Then and Now

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Introduction

- The textbooks for the last 200 years have remained the same algebraically in many ways, but not in presentation.

- The word problem has slowly lost it's importance and changed on when it is to be used.

- The developments of the their era is reflected in new ideas and how the child is taught.

- The subjects and what is consider for a child to know to be useful in that era has changed.

A Brief Glimpse of Evolution

1800 - 1830: Textbooks consisted of one copy and it was in the teacher possession.

There were texts book written for Men and Women in England and these texts were export and used in the States, too. The text being gender specific continued through most of the nineteenth century.

1840 - 1860: Most texts were revised copies of material from 1830. Some texts from these period were even used in some cases all the way up into the 1930's.

Sewing Machines and Cloth manufacture were showing up on the texts day.

A Brief Glimpse of Evolution

1860-1865: The Civil War Era did not have much production in the way of Math books. The texts were repeatedly used from the era before.

1865-1880: Many of the same concepts are still kept. The industrial age becomes apparent with the use of industrial scene for visual enhancement and word problems about industry and railroad.

1880-1900: Texts became less gender specific.

Simple texts were becoming a trend.

Pictorials became a very common necessity in the development of more concepts and ideas.
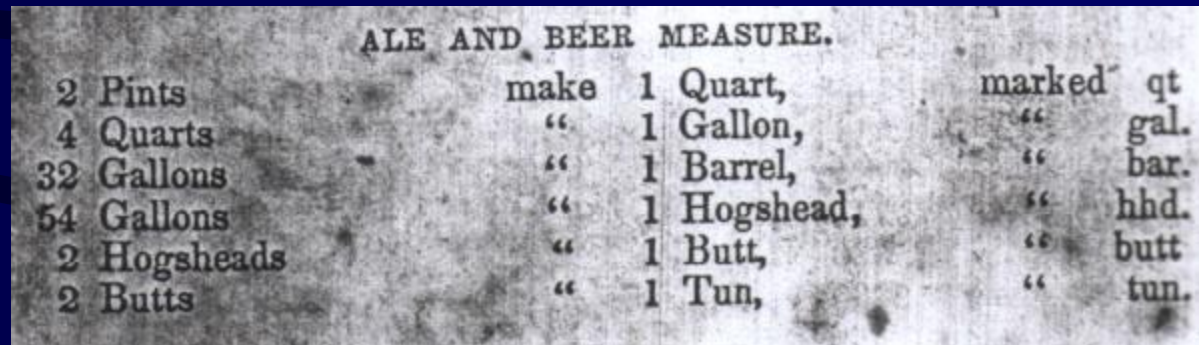
Similarities

- **Addition, Substraction, Multiplication, and Division of numbers, fractions, simple and complex equations have been presented and taught in Arithmetic and Algebra the way the are today with the exception of simplicity.**

- **Binomial Theorem with the aid of Pascal's triangle was used in Algebra to expand polynomials as it is used to do the same today.**

- **Compound Interest, stock, and annuity problems in both Arithmetic and Algebra.**

- **Conversations of different types: monetary, measures, weights, etc….**

Differences

1) Terminology,
   language, and Methods

2) Visual

ALE AND BEER MEASURE.

2 Pints	make	1 Quart,	marked	qt
4 Quarts	"	1 Gallon,	"	gal.
32 Gallons	"	1 Barrel,	"	bar.
54 Gallons	"	1 Hogshead,	"	hhd.
2 Hogsheads	"	1 Butt,	"	butt
2 Butts	"	1 Tun,	"	tun.

3) Word Problems

Terminology, Language, and Methods

- The some of the terms of yesteryear have gone out of use a few are
  - Vulgar fraction - simple fraction
  - Incommensible number - irrational number
  - Involution - rising number to the exponent
  - Evolution - extracting a root

Terminology, Language, and Methods

- The language is slightly different to:
  - "hitherto" is used in the first part of the nineteenth century
  - the explanation were in a more adult tone instead of learner friendly
  - simplicity of terms and language developed in the late 1870's and early 1880's.

Terminology, Language, and Methods

Methods

Logarithms were taught by hand and a table was given for first twenty or so usually in a book. The logs are probably one of the last methods to go into obscurity.

Division for example was set in a different way as many of the symbols were.

$$
\begin{array}{r}
\textit{Divisor} \quad \textit{Dividend} \quad \textit{Quotient} \\
4)\,95307\,(23826 \\
8 \\
\hline
15 \\
12 \\
\hline
33 \\
32 \\
\hline
10 \\
8 \\
\hline
27 \\
24 \\
\hline
\textit{Remainder } 3
\end{array}
$$

Visual Stimulation

- Visual were not as usual part of the textbooks until about 1850.

- The pictorials which were used, usually, had scenes of the period, showed a man at some task, or a town scene.

- Visual aids used in the enhance of understanding a concept or problems were not used, frequently, until 1880.

- Some trends of what aids to use are still in fashion today and others built what is in today's texts.

Visual Stimulation (Cont.)

- Visuals were more frequent in Arithmetic that Algebra texts.

- The visuals in algebraic texts were usually for certain problems or to convey a concept as the ball visual used in explaining series.

- The visuals have several categories:
  - **Chart**
  - **Tables**
  - **Pictures**
  - **Aids**

Visuals Categories

- Charts
  - **usually consisted of traveling subject, compound interest for a number of years, longitude and latitude, percents of life insurance, etc…**

118. DIFFERENCE IN TIME BETWEEN N. Y. AND THE FOLLOWING PLACES.

F. representing fast, and S. slow.

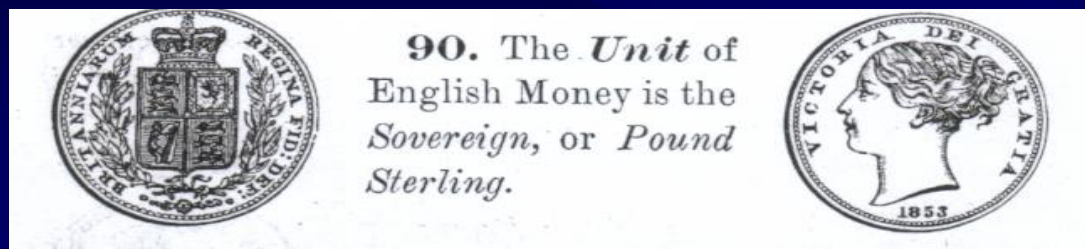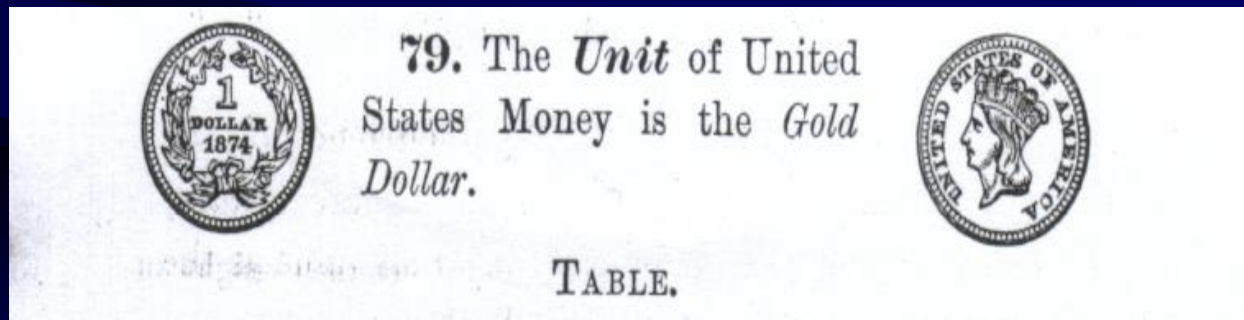| Place.	New York. hr. min. sec.	Place.	New York. hr. min. sec.
Albany, N. Y.	1 1 S.	Jefferson City, Mo.	1 12 32 S.
Augusta, Ga.	41 31 "	Lima	12 24 "
Austin, Texas	1 34 36 "	Lisbon	4 19 24 F.
Baltimore, Md.	10 27 "	Liverpool	4 44
Bangor, Me.	20 57 F.	Little Rock, Ark.	1 12 48 S.
Boston, Mass.	11 46 "	Louisville, Ky.	46 "
Berlin	5 49 35 S.	Macon, Ga.	38 30 "
Beaufort, N. C	10 38 S.	Madrid	4 41 52 F.
Buffalo, N. Y.	19 56 "	Marseilles	5 17 28 "
Bombay	9 47 36 F.	Mexico	1 40 20 S.
Bremen	5 31 16 "	Milwaukie, Wis	55 36 "
Buenos Ayres	1 2 32 "	Mobile, Ala.	56 6 "
Calcutta	10 49 20 "	Montreal, C. W	1 49 F.
Canton	12 28 56 "	Moscow	7 18 12 "
Cairo, Egypt	7 1 12 "	Naples	5 53 4 "
Cape Horn	36 56 "	Nashville, Tenn	51 16 S.
Chicago, Ill.	54 31 S.	New Orleans, La.	1 4 10 "
Cincinnati, Ohio.	41 58 "	New Haven, Conn	4 18 F.
Charleston, S. C.	23 43 "	Ottawa, C. W	6 48 S.
Cleveland, Ohio	31 24 "	Paris	5 20 F.
Concord, N. H.	10 4 F.	Pekin	12 41 52 "
Cape of Good Hope	6 9 55 "	Palermo	5 49 28 "
Constantinople	6 51 56 "	Philadelphia, Pa	4 34 S.
Copenhagen	5 46 16 "	Prairie du Chien, Wis.	1 8 34 "
Detroit, Mich.	36 10 S.	Providence, R. I.	10 24 F.
Dubuque, Iowa	1 6 40 "	Quebec, C. E.	11 11 "
Dublin	4 30 38 F.	Rio Janeiro	2 3 24 "
Edinburgh	4 42 12 "	Rome	5 45 48 "
Florence	5 41 4 "	Richmond, Va	13 43 S.
Fort Leavenworth, Kans.	1 22 56 S.	Rochester, N. Y.	15 24 "
Frankfort, Ky	42 40 "	Salt Lake City, U. T.	2 32 24 "
Galveston, Texas	1 22 8 "	San Francisco, Cal.	3 13 47 "
Genoa	5 31 32 F.	Santa Fé	2 8 5 "
Geneva	5 20 37 "	Sydney	5 9 32 "
Gibraltar	4 34 32 "	Suez	7 6 16 F.
Glasgow	4 38 56 "	St. Petersburg	6 57 16 "
GREENWICH	4 56 "	St. Helena	4 33
Halifax, N. B	41 40 "	St. Louis, Mo.	1 5 1 S
Harrisburg, Pa	11 20 S.	St. Paul, Minn	1 16 20 "
Havana, W. I	33 25 "	Tallahassee, Fla.	42 24 "
Hamburg	5 35 52 F.	Toronto, C. W	21 33 "
Havre	4 55 36 "	Venice	5 53 4 F.
Indianapolis, Ind	48 20 S.	Vienna	6 1 32 "
Jackson, Miss.	1 32 "	WASHINGTON, D. C	12 1 S.
Jeddo	14 16 F.	Wheeling, W. Va	26 48 "
Jerusalem	7 25 20 "		

Visual Categories (Cont.)

- Tables
  - usually consisted of monetary conversions, weights and measures, standard scales, and other scales used in business and other useful jargon.

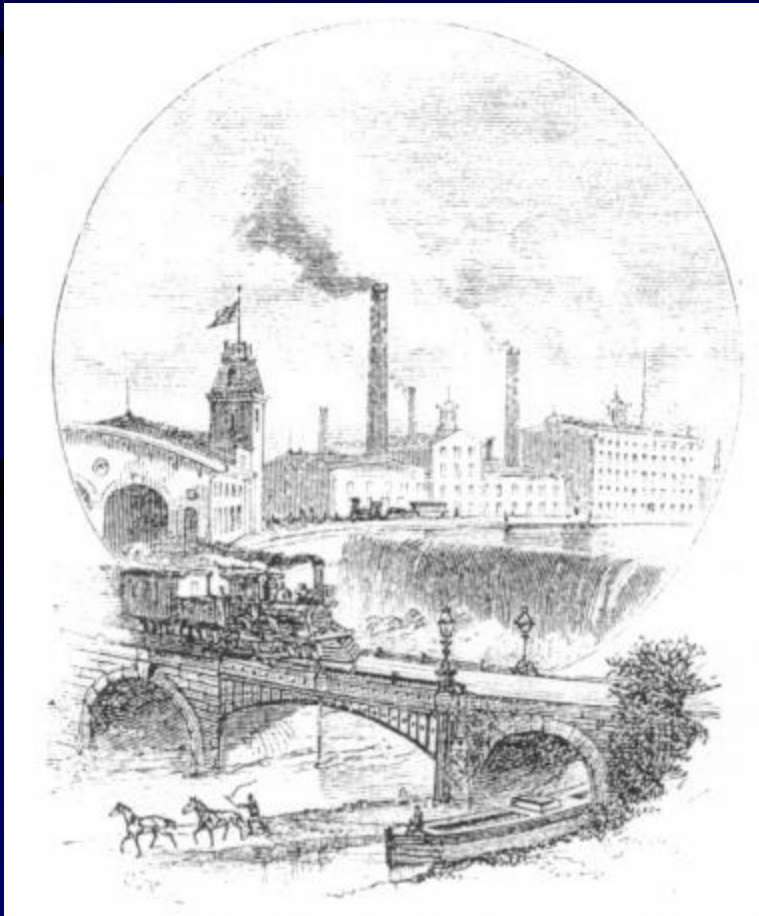| A TABLE OF POWERS.								
	1	2	3	4	5	6	7	8	9
1st Power	1	2	3	4	5	6	7	8	9
2d Power	1	4	9	16	25	36	49	64	81
3d Power	1	8	27	64	125	216	343	512	729
4th Power	1	16	81	256	625	1296	2401	4096	6561
5th Power	1	32	243	1024	3125	7776	16807	32768	59049
6th Power	1	64	729	4096	15625	46656	117649	262144	531441
7th Power	1	128	2187	16384	78125	279936	823543	2097152	4782969
8th Power	1	256	6561	65536	390625	1679616	5764801	16777216	43046721
9th Power	1	512	19683	262144	1953125	10077696	40353607	134217728	387420489
10th Power	1	1024	59049	1048576	9765625	60466176	282475249	1073741824	3486784401

Visual Categories (Cont.)

- Pictures
  - usually consisted of scenes of towns, a man at a task, objects that go with a concept but do not help in the understanding or explanation, etc...

79. The *Unit* of United States Money is the *Gold* Dollar.

TABLE.

90. The *Unit* of English Money is the Sovereign, or *Pound* Sterling.

Visual Categories (Cont.)

- Pictures (Cont.)

Visual Categories (Cont.)

- **Aids**

  - **helped to convey a concept trying to be taught as many are used today**
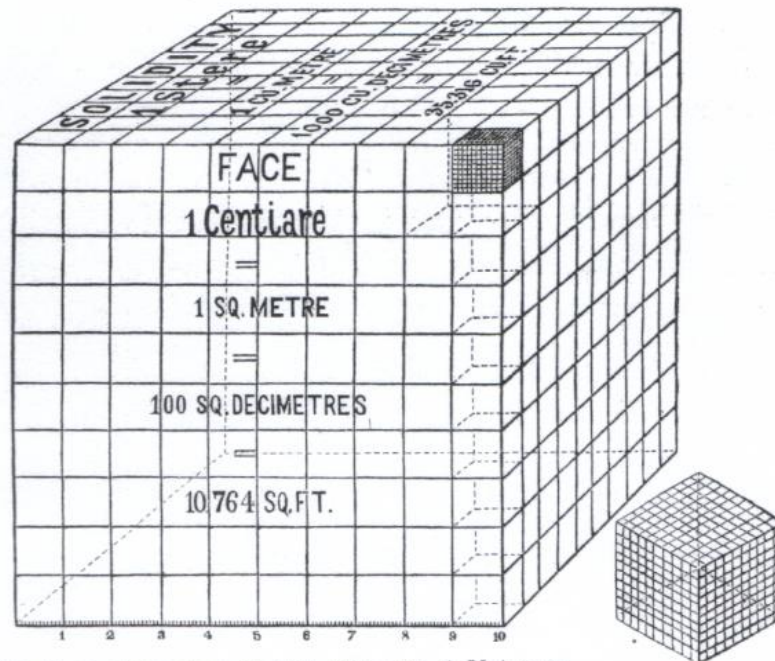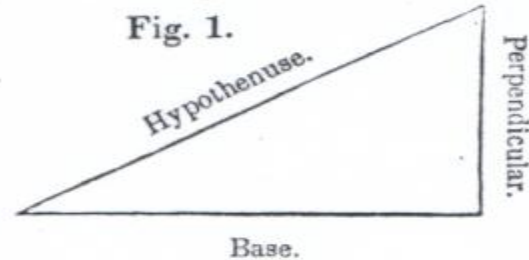
  - **many of the one used then are still in use to day as the examples will illustrate.**
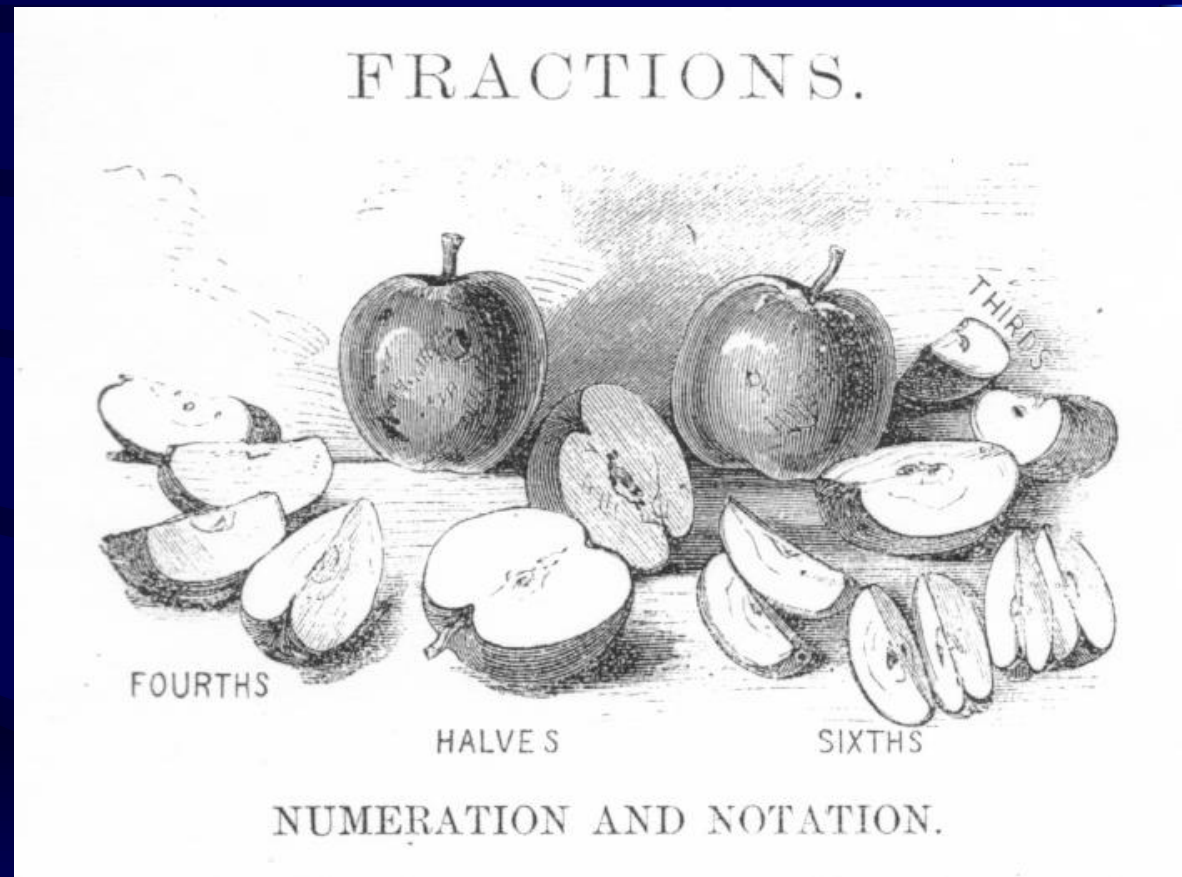
Visual Categories (Cont.)

- **Aids (Cont.)**

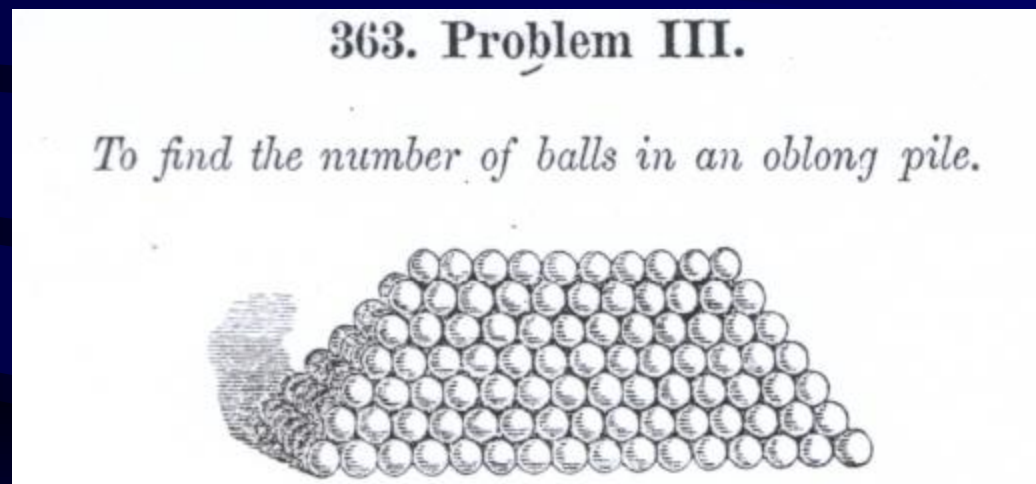The longest side is called the hypothenuse, the horizontal side the base, and the other side is called the perpendicular.

Fig. 1.

The three dimensions of this cube are, 1 Meter, or 10 Decimeters, or 100 Centimeters, in length.
SCALE 1/10 OF THE *Exact Size.*

1 Cu. Centimeter.
Exact Size.

Viual (Cont.)

- The Ball Problem

363. Problem III.

To find the number of balls in an oblong pile.

Is used in the development of the series.

The Evolution of the Word Problem

- The subjects reflect the trends in new ideas, industry, society and government of the given period.

- The emphasize of the word problem is not as important as 200 years ago, nor the less, fifty years ago.

Subject Diversities

- Slavery

6. The first slaves were brought into the American Colonies in the year 1685. Suppose the first number to have been 50. and that 50 had been brought each year for 100 years, and the rate of increase 3 per cent. How many would there have been in the country at the end of the hundred years?

8. There is a society established in the United States for the purpose of colonizing the free people of colour. Suppose the slaves to be emancipated as fast as this society can transport them away; how many must be sent away annually, that the number may be neither increased nor diminished?

Subject Diversities (Cont.)

- Agriculture

32 What cost 27T. 15cwt. 1qr. 3½lb. of hemp, at $183.62 per ton?   Ans. $5098.03,7 $\frac{5}{32}$.

5. A sugar plantation of 1450 acres was fertilized at a cost of $16 per acre. The fertilization increased the production by 1.6 tons of sugar per acre. How many extra tons of sugar were produced? If sugar sold for $92.75 a ton, find the total net profit from fertilizing the farm.

Net profit = value of extra sugar — cost of fertilizer.

Subject Diversities (Cont.)

- Agriculture

6. My factor at New Orleans advises me that he has purchased on my account 37 bales of cotton, at $107.75 per bale; what is his commission, at $\frac{3}{8}$ per cent.?   Ans. 14.95\frac{1}{32}$.

14. A certain company own a cotton factory, valued at $26,250. For what sum must a policy be taken out to cover the whole property, at $12\frac{1}{2}$ per cent.?   Ans. $30,000.

Subject Diversities (Cont.)

- Military

4. A shepherd driving a flock of sheep in time of war, met a company of soldiers, who plundered him of one half the sheep he had and half a sheep over ; the same treatment he received from a second, a third, and a fourth company, each succeeding company plundering him of one half the sheep he had left and one half a sheep over.   At last he had only 7 sheep left. How many had he at first ?

2. If a garrison of 987 men are supplied with 175686 pounds of beef, how much will there be for each man ?   Ans. 178 lbs.

Subject Diversities (Cont.)

- Spirituous Refreshments

29. *If a grocer mix sherry and brandy in the ratio of 2 to 1, the mixture is worth 78 shillings per dozen. If he mix them in the ratio of 7 to 2, the mixture is worth 79 shillings per dozen. What is the price per dozen of each kind of wine?

Prob. 9. A person goes to a tavern with a certain sum of money in his pocket, where he spends 8 shillings. He then borrows as much money as he had left, and going to another tavern, he there spends 8 shillings also. Then borrowing again as much money as was left, he went to a third tavern, where likewise he spent 8 shillings, and borrowed as much as he had left; and again spending 8 shillings at a fourth tavern, he then had nothing remaining. What had he at first?

Ans. 15 shillings.

Subject Diversities (Cont.)

- Gambling

> 7. Two persons engage at play, A has 76 guineas, and B 52, before they begin. After a certain number of games lost and won between them, A rises with three times as many guineas as B. How many guineas did A win of B?

Predecessors of the Modern

16. Two pedestrians start from the same point; the first steps twice as far as the second, but the second makes 5 steps while the first makes but one. At the end of a certain time they are 300 feet apart. Now, allowing each of the longer paces to be 3 feet, how far will each have traveled?

Ans. 1st, 200 *feet;* 2d, 500.

7. The formula $d = 24\,t$ represents the distance a car runs at an average of 24 miles an hour. Draw a graph to show that the car, after running for $2\frac{1}{2}$ hours, was delayed $1\frac{3}{4}$ hours and then proceeded. From the graph determine the number of miles covered after $1\frac{3}{4}$ hours; after $3\frac{1}{2}$ hours.

Miscellaneous Examples

5. A man being asked how many teeth he had remaining, answered, three times as many as he had lost; and being asked how many ne had lost, answered, as many as, being multiplied into $\frac{1}{6}$ part of the number he had left, would give the number he had at first. How many had he remaining, and how many had he lost?

19. A cistern containing 60 gallons of water has three unequal cocks for discharging it; the largest will empty it in one hour, the second in two hours, and the third in three: in what time will the cistern be emptied if they all run together?

Ans. $32\frac{8}{11}$ min.

35. A man and his wife usually drank out a vessel of beer in 12 days: but when the man was from home it would usually last the wife alone 30 days. In how many days would the alone drink it out?

Conclusion

- The characteristics of each mathematical text written is based on what is available to the author in that age, the industry, and the technology developed that can aid in the development of new mathematics.

- The word problem is the best illustration of telling when a mathematical text was written combined with the terminology and language so much more can be said.

- The development of the visual is showing how visual our society has become and how much we rely on it.