PROJECTIVE GEOMETRY.

To the Editor of the *Mathematical Gazette*.

DEAR SIR,—I think attention should be drawn to a logical slip in the article *Generalised Metrical Theorems* in the *Gazette*, Vol. XXX, No. 290, p. 122. By taking a real circle as his starting-point, the author necessarily confines himself to a *non-degenerate* conic, and so his final theorem (that the diagonals of a square bisect each other), though indisputable, is not proved by this method. There is, as far as I know, no way of passing from the real circle of theorem A, through the non-degenerate conic ϕ (the proof would not work if it were degenerate) of theorem B, to the line-pair AB, AC of the last result.

This step is akin to the " proof " of the theorem of Pappus which every examiner meets at intervals : the two given lines are a special case of a general conic ; project that conic into a circle and chase angles ; hence the result.

While I am writing, may I raise the whole question of projection into the circular points at infinity ? (The author of the above article very carefully avoids projection ; his wording could be taken as a model for the method which he describes.) I should very much like to know whether teachers believe that pupils really understand what they talk so glibly about. The whole idea seems to me full of difficulties, and I usually feel that the phrase " project into . . . " is used as a kind of charm, but that its user could seldom say just how he would do the projection. Are we, in fact, on ground where the school-boy should not stand ? The views of teachers should be very interesting and valuable. Yours etc., E. A. MAXWELL.

TERMINOLOGY IN DYNAMICS.

To the Editor of the *Mathematical Gazette*.

SIR,—Although the word *inextensible* (of strings, etc.) is of frequent occurrence (see any examination paper in mechanics), its meaning is not always clear. For instance, when Mr. Lightfoot refers in a recent article in the *Gazette* * to an " inextensible string of length a " he appears to mean a string of unalterable length ; but when he states, a few lines further on, that " no real string fulfils the condition of being inextensible ", he seems to refer to another property, *viz.* that when the motion of a particle is checked by a string the particle does not rebound and the string afterwards remains taut. May I use your columns, Sir, to urge the use of a terminology that would avoid this confusion?

Two distinct physical properties are involved. First there is the deformability of a body. One says of a solid that it is rigid or non-rigid, or of a fluid that it is compressible or incompressible. Similarly, I suggest, one should say of a string that it is *extensible* or *inextensible* according as it can or can not be stretched. All these adjectives express purely geometrical conditions.

Secondly, there is the property that distinguishes a lump of rubber when it is deformed from a lump of putty, or a collision between steel balls from a collision between lead balls. The common idea behind these phenomena is that, when a deformation or impact occurs, internal forces or stresses come into play, and the property that distinguishes the rubber and the steel from the putty and the lead is that the work done by these internal forces during a cyclic deformation or during the impact is zero. To describe this property I suggest the word *elastic*. Thus a solid is elastic if the deformation-forces are conservative. A collision is elastic if the forces of interaction between the

* *Gazette*, XXX, No. 290, p. 129 (July, 1946).