$\frac{13 \times 16}{5}$ ch. -15	$\mathrm{men} = \frac{13 \times 16 \ \mathrm{ch.}}{5} - 4$	$men = \frac{13 \times 16 \times 4\text{'ch.}}{15 \times 5}$
Again 12 children do a work in 60 days $13 \times 16 \times 4$ ch. $60 \times 12 \times 15 \times 5$		

$$\frac{15 \times 5}{15 \times 5} = \frac{00 \times 12 \times 15 \times 5}{13 \times 16 \times 4} = 6433$$
 days

9. If § of A's money=§ of B's, 1 of C's, or 13 of D's, and C has \$9.70 more than the other three, How much has A?

A B C D.

Solution. $-\frac{5}{3} = \frac{1}{3} = \frac{1}{3} = \frac{1}{3}$, and $\frac{1}{3} = \frac{1}{3} = \frac{1}{3} = \frac{1}{3}$ — unit $\frac{1}{3}$ of A's and rest in proportion. " $\frac{3}{3} = \frac{1}{3} = \frac{1}{3} = \frac{1}{3} = \frac{1}{3}$ — integer unit of A's rest in pro-

then, $1=15=2^{1}5=2^{2}5=1^{7}5_{4}$ - proportional sum of money of each.

then, 208=195=650 150 then 650 (208+195+150)=97. and 97=\$9.70 and 208=\$20.80 A's share.

10. If § of the time past 6 a.m. equal § of the time till 9 p.m. How long since 12 noon.

Solution .- § equals §-5=15=25 past 6 a.m. : 16 till 9 p.m.

then from 6 a.m. till 9 p.m. = 15 hours and $J_1^5 \times \frac{2}{4} \frac{1}{4} = 9$ hrs. $8\frac{3}{4}\frac{2}{4}$ min.

and 9 hrs. 847 min. - 6 hrs=3 hrs. 837 min. after 12 noon. 11. If 3 of the time past July 1st at 12 noon equal 3 of the time till Dec. 20th, and A's birthday is Nov. 20th at 6 p.m. How many

days, hours, minutes from the time indicated till his birthday? Solution. From July 1st 12 noon till Dec. 20th noon = 172 days, then $\frac{3}{4}$ past = $\frac{1}{5}$ time to come $\frac{1}{5} = \frac{1}{15}$ and $\frac{1}{5} = \frac{1}{15}$ or 32:15and $\frac{3}{7}$ of 172 days=117 days, 2 hrs. 33 mts., then 117 days 2 hrs. 33 mts. after July 1st noon gives 27 mts to 3 p.m. on 25th Oct. and from this time Nov. 20th at 6 p.m gives 26 days, 3 hours, 27 minutes

12. The sum of two Nos. is $\frac{3}{4}$ their dif. $\frac{3}{10}$ of their sum find their quotients,

Solution. $\frac{3}{4} - (\frac{3}{60} \text{ of } \frac{3}{2}) \div 2 = \frac{2}{5} = \text{smaller No. } \frac{3}{5} \times (\frac{3}{60} \text{ of } \frac{3}{2}) = \frac{3}{3} = \frac{3}{5}$ gr. ater and $\frac{3}{5} \div \frac{2}{5} = \frac{19}{2}$, greater quotient $\frac{2}{5} \div \frac{3}{5} = \frac{13}{13}$ lesser quotient tient.

18. Find interest on \$275.50 for 2 yrs., 7 mo., 15 days. at 8% (simple interest.)

Solution. Interest on \$1 for 2 years is 16 cts. for 6 months, 4 cts. for 1 month, $\frac{3}{5}$ cts. for 15 days is $\frac{1}{3}$ cts., then 16 cts. +4 cts. + $\frac{3}{5}$ cts. + $\frac{1}{5}$ cts. =21 cts. Then if \$1 gives 21 cts. 275.60 give \$57.85 $\frac{1}{2}$ or $\frac{1}{5}$ $\frac{51}{5}$ $\frac{31}{5}$ $\frac{1}{5}$ $\frac{1}{5}$ $\frac{51}{5}$ = \$57.85 $\frac{1}{2}$.

14. What sum of money will amount to \$225 in 2 years and 9 months at 8% (simple int.)?

Solution. Interest on \$1 for 2 yrs. 9 mo. = 22 cts. then \$1.22

requires \$1 principal, and \$225 amount requires $\frac{1.00 \times 225}{1.00} = 184.42 . 1.22

15. In what time at 6% will \$300 give \$44 interest ?

Solution. \$800 int. 1 year at 6% gives \$48 and 11 of a year = 11 months.

16. At what rate % will \$340 amount to \$384 in 1 year, 10 months ?

1 year 10 months = $\frac{1}{6}$ years and $\frac{1}{6}$ years = (384 - 340) = 1 year = \$24, interest on \$340 for 1 year $\frac{32}{6}$ of $\frac{192}{12} = 7\frac{1}{7}$

17. How many feet of lumber board measure (1 inch thick) are there in 8 square logs 45 inches square, 48 feet long, 3 lost in sawing?

Solution. $\frac{45}{5} \times \frac{18}{5} \times \frac{2}{5} \times \frac{2}{5} = 52180$ feet.

18. A has 2400 bushels wheat. A sells 1 of it at a gain of 12 % t at a gain of 20%, t at a loss of 30%, remainder at cost and cleared \$38.40, for what should he have sold to have cleared 25% on the whole ?

$$\frac{1}{4}$$
 of 2400 bush. at $12\% = 72 \frac{38.40}{(120 - 72 \times 96)} = 80$ cts. per bushel.

 $\frac{1}{2}$ of 2400 at 20% =96 then $25\% = \frac{1}{2}$ gain + $\frac{1}{4} = \frac{5}{2}$, $\frac{1}{2} = 80c.$ $\frac{1}{2}$ of 2400 at 30% = 120, and $\frac{3}{4} = 1.00 per bushel. 19. A cow and a horse cost \$286.80, the horse cost 39% more than the cow, find cost cost of each.

Solution. As often as the cow costs \$1 the horse will cost \$1.39 and \$1.00 + \$1.39 = \$2.39 then 2.39 give \$286.80, 1.39 will give \$166.80, \$286.80 - \$156.80 = \$120 price of cow and \$166.80 = price of horse.

20. In plowing a ten acre field (sq.), it is noticed that 8 inches are taken off at each furrow; what distance will a plowman walk in plowing the field ?

Solution. Side of field 660 ft. 8 in, $=\frac{2}{3}$ of a ft. and 660 $\times \frac{3}{2} =$ 990 furrows, the field is 10 chain long then $290 + \frac{6}{10} = 1233$ miles. Answer.

21. It is noticed that a water conduit 9 inches by 6 inches 90 feet long empties itself every 5 seconds, find weight of water that will run through in one hour a cubic foot of water weighing 621 lbs.

Solution. $\frac{3}{4} \times \frac{1}{2} \times \frac{90}{1} \times \frac{3000}{5} \times 62\frac{1}{2} = 1,518,750$ lbs.

22. I bought 55272 acres of land at \$5,500 per acre, and .1,253 acres at \$270 per acre. Find amount paid for both, and number of acres, roods, per, etc.

Solution. $-55272 = 552_{1T}^{a} \times 5500 = 3040

·1253=1253 × 270=\$30?4:44.

Again $\overline{552}_{17}^{8}$ + $1253 = 1205 \times 270 = 8_{35}^{7}$ (7.14) Again $\overline{552}_{17}^{8}$ + $1253 = 678_{13}^{2}$ acres, then $\overline{578}_{13}^{8} \times 4 = 2712_{13}^{8}$ roods $\overline{712}_{13}^{8} \times 40 = 2848933$ per. $-489333 \times 304 = 14\cdot813333$ eq. yds. $\cdot 81343 \times 9 = 7\cdot 32$ eq. ft.

23. A bought a quantity of tea and sold 3 of it at a loss of 10 %, for what must he sell the remainder to gain 20 % on the whole quantity.

Solution. Take 5 lbs. at \$1 per lb., then $\frac{2}{3}$ of 5 lbs. at \$1=\$2.00 and 10 % off \$2.00=\$1.80. Again 5 lbs, cost \$5 and 20 % on \$5.00+\$5.00=\$6.00,

 $\frac{\$6\ 00+\$1.80}{\$1}=\1.40 selling per lb. therefore 40c. gained on \$1, then

therefore he has to sell at an advance of 40 %

or $[\{\$5.00+(3 \text{ of } \$5.00)\} - \{2^3 \times (1 - \gamma_0)\}] - 100 = 40\%$. 24. An army fought 3 battles ; m the 1st 1 m e.ery 25 were lost, in 2nd 5 in every 24 were lost of the remainder ; in 3 rd γ_0 of the remainder were lost, and 28,800 men were left. How many at first? Solution .- take one hundred men,

then 1 in every 25 or 4 in every 100 were lost, leaving 96.

Again 4 in every 24 or 20 in every 96 were lost, leaving 76,

and 1 in every 19 or 4 in every 76 were lost, leaving 72,

then 72 gives 28,800, and 100 gives 40,000 men, or ${}^{24}{}^{600}$ $\div {}^{21}{}^{10}$ $\times {}^{16}$ $\times {}^{16}$ $\approx 40,000$ men. 35. A train 100 yds. long passes A, who is walking (same direc-tion as train), at the rate of 4 miles per hour, in 15 seconds; find rate of train per hour.

Solution. -110 yds=1'a of a mile.

In 3,600 min. A goes 4 miles, in 15 min. he goes $\frac{1}{60}$ of a mile. Therefore the train goes $\frac{1}{10} + \frac{1}{60} = \frac{10}{240}$ miles in 15 minutes, or $1_{0}^{0} \rightarrow 1_{0}^{0} \rightarrow 1_{0}^{0} = 19$ miles per hour.

Practical Department.

FACTS.

[The following article is taken from "School Amusements," published by A. S. Barnes & Co., Chicago.]

I was troubled some time since by the want of punctuality in my pupils. I had just undertaken the management of a school which had "run down," under the control of a man who had governed, at times with severity, at times with laxity of discipline, and I was at loss what course to pursue to create a reformation in this particular.

Acting, however, on the principle of attracting rather than coercing, I determined on the following plan :--- I was not sure of its success, and I did not make known my motive, intending to try * * * After opening school with other means if this failed. the usual devotional exercises, I teld the few who were at their seats that I intended to spend a quarter of an hour every morning in telling them something interesting, something which they would be pleased and profited to hear. * * * The process was repeated every morning.

I took pains to have something really interesting, and I soon began to observe the effects. They who had heard the "facts," as I called them, told their tardy companions what pleasant information the teacher had given them, and advised them to come in time if they wanted to hear something nice.

I was walking behind two of my boys one morning, on my way to school,-two of the quondam tardies,-and overheard one of them say, "Hurry up, or we shan't be in time for facts."