KEY TO BONNYCASTLE'S GUIDE TO ARITHMETIC: DESIGNED FOR THE USE OF TEACHERS, AND PERSONS DESIROUS OF BECOMING THEIR OWN INSTRUCTORS

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Key to Bonnycastle's Guide to Arithmetic: Designed for the Use of Teachers, and Persons Desirous of Becoming Their Own Instructors by E. C. Tyson & William Rutherford

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E. C. TYSON & WILLIAM RUTHERFORD

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KEY

TO

BONNYCASTLE'S GUIDE

TO

ARITHMETIC:

DESIGNED FOR THE USE OF TEACHERS, AND PERSONS DESIROUS OF BECOMING THEIR OWN INSTRUCTORS.

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A NEW EDITION, ENTIRELY RE-EDITED.

BY DR. RUTHERFORD, F.R.A.S.

ROYAL MILITARY ACADEMY.

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1860.

181. c. 6.

PREFACE.

THIS Key to Bonnycastle's Guide to Arithmetic contains the solutions to all the unanswered questions embodied in that excellent work. In preparing this edition of the Key, every solution has been examined with care; some faulty solutions have been corrected, others have been modified, and answers have been supplied to all the exercises which were left unanswered in the previous edition, as presenting difficulties unsurmountable without the introduction of algebraic symbols and investigations which were deemed foreign to a work on arithmetic. Some of the exercises in the Rule of Position, and in the "Arithmetical Recreations" especially, were considered beyond the power of arithmetic to solve; but to several of these, purely arithmetical solutions have been given, which, it is hoped, will be interesting to the student.

The modern method of extracting the cube root of any number has been introduced in this edition, thereby rendering the operation nearly as simple as that for the extraction of the square root.

The Work, together with the Key, forms an excellent treatise on the science of Arithmetic, one of the most useful branches of education; and as the Key has been enriched with several improved processes of calculation, it is hoped that, jointly, they will supply an amount of information seldom met with in any of the ordinary treatises on Arithmetic.

WILLIAM RUTHERFORD.

Royal Military Academy,
Woolwich.

CONTENTS.

	PAGE
Numeration	1
Simple Addition	2
——— Subtraction	2
——— Multiplication	4
——— Division	5
Compound Addition	11
——— Subtraction	17
——— Multiplication	21
Bills of Parcels	23
Compound Division	25
Reduction	29
Rule of Three	35
Compound Proportion	53
Practice	55
Tare and Trett	66
Fractions	69
Reduction of Fractions	69
Addition of ditto	75
Subtraction of ditto	77
Multiplication of ditto	78
Division of ditto	79
Rule of Three in Fractions	80
Decimal Fractions	82
Addition of Decimals	82
Subtraction of ditto	82
Multiplication of ditto	82
Division of ditto	84
Reduction of ditto	85
Rule of Three in Decimals	88
Circulating Decimals	89
Reduction of ditto	89
Addition of ditto	90
Subtraction of ditto	92
Multiplication of ditto	92
Division of ditto	93
Duodecimals	94
Involution	96
Evolution	97
Extraction of Square Root	97
Extraction of Cube Root	99
Extraction of Roots in general	103
Arithmetical Progression	105
Geometrical Progression	106
Barter	108
Profit and Loss	108
Partnership without regard to time	110
Partnership with regard to time	112
Alligation	113
Single Position	116
Double Position	117
Permutations and Combinations	121
Commission, Brokerage, Insurance, &c.	122
Simple Interest	125
Ditto by Decimals	127
Compound Interest	128
Ditto by Decimals	130
Discount	131
Ditto by Decimals	132
Equation of Payments	133
Annuities	135
Amount of Annuities at Simple Interest	136
Present worth of ditto	137
Amount of Annuities at Compound Interest	137
Present worth of ditto	138
Perpetuities	139
Present value of an Annuity in Reversion	140
Present value of a Perpetuity in Reversion	141
Exchanges	143
Arbitration of Exchanges	147
Arithmetical Recreations	147
Appendix	157

KEY

TO

BONNYCASTLE'S ARITHMETIC.

NUMERATION.

Answers to the Examples in pages 2 and 3.

52—185—204—717—860—303—1033—157505—1300000—1200675—2000097—808008008.

Fifty-eight—One hundred and one—One thousand, seven hundred and eighty-six—One thousand, eight hundred and twenty-eight—One hundred and one thousand, and eighteen—Five hundred and five thousand, six hundred and eighty-one—Nine thousand, and ninety-one—Ten thousand, eight hundred and three—Forty-two thousand, six hundred and seventy-eight—One hundred and thirty thousand, three hundred and six—One hundred and twenty-three thousand, four hundred and fifty-six—One million, two hundred and thirty-four thousand, five hundred and sixty-seven—Thirty-eight thousand, seven hundred and twenty-six — Five hundred thousand, and two — Four hundred and one thousand, and nineteen—Seven hundred and sixty-eight thousand, five hundred and twenty—Thirteen thousand, five hundred and seventy-nine — Nine millions, nine hundred and eight thousand, and sixty.

SIMPLE ADDITION, p. 5.

(4)	(5)	(6)	(7)
8653	97684	3684	37006
2194	30768	4863	429009
7421	5015	365	2000036
5063	307	29	2466051
2196	36	56874	
1245	15	609	
26772	133825	66424	

(8)		(9)		(10)
January .	31 days.	April . .	29 days.	£ 3129
February .	29 „	May . .	31 „	5009
March ..	31 „	June . .	30 „	4009
April . .	30 „	July . .	31 „	4009
May . .	31 „	August .	31 „	4009
June . .	30 „	September	30 „	4009
July . .	31 „	October .	31 „	£ 24174
August .	31 „	November	28 „	
September	30 „	1 Year =	365 „	
	274 days.		606 days.	

SIMPLE SUBTRACTION, p. 6.

(4)	(5)
2683947	1060901
685427	999999
1998520	60902

(6)

The Indian method of notation was first known in England about the year 1150; how many years have elapsed from that period to the present year 1859?

Years.
1859
1150
Ans. 709

(7)

Sir Isaac Newton was born in the year 1642, and died in 1727; how many years did he live?

Years.
1727
1642
Ans. 85

(8)

The art of printing was invented in . . 1440
and the mariner's compass in 1302
Interval = 138 years.

Columbus discovered America in . . . 1492
The mariner's compass invented in . . . 1302
Interval = 190 years.

Columbus discovered America in . . . 1492
The art of printing discovered in . . . 1440
Interval = 52 years.

(9)

Distance between London and Edinburgh . 393 miles.
„ „ London and Newcastle . 272 „
Distance between Edinburgh and Newcastle 121 miles.

(10)

	Years.
The Peloponnesian war began about 431 years before the birth of our Saviour, and 2290 years from the present year; required the number of years elapsed since the birth of Christ.	2290
	431
Ans.	1859

(11)

	Years.
The dedication of the temple at Jerusalem took place before the Christian era	1004
Jerusalem was conquered before ditto	587
Interval =	417

(12)

The first recorded lunar eclipse took place 2580 years.
before the present year . . . . . 1859 „
Interval between eclipse and birth of Christ = 721 years.

(13)

Homer was born . . . . . 2766 years ago.
Homer lived . . . . . 62 years.
Homer died . . . . . 2704 years ago.
Birth of our Saviour . . . . . 1859 „
Interval between the death of Homer and the birth of our Saviour . . = 845 years.

SIMPLE MULTIPLICATION, p. 9.

(2)
4768923
7
33382461

(3)
796534289
11
Prod. 8761877179

(4)
54328432847
8
Prod. 434627462776

(5)
8643597
9
77792373

(6)
57864329
579
520778961
405050303
289321645
Prod. 33503446491

(7)
3274656461
12
Prod. 39295877532

(8)
7324687567
15
36623437835
7324687567
109870313505

(9)
94713761
18
757710088
94713761
Prod. 1704847698

(10)
273580961
23
820742883
547161922
Prod. 6292362103

(11)
27501976
271
27501976
192513832
55003952
7453035496

(12)
82164973
3027
575154811
164329946
246494919
248713373271

(13)
6247386495
27356
37484318970
31236932475
18742159485
43731705465
12494772990
Prod. 170903504957220

(14)
8496427
874359
76467843
42482135
25489281
33985708
59474989
67971416
Prod. 7428927415293

(15)
123456789
123456789
1111111101
987654312
864197523
740740734
617283945
493827156
370370367
246913578
123456789
Prod. 15241578750190521