As an example, consider the simple problem of a uniform rod AB, of mass m and length $2a$, at rest on a smooth horizontal table. If the rod receives a horizontal impulse J, perpendicular to AB, at A, then it is easily shown that the instanteous centre of the resulting motion is between A and B at the point C where $AC = 4a/3$, and that the kinetic energy generated is $2J^2/m$. In order to use (or illustrate) Bertrand's theorem we apply a variable constraint by smoothly pivoting, to the table, the point P of the rod at distance x from A. The resulting kinetic energy T is easily shown to be given by

$$T = 3J^2 x^2/2m \, (4a^2 - 6ax + 3x^2).$$

Differentiation with respect to x gives

$$\frac{dT}{dx} = 3J^2 \, ax(4a - 3x)/m \, (4a^2 - 6ax + 3x^2)^2,$$

showing that T has, of course, a minimum at $x = 0$ and a maximum value, of $2J^2/m$, when $x = 4a/3$, that is when P coincides with C, and the resulting motion is the same as in the unconstrained case.

The conclusion seems to be that Bertrand's Theorem is not of much assistance in the exact solution of problems, though it may be of use in finding a lower bound for the kinetic energy.

Yours etc., S. T. Cook

To the Editor of the *Mathematical Gazette*

SUBTRACTION AND DIVISION

DEAR SIR,

In a discussion on Subtraction, I see that I am being quoted as an authority for some modern method which teachers of infants have found useful.

Let us be frank about the duties of a member of a committee. Is he to be obstructive about every detail outside his own experience? On a matter of sacred principle or deep conviction let him dig in his heels in passionate protest; but if we all do this about every detail of which we know or care but little, what is left but a mosquito-like swarm of minority-reports on trivialities?

Like most Victorians, I subtract by the outmoded method of the 19th century; but if A or B prefers something better suited to this enlightened age, let him have it: it is out of place for me to object. This is surely a case for easy tolerance.

But if you want something for me to gnash a tooth about, take those mouldy little figures that look like indices and aren't, baffling enough even when neatly printed on page 180† of the current issue, and utterly chaotic when smudged about by a heavy-fisted boy with a fat pen.

† $\dfrac{5^1 2 \, 7^3 6}{4}$

In good Queen Victoria's reign we had heads on the tops of our necks, and we used them for remembering "remainder 3" But if the modern neck is not so garnished, why not put down three fingers of the left hand on the desk and lift them off again when done with? It is not an exhausting procedure.

Then what about a remainder 6? Well, haven't you a back and a front to your hand? When you come to remainder 11, if you haven't grown a head by then it is simpler to use Long Division than to take your boots off and put toes on the desk.

After all, I have seen a boy use Long Division for dividing by 1, and get every figure of the answer right too—(but unfortunately in the reverse order.)

Yours etc., W. HOPE-JONES

Shamley Green, Guildford.

To the Editor of the *Mathematical Gazette*

DEAR SIR:

This letter is an announcement of a new magazine which will appear bimonthly starting February 1961, and which I think might be of interest to readers of the *Mathematical Gazette.* Its title will be *Recreational Mathematics Magazine* and it will be devoted to the lighter side of mathematics. It will include such sundry items as paper-folding, interesting number phenomena, constructions, word games, mechanical puzzles, chessboard problems, treatment of various lighter mathematical topics, brainteasers—in short, anything that can be included in the rather extensive fields of recreational mathematics and puzzles. Of course, *Recreational Mathematics Magazine* is not going to be a mere collection of half-page or one-paragraph puzzles, but will include articles about and discussions of the above mentioned topics and more.

The magazine will sell for 5s ($.70) per issue but the subscription rate is 25s ($3.50) for each year. Cheques should be made out to *Recreational Mathematics Magazine.* Any person getting a new subscriber will receive a free issue and every five new subscribers will earn him a free year's subscription. Anyone getting new subscribers should include his name and address along with those of the new subscribers. Payment will be made for published material. Articles from about 3000 to 4000 words are needed and payment will run from $20.00 to $40.00 (£7 3s to £14 6s) per 1000 words. Puzzles and problems will receive from $5.00 to $10.00 (36s to £3 12s.)

The editor is a member of the National Council of Teachers of Mathematics and of the American Chemical Society. He is, at present, a research chemist with the Atomic Energy Division of Phillips Petroleum Company in Idaho Falls, Idaho, working in the field of radioactive waste disposal. He is a former teacher of mathematics and chemistry, an alumnus of Western Reserve University in Cleveland, Ohio, and an incurable puzzle-fiend.

Yours etc., JOSEPH S. MADACHY