

**THE PROGRESSIVE INTELLECTUAL
ARITHMETIC, ON THE INDUCTIVE
PLAN. AND DESIGNED FOR THE MORE
ADVANCED CLASSES IN COMMON
SCHOOLS AND ACADEMIES**

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The Progressive Intellectual Arithmetic, on the Inductive Plan. And Designed for the More Advanced Classes in Common Schools and Academies by Horatio Nelson Robinson

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HORATIO NELSON ROBINSON

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Horatio Nelson Robinson

THE

PROGRESSIVE

INTELLECTUAL ARITHMETIC;

ON THE INDUCTIVE PLAN.

BEING

A SEQUEL TO THE PROGRESSIVE PRIMARY ARITHMETIC, CONTAINING
MANY ORIGINAL FORMS OF ANALYSIS APPLICABLE TO A
GREAT VARIETY OF PRACTICAL QUESTIONS.

AND DESIGNED FOR

THE MORE ADVANCED CLASSES

IN

COMMON SCHOOLS AND ACADEMIES.

EDITED BY

DANIEL W. FISH, A.M.

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PREFACE.

THE importance, and the practical benefit to be derived from the study of Intellectual Arithmetic, not only as a preparation for business life, but as a means of developing and strengthening the thinking and reasoning powers, and of *thorough mental* culture, can not be over-estimated. Not only is it a necessary study for *young pupils*, but indispensable to the more advanced student, as a preparation for the prompt and accurate business man. And it is believed that, as a general rule, the most *critical, correct, and ready* students of mathematics are those who have been most thoroughly drilled in intellectual arithmetic.

This work has been prepared more especially for *advanced classes*, and is designed for those who have first been well taught in the primary book, and for such as are pursuing the study of written arithmetic, or algebra, and who have never been *thoroughly* exercised in this branch of study.

Only a few of the many points of difference between this and other similar works, and which, it is believed, renders this superior to them, will be referred to.

It is more *complete, comprehensive, and progressive* in its character. The arrangement and classification are more strictly *systematic*, and in accordance with the natural order of mathematical science. The development of principles, and their applications, are shown by a more numerous selection, and greater variety of appropriate examples, *progressively* arranged, commencing with those that are simple and easy, and advancing to those more complex and difficult.

At intervals, and especially in the closing sections of each chapter, examples are given containing such a combination of principles, and forms of analysis, as to require a knowledge of almost every principle *previously* taught, thus affording the pupil a thorough review, as well as requiring him to *classify* his knowledge of what he has been over.

One of the most important, and, it is thought, one of the most original and useful features of this work, is the *full, concise, and uniform* system of ANALYSIS it contains, — the result of long experience in the school-room.

Particular attention is invited to the subjects of *Fractions, Percentage, and Interest*; their treatment is peculiar, and adapted to obviate many of the difficulties, and greatly *abbreviate* most of the operations in them.

The chapter of Miscellaneous Examples will afford a valuable and thorough drill to the advanced student of arithmetic or algebra. They contain a great variety of principles, and while they may be considered difficult, yet the full analysis given of every principle, and the selection of numbers so adapted to the conditions of the question as to produce results free from large and difficult fractions, will render a *mental* solution of them comparatively easy.

In conclusion, we may be allowed to express the belief, that in this work the thorough teacher will find a *desideratum* long sought in this department of science,—the means of mental discipline and development such as has been furnished by no similar treatise.

THE AUTHOR.

SUGGESTIONS TO TEACHERS.

Pupils of nearly the same degree of advancement should be classed together. Regular exercises should be assigned to the class, and sufficient time allowed them to thoroughly examine their lesson before being called upon to recite.

The use of the book at the time of recitation should be *strictly prohibited*, except, perhaps, in some of the more difficult lessons in the latter part of the work.

Each example should be read but *once, slowly and distinctly*, the pupils called upon *promiscuously*, who should arise, stand erect, repeat the example, and then give the analysis. This will secure close attention.

Every question should be *clearly and thoroughly analyzed*, and the pupil required to adhere strictly to the *forms* of solution given, unless better ones can be substituted; and in no case should he be allowed to omit the *conclusion*, commencing with "Therefore."

The class should be encouraged to detect and correct errors in statement or analysis, to criticise and make proper inquiries, all of which should be signaled by the uplifted hand.

It is suggested that the class be occasionally exercised upon "Ringing the Changes," as explained in the Appendix, and which may be applied to a great number and variety of examples. It will not only afford a valuable drill, but a pleasant and enlivening exercise.

INTELLECTUAL ARITHMETIC.

CHAPTER I.

ADDITION.

1. JAMES had 1 cent, and his father gave him 1 more ; how many had he then ?
2. If a slate pencil cost 2 cents, and a steel pen 1 cent, how many cents will both cost ?
3. George spent 2 cents for candy, and had 2 cents left ; how many cents had he at first ?
4. A farmer sold a calf for 3 dollars, and a pig for 2 dollars ; how many dollars did he receive for both ?
5. Mary gave 2 cents for some tape, and 5 cents for a thimble ; how many cents did she give for both ?
6. Martin gave John 3 apples, and kept 4 for himself ; how many apples had he at first ?
7. There are 4 books on one desk, and 2 books on another ; how many books on both desks ?
8. If a lemon cost 3 cents, and an orange 5 cents, how many cents do both cost ?
9. In a certain class there are 5 girls and 4 boys ; how many pupils in the class ?
10. Samuel had 3 marbles, and his brother gave him 3 more ; how many did he then have ?
11. Bought a barrel of apples for 2 dollars, and a cord of wood for 4 dollars ; how many dollars did both cost ?

2. 1. 1 and 1 are how many?
2. 1 and 2 are how many?
3. 2 and 2 are how many?
4. 2 and 3 are how many?
5. 2 and 4 are how many?
6. 2 and 5 are how many?
7. 2 and 6 are how many?
8. 2 and 7 are how many?
9. 2 and 8 are how many?
10. 2 and 9 are how many?
11. 3 and 3 are how many?
12. 3 and 4 are how many?
13. 3 and 5 are how many?
14. 3 and 6 are how many?
15. 3 and 7 are how many?
16. 3 and 8 are how many?
17. 3 and 9 are how many?
18. 3 and 10 are how many?
19. 4 and 2 are how many?
20. 4 and 3 are how many?
21. 4 and 4 are how many?
22. 4 and 5 are how many?
23. 4 and 6 are how many?
24. 4 and 7 are how many?
25. 4 and 8 are how many?
26. 4 and 9 are how many?
27. 4 and 10 are how many?
28. 5 and 1 are how many?
29. 5 and 2 are how many?
30. 5 and 3 are how many?
31. 5 and 4 are how many?
32. 5 and 5 are how many?
33. 5 and 6 are how many?
34. 5 and 7 are how many?
35. 5 and 8 are how many?
36. 5 and 9 are how many?

3. 1. A man bought a calf for 7 dollars, and sold it for 3 dollars more than he gave for it; how much did he sell it for?

2. Bought a barrel of cider for 2 dollars, and 20 bushels of apples for 8 dollars; how many dollars did the whole cost?

3. If a coat cost 10 dollars, and a pair of pantaloons 5 dollars, what will be the cost of both?

4. A merchant bought 4 boxes of black tea, and 7 boxes of green tea; how many boxes did he buy of both kinds?

5. A farmer sold 5 sheep to one man, and 9 to another; how many did he sell to both?

6. Ralph walked 4 miles and rode 10 miles; how many miles did he go?

7. Philip answered 8 questions in geography, and Oliver 5; how many questions did both answer?

8. If a quart of chestnuts cost 10 cents, and a quart of walnuts 4 cents, what will be the cost of one quart of both?

9. 6 and 3 are how many?
10. 6 and 4 are how many?
11. 6 and 5 are how many?
12. 6 and 6 are how many?
13. 6 and 7 are how many?
14. 6 and 8 are how many?
15. 6 and 9 are how many?
16. 6 and 10 are how many?
17. 7 and 4 are how many?
18. 7 and 5 are how many?
19. 7 and 6 are how many?
20. 7 and 7 are how many?
21. 7 and 8 are how many?
22. 7 and 9 are how many?
23. 7 and 10 are how many?
24. 8 and 3 are how many?