

ON THE ACCURACY OF TRAINING
IN THE FUNDAMENTAL OPER-
ATIONS OF ARITHMETIC

A test of the fundamental operations of arithmetic, the Woody-McCall Mixed Fundamentals, Form I, was given to a group of first year students at the State Normal School at Harrisonburg, Va., seven weeks after the opening of the session. Of this group 244 were graduates of accredited high schools of Virginia within the last four years. This group divided itself into four sections by the choice of its members to prepare themselves to teach in the primary grades (Pr.), the grammar grades (Gr.), the high school (H. S.), or in the field of home economics (H.E.).

The test was given to the group at one time, exactly according to the printed instructions with the single exception of the time allowed, which was twelve minutes instead of twenty. This number was arrived at by allowing the group twice as much time as was required by the pupil who completed the whole test first. The results are tabulated below in Table I.

TABLE I

	Number making each score					W. G.
	Pr.	Gr.	H.S.	H.E.	Whole Group	Less Gr.
34	0	0	2	0	2	2
33	1	2	1	0	4	2
32	2	0	4	0	6	6
31	3	8	10	1	22	14
30	2	11	2	2	17	6
29	9	6	5	3	23	17
28	5	11	7	6	29	18
27	14	5	2	3	24	19
26	14	5	8	6	33	28
25	3	4	7	3	17	13
24	8	2	7	7	24	22
23	7	3	1	5	16	13
22	0	1	4	2	7	6
21	3	1	3	3	10	9
20	1	0	1	0	2	2
19	0	1	0	1	2	1
18	1	0	0	0	1	0
17	3	0	0	1	4	4
Median	26.9	28.7	27.5	25.5	27.6	26.7

A glance at the position of the median in the first four columns reveals a considerable variation. The high median in the Gr. column is easily explained by the statement that this section had been taking a course in arithmetic for the grammar grades for seven weeks, while none of the other sections had had any arithmetic during that time. For this reason the extra column has been added,

giving the scores for the 184 students who had no instruction in arithmetic. The difference in the other three groups may be accidental.

It is the intention of the writer to carry on a series of experiments covering a term of years to determine if possible whether there is any relation between ability in arithmetic and the choice of the grade in which an individual desires to teach.

An analysis of the class of errors was made as follows. In Table II the column on the left gives number of the problem on the sheet. The other columns give the respective number of failures to solve the given problems in each of the groups and in the whole group.

TABLE II

No. of Problem	Number of Failures to Solve				W.G.
	Pr.	Gr.	H.S.	H.E.	
1	1	1	0	0	2
2	4	1	0	1	6
3	1	0	1	1	3
4	4	5	4	9	22
5	3	0	3	2	8
6	5	4	5	1	15
7	4	6	7	4	21
8	1	2	1	3	7
9	12	8	8	6	34
10	0	1	3	1	5
11	12	13	12	5	42
12	3	0	0	2	5
13	8	1	4	1	14
14	7	9	3	6	25
15	7	5	3	6	21
16	21	9	12	6	48
17	4	1	6	4	15
18	13	6	12	15	46
19	10	5	4	8	27
20	23	12	19	11	65
21	17	15	18	12	64
22	44	23	20	20	107
23	10	9	9	14	42
24	5	3	2	1	11
25	14	5	8	12	39
26	53	36	34	38	161
27	26	16	15	13	70
28	25	13	15	19	72
29	41	26	32	27	126
30	51	25	34	30	140
31	58	25	42	34	159
32	50	34	38	30	152
33	28	16	20	20	84
34	66	34	47	40	187

The errors in the last four exercises were mostly either omissions or failures to simplify results. On account of the shortness of time allowed in taking the test, the results of the last four exercises are therefore discarded as meaningless.

The average number of errors for each individual then appears as follows:

Pr.	5.6
Gr.	4.3
H.S.	4.6
H.E.	6.5
Whole Group	5.1
Whole Group Less Gr.	5.4

Examining the frequency and the kinds of errors in the whole group we find

161 or 66 percent failed on No. 16,	.003).0936
140 or 57 percent failed on No. 30,	$3 \frac{7}{8} - 1 \frac{5}{8}$
126 or 47 percent failed on No. 29,	$62.50 \div 1 \frac{1}{4}$
107 or 44 percent failed on No. 22,	$23)469$
72 or 30 percent failed on No. 28,	6.25×3.2
70 or 29 percent failed on No. 27,	Add $2 \frac{1}{6}$, $6 \frac{3}{8}$ and $3 \frac{3}{4}$
65 or 27 percent failed on No. 29,	Add \$8.00
	5.75
	2.33
	4.16
	.94
	6.23
64 or 26 percent failed on No. 21,	24×234
48 or 20 percent failed on No. 16,	Subtract 567482
	<u>106493</u>
46 or 19 percent failed on No. 18	8754×8

The writer submits these results to teachers of arithmetic without comment, except to state again that the pupils who took this test are all graduates of accredited high schools¹ of Virginia within the last four years.

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¹The writer will be glad to furnish to principals of high schools information as

to type of errors made by pupils who are graduates of their respective high schools.

PURPOSEFUL ACTIVITY IN THE THIRD GRADE

A PURPOSEFUL activity or project in the form of dramatization of plays has just been completed in the 3-B grade of the Harrisonburg Training School. The entire project, from beginning to end, was the work of the children—initiating, planning, executing and judging. Of course it was not without many defects, but the benefits derived by the children were more than anyone expected, and many children who were usually backward came up to the standard, offered valuable suggestions and did splendid work in a most surprising way.

The beginning was natural, coming entirely from the children. One group asked to "play a story" which they had read. Consent was given and the performance was staged. The children were delighted with this and asked if they could give other plays. Then another child suggested that they make their plays like real ones and have costumes. To this a third child added the idea of a stage, a real curtain, and eventually the idea of scenes was initiated. Plans rapidly developed, and by the end of the reading period the children had decided upon dividing the

class into various groups, and each was to give a play. When one child found a story that he wanted to play, he could call a group together and if it was agreeable to all concerned, that story was decided upon. And so in this way six groups originated, giving the following plays:

1. Peter Rabbit
2. Tom Tit Tot
3. The Three Bears
4. Snow White and Rose Red
5. Red Riding Hood
6. Epaminondas

Every child in the room was to take part, but one child was selected as the manager of the play, and under his leadership it made rapid progress.

In order to decide upon the plays that they could best give, much reading had to be done. Stories of every sort were read, and one child, who had heretofore had an aversion to reading, began reading with interest. He was rewarded by being made manager of his group by the children. The reading taught the children new words, gave them new thoughts, and added to their knowledge of good stories. Aside from valuable work for the children in reading, the following subjects were used: