercial debts this was the transition from one month to the next. In the case of crop debts, payment was made annually at the appropriate New Year. In this way Sumerian debts were associated with the traditional birth metaphor for the periodic renewal of time. The monthly payment of a shekel— $1/60$ th of a mina—appeared as a newborn unit accruing each month.

In an epoch when political organization, social organization and redistribution had not yet become separated from the rhythms and periodicities of nature, the language of economic structuring was still poetic. The metonymy of the word *māš*, from offspring or birth to the interest yielded by the capital/debt relationship, established a neat formula: Interest was to capital as calves were to cattle. This explains how silver could be lent out to yield offspring. Interest

41) Stieglitz 1982, p. 257.

42) The correlation of calendrical periodicities with animal reproduction cycles is found as early as Ice Age times. Marshack 1972 describes how Magdalenian cave paintings and inscribed batons reflect such calendrical events as the local area’s mating and birthing of animals, the spawning of fish and the annual fructification of nature in general. Deer, fish and other important species to humankind at the hunting stage mate and give birth in specific seasons. (Humans are exceptional in giving birth throughout the year.)



was a payment for time, expressed in the imagery of time being born anew and of capital earning “calves” on the new moon or new year. In a similar manner, the CAD cites a proverb that making a loan is like making love; getting it repaid with interest is like having a baby. Lichtheim cites an Egyptian saying: “If wealth is placed where it bears interest, it comes back to you redoubled.”<sup>43)</sup>

This analogy appears to have emerged during the Ur III period, by which time the means of payment were silver or barley, not livestock. The word *māš* signified the small units (silver shekels) being “born” of their financial parents (*minas*). Economists will recognize here the irony noted by Aristotle nearly two thousand years later. Silver is sterile, but its metaphoric term for interest was animate. Metal itself does not give birth, only animate beings do. In an animate view of the economic cosmos, if capital increases, it does so by bearing increments. The birth metaphor must have seemed especially reasonable in cases where the increase occurs on regular periodic dates coinciding with the rebirth of calendrical time, such as the new moon or new year.

What made the reproduction metaphor seem natural was the idea of a “baby” unit fraction being “born” of the full unit, *e.g.*, the shekel from a mina. Minas invested at interest gave birth, and the shekel per mina was due at the inception of each month. Silver-interest was born like a calf, on the key calendrical date when the crescent moon (and certainly by classical antiquity the moon had become the celestial patron deity of silver), also was (re)born. Barley debts and other agrarian crop obligations were due at the end of the crop year, when the harvest was in and the yield was being weighed out on the threshing floor.

The common denominator associating all such payments was the periodicity of time. Confirmation of this principle is provided by Greek and Roman practices in the first millenium.

### *Classical Greek and Roman calfbirth terminology for the payment of interest*

If the Mesopotamian term for interest, *māš*, was not a literal reference to payment in young animals but a metaphor for the numerical accrual of interest, the next question to be addressed is whether this usage was reinvented spontaneously by classical Greece and Italy or was borrowed from the Near East.

I have argued elsewhere that the idea of interest-bearing debt was brought to Greece and Italy by Phoenician or Syrian merchants, probably in the 8th century BC.<sup>44)</sup> For if the practice of charging interest and other commercial

43) Lichtheim 1976, p. 135.

44) Hudson 1992.



procedures were not pristine indigenous developments in Greece and Italy, the calf metaphor for interest likewise is unlikely to be inherent and universal. I believe that the semantic imagery of interest was adopted from the same Near Eastern sources that pioneered in charging interest on debts.

The diffusion of social and economic practices rarely produces an exact copy, of course. The Mediterranean world c. 750 BC was much less centralized than Bronze Age Mesopotamia. Commercial enterprise was conducted mainly via family estates (the classical *oikos*) as industry and credit flowered in private hands on a smaller and less urbanized scale than that of the Bronze Age city-temples and palaces.

These facts would suggest a reduced ability to pay interest. But how was the rate set? In the case of industry, workshops were self-financed rather than funded with borrowed money. In agriculture, credit took the form of usurious "consumer" debt or tax debt under emergency conditions rather than through economic calculation. We therefore must look to noneconomic explanations of Greek and Italian interest rates.

Throughout history, consumer interest rates have been higher and more diverse than commercial rates. Yet when the annual rate of barley interest settled at  $33 \frac{1}{3}$  per cent in Ur III, this was roughly consistent with what the land was able to yield, less the amount needed for the cultivator to feed his family and pay for seed, water, plows, animals and other inputs. But in the uninviting and rocky soil of Attica, the *hektemoroi* ("sixth-parters") of the late 7th century BC could pay no more than one-sixth of the crop, and even at that rate many cultivators fell into debt servitude. (Matters were saved after Solon by local restrictions against alien ownership of the land. This prevented foreign bankers from foreclosing, by blocking a smoothly functioning land market from emerging.)

As in Sumer, part of the explanation probably lies with the temples, although in a different way. Classical Greek and Italian temples were not the entrepreneurial centers that their Sumerian predecessors had been, but they did play an important economic role. For one thing, they served as embassies for travelling merchants. (The sanctification of mercantile trade, protection of travelling merchants and creation of "neutral" zones seems to date at least from the neolithic.) And throughout the Greek world, for centuries before interest is attested as such, a tithe (*dekate*) of military booty typically was turned over to the temples.<sup>45</sup> Such offerings extend back at least to the Dark Age (1200-750 BC), as attested by the treasuries of Greek cities built at the sacred amphictyonic centers.

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45) Pritchett 1971, pp. 93ff., with bibliography.

The two major sources of public revenue in classical antiquity were the do-nation of war booty and votive offerings, although neither were as regularized as was the Mesopotamian receipt of commercial interest and crop-rent. Probably the Greek tithe contributed out of military booty was not yet levied on commercial income, inasmuch as such income had not yet come into being in subsistence economies. (As Thucydides pointed out, piracy was still viewed as an honorable form of commerce and indeed, its most characteristic form.) But as the Hellenic commercial flowering occurred, the *dekate* seems to have evolved into the normal rate of interest paid on deposit banking.<sup>46)</sup>

Without large public institutions having to support dependent labor, there was little need for a fractional monthly notation composed of 30ths, 60ths or other such calendrical measures. Already in their Linear B records the Mycenaean Greeks are found using a decimal system, probably reflecting Egyptian influence via Crete. Here, too, an important underlying principle shaped the early charging of interest. As in Mesopotamia, Mediterranean interest rates were correlated with their fractional counting systems. And although it is theoretically possible in that the Greeks hit upon this practice independently, this seems unlikely.

The linkage of Athenian debt practice to the periodicities of time was reflected in counting the days of the month backwards from midmonth or the third decade of the month (that is, the 20th). This indicated the number of days remaining before periodic obligations such as personal debts and rents fell due on the new moon (*i.e.* at month-end, as with many debts in modern society). Merritt cites a scholion to Aristophanes' *Clouds* in which Strepsiades declaims:

The fifth, the fourth, the third, and then the second,  
And then that day which more than all the rest  
I loathe and shrink from and abominate,  
Then comes at once that hateful Old-and-New day,

the day when his debts were due.<sup>47)</sup> (Ancient historians attributed this practice to Solon, but he may merely have systematized it.)

Calendrical practices likewise seem to have helped shape Italian temple traditions and contributions, and indirectly to have influenced Roman interest rates. Just as the copper *as* (pound) was divided into twelve *unciae* (the origin of the modern troy ounce system), so the XII Tables tradition set the legal rate of interest at 1/12th per year—a “baby” fractional unit being paid as interest on each large or “full” unit.

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46) Bogaert 1968.

47) Merritt 1961, p. 40, citing Aristophanes' *Clouds*, line 1131.

The basic idea continued into the Byzantine epoch. Jones reports that “Justinian (Nov. xxii, xxxiii, xxxiv, 535) found it necessary to give special protection to small holders in Thrace and Illyricum against lenders of money or of corn. He limited the annual rate of interest to one *siliqua* in the solidus (or slightly over 5 per cent) on money loans, and one-eighth (or 12 1/2 per cent) on loans in kind, and enacted that if this were paid with the original debt, the lender must restore the land or stock which he had seized. The lenders were, it appears, mainly officials, probably collectors of taxes or arrears, who made a practice of converting the obligation to the state into a private bond to themselves.”<sup>48</sup>) This observation shows how lasting and influential Mesopotamian economic relations remained even after an interval of some three thousand years.

The irony is the fact that the Latin term for loan interest was *fœnus*. Its prefix (*fe-*) connoted the idea of fecundity, much as the Greek word for interest/usury, *tokos*.<sup>49</sup>) Aristotle noted that unlike cows which reproduce themselves, metallic money lent out by usurers is sterile. This barrenness of metal is the central problem of usury: Interest is demanded on the basis of money-loans whose proceeds are not invested productively, much less at sufficient profit to pay the rates demanded by usurers. For good reason, Aristotle observed, the most hated form of money-making “is usury, which makes a gain out of money itself, and not from the natural use of it. For money was intended to be used in exchange, but not to increase at interest. And this Usury, which means the birth of money from money, is applied to the breeding of money, because the offspring resembles the parent.”<sup>50</sup>) By classical times most debt had become sterile consumer usury at the expense of insolvent peasants and the usual scattering of profligate aristocrats.

The monopolization of money and land in the hands of creditors found its counterpart in the descent of large numbers of cultivators into debt bondage. This produced the ultimate irony when Roman writers depicted usury in a manner diametrically opposite from the meaning of its root-words. When Livy reconstructed Rome’s debt revolt that had led to the abolition of nexum bondage in 326 BC, he portrayed the crowd rioting to protest an old homosexual usurer, Lucius Papirius, abusing an attractive boy left in his charge as a debt pledge, regarding “the boy’s youthful bloom as added interest on his loan.”<sup>51</sup>)

48) Jones 1992, vol. II, p. 775.

49) Neither the Greek nor Romans distinguished between the ideas of interest and usury. The choice of just which modern term to use for *tokos* and *fœnus* thus reflects more the ideology of the translator than something inherent in the Greek or Latin language.

50) Aristotle, *Politics*, Book I at 1256 (Jowett’s translation).

51) Livy, VIII.28.

There are sound historical reasons why usurers through the ages have been portrayed as Shylocks or old men without families, typically outsiders. Ancient bankers frequently were money changers, often aliens who had left their families behind—Near Easterners in Greece, Greeks and Phoenicians in Etruria, and just about everybody in second-century BC Delos. At the end of this long line of development, when Philip IV staged public show trials against Europe's major banking order, the Knights Templar in early 14th-century France, he accused them of sodomy as well as apostasy. Their persecution thus embodied what already had become the traditional stereotype of the usurer through Dante in his *Inferno*, a *topos* inverting the early calf and birth metaphors to reflect a harsh and sinister sterility.

Creditors often broke up families by taking away their servant girls, daughters, sons or mother as debt pledges, while they themselves refrained from marrying in order to keep their own family fortunes intact. In effect, they became servants of their own wealth. The *naditu* heiresses of the Old Babylonian period lived in temple precincts in order to invest their families' money rather than marry and convey it out of their clan. Today, four thousand years later, one need only read Henry James's *Washington Square* or the novels of Charles Dickens and Honorée de Balzac to find psychological survivals of this literal barrenness of wealth.

### *Some consequences of "uneconomic" interest rates*

Commercial credit seems to have preceded agrarian interest-bearing debts. Mercantile interest rates were lower and remained more uniform. Merchants evidently believed they could make a trading profit sufficient to repay their backers. Partly, this was because they were protected by various stipulations providing that their debts would be annulled in the event of robbery, piracy, or loss of their boats. But no such protection was offered to cultivators. Even classical antiquity's lower rates proved too high for many cultivators to meet in times of drought or infestation, crop failure, warfare and military call-ups, or in the event of the cultivator's own ill health. To maintain economic balance under these conditions, barley debts periodically were cancelled throughout the Old Babylonian period; commercial silver-debts, however, were left intact.

Usury became the major force polarizing ancient society as credit passed out of the hands of public institutions into those of private households. By classical Greek and Roman times, no palace rulers were left to cancel agrarian debts and otherwise keep creditor power in check. Thus, what seems to have begun as justifiable debt in third-millennium Mesopotamia evolved into classical usury. Its corrosive dynamics polarized ancient society more than any other factor,

destroying the archaic social balance between rich and poor, mercantile creditors and cultivators, despite the nominal decline in interest rates.

The power of creditors increased in the face of declining royal authority. Although the normal lending rate declined from Bronze Age Mesopotamia through classical Greece and Rome, creditors were able to render irreversible the forfeiture of land and personal freedom which debtors traditionally had been obliged to pledge as a condition for obtaining loans. In sum, what is first documented in Sumer is a revolutionary institution, revolutionary in that interest-bearing debt ended up by inciting populations to revolution at the end of antiquity, in the second and first centuries BC throughout the Romanized Mediterranean world.

### Summary

1. Although ancient economies were predominantly agricultural, the practice of accruing interest seems to have been first invented in the commercial sphere of Sumer, apparently with the temples playing a catalytic role.

2. The terms *máš* in Sumerian and Akkadian, *tokos* in Greek and *fœnus* in Latin signified a young animal, and hence the idea of birth. (*Sibtum* connotes the kindred idea of “that which is added.”) But rather than deriving from the pastoral economics of herding and referring to the birth of animals literally, these terms referred to the periodic accrual or “birth” of the local unit fraction. The process started in third-millennium Sumer and diffused over about two thousand years to classical Greece and Italy, whose interest terminology appears to have followed that of Mesopotamia.

3. Mesopotamia’s commercial rate of 1/60th per month aimed at achieving a numerical ease of computing interest regularly at standardized rates. This basic rate found its counterpart in other regions—1/10th in Greece, and 1/12th in Rome, reflecting their respective systems of calculating fractions.

It follows that economists trying to explain the secular decline in interest rates on “economic” grounds are following a false trail. The apparent chronological decline in these interest rates was an accidental byproduct of the numerical fraction system in each region, rather than reflecting economic rates of return or the debtor’s shrinking ability to pay.

4. Interest rates in the commercial and agricultural spheres remained segregated throughout most of antiquity. Rates for agrarian debts tended to reflect land rents. (In Sumer’s case, this was the sharecropping rate.) Rents and agrarian interest rates both tended toward a norm of 1/3 by Ur III times, but there was more local variation in agriculture than in the commercial sphere.

5. Although commercial lending did not seem to cause major society-wide

problems, but agrarian rates were above the “economic” rate that many cultivators were able to pay. Unlike the case in most countries today (although not in Germany), personal bankruptcy was not available as a means of extracting oneself from debt. The normal resolution of debt problems was to lose one’s family members and land-rights, until such time as the ruler might proclaim an agrarian debt cancellation. But such Clean Slates became less frequent after the Middle Bronze Age. Interest-bearing debt without such royal cancellations led to economic polarization of the Babylonian, Greek, Roman and Byzantine economies.

6. There seems to have been a long tradition of considering the loan to be amortized when its interest payments had fully reproduced the principal. A hint of this idea is found in Hammurapi’s law (§117) liberating bondsmen after three years of service. His choice of three years may reflect the fact that agricultural interest rates typically were 1/3 per year. In three years the value of the crop payments or personal services provided by the debt-pledge would have repaid the original debt. Two thousand years later, Justinian’s laws explicitly considered the debt was to have been paid off once the interest paid by cultivators had equaled to the initial principal.<sup>52</sup>) This ruling seems to reflect a long-standing Roman practice.

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52) See Noonan 1957, pp. 39-41 and Grice-Hutchison 1978, p. 29, citing *Codex* 4:32:3; *Institutions* 3:14:2; *Digest* 12:1:2:1; 13:6, f. 3, n. 6 and f.4; 44:7:1:4; 50:16:121.

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