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Students' Department

H. A. Finney

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Students' Department

EDITED BY H. A. FINNEY

In the May, 1923, examination of the American Institute of Accountants, appeared a problem in the consolidation of three corporations. This problem and a solution thereof were published in the *Students' Department* of July, 1923. The solution is an algebraic one, and the editor made the following comment and invitation:

"An algebraic solution is presented because it is the only method apparent to the editor by which the necessary results can be obtained. If any reader can submit a simple arithmetical solution, producing correct results, it will be welcomed and published, for the editor cannot believe that the examiners expected an algebraic solution involving three unknowns. So much mathematical ability has never been expected of candidates in the past, and the editor feels, therefore, that he must have overlooked some simpler method."

This invitation was accepted by about a dozen readers. It is impossible to publish all the solutions received, and the following are therefore selected:

Solutions by E. B. Escott, Oak Park, Illinois

"In the first solution I start with approximate values, namely the value of the outside assets. Then I add the corrections—15 per cent. of B and 15 per cent. of C, the correction for A, which gives the second approximation to A. In the same way, form the second approximations to B and to C.

"Then start the problem over, using these new approximations in the same way that the first approximations were used, giving the third approximations as shown. When the approximations no longer change, I know that I have the correct result.

"One advantage of this method is that since each new approximation is obtained by starting the work over, errors—except in the last computation—are automatically eliminated.

"In the second method, after obtaining the second approximations, instead of recommencing the work, I merely add 15 per cent. of the correction to B and 15 per cent. of the correction to C for the correction to the second approximation to A. By this method, the rapid decrease in the size of the corrections is evident, showing that the work will soon converge to the correct result. This method does not have the advantage of the automatic elimination of errors which the first method has.

"In the third solution, by using suitably chosen multipliers—found by the method of 'cross-multiplication,' two unknowns are eliminated at the same time, which saves time and also conduces to greater accuracy, since it is not necessary to substitute the value of an unknown quantity just found, which may not be accurate."

FIRST SOLUTION

A		B		C	
1st approx. to A	\$ 850,000.00	1st approx. to B	\$ 925,000.00	1st approx. to C	\$ 2,290,000.00
.15 B	198,750.00	.15 A	199,837.50	.05 A	66,612.50
.15 C	343,500.00	.10 C	239,000.00	.05 B	67,691.88
2nd approx. to A	<u>1,332,250.00</u>	2nd approx. to B	<u>1,353,837.50</u>	2nd approx. to C	<u>2,424,304.38</u>
.15 B	850,000.00	.15 A	925,000.00	.05 A	2,290,000.00
.15 C	203,075.63	.10 C	212,508.20	.05 B	70,836.07
3rd approx. to A	<u>1,416,721.29</u>	3rd approx. to B	<u>242,430.44</u>	3rd approx. to C	<u>68,996.93</u>
.15 B	850,000.00	.15 A	1,379,938.64	.05 A	2,429,833.00
.15 C	206,990.80	.10 C	925,000.00	.05 B	2,290,000.00
4th approx. to A	<u>1,421,465.75</u>	4th approx. to B	<u>213,219.87</u>	4th approx. to C	<u>71,073.29</u>
.15 B	850,000.00	.15 A	242,983.30	.05 A	69,060.16
.15 C	364,474.95	.10 C	1,381,203.17	.05 B	2,430,133.45
5th approx. to A	<u>1,421,700.50</u>	5th approx. to B	<u>925,000.00</u>	5th approx. to C	<u>2,430,148.45</u>
.15 B	850,000.00	.15 A	213,255.08	.05 A	2,290,000.00
.15 C	207,180.48	.10 C	243,013.35	.05 B	71,085.63
6th approx. to A	<u>1,421,712.53</u>	6th approx. to B	<u>1,381,268.43</u>	6th approx. to C	<u>69,063.59</u>
.15 B	850,000.00	.15 A	925,000.00	.05 A	2,430,149.22
.15 C	364,523.27	.10 C	213,256.88	.05 B	2,290,000.00
7th approx. to A	<u>1,421,713.13</u>	7th approx. to B	<u>1,381,271.73</u>	7th approx. to C	<u>71,085.66</u>
.15 B	850,000.00	.15 A	925,000.00	.05 A	69,063.60
.15 C	207,190.75	.10 C	243,014.92	.05 B	2,430,149.26
8th approx. to A	<u>1,421,713.17</u>	8th approx. to B	<u>1,381,271.91</u>	8th approx. to C	<u>71,085.66</u>
.15 B	850,000.00	.15 A	925,000.00	.05 A	69,063.60
.15 C	207,190.78	.10 C	243,014.93	.05 B	2,430,149.26
8th approx. to A	<u>1,421,713.17</u>	8th approx. to B	<u>1,381,271.91</u>	8th approx. to C	<u>71,085.66</u>

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SECOND SOLUTION

	A	B	C
1st approximation	\$ 850,000.00	\$ 199,837.50	\$ 66,612.50
Corr. 15% of B	\$ 138,750.00	\$ 29,970.63	\$ 9,991.88
Corr. 15% of C	\$ 343,500.00	\$ 229,000.00	\$ 67,691.88
Total correction	482,250.00	258,970.63	77,683.76
2nd approximation	1,332,250.00	458,807.13	134,304.38
15% of corr. to B	64,325.63	12,670.69	4,223.56
15% of corr. to C	20,145.66	13,430.44	1,305.06
Total correction	84,471.29	26,101.13	5,528.62
3rd approximation	1,416,721.29	1,379,938.63	2,429,833.00
15% of corr. to B	3,915.17	711.67	237.22
15% of corr. to C	829.29	552.86	63.23
Total correction	4,744.46	1,264.53	300.45
4th approximation	1,421,465.75	1,381,203.16	2,430,133.45
15% of corr. to B	189.68	35.21	11.74
15% of corr. to C	45.07	30.05	3.26
Total correction	234.75	65.26	15.00
5th approximation	1,421,700.50	1,381,268.42	2,430,148.45
15% of corr. to B	9.79	1.81	.60
15% of corr. to C	2.25	1.50	.17
Total correction	12.04	3.31	.77
6th approximation	1,421,712.54	1,381,271.73	2,430,149.22
15% of corr. to B	.50	.09	.03
15% of corr. to C	.12	.08	.01
Total correction	.62	.17	.04
7th approximation	1,421,713.16	1,381,271.90	2,430,149.26
15% of corr. to B	.03	.01	.00
15% of corr. to C	.01	.00	.00
Total correction	.04	.01	.00
8th approximation	1,421,713.20	1,381,271.91	2,430,149.26

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THIRD SOLUTION—BY ALGEBRA

$$\begin{aligned} A - .15 B - .15 C &= \$ 850,000 & (1) \\ -.15 A + B - .10 C &= 925,000 & (2) \\ -.05 A - .05 B + C &= 2,290,000 & (3) \end{aligned}$$

Multiply each equation by 20 to clear of fractions

$$\begin{aligned} 20 A - 3 B - 3 C &= 17,000,000 & (4) \\ - 3 A + 20 B - 2 C &= 18,500,000 & (5) \\ - A - B + 20 C &= 45,800,000 & (6) \end{aligned}$$

Multiply (4) by 398

(5) by 63

(6) by 66

and add. (These multipliers are obtained by 'cross multiplication.')

We have

$$\begin{aligned} 7,705 A &= 10,954,300,000 \\ A &= 1,421,713.1732 \end{aligned}$$

Multiply (4) by 62

(5) by 397

(6) by 49

and add.

We have

$$\begin{aligned} 7,705 B &= 10,642,700,000 \\ B &= 1,381,271.9014 \end{aligned}$$

Multiply (4) by 1

(5) by 1

(6) by 17

and add.

We have

$$\begin{aligned} 335 C &= 814,100,000 \\ C &= 2,430,149.2537 \end{aligned}$$

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Solution by H. E. Bowman, Tacoma, Washington

A		B		C	
Owning 15% B: 15% C		Owning 15% A: 10% C		Owning 5% A: 5% B	
Capital stock	\$1,000,000.00	Capital stock	\$ 750,000.00	Capital stock	\$2,000,000.00
Surplus	250,000.00	Surplus	500,000.00	Surplus	400,000.00
	1,250,000.00		1,250,000.00		2,400,000.00
Add to bring investment in B to par..	12,500.00	Add to bring investment in C to par..	25,000.00	Deduct to bring investment in B to par	22,500.00
	1,262,500.00		1,275,000.00		2,377,500.00
Add 15% B's surplus of....\$25,000.00	78,750.00	Add 15% A's adj. surp. of..	397,875.00	Add 5% A's adj. surplus of..	\$397,875.00
Add 15% C's surplus of....	56,625.00	Add 10% C's surplus of....	377,500.00	Add 5% B's adj. surplus of..	622,431.25
Add 15% B's adj. surplus of	14,614.69	Add 15% A's adj. surplus of	22,266.99	Add 5% A's adj. surplus of	23,266.99
Add 15% C's " "	7,652.30	Add 10% C's " "	51,015.31	Add 5% B's " "	8,441.58
Add 15% B's " "	1,266.24	Add 15% A's " "	1,496.55	Add 5% A's " "	1,496.55
Add 15% C's " "	230.31	Add 10% C's " "	1,535.43	Add 5% B's " "	378.02
Add 15% B's " "	56.70	Add 15% A's " "	70.76	Add 5% A's " "	70.76
Add 15% C's " "	14.06	Add 10% C's " "	93.73	Add 5% B's " "	19.98
Add 15% B's " "	3.00	Add 15% A's " "	3.08	Add 5% A's " "	3.68
Add 15% C's " "	.68	Add 10% C's " "	4.54	Add 5% B's " "	1.00
Add 15% B's " "	.15	Add 15% A's " "	.18	Add 5% A's " "	.18
Add 15% C's " "	.03	Add 10% C's " "	.23	Add 5% B's " "	.05
Add 15% B's " "	.01	Add 15% A's " "	.08	Add 5% A's " "	.01
Add 15% C's " "	.01	Add 10% C's " "	.02	Add 5% B's " "	.05
Total net worths	\$1,421,713.17	Total net worths	\$1,381,271.88	Total net worths	\$2,430,149.25

The figures are paired merely to give a little clearer view of the process.

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Solution by E. S. Thomas, Cincinnati, Ohio

A	B	C
\$1,250,000.00	\$1,250,000.00	\$2,400,000.00
87,500.00	37,500.00	12,500.00
60,000.00	65,000.00	2,500.00
1,397,500.00	1,352,500.00	2,415,000.00
15,375.00	22,125.00	7,375.00
2,250.00	1,500.00	5,125.00
1,415,125.00	1,376,125.00	2,427,500.00
3,543.75	2,643.75	881.25
1,875.00	1,250.00	1,181.25
1,420,543.75	1,380,018.75	2,429,562.50
584.06	812.81	270.94
309.38	206.25	194.69
1,421,437.19	1,381,037.81	2,430,028.13
152.86	134.02	44.67
69.84	46.56	50.95
1,421,659.89	1,381,218.39	2,430,123.75
27.09	33.40	11.14
14.34	9.56	9.03
1,421,701.32	1,381,261.35	2,430,143.92
6.44	6.21	2.08
3.03	2.02	2.15
1,421,710.79	1,381,269.58	2,430,148.15
1.23	1.42	.48
.63	.42	.41
1,421,712.65	1,381,271.42	2,430,149.04
.29	.28	.09
.13	.09	.09
1,421,713.07	1,381,271.79	2,430,149.22
.06	.06	.02
.03	.02	.02
1,421,713.16	1,381,271.87	2,430,149.26

Note: The first additions are the differences between cost of stocks and net worths as shown by the respective books. And thereafter the additions to

A equal 15% of previous additions to B and C

B equal 15% of previous additions to A and 10% C

C equal 5% of previous additions to A and B

By previous addition is meant the addition immediately preceding.

A	B	C
\$1,250,000.00	\$1,250,000.00	\$2,400,000.00
147,500.00	102,500.00	15,000.00
17,625.00	23,625.00	12,500.00
5,418.75	3,893.75	2,062.50
893.44	1,019.06	465.63
222.70	180.58	95.62
41.43	42.96	20.17
9.47	8.23	4.23
1.86	1.84	.89
.42	.37	.18
.09	.08	.04
1,421,713.16	1,381,271.87	2,430,149.26

Note: This is a practical way, which saves work. See preceding computation for explanation of method.

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The sum of the first additions to B and to C equals 117,500, and 15% of this equals 17,625, which is the next addition to A. The sum of A and B equals 250,000, and 5% of this equals 12,500, which is the next addition to C.

Solution by John W. Sparling, Seattle, Washington

	A	B	C
Assets	\$1,100,000.00	\$1,675.00	\$3,390.00
Liabilities	250,000.00	750.00	1,100.00
Net worth	<u>\$ 850,000.00</u>	<u>\$ 925.00</u>	<u>\$2,290.00</u>
80% to stockholders	80% to stockholders	75% to stockholders	
15 to B	15 to A	15 to A	
5 to C	5 to C	10 to B	
<u>100</u>	<u>100</u>	<u>100</u>	
\$ 680,000.00 to stock	\$ 740,000.00 to stock	\$1,717,500.00 to stock	
127,500.00 to B	138,750.00 to A	343,500.00 to A	
42,500.00 to C	46,250.00 to C	229,000.00 to B	
<u>\$ 850,000.00</u>	<u>\$ 925,000.00</u>	<u>\$2,290,000.00</u>	
\$ 138,750.00	\$ 127,500.00	\$ 46,250.00	
343,500.00	229,000.00	42,500.00	
<u>\$ 482,250.00</u>	<u>\$ 356,500.00</u>	<u>\$ 88,750.00</u>	
\$ 385,800.00 to stock	\$ 285,200.00 to stock	\$ 66,562.50 to stock	
72,337.50 to B	53,475.00 to A	(1) 13,312.50 to A	
24,112.50 to C	17,825.00 to C	(1)& 8,875.00 to B	
<u>\$ 482,250.00</u>	<u>\$ 356,500.00</u>	<u>\$ 88,750.00</u>	

Following the same procedure until the full balance is gone, then adding the stockholders together with final result:

A	\$1,137,370.54	—	27.979 plus
B	1,105,017.52	—	27.183 plus
C	1,822,611.94	—	44.836 plus

Solution by W. T. Sunley, Chicago

FIRST SOLUTION

"The balance-sheets may be rearranged to show the interest which each company has in the other as carried on their present balance-sheets, thus:

	A	B	C
Assets other than stock	\$1,100,000	\$1,675,000	\$3,390,000
Stock of A .....	.....	150,000	50,000
Stock of B	100,000	.....	60,000
Stock of C	300,000	175,000	.....
Total assets	<u>\$1,500,000</u>	<u>\$2,000,000</u>	<u>\$3,500,000</u>
Liabilities	250,000	750,000	1,100,000
Net worth	<u>\$1,250,000</u>	<u>\$1,250,000</u>	<u>\$2,400,000</u>

"This statement may now be rearranged to show the net worth of each corporation, exclusive of interest in other companies.

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	A	B	C
Net worth exclusive of stock in other companies	\$ 850,000	\$ 925,000	\$2,290,000
Stock of A .....	.....	150,000	50,000
Stock of B	100,000	.....	60,000
Stock of C	300,000	175,000	.....
Total net worth	\$1,250,000	\$1,250,000	\$2,400,000

“The next step would be to change the valuation of the stock of A held by B, from \$150,000 to 15% of the net worth of A. But since the net worth of A is dependent upon the value of the stock which A holds in B (changing \$100,000 valuation to 15% of B's net worth), we cannot value 'stock of A' held by B at 15% of \$1,250,000.

“The valuation which should be placed on the intercompany stock holdings can be determined by trial or algebraic equations.

“The 'trial' method consists of substituting the percentages of the respective net worths as the valuations of the intercompany holdings until net-worth figures are obtained which actually fulfill the percentage requirements.

“The following tabulation shows the 'trial' method. Starting with the figures as given in the problem the first trial is made by substituting 15% of B's net worth as originally given for A's stock in company B. This changes the valuation from \$100,000 to \$187,500. In a like manner, A's stock in company C is changed to 15% of \$2,400,000, which is \$360,000; and similarly all the intercompany stock is revalued on this basis.

“As a result the first trial shows *new* net worth figures. So it is necessary to recalculate the valuation of 'stock of B' held by A; so in the second trial we substitute 15% of B's net worth, as shown by the first trial in place of \$187,500. This new figure is \$202,875.

“In a similar manner, the second trial figures for the valuations of the other intercompany stock holdings are calculated using as a basis the net-worth figures developed in the first trial.

“Then adding these new valuations to the respective 'net worths exclusive of the stock in other companies,' gives *new* net-worth figures. So a third trial is made, substituting stock valuations based on the net worths as developed in the second trial.

“This process is continued until there is no material difference between the valuation determined by the test. This occurs in the twelfth trial.”

	As given in problems	Trial 1	Trial 2	Trial 3
C				
A				
Net worth exclusive of stock in other companies	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00
Stock of B (15%) ..	100,000.00	187,500.00	202,875.00	206,418.75
Stock of C (15%) ..	300,000.00	360,000.00	362,250.00	364,125.00
Total	\$1,250,000.00	\$1,397,500.00	\$1,415,125.00	\$1,420,543.75
B				
Net worth exclusive of stock in other companies	925,000.00	925,000.00	925,000.00	925,000.00
Stock of A (15%) ..	150,000.00	187,500.00	209,625.00	212,268.75
Stock of C (10%) ..	175,000.00	240,000.00	241,500.00	242,750.00
Total	\$1,250,000.00	\$1,352,500.00	\$1,376,125.00	\$1,380,018.75

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	As given in problems	Trial 1	Trial 2	Trial 3
C				
Net worth exclusive of stock in other companies	2,290,000.00	2,290,000.00	2,290,000.00	2,290,000.00
Stock of A (5%)	50,000.00	62,500.00	69,875.00	70,756.25
Stock of B (5%)	60,000.00	62,500.00	67,625.00	68,806.25
Total	\$2,400,000.00	\$2,415,000.00	\$2,427,500.00	\$2,429,562.50
	Trial 4	Trial 5	Trial 6	Trial 7
A				
Net worth exclusive of stock in other companies	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00
Stock of B (15%)	207,002.82	207,155.67	207,182.76	207,189.20
Stock of C (15%)	364,434.38	364,504.22	364,518.56	364,521.59
Total	\$1,421,437.20	\$1,421,659.89	\$1,421,701.32	\$1,421,710.79
B				
Net worth exclusive of stock in other companies	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00
Stock of A (15%)	213,081.56	213,215.58	213,248.98	213,255.20
Stock of C (10%)	242,956.25	243,002.82	243,012.38	243,014.39
Total	\$1,381,037.81	\$1,381,218.40	\$1,381,261.36	\$1,381,269.59
C				
Net worth exclusive of stock in other companies	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00
Stock of A (5%)	71,027.19	71,071.86	71,082.99	71,085.07
Stock of B (5%)	69,000.94	69,051.89	69,060.92	69,063.07
Total	\$2,430,028.13	\$2,430,123.75	\$2,430,143.91	\$2,430,148.14
	Trial 8	Trial 9	Trial 10	Trial 11
A				
Net worth exclusive of stock in other companies	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00
Stock of B (15%)	207,190.44	207,190.71	207,190.77	207,190.78
Stock of C (15%)	364,522.22	364,522.35	364,522.38	364,522.39
Total	\$1,421,712.66	\$1,421,713.06	\$1,421,713.15	\$1,421,713.17
B				
Net worth exclusive of stock in other companies	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00
Stock of A (15%)	213,256.62	213,256.90	213,256.96	213,256.97
Stock of C (10%)	243,014.81	243,014.90	243,014.92	243,014.92
Total	\$1,381,271.43	\$1,381,271.80	\$1,381,271.88	\$1,381,271.89
C				
Net worth exclusive of stock in other companies	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00
Stock of A (5%)	71,085.54	71,085.63	71,085.65	71,085.66
Stock of B (5%)	69,063.48	69,063.57	69,063.59	69,063.59
Total	\$2,430,149.02	\$2,430,149.20	\$2,430,149.24	\$2,430,149.25

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A	Trial 12
Net worth exclusive of stock in other companies	\$ 850,000.00
Stock of B (15%)..	207,190.78
Stock of C (15%)..	364,522.39
Total	\$1,421,713.17

B	
Net worth exclusive of stock in other companies	\$ 925,000.00
Stock of A (15%)..	213,256.98
Stock of C (10%)..	243,014.92
Total	\$1,381,271.90

C	
Net worth exclusive of stock in other companies	\$2,290,000.00
Stock of A (5%)...	71,085.66
Stock of B (5%)...	69,063.59
Total	\$2,430,149.25

“By this test method we have obtained the following net-worth valuations for the three companies:

Corporation A	\$1,421,713.17
Corporation B	1,381,271.90
Corporation C	2,430,149.25
Total	\$5,233,134.22

“The last column of the ‘trial’ tabulation gives the balance-sheets as revised to show the corrected valuation of the intercompany stock.

“The next step is to calculate the number of shares each corporation will receive from D upon turning in its net worth and receiving its pro rata number of shares. This is done by adding the net worths and calculating the percentage which each net worth is of the combined net worth.”

	Total paid to D	Per cent. of total	Pro rata number of shares
Corporation A	\$1,421,713.17	27.16752%	271,675.2
Corporation B	1,381,271.90	26.39473%	263,947.3
Corporation C	2,430,149.25	46.43775%	464,377.5
Total	\$5,233,134.22	100.00000%	1,000,000.0

“D now holds stock in A, B and C; and when A, B and C distribute ‘D company stock’ to their stockholders, D will receive ‘D company stock’ for its holdings in A, B and C.”

	D receives back
A—receives 271,675.2 shares in D. A then pays back to D in liquidation of A company’s stock held by D, 20% of 271,675.2	54,335.04
B—pays D 20% of 263,947.3	52,789.46
C—pays D 25% of 464,377.5	116,094.4
Total	223,218.9

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	Then	
D stock outstanding:		
Held by A company stockholders, 80% of 271,675.2		217,340.16
By B company stockholders, 80% of 263,947.3		211,157.84
By C company stockholders, 75% of 464,377.5		348,283.1
Total outstanding		776,781.1

Percentages of outstanding:		
A company	27.9796%	
B company	27.1837%	
C company	44.8367%	
	100.0000%	

“D company then proceeds to distribute to its stockholders the D company stock which it received from A, B and C, as follows:

Those who were stockholders in company A, 27.9796% of 223,218.9 shares	62,455.84
Those who were stockholders in company B, 27.1837% of 223,218.9 shares	60,679.16
Those who were stockholders in company C, 44.8367% of 223,218.9 shares	100,083.9

Total distributed by D

223,218.9

“The total D company stock will then be held as follows:

Those who were stockholders in company A:		
Received from corporation A	217,340.16	
Received from corporation D	62,455.84	279,796
Those who were stockholders in company B:		
Received from corporation B	211,157.84	
Received from corporation D	60,679.16	271,837
Those who were stockholders in company C:		
Received from corporation C	348,283.1	
Received from corporation D	100,083.9	448,367
Total shares of D		1,000,000

“The problem calls for the percentage of shares received by the stockholders in A, B and C. Therefore:

Stockholders of A	27.9796%
Stockholders of B	27.1837%
Stockholders of C	44.8367%
	100.0000%

The total equity or paid-in value of the consolidated capital will be the combined net worths *exclusive* of the intercompany stock holdings that have now been liquidated, the stock surrendered and canceled, as follows:

From corporation A	\$ 850,000
From corporation B	925,000
From corporation C	2,290,000
Consolidated capital	\$4,065,000

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SECOND SOLUTION

"The balance-sheets may be rearranged to show the interest which each company has in the other as carried on their present balance-sheets, thus:

	A	B	C
Assets other than stock	\$1,100,000	\$1,675,000	\$3,390,000
Stock of A .....	.....	150,000	50,000
Stock of B	100,000	.....	60,000
Stock of C	300,000	175,000	.....
Total assets	<u>\$1,500,000</u>	<u>\$2,000,000</u>	<u>\$3,500,000</u>
Liabilities	250,000	750,000	1,100,000
Net worth	<u>\$1,250,000</u>	<u>\$1,250,000</u>	<u>\$2,400,000</u>

"This statement may now be rearranged to show the net worth of each corporation, exclusive of interest in other companies.

	A	B	C
Net worth exclusive of stock in other companies	\$ 850,000	\$ 925,000	\$2,290,000
Stock of A .....	.....	150,000	50,000
Stock of B	100,000	.....	60,000
Stock of C	300,000	175,000	.....
Total net worth	<u>\$1,250,000</u>	<u>\$1,250,000</u>	<u>\$2,400,000</u>

"In this solution it is assumed that A, B and C turn over to D their respective net worths *exclusive* of stock in other companies.

"Then corporations A, B and C will receive from D their proportionate number of shares of D company stock as follows:

A pays in	\$ 850,000
B pays in	925,000
C pays in	2,290,000
Combined capital	<u>\$4,065,000</u>
A's share is	20.910209%
B's share is	22.755228%
C's share is	56.334563%
Total	<u>100.000000%</u>

Therefore:

Corporation A receives 209,102.09 shares of D company stock.

Corporation B receives 227,552.28 shares of D company stock.

Corporation C receives 563,345.63 shares of D company stock.

Total..... 1,000,000.00

"When corporation A receives 209,102.09 shares of D company stock, it distributes them to its stockholders—80% of the 209,102.09 is paid to individuals, 15% to corporation B and 5% to corporation C.

"Now B had received 227,552.28 from D and in addition will receive 15% of 209,102.09 from A, and when it distributes all this stock corporation A will receive more shares of D from B, which it will then redistribute to its stockholders among whom is B. And B upon receiving these shares will distribute to its stockholders, among whom is A, so A will receive a third lot of shares which it will redistribute, some going back to B again.

"This distribution may be made in accordance with the following tabulation:

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	Corporation A	Corporation B	Corporation C	Individual stockholders A	Individual stockholders B	Individual stockholders C
1. Corp. A receives from D	209,102.09					
80% to individuals A				167,281.672		
15% to corp. B		31,365.3135				
5% to corp. C			10,455.1045			
2. Corp. B receives from D		227,552.28				
Total (from A and D)		<u>258,917.5936</u>				
80% to individuals B					207,134.0748	
15% to corp. A	38,837.6390					
5% to corp. C			12,945.8796			
3. Corp. C receives from D			563,345.63			
Total (from A & B & D)			<u>586,746.6141</u>			
75% to individuals C						440,059.9606
15% to corp. A	88,011.9921					
10% to corp. B		58,674.6614				
4. Corp. A (from B & C)	126,849.6311					
80% to individuals A				101,479.7049		
15% to corp. B		19,027.4447				
5% to corp. C			6,342.4815			

	Corporation A	Corporation B	Corporation C	Individual stockholders A	Individual stockholders B	Individual stockholders C
5. Corp. B (from A & C)	.....	77,702.1061	.....	.....	.....	.....
80% to individuals B	.....	.....	.....	.....	62,161.6849	.....
15% to corp. A	11,655.3159	.....	.....	.....	.....	.....
5% to corp. C	.....	.....	3,855.1053	.....	.....	.....
6. Corp. C (from A & B)	.....	.....	10,227.5868	.....	.....	.....
75% to individuals C	.....	.....	.....	.....	.....	7,670.6901
15% to corp. A	1,534.1380	.....	.....	.....	.....	.....
10% to corp. B	.....	1,022.7587	.....	.....	.....	.....
7. Corp. A (from B & C)	13,189.4539	.....	.....	.....	.....	.....
80% to individuals A	.....	.....	.....	10,551.5631	.....	.....
15% to corp. B	.....	1,978.4181	.....	.....	.....	.....
5% to corp. C	.....	.....	639.4727	.....	.....	.....
8. Corp. B (from A & C)	.....	3,001.1768	.....	.....	.....	.....
80% to individuals B	.....	.....	.....	.....	2,400.9414	.....
15% to corp. A	450.1765	.....	.....	.....	.....	.....
5% to corp. C	.....	.....	150.0589	.....	.....	.....
9. Corp. C (from A & B)	809.5316
75% to individuals C	607.1487
15% to corp. A	121.4297
10% to corp. B	80.9532

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	Corporation A	Corporation B	Corporation C	Individual stockholders A	Individual stockholders B	Individual stockholders C
10. Corp. A (from B & C)	571.6062					
80% to individuals A				457,285		
15% to corp. B		85,7409				
5% to corp. C			28,5803			
11. Corp. B (from A & C)		166.6941				
80% to individuals B					133,3553	
15% to corp. A	25,0041					
5% to corp. C			8,3347			
12. Corp. C (from A & B)			36,9150			27,6862
75% to individuals C						
15% to corp. A	5,5372					
10% to corp. B		3,6916				
13. Corp. A (from B & C)	30,5413					
80% to individuals A				24,433		
15% to corp. B		4,5812				
5% to corp. C			1,5271			
14. Corp. B (from A & C)		8,2728				
80% to individuals B					6,6183	
15% to corp. A	1,2409					
5% to corp. C . . . . .			.4136			

	Corporation A	Corporation B	Corporation C	Individual stockholders A	Individual stockholders B	Individual stockholders C
15. Corp. C (from A & B)			1.9407			
75% to individuals C						1.4555
15% to corp. A . . . . .	.2911					
10% to corp. B . . . . .		.1921				
16. Corp. A (from B & C)	1.532			1.2256		
80% to individuals A . . . . .		.2298				
15% to corp. B . . . . .			.0766			
5% to corp. C						
17. Corp. B (from A & C) . . . . .		.4239			.3391	
80% to individuals B						
15% to corp. A . . . . .	.0636					
5% to corp. C . . . . .			.0212			
18. Corp. C (from A & B) . . . . .			.0978			.0733
75% to individuals C						
15% to corp. A0147					
10% to corp. B0098				
Total0783	.0098		279,795.8836	271,837.0138	448,367.0144

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Solution by G. Travis, San Francisco

	First approx.	Second approx.	Third approx.	Fourth approx.	Fifth approx.	Sixth approx.	Seventh approx.	Eighth approx.
Company "A"								
Net assets	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00	\$ 850,000.00
Add 15% "B"	138,750.00 ¹	203,075.63 ¹	206,990.79	207,180.47	207,190.26	207,190.76	207,190.79	207,190.79
Add 15% "C"	343,500.00 ²	363,645.66 ²	364,474.95	364,520.02	364,522.27	364,522.38	364,522.39	364,522.39
Total net assets Co. "A" ...	\$1,332,250.00	\$1,416,721.29	\$1,421,465.74	\$1,421,700.49	\$1,421,712.53	\$1,421,713.14	\$1,421,713.18	\$1,421,713.18
Company "B"								
Net assets	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00	\$ 925,000.00
Add 15% "A"	199,837.50 ³	212,508.19 ³	213,219.86	213,255.07	213,256.88	213,256.97	213,256.98	213,256.98
Add 10% "C"	229,000.00 ⁴	242,430.44 ⁴	242,983.30	243,013.35	243,014.85	243,014.92	243,014.93	243,014.93
Total net assets Co. "B" ...	\$1,353,837.50	\$1,379,938.63	\$1,381,203.16	\$1,381,268.42	\$1,381,271.73	\$1,381,271.89	\$1,381,271.91	\$1,381,271.91
Company "C"								
Net assets	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00	\$2,290,000.00
Add 5% "A"	66,612.50 ⁵	70,836.06 ⁵	71,073.29	71,085.02	71,085.63	71,085.66	71,085.66	71,085.66
Add 5% "B"	67,691.88 ⁶	68,996.93 ⁶	69,060.16	69,063.43	69,063.58	69,063.59	69,063.60	69,063.60
Total net assets Co. "C" ...	\$2,424,304.38	\$2,429,832.99	\$2,430,133.45	\$2,430,148.45	\$2,430,149.21	\$2,430,149.25	\$2,430,149.26	\$2,430,149.26

¹ 15% of \$ 925,000.00 equals \$ 138,750.00
² 15% of 2,290,000.00 " " equals \$ 343,500.00
³ 15% of 1,332,250.00 " " equals \$ 199,837.50
⁴ 10% of 2,290,000.00 " " equals \$ 229,000.00
⁵ 5% of 1,332,250.00 " " equals \$ 66,612.50
⁶ 5% of 1,353,837.50 " " equals \$ 67,691.88
⁷ 15% of 1,353,837.50 " " equals \$ 203,075.63
⁸ 15% of \$2,424,304.38 equals \$ 363,645.66
⁹ 15% of 1,416,721.29 " " equals \$ 212,508.19
¹⁰ 10% of 2,424,304.38 " " equals \$ 242,430.44
¹¹ 5% of 1,416,721.29 " " equals \$ 70,836.06
¹² 5% of 1,379,938.63 " " equals \$ 68,996.93
 and so on.

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The allocation of the 1,000,000 shares of no-par-value stock is then determined in the following manner:

Company "A"				
Total net assets as revised		\$1,421,713.18		
Less:				
15% held by Co. "B"	\$ 213,256.98			
5% held by Co. "C"	71,085.66	284,342.64	\$1,137,370.54	27.979%
Company "B"				
Total net assets as revised		\$1,381,271.91		
Less:				
15% held by Co. "A"	\$ 207,190.79			
5% held by Co. "C"	69,063.60	276,254.39	\$1,105,017.52	27.183%
Company "C"				
Total net assets as revised		\$2,430,149.26		
Less:				
15% held by Co. "A"	\$ 364,522.39			
10% held by Co. "B"	243,014.93	607,537.32	\$1,822,611.94	44.836%
Total consolidated net assets			<u>\$4,065,000.00</u>	<u>100%</u>

The no-par-value stock of the new company is then apportioned in the following ratios:

Company "A"	27.979%
Company "B"	27.183%
Company "C"	44.836%

CORRECTING AN ERROR OF OMISSION

Editor, Students' Department:

SIR: I have studied the answers to accounting theory and practice, part II, of the American Institute examinations, May 17, 1923, as presented by you in the August number of THE JOURNAL OF ACCOUNTANCY, and wish to call your attention to an omission in the answer to question No. 3. This question reads as follows:

"A corporation spends \$500,000 on an advertising campaign during the first six months of the year 1922, and expects to begin to secure benefits therefrom on and after July 1, 1922, and for three succeeding years. How would you handle this expenditure on the published balance-sheet and profit-and-loss account issued to stockholders? How would you handle it on the income-tax return for 1922?"

Two specific questions are asked and you have submitted a full and explicit answer to the first question, which I believe is in accordance with good accounting practice, but you have failed to answer the second half of this question.

The answer to the second half of this question is that the charges must be deducted in the calendar year 1922. Office decision 1039, published on page 130 of cumulative bulletin No. 5, reads as follows:

"A corporation conducted in its taxable year a national campaign of advertising its manufactured product. Inquiry is made as to whether

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this expense of advertising must be charged off as an operating expense during the year in which it was incurred, or whether it can be carried as a deferred asset and charged off over a period of years.

"It is held that the expenses of such advertising campaign are deductible as a business expense only in the return for the year in which such expenses were paid or in the year in which liability therefor accrued, if the books of the company are kept on an accrual basis."

WM. W. JOHNSTON.

Springfield, Massachusetts.

Robert G. Severance and Edgar G. Lucker announce the opening of an office under the firm name of Lucker & Severance, with offices at 1051 Ellicott Square, Buffalo, New York.

Marwick, Mitchell & Co. announce that John Watt has been admitted to partnership in the firm and will continue at the Pittsburgh office of the firm as resident partner.

Price, Waterhouse & Co. announce the removal of their Los Angeles offices to the A. G. Bartlett building, 215 West Seventh street.

F. A. Morrison & Co. announce the opening of an office at 237 Tube Concourse building Jersey City, New Jersey.

J. H. Wren & Co., Norfolk, Virginia, announce that Stewart A. Steen has become a member of the firm.

Kinard & Olcott announce the removal of their El Dorado, Arkansas, offices to 16 Marks building.

Goldenberg, Rosenthal & Co. announce the removal of their offices to Widener building, Philadelphia.

Charles Gale announces the removal of his office to 294 Washington street, Boston, Massachusetts.

W. S. Dent announces the opening of offices in the Foster building, Denver, Colorado.

Samuel C. Hyer announces the removal of his office to 150 Nassau street, New York.

Elias A. Penzell announces the opening of an office at 276 Fifth avenue, New York.