THE FOUNDATIONS OF GEOMETRY

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The Foundations of Geometry by Edward T. Dixon

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BY

EDWARD T. DIXON.

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PREFACE.

I BELIEVE that the system of geometry I have set forth in this book is logically sound, and that consequently the more it is discussed and criticised, the more firmly will it become established. I shall therefore be very glad to see any criticisms of my views, whether friendly or hostile, either in the public press, or addressed to me privately, at the address given below. But I have already found that, the subject being such a wide one, criticism is apt to become discursive; and with a view to keeping it to the point I would suggest to my critics and opponents in argument that they should consider categorically the following questions:—

(i) Do you accept the requirements I have laid down for a logical definition? (see p. 21).

(If not, please state which of them you object to, why you object to it, and what you would propose to substitute for it.)

(ii) Do you entertain a mental concept (which I shall call by the name 'direction') such that the assertion "A Vector is a given amount of transference in a given direction, irrespective of the point of departure," is intelligible to you?

(iii) If so, does not this concept fulfil all the four requirements of my definition of 'direction'?

(Whether you think these properties are established by Euclid's geometry, or not, is immaterial. If you grant this you have granted my Axiom II.; for this does not assert any objective fact at all.)

(iv) Do you accept the logical accuracy and permissibility of my remaining definitions and axioms?

(Objections on the score of *convenience* and *simplicity* had better be considered elsewhere.)

(v) Do you admit the formal accuracy of the proofs of propositions in my Books I. and II.?

(N.B. If you admit this there can no longer be any doubt as to the sufficiency of my premises.)

(vi) Do you admit the objective applications of my three Axioms, and therefore of my system of geometry, as discussed in Chap. I. of Part. III.?

(vii) If you admit that there is a theoretical doubt as to the objective counterpart of my second Axiom, please give any criticisms which may occur to you on the remainder of Part III.

Now, if there is no flaw in the line of argument I have adopted, it follows that my conclusions are true, and consequently that any objection taken to them outside this line of argument, however specious it may sound, must contain a fallacy. I might therefore refuse to discuss such an objection. But the objector might truly urge that, conversely, if *his* objection was irrefutable, there must be some hidden fallacy in *my* argument. And therefore, though I prefer arguing in my own way, having devoted a good deal of thought to the subject, and having come to the conclusion that my line of argument is the most direct, and the easiest to discuss; I shall nevertheless feel bound to give the best answer I can to any reasonable objection whatever.

I must here point out that, this book being intended for the study of geometricians, I have not entered upon the question whether beginners could readily be brought to understand it or not. If it is not logically sound, to discuss such a question would be useless. But if it is acknowledged to be logical, I have no doubt that it could be drummed into the head of the average schoolboy as easily as Euclid. But I prefer to postpone this question till the more important one is at least on a fair way towards settlement; when I shall, I hope, bring out a text-book for beginners founded on my method.

EDWARD T. DIXON.

12, Barkston Mansions,
South Kensington,
January, 1891.

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