ELEMENTARY NOTIONS OF LOGIC, DESIGNED AS PROLEGOMENA TO THE STUDY OF GEOMETRY

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Elementary Notions of Logic, Designed as Prolegomena to the Study of Geometry by Alfred Milnes

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ALFRED MILNES

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DESIGNED AS PROLEGOMENA TO THE

Study of Geometry

BY

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PREFACE

IT would be no recommendation, but quite the reverse, if a work of the kind that this professes to be were found to contain much that is new. Since, then, its matter can give it no claim to supplant other treatises, my little book, forced to plead for its life before judges at least impartial, possibly severe, must needs be forgiven a statement of its method and purpose somewhat more detailed than may at first sight seem modestly proportioned to its humble dimensions. It purports to be not so much a contribution to logical science itself as to the art of teaching it. I have long been driven to the conclusion that the rationale of the elementary teaching of a subject is in England too often fundamentally mistaken. Too often *Uebersicht* is put where *Einsicht* ought to be. Too often our elementary text-books resemble rather the lecture-notes of a clever student preparing for an examination than the thorough rounded work of the highly-trained teacher. The result is that the student finds himself bewildered by an immense amount of matter crammed into a small compass, and he must needs learn

his subject before he can understand his book. Now I venture to submit that all teaching should be *concentric;* by which I mean that a small area of the subject should be first mapped out and treated as completely as possible, then the boundaries of this area enlarged, and the new area as completely treated again; and so on, till the appointed task be done. At each enlargement of area, the advance into the wider range of thought should bring with it not only new notions, but that which is of infinitely greater importance—more enlarged views of the notions gained hitherto. The following pages contain an endeavour to treat the contents of the first and smallest area for the science of Logic, and in this, as in all other cases, the question must arise as to the boundaries of this first small area. In the present instance, however, the selection was ready to my hand; and I have written on so much of Logic as seems to me to be implied in, and necessary to, a just appreciation of the arguments of the First Book of Euclid. No one can be more painfully aware than myself of the many defects in the execution of this idea as now carried out. Nevertheless, my aim will be attained if, as I trust he may, the student, from carefully following the investigations of this little volume, gains a power which, aided by due industry and perseverance, shall enable him to read and assimilate the works of the great logicians. At the same time, I would also venture to hope that a reader who cannot proceed beyond the limits of one small volume may here obtain a knowledge sound and competent as far as it goes.

It will be as well to state here the exact relation of this work to geometrical knowledge. All the earlier portion

of the book can be read without any knowledge of geometry, but the geometrical examples should not be taken up until they can be treated concurrently with the propositions in Euclid to which they apply. When I speak of propositions in Euclid, however, I must not be understood to be declaring for the teaching of Euclid as distinguished from what is known as Modern Geometry, to which all my tastes and habits as a teacher strongly incline. And in order to make clear that the book applies as much to one as to the other, I have referred to Mr Wilson's Geometry throughout concurrently with Euclid, whenever geometrical examples are quoted. Logicians will not fail to recognize that the word "Prolegomena" on the Title-Page is used in a sense similar to that in which it occurs in Mansel's "Prolegomena Logica."

Some portions of the work have presented to me great difficulties. The chapter on Definition was the chief of these; and here I have largely departed from the treatment of that subject by Mill, and have more closely followed Archbishop Thomson—Mill's search for the ideally perfect definition being altogether too difficult for the beginner. But throughout the volume, in every case where I have been forced to adopt one view out of many, all supported by equally high authority, I have always been careful to give fair warning that different opinions will be met with in the course of a wider study of Logic. One or two minor points I have, to the best of my belief, worked out anew.

Though the book has been kept as elementary as possible, it has not been thought well to deny one or two glimpses into higher regions. Such, for instance, is the

identification of the *Reductio ad absurdum* with the ultimate process of human thought. This idea, in a somewhat different form, has recently received able statement from Professor Jevons, and is one which the late James Hinton, who also worked it out, was fond of saying that he had first learnt from the lines of Shelley's *Prometheus*—

> "In heaven-defying minds
> As thought by thought is piled, till some great truth
> Is loosened, and the nations echo round,
> Shaken to their roots."

It only remains to acknowledge my obligations to other writers. The admirable tractate "First Notions of Logic," by Professor De Morgan, intended by its illustrious author as an introduction to geometrical reasoning, is now out of print, and very rare. Had it not been so, the following pages would not have been written. But De Morgan's educational works, perfect as they are in conception and finish, are also intensely difficult—admirable for the teacher who has the courage to encounter them, but to the average pupil all but unapproachable. Hence a new edition of the "First Notions," which I had at first thought of undertaking, would not, as I soon found, have suited the purpose I had in view, even if I had been able in every instance to endorse the matter and approve the manner, which I could not always do. But I have freely consulted that work throughout the course of my own. I am also much indebted to the "Deductive Logic" of Professor Fowler, the "Principles of Science" of Professor Jevons, and the "Laws of

Thought" of Archbishop Thomson. The view I have adopted of the Import of Propositions is that which I learnt as a student from Professor Martineau, to whose instruction I shall ever look back as to the highest intellectual privilege it has been my lot to share. Special obligations, in addition to these general ones, I have acknowledged in foot-notes as they occurred.

The communication to me, under cover to the publishers, of any suggestions, and in particular any notification of difficulties that may be met with either by teachers or students, will be esteemed a favour.

A. M.

LONDON, *February 12, 1880*

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