588. Mnemonic for μ

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lifting the reproach from elementary mechanics of being too scanty in its kinetic content and overburdened in its mathematical form.

Sydney.

F. G. BROWN.

587. [I. 2.] *An Old Result in Novel Form.*

Any number N is written down, and beneath it are written its multiples $2N, 3N, \dots$ up to $10N$.

Consider the ten figures in any column. There does not appear to be any general law; yet every complete column must contain *either* a 9 or a 0. Prove this.

[In the first column the gaps may be filled by 0's, and the same result holds.]

If the multiples of N up to $100N$ are written down in the same way, then it is certain that any two adjacent columns will, for some multiple, contain either two 9's or two 0's.

	3	8	7	3
	7	7	4	6
1	1	6	1	9
1	5	4	9	2
1	9	3	6	5
2	3	2	3	8
2	7	1	1	1
3	0	9	8	4
3	4	8	5	7
3	8	7	3	0

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H. W. RICHMOND.

588. [I. 1.] *Mnemonic for μ .*

Base ten: best in practical work. Can't evaluate a logarithm? Nothing can be nicer! A constant is clearly needed first. A what's-his-name (Napierian) logarithm I evaluate, employing a simple series. Nothing stiff—nothing. Multiply by an unusually easy and tractable decimal. . . .

“Nothing” = zero. Words (omitting “nothing”) *sic*:

“*Litera petiti numeri index.*”

Simple enough, I'm sure. Just count the letters. Accurate? Yes, I rather think, accurate enough.

W. HOPE-JONES.

589. [K. 21. b.] *A Trisection.*

It is well known that a straight line of given length “moving in the legs” of a right angle enables us to trisect any given angle. But that this property leads in turn to a further trisection is, I think, less widely recognised.

Briefly, the mid-point of the moving line traces a circle; and if two positions of the line intersect at a point on its circumference—the given length being bisected there in one case only—then the angles at the centre, subtended by the two chords, are respectively as 3:1.

If I may invite the reader to draw a figure, a lettered example will make this perhaps rather more clear.

Take the semi-circle ABC (centre O) with diameter CA and ordinate OB , both produced as necessary towards A and B . Let the straight line DE ($=AC$) move in the right angle AOB , D on AC and E on OB . Then its mid-point will lie on the circumference at some point F ; and, except in the tangential case, it (produced, if necessary) will cut the arc again at some point G .

Now let the line move to another position $dFfe$, passing through F but with its mid-point at f . Join OF , OG , and Of .

Then, evidently,

angle $FOC = 3$ times the angle fOA ,

also angle $GOC = 3$ „ „ FOA ,

and therefore angle $FOG = 3$ „ „ fOF ,

and these are the angles at the centre subtended by the two chords FG and fF .

The tangential case where both positions coincide and all the points of intersection lie together at H , on the arc half-way between A and B , calls for little remark; except that the fixed point H is in itself worthy of notice, for in all positions

angle $FOH = \frac{1}{4}$ angle $FOG = 3 \cdot$ angle fOH .

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