

**WHO CREATES WEALTH?
STORY OF MATHS BEHIND
ITS CONCENTRATION**

How interest on loans arose

The earliest justification to collect interest on a loan comes from a Sumerian record.

Here a judge gives a ruling that interest is to be given when a seeds are borrowed from a neighbor.

Because seeds or animals reproduce themselves .and the person who has lent them has to be given a share.

In later years this justification was the norm when money was given as a loan.

Laws of ESHNUNNA

Earliest record are TABLETS OF ESHNUNNA CODE where punishment for false distraint is encoded.

DISTRAINT is taking possession of ones property when a loan is not paid.

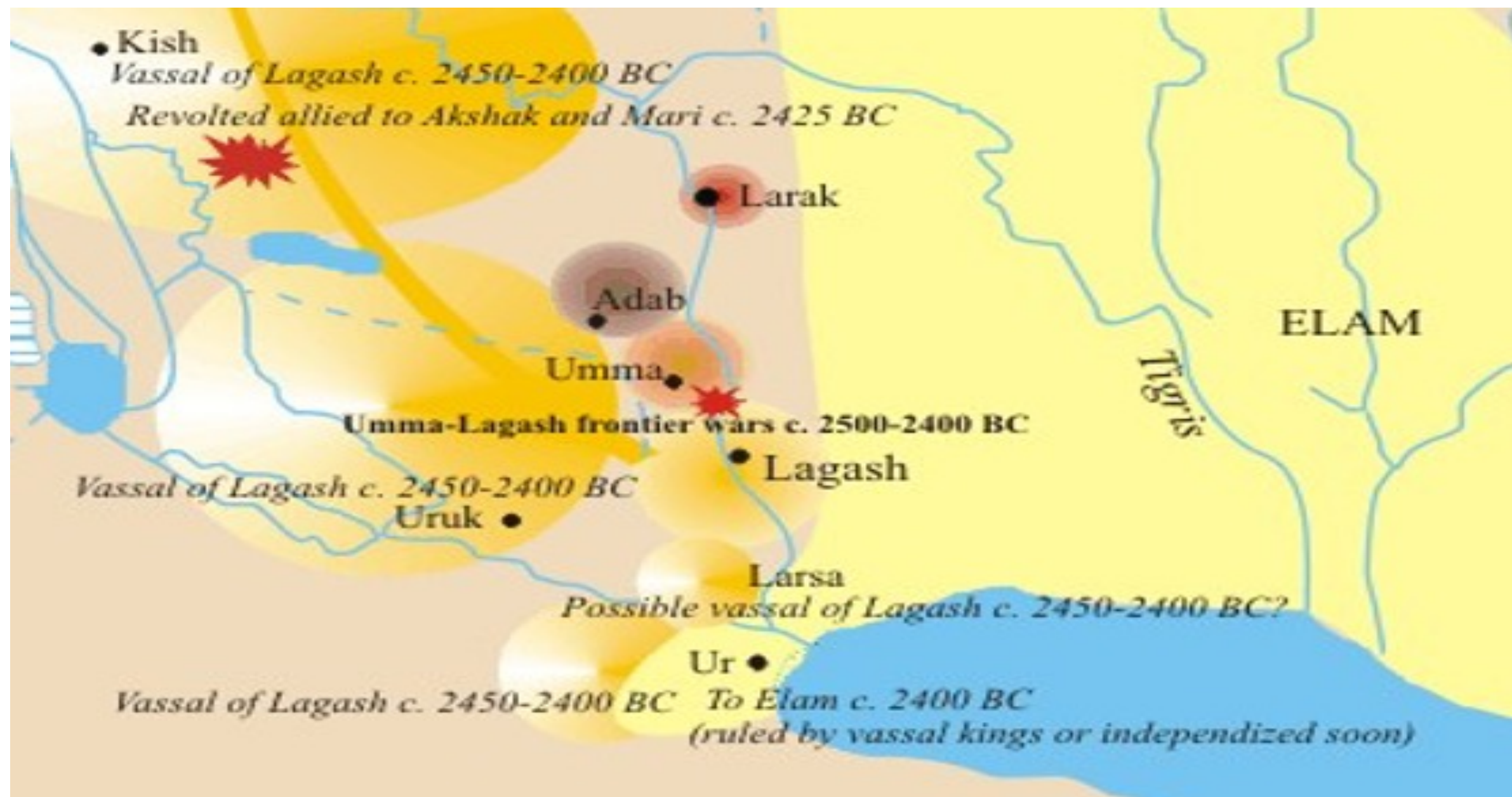


PAINTING SHOWING EXECUTION OF DISTRAINT (1843)



COMPOUND INTEREST

- **Umma was the "neighbour and antagonist" of Lagash due to competing claims over water sources and the supply of water.**
- **Lagash and Umma were two Sumerian city-states located 18 miles (29 km) apart.**
- **The two cities had begun disputing over a fertile area called Gu-Edin or the 'Edge of the Plain', which led to a border treaty dating back to 2550–2600 BCE drawn up by King Mesilim of Kish (though perhaps the agreement is as old as 3100 BCE).**



COMPOUND INTEREST

- **Around 2400 BCE, Entemena or Eannatum king of Lagash, had a marble pillar (the Stele of the Vultures) erected to establish a border between the warring city states of Lagash and Umma and stake his claim to the territory.**
- **He "set aside a fallow strip of land on the Umma side of the boundary ditch as a no-man's land".**
- **The king of Umma was required to swear an oath to multiple gods and the Lagash king, and to promise not to push into their lands.**
- **The Cone of Entenema offers additional records on this war.**
- **The losses for Umma were probably 100–200 (the majority of their army) while Lagash casualties were minimal.**

However, Umma began encroaching on Lagash's territory which reignited the dispute and led to a war. The war began around 2450 BCE.

Aspects of the war were documented and preserved on historical objects like the Stele of the Vultures, as Sumerian scribes had begun writing with cuneiform and clay tablets 1000 years earlier.

Stele of vultures settlement claims with
interest



Entemena Ensi Lagash-ki"

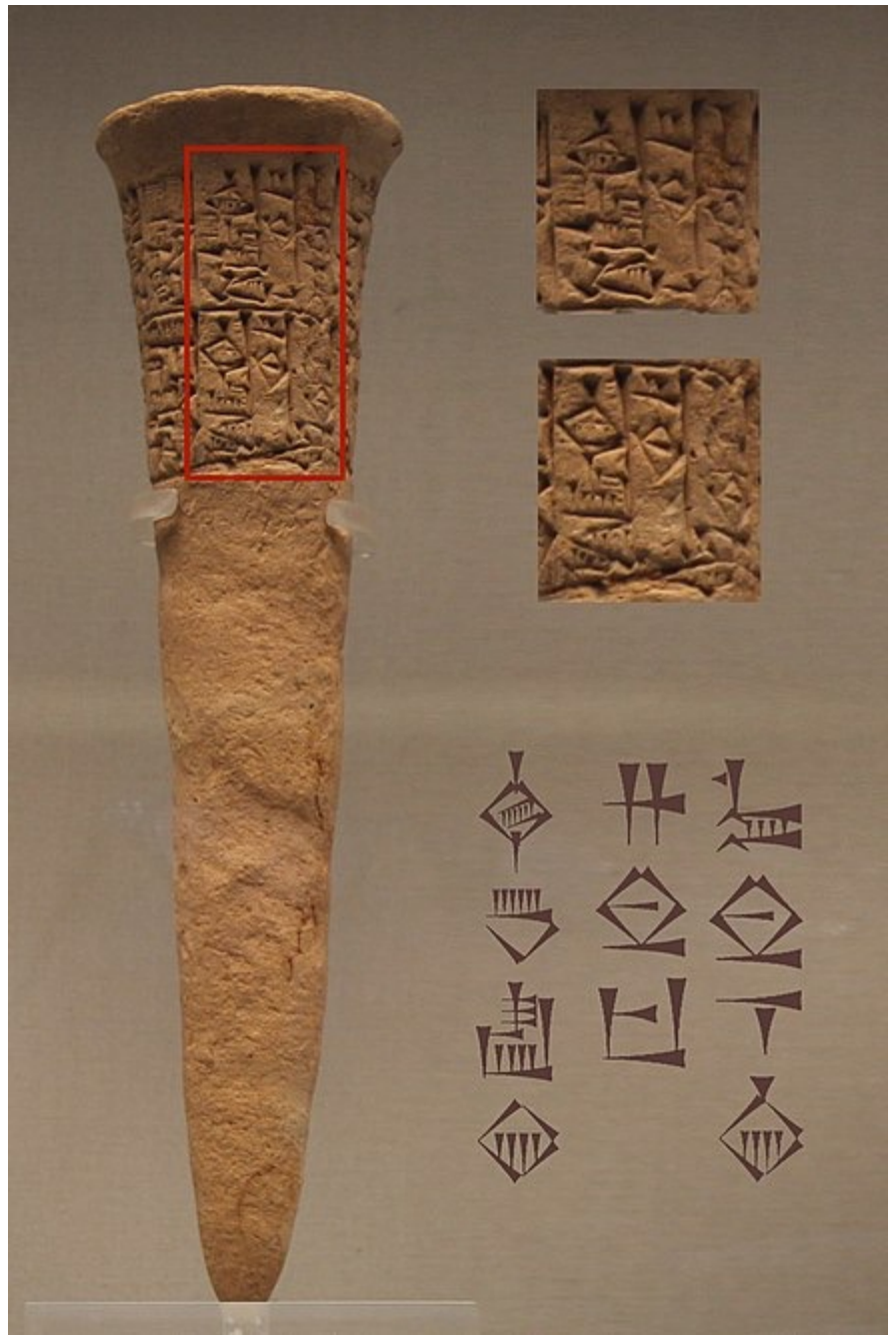
Foundation cone of Entemena, king of Lagash , found in the temple of the god of Bad-Tibira, Dumuzi,

- .I mentioning the peace treaty between Lagash and Umma.

In this treaty the compensation for the war is calculated.

this is the first available record of compound interest

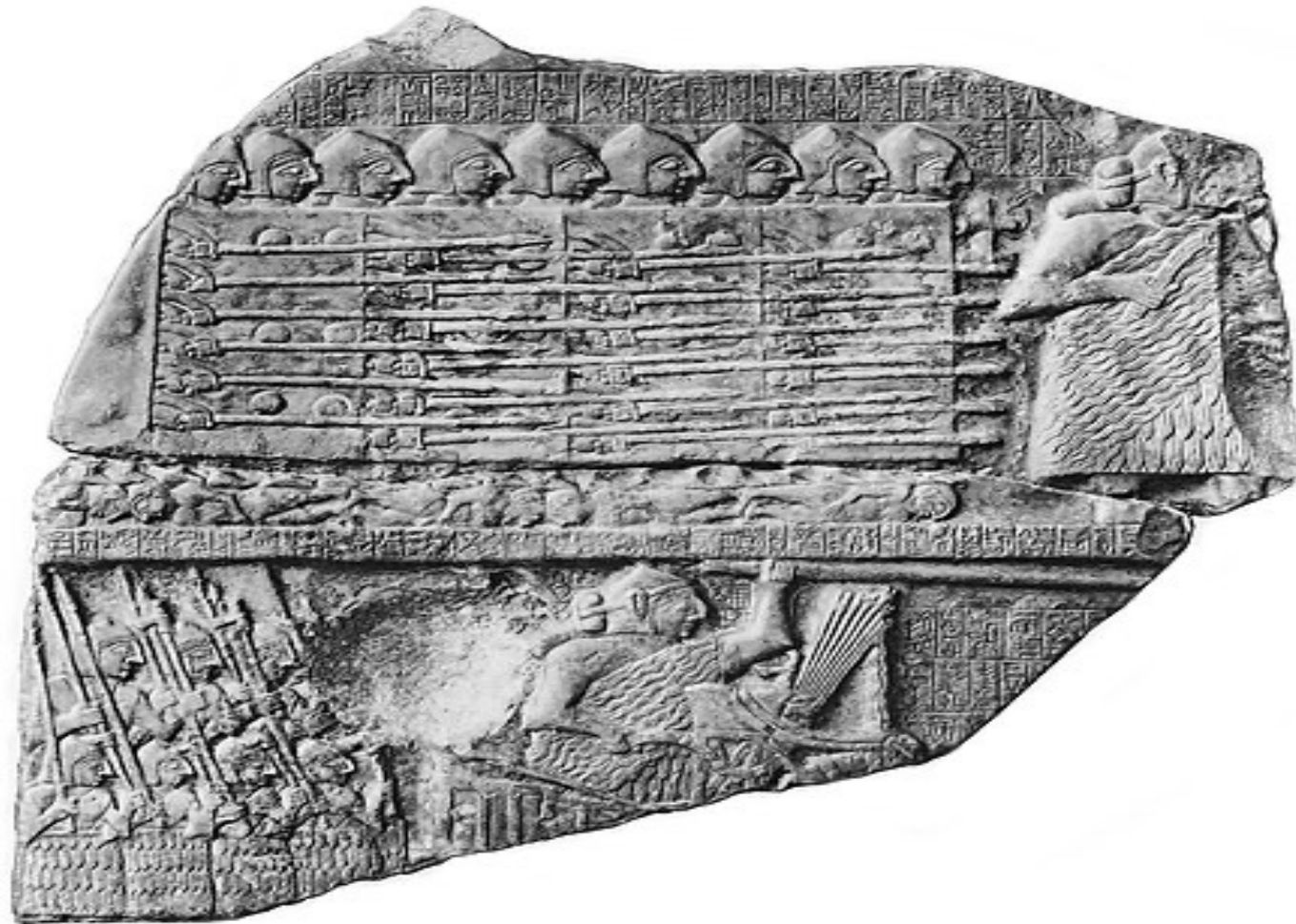
This text is the oldest known mention of a diplomatic document (about 2400 BC). In British Museum .



**According to the following passage inscribed on the
Cone,
Lagash had lent a large amount of barley at interest
to Umma,
but Umma did not repay**

**This is what is recorded on the foundation clay
cone of his new temple**

COMPOUND INTEREST TABLET



the loan:

21. 1 gur7-am6

22. lú Ummaki-ke4

23. ur5-šè ì-kú

24. kud-rá ba-ús

25. 4 šar'u-gal gur7

26. ba-ku4

1 gur7 (of barley)

1 gur7 (of barley)

the man of Umma got an
interest-bearing loan (from
Lagash).

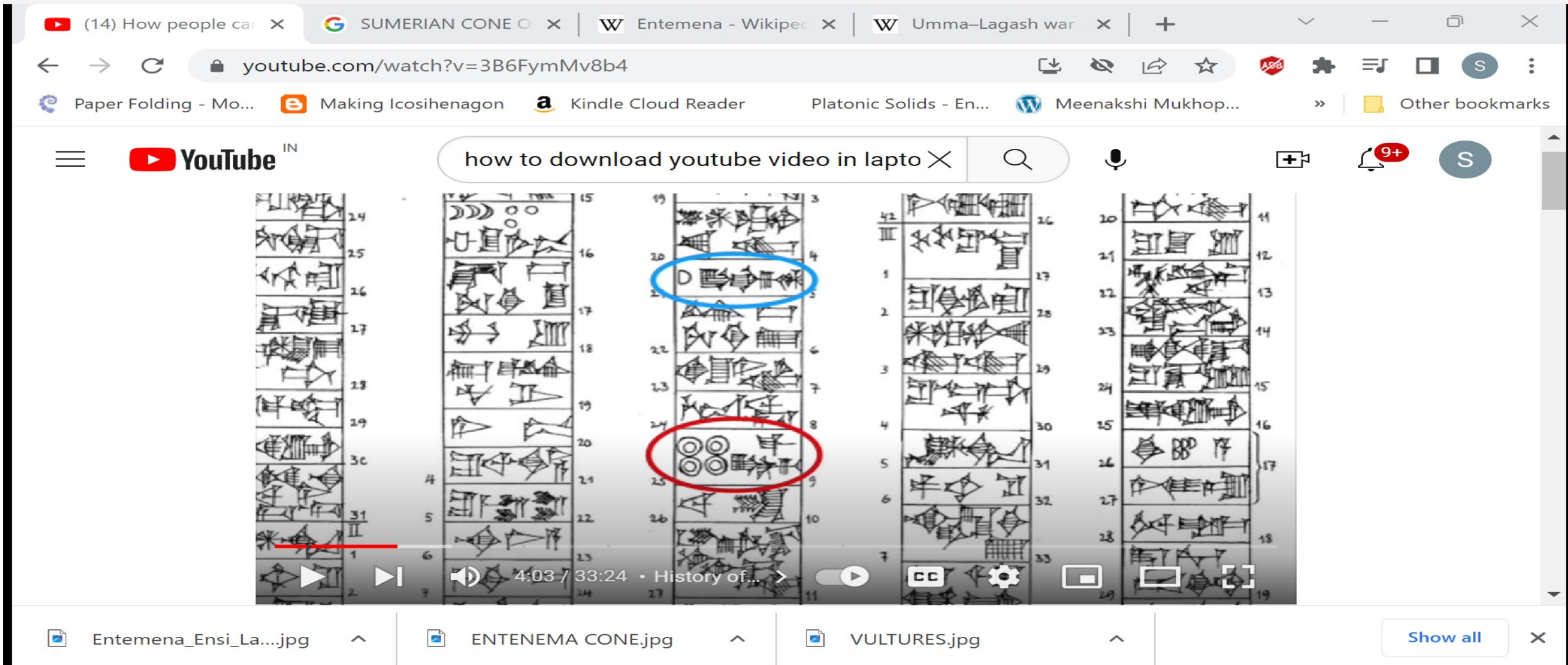
The decision followed.

(The principal and interest)
became

40,0,0,0 (sìla, whose order is)
gur7.

COMPOUND INTEREST one guru at 33 1/3%
amounts to 8.64 million guru

YouTube player interface showing a video titled "how to download youtube video in lapto". The video content displays a grid of Sumerian cuneiform tablets, with two specific tablets circled in red and blue. The video progress bar shows 4:03 / 33:24. The browser tabs include "SUMERIAN CONE", "Entemena - Wikiped", and "Umma-Lagash war". The bottom of the screen shows a file explorer with images: "Entemena_Ensi_La...jpg", "ENTENEMA CONE.jpg", and "VULTURES.jpg".



Sumer and the custom of compound interest was handed down to the Babylonians.

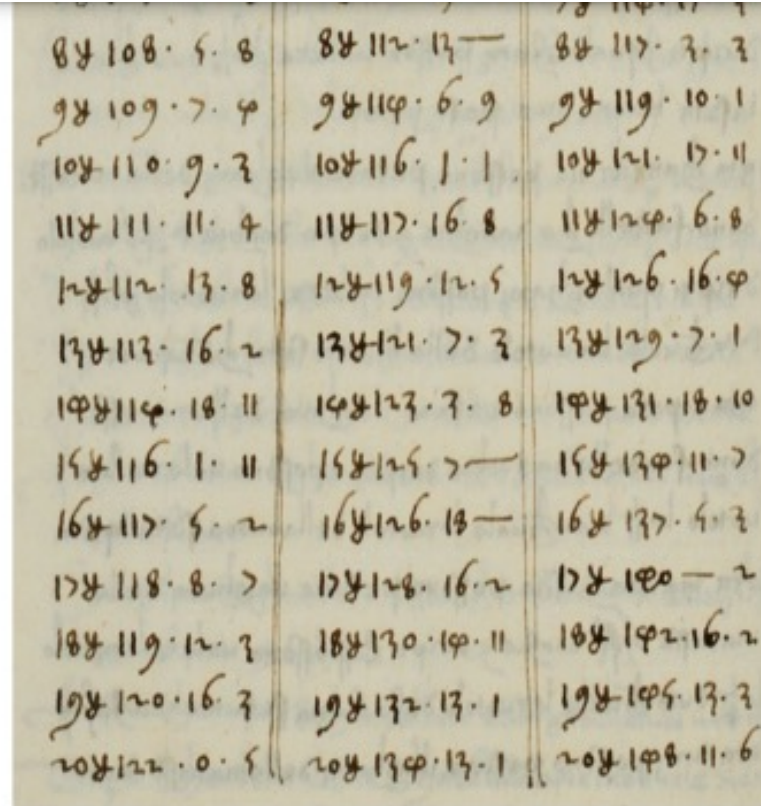
It may be a surprising fact for us that at this early time the Sumerians had already invented what shows both human beings' rational mind and greediness, that is, compound interest.

As to its negative aspect, the Babylonians warned of borrowing money easily by their proverbs written in Sumerian, for example.(11)

ama ír-še8-še8 [--- --- ---] ur5-ra bí-íb-kú-en

“A weeping mother [said to her son (?)] ‘You are swallowed up in debt.’”

THE EARLIEST RECORD OF COMPOUND INTEREST IS FROM AGE OF RENAISSANCE



88 108. 5. 8	88 112. 13. —	88 117. 3. 3
98 109. 7. 4	98 114. 6. 9	98 119. 10. 1
108 110. 9. 3	108 116. 1. 1	108 121. 17. 11
118 111. 11. 4	118 117. 16. 8	118 124. 6. 8
128 112. 13. 8	128 119. 12. 5	128 126. 16. 4
138 113. 16. 2	138 121. 7. 3	138 129. 7. 1
148 114. 18. 11	148 123. 7. 8	148 131. 18. 10
158 116. 1. 11	158 125. 7. —	158 134. 11. 7
168 117. 5. 2	168 126. 13. —	168 137. 4. 3
178 118. 8. 7	178 128. 16. 2	178 140. — 2
188 119. 12. 3	188 130. 14. 11	188 142. 16. 2
198 120. 16. 3	198 132. 13. 1	198 145. 13. 3
208 122. 0. 5	208 134. 13. 1	208 148. 11. 6

Figure 1. The earliest compound interest tables known (extract). Pegolotti's interest tables for 1%, 1½% and 2%, reproduced by permission of the Riccardian Library from Ricc. MS 2441, f. 191v. (The heading is the three lines of text immediately above the tables and they follow on from text on the same page relating to the previous subject, showing that the tables form an integral part of the manuscript).

88 108. 5. 8	88 112. 17. —	88 117. 3. 3
98 109. 7. 4	98 114. 6. 9	98 119. 10. 1
108 110. 9. 3	108 116. 1. 1	108 121. 17. 11
118 111. 11. 4	118 117. 16. 8	118 124. 6. 8
128 112. 13. 8	128 119. 12. 5	128 126. 16. 4
138 113. 16. 2	138 121. 7. 3	138 129. 7. 1
148 114. 18. 11	148 123. 7. 8	148 131. 18. 10
158 116. 1. 11	158 125. 7. —	158 134. 11. 7
168 117. 5. 2	168 126. 18. —	168 137. 5. 3
178 118. 8. 7	178 128. 16. 2	178 140. — 2
188 119. 12. 3	188 130. 14. 11	188 142. 16. 2
198 120. 16. 3	198 132. 13. 1	198 145. 13. 3
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AN EARLY BOOK ON COMPOUND INTEREST
RICHARD WITT'S *ARITHMETICALL QUESTIONS*

BY

C. G. LEWIN, F.I.A., F.S.S.

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for Questions of 10. *per Cent.*

The fourth Breuiat, shewing what Annuity for any
Number of yeares vnder 31. 1^{li}. ready
money will buy.

<i>Yeares.</i>		<i>Yeares.</i>	
1	11000000	16	1278166
2	5761905	17	1246641
3	4021148	18	1219302
4	3154708	19	1195468
5	2637974	20	1174596
6	2296073	21	1156243
7	2054055	22	1140050
8	1874440	23	1125718
9	1736405	24	1112997
10	1627453	25	1101680
11	1539631	26	1091590
12	1467633	27	1082576
13	1407785	28	1074510
14	1357462	29	1067280
15	1314737	30	1060792

The Numbers, in this Breuiat, must also bee esteemed for Numerators; each of them hauing for Denominator 10000000.

1520. So in other 1520.

End of this number of years till 30 is worth in ready money at 8 in 100 year.

3. years	li	s	d	q
1.	0.	18.	6.	0.
2.	0.	17.	10.	3.
3.	0.	15.	1.	2.
4.	0.	14.	8.	1.
5.	0.	13.	7.	1.
6.	0.	12.	7.	0.
7.	0.	11.	8.	0.
8.	0.	10.	9.	2.
9.	0.	10.	10.	0.

Let for 15 in 100 per annum
mathematically for each of 100 years

End of this number of years till 30 is worth in ready money after 8 for a hundred per annum.

4. years	li	s	d	q
1.	0.	18.	6.	0.
2.	1.	15.	7.	3.
3.	2.	11.	6.	2.
4.	3.	6.	2.	3.
5.	3.	19.	10.	1.
6.	4.	12.	5.	1.
7.	5.	4.	1.	2.
8.	5.	14.	11.	0.
9.	5.	14.	12.	0.

Let for 25
mathematically for each of 50 years

- Compound interest was known in ancient civilisations, though we are not aware of it having been studied mathematically.
- In the Middle Ages, many everyday lending transactions were based on simple interest, usually for periods not exceeding 2 years; the lack of compounding was due partly to the need for ease of calculation and partly to religious reasons, but mainly to the fact that for these short durations compounding would have made little difference.
- Even though medieval banks could not (for the most part) charge individual borrowers interest, and it is even less likely that they would have been allowed to compound any interest which was charged, nevertheless the banks were very proficient in compound interest and had tables of it. This was because commercial transactions between merchants tended to be subject to fewer restrictions and compounding may have sometimes been permitted for longer-term loans designed to finance trade. Moreover, a sum set aside in a pool for short-term loans at simple interest to a number of borrowers in turn could earn the bank the equivalent of a compound interest return.
- The main question in which medieval lenders were interested was how much a sum could accumulate to at a particular rate of compound interest. They also wanted to find out the rate of interest implied in a transaction of which the terms were known, possibly so that they could compare it with a “hurdle” rate of interest which had to be reached before they would go ahead.
- Individual merchants would probably have been interested in using compound interest techniques to ascertain the rates of return they had made from their various loans and trading ventures.

IN SUBSEQUENT CIVILIZATIONS THE IDEA OF
COMPOUND INTEREST CAUGHT ON.
BUT EVERY RELIGION CONDEMNED IT.

BUT IN MODERN TIMES THE FORMULA FOR
COMPOUND INTEREST IS CALLED AS WEALTH
CREATION FORMULA

$$\left(1 + \frac{1}{n}\right)^n$$