Therefore $x + \frac{1}{x}$ can be found, and hence x. The solution is $x = 2$.

6. Let $y = z\,x$. Then

$$x^2 (1 + z + z^2) = \tfrac{1}{4},$$
$$x^2 (4 + 11 z + 8 z^2) = \tfrac{1}{4}.$$

Eliminate x, and the rest is plain sailing.

7. Put s for $2x + y$, and d for $2x - y$. Then

$$\frac{1}{sd} + \frac{1}{s} = \frac{4}{3},$$
$$\text{and, } d - 2\,sd + 3 = 0.$$

The equations in this form present no difficulty.

8. Bookwork.

9. Bookwork.

10. Let $2x$ be the distance of P from M, and Zx the distance of distance of P from N; y the rate of B, and $y + 1$ the rate of A. Then

$$\frac{3x}{y} - \frac{2x}{y+1} = 5,$$
$$\text{and, } \frac{6}{y} + \frac{1}{2} + \frac{x}{2y} = \frac{5x}{2(y+1)}.$$

Eliminate x. Then $y = 2$, and $5x = 30$.

MISCELLANEOUS CORRESPONDENCE.

To the Editor of the Journal of Education.

In the January No. of the journal, Mr. J. A. McLellan, solves the problem cited as No. 4, and enunciated "City of Toronto Debentures, 6 per cent, having 6 years to run, are offered for sale; What price shall I pay to realize 10 per cent, upon my investment?" Mr. McLellan makes the result to be $100 \times (1.06)^4 \div (1{\cdot}1)^4$ to which I demur.

A six per cent debenture entitles the holder to receive \$6 00 annually, and \$100 at expiry of term. Consequently the present value at 10 per cent of one having six years to run is $\frac{6.}{(1{\cdot}1)^6} + \frac{6.}{(1{\cdot}1)^5} + \frac{6.}{(1{\cdot}1)^4} + \frac{6.}{(1{\cdot}1)^3} + \frac{6.}{(1{\cdot}1)^2} + \frac{6.}{(1{\cdot}1)} + \frac{100}{(1{\cdot}1)^6}$ which $= \frac{6\,(1{\cdot}1)^6 + 4}{{\cdot}1 + (1{\cdot}1)^6}$ as may be be proved by actual expansion and collation, and which may be further transformed into $60 + 40 \div (1{\cdot}1)^6 = \$32.579$.

Mr. McLellan's result is \$50.071.

H. T. Scudamore.

Euphrasia, 19th, July, 1872.

To the Editor of the Journal of Education.

In the April No. of the *Journal* Mr. Ireland propounds this problem:—"An Indian Reserve is bounded by four straight lines 1, 2, 3, 4 miles. Required its maximum area in square miles"

A quadrilateral is a maximum when it can be inscribed in a circle, that is, when it has its opposite angles supplementary to each other.—(See Geom. maxa. and mini.) And it makes no difference in what order the sides are taken.—(Euclid, 3 Book, prop. 10.)

$\therefore$ putting a, b, c, d for the sides we have

$$a^2 + b^2 - 2\,ab \cos\psi = c^2 + d^2 - 2\,cd \cos(180^\circ - \psi)$$

But $\cos(180^\circ - \psi) = -\cos\psi \;\therefore \cos\psi = \frac{a^2 + b^2 - c^2 - d^2}{2\,ab + 2\,cd}$

And the area of the quadrilateral is

$\frac{ab}{2} \sin\psi + \frac{cd}{2} \sin(180^\circ - \psi)$ But $\sin\psi = \sin(180^\circ - \psi)$

and $\sin\psi = \sqrt{1 - \cos^2\psi} = \frac{\sqrt{4(ab + cd)^2 - (a^2 + b^2 - c^2 - d^2)^2}}{2\,ab + 2\,cd}$

Consequently the area is

$$\tfrac{1}{4}\sqrt{4\,(ab + cd)^2 - (a^2 + b^2 - c^2 - d^2)^2}.$$

Inserting the values of a, b, c, d, viz., 1, 2, 3, we get the area $\sqrt{24}$ miles.

This expression for the area may be reduced by putting $2S = a + b + c + d$ into the form $\sqrt{(s-a)(s-b)(s-c)(s-d)}$.

H. T. Scudamore.

Sutherland's Corners P. O., 18th July, 1872.

To the Editor of the Journal of Education.

Sir,—Having noticed in the April Number of the *Journal* some answers to the question "A lends B \$1,000, payable in ten annual instalments of \$160 each. What rate per cent. simple interest does B pay for his money?" I give the following remarks and figures thereon. In this agreement the ten payments, = \$1,600, pays principal and interest—consequently each payment pays the interest due at the end of each year, and some of the \$1,000 back each year, leaving the borrower with less and less of the \$1,000 every year. Now if the rate per cent. is $21\frac{3}{7}$, the first payment will not nearly pay the interest due on the \$1,000 B has had the first year will not pay any of the principal. And the rate $10\frac{10}{11}$, as some seem to think it is, is on the assumption that B pays \$100 of the principal off each year, which only leaves \$60 interest equal to 6 per cent. first year, while for the last year B is made to pay 60 per cent. I have no very satisfactory solution to the question, but find the rate to be 9·607 nearly, and give the following table of payments as proofs of its correctness:—

				Interest.	Principal.	Back.
First year	B has	\$1,000,	for which he pays	\$96·07 +	63·93	= 160
2nd	"	936·07	" "	87·92 "	70·08	"
3rd	"	865·99	" "	83·19 "	76·81	"
4th	"	789·18	" "	75·81 "	84·19	"
5th	"	704·99	" "	67·72 "	92·28	"
6th	"	612·71	" "	58·86 "	101·14	"
7th	"	511·57	" "	49·14 "	110·86	"
8th	"	400·71	" "	38·48 "	121·52	"
9th	"	279·19	" "	26·81 "	133·19	
10th year	B had	146·00	" "	14·00 "	146·00	"
		\$6,246 42		\$600.00	\$1,000	

From the above it will be seen that B has \$6,246·42 equal to one year, for which he pays \$600 interest; which makes it to the lender if he lets the repayment, on the same terms, out again as soon as he has paid, the same as lending money at 9·607 per cent. per annum compound interest.

Yours,

T. B. White.

Collingwood, July 26, 1872.

To the Editor of the Journal of Education.

The April No. of the *Journal*, contains an elegant and very elaborate article upon Interest, by Mr. Cameron. I have perused the article with much pleasure and profit, and, in venturing to criticize it, do so with all due deference.

I have not at present sufficient leisure to make more than one remark. It is in reference to the principle whereby Mr. C. computes the rate of interest on the protested money-lending case. My remark takes the form of a problem.

A. lends B. \$100, payable in 41 annual instalments of \$5 each. What rate per cent., simple interest, does B. pay for his money?

By Mr. Cameron's mode of computation we learn:—

Interest for 1st year $= 100\,r$.
" 2nd " $= (100 - 5)\,r$.
" 3rd " $= (100 - 2 \times 5)\,r$.
" 4th " $= (100 - 3 \times 5)\,r$, &c., &c.

for 41 terms, the last of which is

Interest for 41st year $(100 - 40 \times 5)\,r$.

Summing, we obtain $\left(41 + 100 - \frac{41 + 40 + 5}{2}\right) r = 41 + 5 - 100$

whence $r =$ infinity.

Such a fearful rate of interest as this would soon land a borrower in the Bankruptcy Court.

I think the fallacy lies deeper than a mere diversity between Mr. C.'s mode and that of the text books, and is inherent in the very idea of there being any such thing as simple interest in contradistinction to compound interest. I should like to see the subject discussed in your columns, and should opportunity permit may address you again on the subject.

Henry Thos. Scudamore.

Euphemia, 19th July, 1872.

III. Miscellaneous.

RAIN IN SUMMER.

How beautiful is the rain,
After the dust and heat
In the broad and fiery street—
How beautiful is the rain!