The Commentaries of Proclus on the First Book of Euclid's Elements of Geometry Translated by Thomas Taylor (London, 1792) Book I, Chapter 8

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CHAP. VIII.

Concerning the Utility of the Mathematical Science.

But let us now consider the utility of this Science, which extends itself from the most principal to the last cognitions. Timæus, therefore, calls the knowledge of the mathematical disciplines the path of erudition, because, indeed, it has the same proportion to universal science, and the first philosophy, which learning has to virtue. For this last frames our soul to a perfect life, by the possession of worthy manners; but the former prepares our cogitation, and the divine eye of our soul to an elevation from the obscurity of sensible information. Hence, Socrates in the Republic says, "That the eye of the soul, which is darkened and buried by other studies, can by the mathematical disciplines alone be invigorated, and again excited to the contemplation of that which *is*, and transferred from resemblances to real beings, from an obscure light to that light which has the power of intelligence, and from a cave, and those bonds which exist in it as the authors of generation, and from material impediments be able to rise to an incorporeal and indivisible essence. For the beauty and order of mathematical reasons, and the firmness and stability of the contemplations they afford, conjoins us with intelligible objects, and perfectly determines us in their essences; which perpetually remain the same, ever shining with divine beauty, and preserving a mutual order without end. But Socrates, in the Phædrus, delivers to us three characters who are elevated from sense, because they fill up and accomplish the primary life of the soul, i. e. the philosopher, the lover, and the musician. But the beginning and path of elevation to the lover, is a progression from apparent beauty, using as excitations the middle forms of beautiful objects. But to the musician, who is allotted the third seat, the way consists in a transition from sensible to invisible harmonies, and to the reasons existing in these. So that to the one, sight is the instrument of reminiscence, and to the other, hearing. But to him who is by nature a philosopher, from whence and by what means is reminiscence the prelude of intellectual knowledge, and an excitation to that which truly is, and to truth itself? For this character also, on account of its imperfection, requires a proper principle: for it is allotted a natural virtue, an imperfect eye, and a degraded manner. It must therefore be excited from itself; and he who is of such a nature, rejoices in that which *is*. But to the philosopher, says Plotinus, the mathematical

disciplines must be exhibited, that they may accustom him to an incorporeal nature, and that afterwards, using these as figures, he may be led to dialectic reasons, and to the contemplation of all the things which *are*. And thus it is manifest, from hence, that the mathematics are of the greatest utility to philosophy. But it is requisite that we should be more explicit, and mention the several particulars to which they conduce, and evince that they prepare the intellectual apprehensions of theology. For whatever to imperfect natures appears difficult and arduous in obtaining the true knowledge of the gods, the mathematical reasons render, by their images, credible, manifest, and certain. Thus, in numbers, they indicate the significations of super-essential properties, but they evince the powers of intellectual figures, in those figures which fall under cogitation. Hence it is, that Plato, by mathematical forms teaches us many and admirable sentences concerning the gods, and the philosophy of the Pythagoreans, using these as veils, conceals from vulgar inspection the discipline of divine sentences. For such is the whole of the *Sacred and Divine Discourse*[13], that of Philolaus in his Bacchics, and the universal method of the Pythagoric narration concerning the Gods. But it especially refers to the contemplation of nature, since it discloses the order of those reasons by which the universe is fabricated, and that proportion which binds, as Timæus says, whatever the world contains, in union and consent; besides, it conciliates in amity things mutually opposing each other, and gives convenience and consent to things mutually disagreeing, and exhibits to our view simple and primary elements, from which the universe is composed, on every side comprehended by commensurability and equality, because it receives convenient figures in its proportions, and numbers proper to every production, and finds out their revolutions and renovations, by which we are enabled to reason concerning the best origin, and the contrary dissolution of particulars. In consequence of this, as it appears to me, Timæus discloses the contemplation concerning the nature of the universe, by mathematical

[13]Concerning this valuable work, entitled ΙΕΡΌΣ ΛΟΓΌΣ, see the Bibliotheca Græca of Fabricius, vol. i. p. 118 and 462. and in the commentary of Syrianus on Aristotle's metaphysics, p. 7, 71, 83, and 108, the reader will find some curious extracts from this celebrated discourse; particularly in p. 83. Syrianus informs us, "that he who consults this work will find all the orders both of Monads and Numbers, without neglecting one, fully celebrated (ὑμνουμένας.)" There is no doubt, but that Pythagoras and his disciples concealed the sublimest truths, under the symbols of numbers; of which he who reads and understands the writings of the Platonists will be fully convinced. Hence Proclus, in the third book of his excellent commentary on the Timaeus, observes, "that Plato employed mathematical terms for the sake of mystery and concealment, as certain veils, by which the penetralia of truth might be secluded from vulgar inspection, just as theologists made fables, but the Pythagoreans symbols, subservient to the same purpose: for in images we may speculate their exemplars, and the former afford us the means of access to the latter."

names, adorns the origin of the elements with numbers and figures, referring to these their powers, passions, and energies; and esteeming as well the acuteness as the obtruseness [*sic.*] of angles, the levity of sides, or contrary powers, and their multitude and paucity to be the cause of the all-various mutation of the elements. But why may we not say, that it profits much, and in an admirable manner, to that philosophy which is called Politic, as well as by measuring the times of actions as affording the various revolutions of the universe, and numbers convenient to things rising into being; I mean the assimilating, and authors of dissimilitude, the prolific too and the perfect, and the contraries to these; together with orderly and elegant ministers of life, and inelegance; and finally, such numbers as procure fertility and sterility. Which, indeed, the speech of the Muses in the Republic[14] evinces, placing the universal Geometric Number as the author of better and more debased generations, and as the cause of the indissoluble preseverance of good manners, and of the mutation of the best Republics into such as are remote from reason, and are given to affections. For it is sufficiently evident, that it belongs to the whole mathematical discipline to deliver the science of this number which is called geometrical, and not to one particular science, such as arithmetic, or geometry: since the reasons or proportions of abundance or sterility, permeate through all the mathematical disciplines. Again, it is the means of our institution in moral philosophy which it brings to its ultimate perfection, and gives order and an elegant life to our manners. Besides this, it delivers to us figures, and modulations and motions convenient to virtue, by which the Athenian guest wishes those to be instituted and perfected, who are destined to pursue moral virtue from their early youth. Add too, that it places before our view the reasons of virtues, in one manner, indeed, in numbers, in another in figures, but differently in musical symphonies; and lastly, it indicates the excess and defect of vices, by which we are enabled to moderate and adorn our manners. Hence it is, that Socrates, in the Gorgias, accusing Calicles of an inordinate and intemperate life, says to him, "You neglect geometry and geometric equality:" but, in the Republic, he finds out the proportion of tyrannic pleasure to a royal interval, according to a plane and solid generation. But we shall learn what great utility is derived to other sciences and arts from the mathematical science, when we consider that it adds order and perfection to contemplative arts; I mean rhetoric, and all such as consist in discourse. But it proposes to the poetic arts, the reasons of poems in the place of an example, because it presides over the measures existing in these. But to the active arts it determines action and motion,

[14]Concerning this Geometric Number, in the 8th book of Plato's Republic, than which Cicero affirms there is nothing more obscure, see the notes of Bullialdus to Theo. p. 292.

by its own abiding and immoveable forms. For all arts, as Socrates says, in the Philebus, require arithmetic, mensuration, and statics, either in all, or in some of their operations. But all these are contained in the discourses of the mathematical science, and are terminated according to their diversity. For from this science the divisions of numbers, and the variety of dimensions, and the difference of weights are known. The utility, therefore, of the whole mathematical science to philosophy itself, and to other sciences and arts, may be from hence known to intellectual hearers.