PHYSICAL COMPENDIUM, Completed in XXXII DISPUTATIONS; Concisely setting forth the entire NATURAL Philosophy.

BY THE AUTHOR M. FRANCO BURGERSDIJK, Professor of Philosophy.

With a syllabus of the disputations, expressing the names of the Respondents.

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PREFACE
OF THE PRINTERS.

Aristotle, whom one of his sons, calls the deity of the wise, and the god of all Philosophers, and the master of universal nature, the inveterate law of scholastic custom
wants to excel in all academies.

This, if any of the learned, our most famous man and most excellent Professor, M. FRANCO BURGERSDIJK, the blessed, has observed with great care. But he seems to surpass many in this, that he was born to reduce diffuse and frequently intricate things to a compendium, which others have not infrequently involved in more prolix and more intricate commentaries.

On which thing other conveniences also depend. For thus is consultation made for the labor, time, expense of learners. He has performed that work in the IDEA OF MORAL PHILOSOPHY; the same he also performs in the present COMPENDIUM OF NATURAL PHILOSOPHY; about to perform more in the remaining parts of Philosophy, unless he had paid his debt to nature two years ago. If however any of his unpublished writings, by which he illustrated both Aristotle's METAPHYSICS, and other more humane disciplines, can come to us intact; that they may also be able to profit others, will be our serious care. For, that we are accustomed to do so, either this very Edition, which a little before his death was enlarged not a little by the Author's own hand, will give you assurance, benevolent Reader. Meanwhile use these, enjoy, favor.

Farewell. Given from our Press, on the
Kalends of February themselves, 1637.

THE PHYSICAL COMPENDIUM OF FR. BURGERSDIJK.

DISPUTATION I. On the constitution of Physics.

Respondent DANIEL SCHELKENS.

THESES I.

Philosophy, if the origin of the name and its first signification be regarded, is nothing other than the love and zeal of wisdom: if the thing itself and common use, it does not differ from wisdom. But wisdom, or as we now say, Philosophy, is the cognition of things collected from principles known through themselves, perfecting the mind of man to felicity. Of it there are two parts, Theoretical and Practical: of which the former is occupied about necessary things, and looks to nothing else than truth; the latter is engaged about the actions of man, and their principles, and directs them to honesty.

Theoretical Philosophy contains within its scope Metaphysics, Physics, and Mathematics; Practical, Ethics, Politics and Economics. Logic ought to be reckoned not a part of Philosophy, as the Stoics want, but an instrument.

II. But setting aside the rest, let us treat more exactly of Physics and its constitution, which is our purpose. Moreover four heads are to be explained, in which are contained all things, which are required for the constitution of Physics; definition, division, the respect which it has to the other parts of Theoretical Philosophy, and its use.

III. The Etymology itself supplies the definition of φυσική. For Physics is named from φύσεως. But φύσις from φύσσας, just as also nature is named from being born.

Therefore according to this etymology Physics will be the discipline about things, which are subject to origin & destruction, and which once born afterwards die away. But this definition is too narrow, and omits heavenly things which do not seem to be subject to corruption: the cognition of which however this discipline claims for itself. Therefore another definition, and that a perfect one is to be sought: which ought to consist of genus and difference. The genus of Physics is science: and that not only in that way, in which every instruction of disciplines is accustomed to be called science: but also, insofar as science is taken strictly and properly for apodictic habit, or cognition of a necessary thing through its causes: as it is taken in 1. Post. ch. 2. & 6. Eth. ch 2.

For Physics is engaged about those things, which depend on necessary causes: which although in many things they are exceedingly recondite and abstruse, nevertheless all are generally of such a kind, that, if the mind should apprehend them by sagacious investigation, it can be said to have obtained science.

Then the cognition of natural things is worthy, that it be sought for its own sake, even if thence no utility should return. Finally no rules are handed down in this discipline, which prescribe something to be done or avoided, as is accustomed to happen in the arts, and in moral Philosophy.

From all which it follows, that Physics is science, and that in the way, in which it has been said.

IV. The difference of sciences is sought from the subject, 1. Post. ch. 27. By subject is not understood, whatever is defined in science; but that alone, which is subjected to proper affections, which ought to be demonstrated concerning it through its causes and principles. In which two as it were parts are accustomed to be distinguished; the thing considered, which is in place of matter, and the mode of considering, which is as it were the form. And indeed the very thing considered can be common to multiple sciences: and therefore the difference is to be taken from the mode of considering.

V. The subject of the sciences ought before every demonstration to be known both that it is, and what its name signifies; then it ought to be equal to the whole science, so that neither it exceeds it, nor is exceeded by it: besides it ought to be subjected to all affections, and it itself to inhere in no thing from those, which pertain to the same science. If these conditions are compared with the whole universe of things, it will be manifest that nothing else can be the subject of Physics, than natural bodies; and those indeed insofar as they are natural. Thus thought Aristotle; who in 2. Phys. ch. 1. & 3. Cœl. ch. 1 , speaking about the subject of Physics, reviews the heaven, elements, mixts, plants, animals, and their species: of all which the proximate and common genus is natural body.

Now natural bodies the Physicist considers, insofar as they are distinguished from non-natural things.

But Aristotle at the beginning of the books of Physics distinguishes natural things from non-natural things only in this way, that they have the principle of their motion in themselves: but non-natural things do not have the principle of motion in themselves, or not unless by accident. Therefore the Physicist considers natural things, insofar as they have the principle of motion in themselves, that is, insofar as they are natural.

Hence it follows that neither artificial things, as a bench, bed, and the rest, nor Mathematics, pertain to the subject of natural science.

For artificial things indeed have in themselves the principle of motion and rest, not insofar as they are artificial, but insofar as they are natural, that is, insofar as they are made from a natural body, as it were, from wood or stone, as from matter.

But the Mathematician either regards quantity abstractedly, or if he proceeds to natural bodies, as in Astronomy, Geography, etc., nevertheless he does not regard bodies, as they are natural, but as quanta.

VI. This is the true opinion about the subject of Physics; from which those who depart, either in the thing considered, or in the mode of considering, cannot be excused from error.

But those err in the thing considered, who want the subject of natural science, either to extend so widely, that it also embraces incorporeal substances; or so restrict it, that it contains only

corruptible bodies, and those indeed mixed, within its scope, judging that the heaven and elements are considered by the Physicist no otherwise, than insofar as they are the principles of mixed bodies. The former error is refuted from this, that matter, form, quantity and other things of that kind, in no way fit incorporeal substances. But place, motion and time indeed seem to fit them, but by a reason so dissimilar, that from place, motion and physical time they differ no less, than incorporeal substances themselves from bodies. As to the other error, although the heaven is efficient; and the elements the matter of mixed bodies: nevertheless they are no less to be considered as species of bodies.

VII. In the mode of considering those err, who state that natural body is considered by the Physicist not as natural, but as mobile. For mobile is said, what can be moved; (the Greeks would say κινητόν) and that potency is an affection which is demonstrated concerning natural body through nature, as through a cause. But the subject ought to be ἀναπόδεικτον, that is, such that it cannot be demonstrated through a cause. If they say that by mobile they understand, what has the force of moving, which to the Greeks is κινητικόν, they speak ineptly, (for mobile does not signify that) and moreover they extend the mode of considering even to those things which have in themselves the principle of motion, by which they move other things; when the Physicist considers natural things only to that extent, insofar as they have in themselves the principle of motion, by which they themselves are moved.

VIII. From those things which have been said, can be collected a definition of this kind: Physics is the science of natural bodies, insofar as they are natural. When I say the science of natural bodies, I understand the perfect cognition of all properties, which belong to natural bodies per se. The cognition of these is then at last perfect, when their causes and principles, all the way to the elements, are clearly seen. 1. Phys. ch. 1.

IX. The division, about which in the second place it was to be spoken, is to be taken from the subject. Therefore since natural body can be considered either in general, or in species; there will also be two parts of Physics: the one common, which treats of natural body, and its principles and affections in general; the other special, which will encompass the various species and grades of natural bodies. But it will consider the species either singly separately, or all collected together under the name of the world, or universe. That special part is to be subdivided into its members entirely in that way, in which natural body is divided: and that, until it is come to the lowest species, in whose history the natural Philosopher ends. How this division is to be instituted, will be understood from the series of the following disputations.

X. There follows the third head, which was about the respect or relation of Physics to the other parts of Theoretical Philosophy. This relation is to be regarded first in agreement and diversity: then in dependence: and thirdly, in order. The agreement and diversity between Physics, and the other Theoretical disciplines will best be perceived from those things, which are accustomed to be said about the threefold abstraction, by which these three sciences are constituted. For all sciences abstract their object to some extent, and that either from the individual conditions of matter, or from the very common substance of matter. And this abstraction is either the work of

the mind alone, or is situated in the things themselves. Physics abstracts its object, not from the common substance of matter (for it considers bodies, which are constituted of matter and form) but from the conditions and characters of matter, by which individuals are distinguished. For to individuals no science proceeds. This is an abstraction of reason, by which universals are not really separate from individuals, but are distinguished only by the aid of the mind. Mathematics abstracts its object both from the conditions of matter, and from the very substance of matter itself. For it considers determinate quantity not as it is an affection of natural body (for this is the function of Physics) but as it is the subject of other affections. This abstraction also happens by reason, not by the thing itself. For no quantity exists through itself, or can exist. It remains to treat of Metaphysics, which abstracts its object from the common substance of matter, and its singular conditions; and that not by reason alone but by the thing itself. For it considers those things alone, which either exclude matter entirely, as when it treats of incorporeal substances; or do not include it necessarily, but only contingently; as when it disputes about being and its properties in general. Between these two a great difference intercedes: and thence arise two parts of Metaphysics: which if anyone wants to be diverse sciences, there will be no opposing it: since also the parts of Mathematics are diverse sciences: as Arithmetic, Geometry, etc.

XI. Sciences depend on sciences, either by reason of the object, or by reason of principles.In both ways Physics and Mathematics depend on Metaphysics. And indeed by reason of the object, because Metaphysics considers being in general, and divides it into its species, as far as the reason of abstraction permits; those which exceed the limits of its abstraction, it hands over to other sciences to be contemplated. By reason of principles: because whatever things Physics and Mathematics assume without demonstration, those have generally been demonstrated by Metaphysics.

XII. Nevertheless it is not to be thought that these, or other disciplines are subalternated to Metaphysics. For to true subalternation it is required:

I. That the subalternate science to the subject of the superior science add nothing else, than a sensible accident; which nevertheless does not pertain to the form of the subject, or to the mode of considering;

II. That the subalternate science use the principles of the superior science. And indeed both these are apprehended in Optics and Music: of which the former, is stated to be subalternate to Geometry; the latter, to Arithmetic, 1. Post. ch. 7. But in Physics and Mathematics they do not have place. For each has a subject proper by abstraction and mode of considering from the subject of Metaphysics diverse: each also uses principles, which in Metaphysics are not principles but conclusions.

XIII. Hence it follows, that Metaphysics according to the order of nature, claims for itself the first place among the theoretical sciences. For since these receive their subject and principles from Metaphysics, they will not be able to obtain absolute perfection without the aid of Metaphysics.

But indeed because our mind ascends from singulars gradually through species to the most universal; and proceeds from effects to first, and thence through more remote to supreme causes; it cannot happen, or at least not conveniently enough, that anyone perfectly learns Metaphysics, which has the most universal object, and supreme causes, if he has not perceived Physics and Mathematics before.

XIV. Between Physics and Mathematics the reason of order is not so manifest: nevertheless Mathematics seems to precede Physics as to the order of teaching. For it also has principles manifest to us, and can be learned even by boys. 1. Eth.ch.6. But according to the order of nature Physics seems to be preferable. For Mathematics is engaged about quantity: but quantity is demonstrated by the Physicist concerning natural body. And consequently Mathematics presupposes Physics

XV. It remains to treat of its use. For although Physics is a theoretical discipline, nevertheless it is not thence to be concluded, that it has no use; but this only, that even if it offered no use of itself, nevertheless it would be worthy, that it be sought for the sake of truth itself. But Physics is useful especially to Theology, and to Medicine, that I may pass over infinite other utilities. To Theology, insofar as it contributes to investigating the first cause, which is God. Rom. 1. ch. 1. To Medicine, insofar as it discloses the first causes of health and diseases, and disputes many things about the causes and properties of things, the cognition of which is exceedingly necessary to the art of healing. Indeed nearly all things which the Physicist demonstrates, are to the Physician principles and foundations, on which the art of healing is supported: so that the Physician is rightly said to begin, where the Physicist ends. 1. de sensu & sens. ch. 1. & at the end of the book de vita & morte. That I may now say nothing about the incredible pleasure, which they perceive, who are engaged in the investigation of natural things; about which the Philosopher discusses many things 1. part. anim. ch. 5.

DISPUTATION II. On the first matter of natural things.

DISPUTATION II.
On the first matter of natural things.
Respondent FREDERIK ABBAMA.

I. Whatever is considered in the Theoretical sciences is either the subject, or an affection, or the cause or principle by which the affection is demonstrated of the subject. 1. Post. ch. 7. & 10. From the cognition of principles, arises the knowledge not only of properties, but also of the subject; 1. Phys. ch. 1. Therefore, since natural things have principles from which they are compounded (for that is so manifest from their origin and destruction, that no one has ever doubted it), the beginning of Physics ought to be made from the consideration of principles. For it altogether pertains to the Physicist, and not to the Metaphysician, to show what & of what sort

are the principles of Natural Things, as far as is enough for the perfection of his science. Although meanwhile I would not deny that the most exquisite explication of principles is to be sought from the Metaphysician.

II. The whole disputation of Aristotle about the Principles of natural things has two parts: 1. against the opinions of the ancients. 2. about his own opinion. But he speaks either about principles in general, or about each one specifically. What he notes about principles in general are nearly these:
1. That the principles of things are contraries. Which he proves because it is necessary τὰ ἐναντία μήτε ἐξ ἀλλήλων εἶναι, μήτε ἐξ ἄλλων, καὶ ἐκ τούτων πάντα, book. 1. Phys. ch.5. For hence it follows that there are first contraries. For because they are first, they are not from others: & because they are contraries, they are not from each other. But that all things come to be from contraries, he proves from this that anything does not come to be from anything. Thus black does not come to be from Musician, or sailor, but from something determinate: that is, a contrary. ch. 6. §41.
2. That contraries have a common subject: as when from white black comes to be, it is necessary that there be a subject, which is said to become black. But this although it is one in number with each of the contraries, nevertheless it is distinguished by reason from each. For the subject remains, but the contraries perish. For when man from white becomes black, man remains, whiteness perishing: or blackness perishing, when man from black becomes white. §. 61. These things follow posited motion & diversity of things.

III. In investigating the principles of Natural things, I know not whether with greater zeal always, or dissension the ancient counselors of wisdom have labored. The errors of all of whom most ingeniously Aristotle has detected & everywhere refuted. book 1. Physic. from ch. 2. all the way to ch.5. book 3. Cœl. 1. ch. 2. book 1. on generation & corruption ch. 1. & 2. book 1. Metaphys. ch. 4. & what follows. Nevertheless in this Aristotle seems to have agreed with all, that for the origin & destruction of natural things there is need of contraries & Matter, or the common subject of contraries, from which one is expelled, the other arriving, as he himself professes book 1. Phys. ch. 6. And that indeed is supported by a reason exceedingly manifest. For since it is agreed that in every change something comes to be, which before was not, & another, which was, in turn perishes, & these are opposites, or, as Aristotle says, contraries; and since moreover it is confessed by all, that nothing comes to be from nothing: it must altogether happen that all who indeed admit some change, or motion, concede contraries, & the immutable subject of contraries. But what the subject or matter is, & what the contraries are, & how many, and of what sort they are, & whether they ought to be called the principles and elements of natural things, in that opinions have so varied, that hardly ever more so. And about Matter what the ancients thought, and what ought to be thought Aristotle teaches, in this disputation we will say: Contraries being put off to the following disputation.

IV. That Matter, whatever in the end it is, is the principle of natural things and element, all have judged by unanimous agreement, understanding by the name of principle or element the first subject from which natural things are composed, & into which, when they perish, they are ultimately resolved. Some have made this corporeal, others devoid of body. And those who

made it corporeal, have said it is either one body, or many: those who said one; either immobile, as Xenophanes, Parmenides, & Melissus; or mobile: and that either one of the elements; for instance water, as Thales of Miletus; or air, as Anaximenes; or fire, as Heraclitus: or a body intermediate between two elements, denser than one, & rarer than the other, and that either between air & water. Of which opinion the author is wrongly thought to have been by Simplicius book 3. Phys. & book 2. on gen. & corr. by Philoponus, Anaximander; since he seems to have posited some body prior to the elements, and that infinite in bulk, lest the origin of things should fail, for matter, as is clear from Diogenes Laertius in the life of Anaximander. And in this infinity of matter he agreed with Thales, Anaximenes, and Melissus. For Parmenides posited it finite 1. Met. 5. Those who admitted many bodies, either embraced the four commonly called elements for matter, as Empedocles; or infinite bodies: and these either feigned atoms, that is, indivisible bodies, solid, devoid of passion: all of the same kind, but diverse in figure, position, and order; as Democritus, Leucippus, whom later Epicurus followed: or homoiomeries, that is, similar parts of all things, diverse in kind, and contrary among themselves, as Anaxagoras. Those who made incorporeal matter, either posited numbers, or I know not what shadows of things, as the Pythagoreans: or surfaces, as Plato. And these are the opinions of the ancients, which Aristotle everywhere refutes, which we also will criticize briefly.

V. And first since matter ought to be the subject of all natural things, & part of substance, it cannot be an accident. For an accident can neither be a subject, since it necessarily requires a subject, in which it may be; nor a part of substance, since added to substance it makes a being of such a kind, which is accustomed to be called one per accidens. Hence therefore the opinion of the Pythagoreans, & of Plato, is refuted, who, as is commonly believed, dreamed of numbers & surfaces. But I can hardly prevail upon myself, to believe that such great Philosophers so ineptly opined about the first matter of things. For besides that this pertains εἰς ἄλλον αἰῶνα, (for numbers & surfaces pertain to the Mathematician) it cannot be understood, how natural things can consist of numbers or surfaces. So that it is likely that they thought something else about the matter of things, which they did not sufficiently explain.

VI. In a similar way it seems that the opinion of Parmenides and others must be judged, who are thought to have stated the material principle of natural things to be a certain immobile body. But since this opinion takes away motion, & with motion, the diversity of natural things, so it is absurd, that it cannot be refuted by Physical reasons. For nothing is more evident and more certain to the Physicist, than that there is motion, & diversity of things: and with motion taken away, it is necessary that all Physical causes and principles are taken away. But Parmenides and others do not seem by immobile principle to have understood a material principle, but an efficient principle: or if they understood a material principle, when they call it immobile, they did not take away all motion, but only that, by which the essences of things are changed; meanwhile conceding that, which happens circa accidents; for sense detects this. From which it indeed follows that all natural bodies are one in essence, but nevertheless meanwhile there is great diversity in accidents. which opinion, although it may seem less absurd, nevertheless is to be rejected for a twofold reason, because it takes away substantial forms, & the essential and natural distinction of things, and because it makes matter a body from itself; of which the former will be refuted in Thesis 10, the latter in the following disputation.

VII. The infinite multitude of similar parts, and of atoms, is to be repudiated in many ways. For first an infinite multitude of principles, is taken away by its own repugnance, and moreover overturns the science of natural things. For the infinite cannot be known, and with the principles unknown, it is necessary that the rest also be unknown. Then the similar parts of Anaxagoras seem to be compounded, and to have another matter. Further the atoms of Democritus cannot have the nature of body; since every body is divisible to infinity, as will be clear in its place. And if atoms & similar parts were supposed, it would be necessary, that as many atoms and similar parts as are admitted, so many matters be posited. Moreover, since they are posited to avoid emptiness, as Aristotle teaches, it follows that they be infinite not only in multitude, but also in bulk: for an infinite multitude is not posited in a finite space.

VIII. Nor more truly can matter be an element, or the elements. Because matter is the first subject of things; the elements are from matter. Also elements are bodies: matter is not, as we will say. Moreover if matter were one of the elements, there would not be generation & corruption of natural things: because matter must remain in generation & corruption, & contraries must change into each other. If the elements themselves were matter, it would follow that matter is corruptible, which Aristotle refutes with many reasons; 1. Phys. ch. 9. & ch. 2. on generation & corruption.

IX. But not even Anaximander's principle is to be approved, who admitted matter prior to the elements, & that infinite in bulk, lest, when things come to be from it, it should be exhausted. For in addition to what we said above about the infinite multitude of atoms, or similar parts, for a similar reason it must be denied about the infinite bulk of matter. Then he thought, that matter must be infinite in bulk, lest the generation of things should cease. Which is manifestly false. For when from matter all things happen successively, and never at once, & those which happen at once are not great, nor infinite, it follows that for generating things there is no need of an infinite bulk of matter, but a finite suffices. Since it is evident that the things which come to be from matter are not infinite, nor of infinite bulk, but finite. Further Aristotle refutes infinite matter with many reasons. For if matter were infinite, it would have infinite power; but this is absurd. And because infinity pertains to quantity, & is as it were the passion of quantity, it cannot pertain to matter. 1. Phys. ch. 5. & 6. Finally what is infinite, has no principle: & because it is the principle of bodies, matter cannot be infinite, lest it lack itself.

X. And these were the opinions of the ancients, which are refuted by Aristotle. Others followed, who said that matter is a body devoid of qualities, and of all accidents of such a kind which are accustomed to be separated from natural things, and apt to receive them: meanwhile substantial forms being repudiated. To which opinion we said before that also the opinion of Parmenides can be drawn, but because this opinion turns the origin of natural things into mere alteration, (for since matter is not corrupted, when a body arises, it ought to arise from a body not corrupted, and the origin of bodies will be mere alteration) Avicenna, that he might distinguish origin from alteration, posited in matter some form coeval with it, by which it was indeed a body, but nevertheless apt to receive substantial forms; and by the origin and abolition

of these he distinguished generation & destruction of natural things from alteration. Avicenna attributed this form coeval with matter,

I. Lest the remaining forms should seem to come to be from nothing.

II. That he might defend the dimensions of matter, which he wanted to be prior to all corruptible forms,

III. That matter might be said to desire forms, by the merit of this form coeval with it. But this form of Avicenna, because it has no force of limiting matter, but leaves it endowed with the potency of receiving all forms without discrimination, cannot be called a form.

XI. Which when, Zabarella saw, he repudiated the form of corporeity of Avicenna, & nevertheless wanted matter to be a body, which was subjected to all substantial forms. This opinion although it is more probable than all the previous ones, nevertheless it is not to be acquiesced in. For every Physical body ought to be sensible, and moreover of definite quantity and figure: but prime matter is devoid of all quality, and therefore cannot be sensible: and moreover, it receives the definition of its quantity and figure from any arriving form.

XII. Since therefore matter is not an accident, nor a body, it is to be seen what in the end it is; and that can be understood no better, than from the analogy of artificial and natural things; for as brass is related to a statue, so prime matter is related to those things which come to be from it: 1. Phys. ch. 6. §. 69.

XIII. From this Analogy it follows, as brass is not actually a statue, before it has received the form of a statue, but only potentially; so also matter is not actually heaven, or earth, or something such, but only potentially. Which Aristotle meant in book 7. Met. ch.3. That matter is neither a this, nor a quantum, nor a quale, nor something such which is posited in the Categories. Matter therefore is devoid of & receptive of all forms, and by that name is called pure potency. Meanwhile just as brass, although it is potentially a statue, nevertheless is actually a body: so also matter has actually its own essence, and substantial existence distinct from the essence and existence of the form: which if it did not have, I do not see, how it could enter into the constitution of bodies; indeed how it could be called receptive of forms, & not rather pure nothing.

XIV. The potency of matter is accustomed to be distinguished into universal & particular. Universal potency is said to be that by which it indifferently respects all forms; particular, that by which it regards this or that form determinately. Universal potency is not a quality distinct from the substance of matter, but the very essence of matter, through which it is what it is. Nor that only if matter be considered as matter, but also if it be considered as subject, or as a certain

absolute substance. Although it cannot happen, that matter be considered without any relation to form. Particular potency is adjoined to it, as an accident. For it can be present & absent, while matter remains meanwhile.

XV. The appetite of Matter, by which it is said to desire form, as a female a male, follows potency: and therefore it also is rightly distributed into universal & particular. The particular appetite introduced by the agent, with the particular potency, does not dissolve the universal appetite. For since through universal potency matter is borne by an indifferent propensity to all forms promiscuously, nor nevertheless is it capable of all at once; it would never admit any, unless the universal potency limited by dispositions introduced by the agent, not indeed lost, desired a certain form before the rest. But in whatever form it acquiesces, it does not desire another by a particular appetite before, than new dispositions are introduced by the agent, by which it is rendered inept for retaining the form which it has, & suitable for receiving that which it does not have. Therefore it is a fiction, what some state that matter, by a loathing of present forms, always desires others, and that this is the cause of corruption in sublunary things: although indeed without matter nothing can be corrupted naturally, nevertheless corruption is to be attributed rather to forms, or dispositions, by which forms are supported, than to matter; as will be clear in its place.

XVI. Finally just as matter is actually a certain substance, which is potentially a body; so also it actually has a certain quantity from itself: which because it is in potency to all figures, & modes of rarity & density, is accustomed to be called indeterminate. For since forms per se are individual, and receive all extension from matter, unless it is extended per se, when they are introduced into it, they will remain individual. Why indeed if an agent is not able to be conjoined to matter, which suffers, if it does not have dimensions; since every contact presupposes quantity.

DISPUTATION III. On form & Privation.

Respondent JOHN EDWARD.

1. Matter has been treated; contraries follow: which we said in the preceding disputation were also recognized by the ancients from the motion & transmutation of things. But in explaining the nature of contraries, there has been no less variation than in matter itself. For Parmenides, although he seems to take away the origin of things & motion, when he says all things are one, and that immobile; nevertheless he is said to have employed hot & cold, that is, fire & earth for the explication of natural things. Democritus employed solid & void, & in solids some contrariety in position, figure & order: by the transmutation of which he stated that things arise and perish. Anaxagoras posited the secretion & confusion of similar parts; just as also Empedocles, who moreover added strife & friendship. Those who made one of the elements, or something intermediate between two elements, matter, used rare & dense. Plato besides great and small,

no doubt admitted some contrariety in surfaces: just as also the Pythagoreans in numbers, and in their shadows of things. But all these things are understood to be sufficiently refuted from those things, which we have said about matter.

II. Aristotle repudiating all these posited Form & Privation, of which the one after the other, would occupy & desert matter in turn. These two he called the first contraries in the genus of substances: & he wanted the origin & destruction of things to be posited in their mutual succession. And he collected this thus. What comes to be per se, does not come to be from anything, but from its contrary, & what perishes per se, does not perish into anything, but into its contrary. For as a musician comes to be per se from ἄμουσος, & again ceases in: so, when natural bodies come to be & perish, they are to be judged to come to be per se from that, which is so related to that, which is said to come to be, as ἄμουσος is to musician; & again to perish per se only into that, which to that, which is said to perish, is related as Musician to ἄμουσος. But musician & ἄμουσος are contraries: of which nevertheless the one includes the privation of the other. Therefore in origin & destruction, besides the subjected matter, which remains, form is required, & the privation contrary to the form. But how privation is contrary to form, will be said later.

III. In form we will consider two things, its nature & its origin or source. Its nature will be sufficiently understood from the terms, and the definition, which have been attributed to it by Aristotle. The terms which are attributed to it, are εἶδος, μορφή, παράδειγμα, λόγος, & ἐντελέχεια. And to omit the rest; ἐντελεχεία was called from τὸ ἐν τελὲς ἐν αὐτῷ ἔχειν. For it is a certain perfection of some subject which is said to have it. And it is either first, which is the form itself: or second, which is the operation of the form. By the Latins it is called act. The definition of form holds itself thus: Form is λόγος τοῦ τί ἦν εἶναι, or, what is the same, οὐσία κατὰ τὸν λόγον, that is, that through which a thing is what it is. For form added to matter, & united to it per se, constitutes the corporeal nature of each thing, and separates it from other things by an essential difference.

IV. Hence many things follow, which are to be explained in order. And first, that Form is not only the principle of natural things, but also is more the principle, than matter. For this, since it has an indefinite nature, only composes bodies: but form not only composes & constitutes, but also distinguishes. Therefore that natural bodies are bodies, they have from matter & form promiscuously; (for corporeality follows the union of form with matter) but that they are bodies of this or that species, for instance fire, or water, that is owed to forms alone.

V. From what has been said it moreover follows, that forms are not accidents of natural things, but true substances. For since form is part of the body, and gives to the matter, which it informs, and to the composite itself that by which it exists, and is distinguished from other things by an essential difference, it cannot be an accident. Then form is the terminus of generation. Therefore if form is not substance, generation will not be diverse from alteration. But between generation & alteration this difference intercedes, that in alteration the same sensible subject remains; in generation not at all: book 1. on generation & corruption §. 23.

VI. And it is necessary not only that form is substance, but & that it is more substance, than matter. 7. Metaph. ch. 3. For each thing is to be judged to be more that, which it is in act, than what it is in potency. But form is substance in act; matter only in potency. 2. Phys. §. 12. Then form contributes much more to the constitution of bodies, than matter. Therefore since Aristotle everywhere calls form οὐσία substance; matter however he says is not unless nearly & in a certain way substance. 1. Phys. §. 79.

VII. Forms are not composed from act & potency, nor from multiple acts, but are altogether simple. For what coalesces from act & physical potency, ought to be a body: & what consists of multiple acts, cannot be one per se. And indeed not only in simple bodies, but also in concrete ones, and even in heterogeneous ones, such as are the bodies of living things, simple forms are to be conceded. For composition pertains only to matter, not to form.

VIII. This simplicity of form is not overturned, by the fact that often form is added to form: for instance, when the form of a mixed body is added to the forms of the elements; or soul, to the form of a mixed body. For from those two or more forms, one form is not composed: for the preceding with respect to the following is not act, but potency: and therefore together with the subject, in which it is, it obtains the character of matter. For that the soul does not consist in the bare and unformed matter of the elements, but in the whole substance of the mixed body, as in its matter, we will demonstrate in its place.

IX. Although moreover there is one matter of all natural things, which indeed undergo origin and destruction, (for about the rest we will state our opinion in its place) nevertheless forms are exceedingly many, and they differing not only in number, but also in species and genus. For since the difference of natural things is from forms, there ought to be no less difference among forms, than among natural things themselves.

X. And these things about the nature of forms; their origin follows: about which in the second place it was to be spoken. And first it is to be stated, that forms are not coeval with matter, but arise, when natural things arise; & again perish, when natural things perish. For if forms do not arise and perish, it is necessary either that the generation and destruction of natural things are taken away; or, if natural things arise and perish, since there are as many forms as there are generable things, either forms will have to consist without matter, or the form of the generated & corrupted thing will inform the same portion of matter at the same time. But that forms cannot survive without matter, is manifest per se: & because the forms of the generated & corrupted thing are often contrary, they cannot consist at the same time in one matter. It remains therefore, that forms arise and perish with natural things. Nor is it an objection, that forms are simple acts, and nothing is said to be generated properly and to perish, except what is compounded from act & potency. For since forms begin to be, & again cease to be, and that by the same action, by which natural things arise & perish, it is altogether to be conceded that forms arise & perish, if not as bodies, at least in a certain way fitting to their nature.

XI. Although moreover forms are said to arise, and to perish, nevertheless it is not to be thought, that before they arise, & after they have perished, they are altogether not, or are utterly nothing. For this is especially to be guarded against, lest anything be stated to come to be naturally from

nothing, or to go away into nothing. But if forms before generation & after destruction, are altogether nothing, that certainly will not be able to be guarded against. For what is altogether nothing, if it arises, it is necessary that it arise from nothing. Nor is it enough, if you say that forms do not come to be from nothing for this reason, because they come to be dependently on matter, which has a natural potency to receive them. For it is one thing to depend on matter, another to come to be from matter. Nor does it seem to be relevant; that matter is said to have potency to forms: since that potency is only receptive.

XII. Therefore let us state with Aristotle, that forms before generation are not nothing, but are in potency that, which they are in act after generation. This potential entity of forms which they have before generation, is not in the efficient, but in matter. For the agent bestows nothing of its own on matter: but what was potentially in it, it makes to exist in act: just as a sculptor educes the form of Mercury from wood. And so we are neither compelled to concede that forms come to be from nothing, (since what is in potency, is not altogether nothing, just as not whatever things are not nothing, must be in act) nor do we take away the generation of things: since forms pass from potency to act. Nor is it an objection, that generation is the way from non being to being. For what is educed from the potency of matter, comes to be partly from being, partly from non being. it comes to be from being, because it comes to be from matter, which is being in potency: from non being, because it comes to be from privation, which happens to matter.

XIII. From which it follows, that forms cannot consist without matter. From which condition nevertheless the rational soul is to be excepted. Which, just as it is not educed from the potency of matter, so also it survives without the aid and assistance of matter. Nevertheless we do not think with those, who think that forms existing in act are not really diverse from matter. For since matter before generation is endowed with the potential entity of form, nothing of a thing will be able to be said to exist by the benefit of generation, which did not exist before, if the actual entity of form is not diverse from matter. Indeed all difference of natural things seems to me to be taken away by that assertion. For if the actual form of fire did not differ from matter, Neither would the form of water differ from matter: therefore since the matter of each is the same, fire will differ from water in no thing.

XIV. And these things about form: privation follows. Of which first its nature is to be regarded; then the force, by which it is stated to be a principle of natural things. Privation, that I may begin from its definition, is the lack of form in a subject with proximate ability to receive it. Therefore it is distinguished from negation; which neither requires a certain subject, nor posits in the subject, to which it is attributed, ability to the form, of which it is said to be the negation.

XV. Nevertheless it ought not to happen, that it be confused with the potency of matter. For although it has something in which it agrees with that, nevertheless it differs from it in this, that with the accession of form it perishes; since potency can no more perish, than matter itself. Then potency is in the essence of matter: but privation is no more in the essence of matter, than to receive forms, and to be subjected to & informed by them. For each of these is in it in turn, so that obviously it is devoid of form, and informed: which could not happen, if either pertained to its essence.

XVI. We have said that privation is the lack of form. From which it follows that it is per se non being. In which it also differs from matter: which indeed is called non being, but by accident: just as privation is called being by accident. For since they are so conjoined among themselves, that they are one in number or subject, and the one is being, and the other non being, in turn they communicate to each other by accident that, which they are per se. Therefore since matter is being per se, it is called non being by accident, and that by the evil doing of the privation, which is in it: but privation, which is not per se, is called being by accident by the benefit of matter. Nevertheless that non being is not to be understood to be that, which altogether is not, & nothing; but what is not this or that; as non man.

XVII. Privation happens not only to matter, but also to the form preceding generation. Therefore just as by the merit of matter it is said to be being by accident; so by the merit of that form, it is said to be contrary to the form about to arise through generation: which arriving, it perishes in matter with the prior form, to which it adheres. And indeed form & privation are said to be not only contrary, but also first contrary: because, just as first matter does not come to be from prior matter: so also neither does form come to be from a prior form; nor privation from a prior privation.

XVIII. From what has been said it is not difficult to collect, by what right privation is posited among the principles of natural things, which in the second place had been proposed. The matter holds itself thus. Since privation is non being per se, & being only by accident, it cannot be a principle per se of the thing which arises, but only by accident: but it can be a principle per se of the origin itself or generation, even if it is non being per se. And this so far does not hinder, that it be a principle, that, if it were not non being per se, it could in no way be constituted a principle. For that, which is to be generated, ought to be non being; and generation proceeds from non being.

DISPUTATION IV. On nature, the efficient cause, & the end of natural things.

Respondent AMBROSIUS WILTENS.

1. Principles are considered in science, either with respect to the subject, or with respect to the affections, which are to be demonstrated about the subject. And indeed so far we have considered them in the former way, namely insofar as they are the principles of the subject, that is, of natural bodies: it remains that we consider them, insofar as they are the principles of motion, & of the remaining affections, which are in natural body first & per se. In this way Aristotle considers principles in book 2. Phys. under the name of nature: to which he adds the efficient cause, & the end. For that all these are to be used in Physical demonstrations, will appear from what follows: and that is expressly taught in book 2. Phys. ch. 7.

II. Nature, named from being born, just as also φύσις, primarily seems to have been used for the act of being born, or for generation; then for the terminus of generation, or the essence of the generated thing. And Aristotle openly teaches this, when he says: ἡ φύσις, ἡ λεγομένη ὡς

γένεσις, ὁδὸς ἐστιν εἰς φύσιν. 2. Physic. §. 14. And because the essence of the generated thing is the principle of its own motion, it happened, that every essence, which is the principle of its own motion, is called nature, even if it does not undergo origin & destruction. And although nature is also attributed to incorporeal and immobile things, (for instance when the nature of God, or the nature of angels is spoken of) nevertheless the signification of nature ought not to be extended so broadly, when it is to be described by the Physicist.

III. But that there is a principle of such a kind in things, from which their motion proceeds, which we call nature, is so manifest, that no one, who indeed, understands what is signified by that term, can be ignorant of it; and it is altogether ridiculous, to require a demonstration of it, or some inquiry: since infinite things are discerned, which, because they have that principle in themselves, & consist through it, are called natural. And indeed assent is not to be given either to Avicenna, who, thinks that nature can be demonstrated to be; indeed not by the natural Philosopher, but by the Metaphysician: nor to Henry of Ghent, who, although he admits that it ought not to be demonstrated, because it is not doubtful; nevertheless contends that it can be shown by the Physicist; and that from motion, of which nature is the principle, and from things, which consist by nature. For nothing is more known in Physics, than that there is motion, which proceeds from an internal principle. Which is nothing other, than that nature is.

IV. Aristotle defined nature the principle, & cause of motion, & rest, in that, in which it is first, per se & not by accident. book 2. Phys. §. 3. This definition is so accurate, that no word in it seems to have been posited rashly, and without reason. Nature is called a principle if it is referred to bodies, which consist by nature; a cause, if it is referred to motion & rest, which are in natural bodies. And so privation, although it can be a principle of natural things, nevertheless cannot be called nature: because it is a principle in such a way, that it cannot be called the cause of motion & rest. Motion & rest is added: where the particle AND does not disjoin, as Simplicius teaches from Porphyry, but copulates. Nevertheless it is not necessary, that every natural body be moved, & rest, & for that reason the definition of nature be removed from the heavens (as Alexander thinks) because they never rest: but this alone is required, that all both motion, & rest, which is natural to a body, be from nature. Therefore nature is the cause of motion & rest: of motion, in those, which are moved from themselves, as in the heavens; & of rest, in those, which rest from themselves, as in the elements. Besides it is said in that in which it is; not because nature cannot be the cause of motion & rest in another: but that it may be hinted only, that those motions are not natural, which are made by another, & in another. Nor does it matter, whether they proceed from art, or from another external cause, or even from nature itself operating outside itself. For nature is not nature, insofar as it operates outside itself, but insofar as it is the cause of motion by which it is moved itself. It is said moreover, in which it is first; that it may be understood that nature is the chief cause, among all, from which motion, & natural rest, in any way arises. And so Aristotle seems to have taken care, lest anyone think gravity, levity, or other qualities of natural bodies, to be nature. For they also are principles of motion & rest, & are in that which is moved, or rests: but they are not in it first & principally, but as instruments which flow from nature, and from which they receive their force: as is excellently taught in 2. on gen. & corr. §.54 & 55. Finally it is added, per se & not per accidens; lest medicine seem to be nature, and the action of a physician healing himself, to be natural motion, which with this particle added it cannot seem: because it happens per accidens; that the art of

healing is in him, who is healed. For the physician is not healed as a physician, but as a sick man.

V. This definition of nature, is said not only about the first subjected matter of each thing having in itself the principle of its own motion & change, (as the Ancients collected from this, that, when they judged that the permanent nature of each thing was, and that the like was produced by it, they discerned that to be proper to matter, as what alone remains, all other things, which are in it, whether forms, or qualities having been changed) but also about form. For just as nothing artificial, so also nothing natural can be said, which has not yet received form. Indeed form is more nature, than matter. For each thing is more, what it is in act, than what it is in potency. Then form generates, or is the reason of generating, (for man generates man) not matter. Finally when generation is said to be φύσις, it is so said on account of the terminus; but not matter, but form is the terminus of generation. for matter precedes origin; form follows. book 2. Phys. ch. 1.

VI. Form is the active principle of motion; matter, the passive. Which that it may be rightly understood, it is to be observed, that form is not only the formal cause, but also the final, and the efficient; the formal cause of the natural body; the end of generation; & the efficient cause of motion. Therefore when form is called the active principle of motion, it is not to be considered as form, or as end, (for form as form, can in no way be said to act, & as end, not unless metaphorically) but as the internal efficient cause. Indeed, if form is considered as form, it seems to have the character of a passive principle. For when matter is called a passive principle, not the bare & unformed subject of all forms is understood, but formed matter, or at least disposed.

VII. Further since the species of motion & change are four, as will be said in its place, generation & corruption, growth, alteration, & local motion, and since by the appellation of natural things are contained the elements, heaven, plants, & animals, (to omit other species) it is to be seen of what sort of principle nature is, of which motions, & in which things. And first it is to be generally established: that, in whatever things nature is the active principle, in the same it is also the passive. For what has the force of moving itself, it is necessary, that it be apt, and have a propensity, by which it is moved. And this is to have the passive principle of its own motion. But these things are not reciprocated. For all natural things have in themselves the passive principle, & of all motions, by which they are naturally moved; just as also of rest, or state, in which, after they have been naturally moved, they consist.

VIII. The active principle of all changes is not in all things. For first no thing has in itself the active principle of generation. For the active principle, is form: which, when a thing is generated,

much less before it is generated, does not yet exist. Nevertheless generation can be said to be natural not only of the generated thing, but also of the generating, (although it is not in the generating) because the form of the generating not only moves the matter of the generated, but itself is the Physical principle, that is, such, as does not move, unless it is moved from elsewhere. The active principle of corruption, is not in the elements, but in mixts & living things. in which sense putrefaction is said to be natural corruption. Growth belongs to living things alone: and it doubtless proceeds actively from the soul. Corruptive alteration is so from an internal or external principle, as corruption: perfective, for instance when hot water is cooled, seems to be actively from an internal principle: nevertheless not without the aid of an external agent. The active principle of local motion, is not only in the elements, and in those things, which compounded from the elements, are moved by the motion of the predominant element; but also in animals, insofar as they are moved by spontaneous motion, and also in the heavens, if they are not stated to be moved by intelligences: about which we do not now dispute.

Here is the English translation of the given Latin text:

IX. Whatever things contain in themselves the active principle of their motion, and have some end or terminus, to which they are moved, when that is acquired they rest. Thus elements, in their places, to which they are moved from themselves, and all living things, in that magnitude, which is established by nature, rest, nor do they progress further. And that rest is actively from the same principle from which the motion is. Circular motion, since it does not have an end, is not borne to rest.

X. And these things about nature: The efficient follows, & the end: which also themselves are doubtless principles of natural affections. For because nature has its force from elsewhere, and exercises it not rashly, but by a constant & certain reason, the mind cannot acquiesce in its cognition, so as not to inquire into the end of each thing, & into the cause, by which nature is promoted to its end. For that the ancients referred the whole procreation of things, to matter, and to chance & fortune, was too great ignorance. Aristotle refers it to the celestial bodies: to which he attributes force (which whether it be light, or something else, we will inquire in its place) of altering, generating, corrupting, & in any way changing inferior nature. And that this force might be aptly distributed to the subcelestial bodies, various motions were attributed to the celestial bodies, (whether also to the earth, we will examine in its place) by which it happens, that according to their various approach & recess to the earth, subcelestial bodies are generated & perish by an indefinite vicissitude. Further since nothing is moved by itself, Aristotle judged that it must be ascended further, and therefore he added immobile causes, by which the subcelestial bodies, and indeed the whole of nature was moved. But what these causes are for Aristotle, & whether they are rightly introduced, is not for this place to examine. Let this only be established, that the Physicist must ascend to an immobile principle of natural things.

XI. The end remains, about which it was to be treated in the last place. But we say nothing here about the end of the universe, just as also we have said nothing about the efficient cause of the universe, (for each pertains to the disputation about the world) but only about the proper end of individual things. But that end is the good of each thing, which is posited in the operation, or proper work, or rather in the operating essence. For of which things there is some work, they exist for the sake of their work. 2. Cœl. c.3. And this is the proximate end. the further end is, to profit other things by its operation or work. By this subordination of ends natural things are exceedingly connected.

XII. Nature does not tend to the end proposed to it rashly, or confusedly, but ordinately, & with the highest skill, and industry: nor does it cease before, than it has brought what it began, to an end. Which since they are so, it is so far from it, that the procreation of all things can be referred to chance or fortune, that on the contrary it is to be stated, that nothing is procreated by nature by chance. For monsters, & other things of that kind, which can seem to be made by nature fortuitously and inordinately, are neither proposed to nature, nor are to be referred to it, as to an efficient cause, unless by accident. For they are the works of nature, either hindered by an opposing force, or by the ineptitude of matter.

XIII. Hence it follows, that the necessity of natural things is to be referred not to matter alone; but also to the end. Thus fire for example necessarily is borne upwards, not only because it is light, but also, that it may rest in a place fitting to its nature. Nevertheless the end ought not to be disjoined from matter: for matter is the cause of the end, not vice versa. And therefore since the account of each is to be had by the Physicist, nevertheless more labor is to be expended about the end. 2. Phys. ch. 9.

DISPUTATION V. On the Magnitude of natural body.

Respondent GERARD NEODORPIUS.

I. And these things indeed about the principles of natural bodies; there follow certain common affections, which are in all bodies naturally, and so proceed from their nature, & natural principles, that they can be demonstrated through them: and that indeed in that way, in which the Physicist is accustomed to demonstrate his things. Affections of this kind are, magnitude, place, motion & time. Among which magnitude rightly claims for itself the first place, and is the foundation of all the rest; as indeed which cannot be in bodies, unless by the intervention of quantity or magnitude.

II. The magnitude of natural body is an affection, through which it is extended everywhere, or, what amounts to the same, by which it has parts outside parts. I have said everywhere: for although surface & line are species of magnitude, nevertheless because no body is given, or can be given, which is extended only in one way, as a line; or in two, as a surface; but every body has three dimensions: it follows, that surface & line, are not to be considered as affections of body, or as species of Physical magnitude, but as boundaries. But that the essence, or formal ratio of quantity is posited in extension rather, than in divisibility, can be concluded from this, that divisibility follows extension, and natural body is divisible for this reason, because it is extended, or has part outside part: since it cannot be said that a body is extended, because it is a quantum. And this difference does not proceed from elsewhere, than that to be a quantum, & to be extended, are formally the same: to be extended or to be a quantum, & to be divisible, although they are the same in reality, nevertheless they differ formally or τῷ λόγῳ.

III. Magnitude or quantity is not an accident really distinct from corporeal substance, as is the common opinion (for no sufficiently firm indications or arguments are supplied of such a great difference) but an affection differing from it by reason alone. For if quantity were an accident really diverse from corporeal substance, & inhering in it in the manner of accidents, the parts of quantity would so inhere in the parts of substance, that the whole quantity would inhere in the whole substance, and therefore the parts of substance would not be distinguished from each other otherwise, than as the parts of quantity are distinguished among themselves. But the parts of quantity are so distinguished, that any one is situated outside another: therefore also substance per se and insofar as it is subjected to quantity, would have parts outside parts: and therefore would be quanta through itself. Wherefore there would be no need of quantity for the extension of corporeal substance, which really differs from it: & if it be feigned to inhere in corporeal substance, as an accident really distinct, the penetration of dimensions will have to be conceded.

IV. Those who defend this opinion among the Papists, I do not see, how without a most open contradiction they can state, either that quantity can exist without corporeal substance, or the latter without quantity. For it is as much, as if they were to state that corporeal substance exists & does not exist. Nevertheless they do not extricate themselves from this contradiction, who state that quantity is an accident really distinct from corporeal substance. For if it is an accident of body, it will have to proceed immediately from its essence, as an effect from that cause, which they call emanative. The nature of which cause is such, that with it posited the effect cannot fail to be posited. For because its causality is its own existence, it is always a cause in act, indeed it is a cause in act by this very thing that it exists. Therefore a body cannot exist without quantity. But neither can quantity without body: for since it is an accident (as they call it) really distinct from the substance of body, it would be & not be at the same time, if it existed separated from body. For since the being of an accident is to be in, certainly that quantity will not be, if it is stated not to be in body as in a subject.

V. In magnitude or quantity, either the essence can be regarded, or the affections, which are in quantity. For although quantity itself by reason of its essence is an affection of natural body; nevertheless it has no less also its own affections: which nevertheless are also affections of natural body on account of quantity. The affections of quantity are of two kinds: certain pertain to

the essence of quantity, and are distinguished from it by reason alone; as, continuity & divisibility: certain are modes, added to the essence of quantity; as finitude, figure, rarity, density: likewise contact, & others of that kind.

VI. The essence of quantity, is coeval with matter; but boundaries, figure, rarity & density, &c. follow the form or dispositions ordered to the form, or are introduced in another way by an external agent. Therefore the boundaries of quantity, figure, rarity & density can be changed, even if matter is not augmented, or diminished; but quantity itself cannot be changed according to its essence, nor lose parts, or acquire new ones, if matter is not augmented or diminished.

VII. But since continuity & divisibility immediately follow the essence of quantity, and do not really differ from it, it follows, that every body is necessarily continuous and everywhere divisible. That is called continuous of which the parts are coupled by a common boundary: or, of which the parts have the same extreme, which is the beginning of one, & the end of the other, each of which is bounded by its own extremes; if the extremes are together, they are said to be contiguous; if the extremes are not together, but something is interposed, they cannot even be said to be contiguous.

VIII. That the nature of the continuous may be understood, boundaries & parts are to be distinguished in it. A boundary, insofar as it is a boundary, is something in a continuous thing utterly indivisible. For if it were divisible, it would have parts, & those parts boundaries, and so on to infinity. Therefore a continuous is not composed from boundaries. Nevertheless it is not to be thought that boundaries are figments, or privations. For although they are indivisible, nevertheless they are true beings, which are actually in the continuous, and that not only in the extremity, but also in the middle & in all the parts. Indeed they also pertain to the essence of the continuous, and so are in the parts, which they conjoin, not indeed so that they touch, but so that they are essentially included in them, so that without them they can neither be nor be conceived. But since a boundary does not touch the part of the continuous, which it couples, much less will a boundary touch a boundary in the same continuous, nor will a boundary be able to cohere with a boundary, unless something continuous intercedes.

IX. From which it follows, that a continuous cannot be divided into its boundaries. For whatever is divided, is divided into its parts. But boundaries, are not parts, because they are indivisible. Therefore when a continuous is divided, it is divided into its parts, which are also continuous: and that not only, because they are coupled to other parts by the benefit of their boundaries, but also because they are composed from other parts coupled by a common boundary, & these again from others, and so on further. From which it follows, that neither natural body, nor any continuous at all is composed from indivisibles, but all are compounded from divisible parts, and therefore in dividing the parts of magnitude ever further, one cannot arrive at an absolutely minimal portion, but one must proceed to infinity: not that any quantity can ever be divided infinitely (for the infinite cannot be completed) but because from division there always arise parts, which are again divisible into other parts. For if a continuous consisted of indivisibles, the individual indivisibles would either have some quantity, or none. If they had quantity, however small, when they are conjoined, they would either touch each other with the whole quantity, or with a part. If with the whole, there will be given penetration of dimensions; and moreover it will

not be able to be understood how they make a continuous, since a continuous has parts outside parts. If they were to touch each other mutually with some part of themselves, they would not be indivisible. If they had no quantity, how could a quantum be made from them? how also could they be coupled by a common boundary: For what is coupled by a common boundary, in it the boundary & the thing coupled ought to be distinguished: but in that, which has no quantity, no distinction of this kind can be conceived. To these I add a most firm demonstration: Let two circles be described from the same center, one larger than the other, and let a radius be drawn from the center, which passes through each circle. and let it be moved, but so little, that in the exterior circle it passes through one indivisible. I ask now, how much will it pass through in the smaller circle? (for this also ought to be moved.) certainly less than in the exterior, and therefore what was said to be indivisible will not be indivisible. for nothing is less than the indivisible.

X. But just as in a continuous there is no part absolutely minimal and indivisible; so also there is none in it absolutely first, or absolutely last. For any given part that which is smaller is to be held prior or ulterior. From which it follows, that a continuous, qua continuous, begins when it is not yet, & ceases when it no longer is. For a thing then begins, when that becomes which is first in it, & ceases, when that perishes, which in it is last. Therefore since no part of a continuous is first or last, a continuous then begins, when no part yet exists; & ceases, when no part any longer exists. But when no part of a thing exists, the thing cannot be said to exist. Therefore a continuous then begins & ceases when it is not. For example; a line then begins, when its first point comes to be: therefore since a point is not a line, or part of a line, a line indeed begins, before it is. And these things about continuity, & divisibility, which is common to magnitude with other things, namely place, motion & time.

XI. It follows, that we speak about finitude, from which figure also arises: Therefore every body is finite in bulk: and no body actually infinite is given in the nature of things, nor can be given. For actually infinite is said, in which there are equal parts, of which if one is taken after another & the same is not repeated, never can so many be taken, but that some always remain to be taken. Therefore if body were actually infinite, it would follow first, that an actually infinite number is given. But infinity destroys the nature of number. For every number is either even, or odd: & if even, with a unity added it becomes odd, just as also if odd, with a unity added it becomes even. But the infinite, qua infinite, cannot be increased. Then every body can be moved locally, at least by God: but to move the infinite locally, involves a contradiction.

XII. The boundaries of natural bodies are either from the form, or from the force of the agent, or from the defect of matter, or from an external impediment, and they are either definite, or indefinite. And indeed living things and their parts have a quantity fitting to their nature, & certain boundaries of quantity, which they cannot exceed, neither towards magnitude, nor towards smallness. Thus a fly, although it can be somewhat larger, than it really is, nevertheless because it cannot grow into the bulk of an elephant, it must stop somewhere, and boundaries must be given, which a fly can attain, but cannot surpass. Similarly also an elephant, although it can be smaller, & ever smaller, than it really is, nevertheless because the nature of an elephant cannot subsist under the quantity of a fly, there will have to be given a certain finite quantity, under which an elephant can subsist, so that it cannot under a smaller. Now since figure follows

finitude, it follows, that living things have a certain figure, and that proceeding from the form, just as also the boundaries of magnitude.

XIII. Elements do not have a certain boundary of their magnitude prescribed by nature. And therefore if suitable matter were not lacking, which they could convert into their own nature, they would never make an end of growing. Of which thing an indication can be seen in fire. The same is the reason of the other elements. Which nevertheless all have boundaries, either from the heavens, or on account of the defect of suitable matter, and the force of contrary elements so resisting each other, that none can be everywhere surpassed by another. Hence it follows, that elements do not have figure from their form, but from that very cause, by which they are bounded. But that they have a spherical figure, that in water & earth is from weight, by which they are borne perpendicularly to the center, whence a round figure exists; in air & fire, which are light, from the zeal of avoiding a vacuum, by which it happens, that they equally everywhere adjoin themselves to the inferior elements, and as it were surround them.

XIV. Elements also do not have a boundary of smallness prescribed by nature. For just as a minimum is not given in quantity, so neither in quanta substance. Therefore that elements cannot subsist in a quantity however small, that either arises from this, that no agent is found, by which minute portions of them can be further divided; or from the repugnance of ambient bodies, against whose force elements cannot protect themselves in a quantity however small.

XV. Of homogeneous bodies and those lacking life, which are mixed, as are stones & woods, the same is the reason, as to the boundaries of magnitude, as of the elements: but they have smallness defined by nature. For because we think that pure elements remain actually in mixts, it must certainly be conceded, that in the division of a mixed body one can arrive at so small a portion, that if it is divided, not mixed bodies but elements will be about to result from the division.

DISPUTATION VI. On Place & Vacuum.

Respondent MATTHIAS de BRUNE.

I. That a place is to be attributed to natural bodies is evident from mutual succession, it is so manifest, that all judge by unanimous consent, that all

things that are, are somewhere: & that those things altogether are not, which are nowhere. Of which thing the argument is, that the Greeks call those things which cannot happen ἀτόπους,

as if you were to say, such things which do not have

a place; thinking obviously, that it cannot happen, that

something be without place. And this indeed rightly,

if to be somewhere, & to be in place are not distinguished.

For to be somewhere, is fitting both to bodies,

and to incorporeal substances, at least finite ones;

(for God is not somewhere, but everywhere; and

accidents are not somewhere, indeed they are not even,

unless insofar as they are in substances) and

therefore, if to be in place signifies the same thing, as to be somewhere, all things which are, will be in place, either per

se, or through another. And God himself indeed, although he is not

somewhere, nevertheless is everywhere, that is, in every

where, or in every place.

II. But God being omitted, just as between bodies, & finite incorporeal substances there is a great difference: so also between the modes, by which both are in place, there is the greatest diversity. For incorporeal substances are said to be in place definitively; bodies circumscriptively. To be in place definitively is nothing other, than to be somewhere, & not to be somewhere, and meanwhile to occupy or fill no space. They are said to be circumscriptively in place, which indeed are somewhere, & are not somewhere, but so that they also occupy, and fill space, and moreover are not only bounded by their own boundaries, but also are circumscribed by an external body, or indeed can be circumscribed. And this is that place whose nature the Physicist examines: the place of incorporeal substances he leaves to the Metaphysician. Nevertheless it is not to be thought, that place is an affection of body, but to be in place, or to occupy place.

III. To be in place is fitting to natural bodies on account of quantity. And therefore as necessary as it is, for a body to be a quantum & extended, so necessary it is for a body to be in place. Wherefore, since for a body not to be a quantum is as much, as for a body not to be a body: also it is as much, for a body not to be in place, as for a body not to be a body. And indeed here the distinction of the Sophists is not to be heeded saying, that it is indeed necessary, that every body be extended in itself & have part outside part; but not in order to place. For because the extension of body in place, follows the extension of body considered in itself, indeed is nothing other, than the very extension of body considered in itself, it is an open contradiction, for a body extended in itself, not to be also so extended in order to place, that the whole corresponds to the whole place, & part to part of place & of itself.

IV. Hence it follows, that two bodies cannot be at the same time in the same equal place. For if two parts of one body cannot be in the same part of place, neither can two bodies be at the same time in the same equal place. For as two bodies are related to one equal place; so two parts of the same body are related to one part of place. But two parts of the same body cannot be in the same part of place: because, what is extended in itself, ought also to be extended in order to place, as was said in the preceding thesis. Therefore two bodies cannot be at the same time in the same place. Besides, since to occupy place is the formal effect of magnitude, it can no more happen, that two magnitudes occupy the same place, than that the same effect is produced by two total causes not subordinated. But this latter falls by its own contradiction. For if a thing has been made by one cause, it certainly already is: wherefore if it is also made by the other cause, one thing will not be one. In a similar way if the place occupied, is again occupied by another body, the same place will be twofold.

V. These things therefore are absurd: but that which certain people state, that one body can be at the same time in many places, seems to surpass all absurdity. For one body cannot be divided from itself; and those which are in different places, and are not in the places in between, are divided from themselves. Therefore those which are in different places, cannot be one. And therefore those who state that one body is in many places, state that it is one and is not one. If they respond, that it is also in the places in between, now they will have to concede penetration of bodies, (for the places in between are full of other bodies) and moreover they will be compelled to this, that they confess that a body is circumscribed and is not circumscribed, finite, and not finite, and other things of that sort. Further let us imagine that one of those, who defend these things, is at the same time at Rome and at Leiden, if by chance at Rome he is beaten with rods, will he also be beaten at Leiden? If they deny it, he will therefore not be the same. If they concede it, I will ask further whether by the same executioner, and with the same rods, and other things of that sort.

VI. And so it has been demonstrated, that every natural body is in place, and indeed each one in its own place: it remains, that we inquire, what place is. Which since it is exceedingly controversial, let us premise certain attributes, which Aristotle in book 4. Phys. §.30. says, by the judgment of all men, are fitting to place. From which it will be able to be easily concluded, what place is, or indeed what it is not. And first, place contains what is placed. 2. It is nothing of that thing, which it contains. 3. It is neither greater than what is placed, nor smaller. 4. It is immobile: that is, it is not moved, if what is placed is not moved: and if what is placed is moved, either it is not moved, or at least not by the same motion, by which what is placed is moved. 5. It is separable, κεχωρισμένον, that is, it is also deserted by each thing placed, obviously when what is placed is moved. For to be moved in place, is to leave a place. And this is the true reading. For that εἶναι, which is in the text, ought to be expunged. 6. It has six differences, upwards, downwards, forwards, backwards, to the right, to the left. 7. It attracts & conserves what is placed, and all bodies are borne to it, and remain there. This traction and conservation is not attributed to place, as to an efficient cause, but as to an end; and it is fitting neither to every place nor of all things, but only to the natural place of the elements, and of elementary bodies, as such.

VII. With these things posited it is easily clear that place is neither matter, nor form, nor quantity, or the outermost surface of what is placed. For all these things are something of the thing placed itself, and therefore are αὐτοῦ. And therefore if any of these were place, it would follow, that a body could never exceed its own place, and therefore could never be moved. That some distinguish place, into internal, and external, is not worth a straw. For whatever is understood by the appellation of place, bodies, when they are moved in place, desert that. For place is known from the motion and succession of bodies. But what is internal to bodies, they do not desert that, as often as they are moved in place. Therefore what is internal, cannot be place.

VIII. Aristotle expressed it thus by definition: Τὸ τοῦ περιέχοντος πέρας ἀκίνητον πρῶτον, τοῦτ᾽ ἔστιν ὁ τόπος. Which words Keckermann takes, not so that the definition of place is contained in them, but so that this alone is asserted, that that part of the ambient body, which is immobile, and sustains what is placed, is primarily place, the remaining part secondarily: but nothing is more false than this interpretation. For the particle τοῦτο shows that Aristotle is closing the preceding disputation. And therefore he doubtless concludes that which he inquired. But he inquired what place is, as is clear from the whole disputation. Therefore he concludes what place is. Then from the genus it is clear that the word πρῶτον pertains to πέρας, not to τόπος. For what he says that in certain books πρῶτος is read; I fear that it is true. Finally τὸ here does not signify the primary, but the first proximate, for Aristotle defines, τὸν ἴδιον τόπον, not τὸν κοινόν. Now what is τὸ πρῶτον to Aristotle? That in which a body first is. And a little later he adds, εἰ δὴ ἐστιν ὁ τόπος τὸ πρῶτον περιέχον ἕκαστον τῶν σωμάτων, πέρας ἂν εἴη. see tex. 14.

IX. Therefore place to Aristotle is the immobile first boundary of the containing body, or, the surface of the ambient body, by which it touches what is placed. Many and urgent reasons impede me from acquiescing in this definition. And first, if this is the genuine definition of place, the whole universe or the outermost heaven will not be in place. But every body must necessarily occupy place: otherwise it will be nowhere, and therefore will not even be. And since place has been apprehended from motion, since the heaven is moved, it ought to have a place. Aristotle certainly confesses that the heaven is most of all in place because it is always moved: §. 32. Those who state that the earth is the place of the heaven, because the heaven is turned around the earth, seem to jest, not to dispute. Certainly they recede from the opinion of Aristotle, which nevertheless they most want to defend. For he himself confesses that the heaven is not somewhere as a whole or in some place, since indeed it is contained by no body: but insofar as it is moved, to that extent he says that there is place for its parts: for one part adheres to another. §. 45. Which things I do not know how they can be reconciled with the preceding. For what is in place per accidens, is not most of all in place. Then since place is the boundary of what contains, it ought not to be continuous, but contiguous to what is placed. §. 34. Nor can it be said that the heavens are in place potentially. For since they are actually moved, they ought to be actually in place: because to be moved is to pass from place to place. Why, that not even potentially can they be said to be in place according to Aristotle's opinion? For since the heaven is incorruptible, it is repugnant to its nature, that it be actually divided. Therefore it can never happen, that the parts are actually in place, and therefore neither are they potentially in place.

X. Secondly, if place is a surface; that bodies are in place, will not arise from their own nature, but from the force of universal nature conjoining bodies to bodies for impeding a vacuum. From which it follows, if a body existed in a vacuum, it would not be in place: which to me indeed seems very absurd. For since to be in place, or to occupy place immediately follows the extension of body, either a body in a vacuum will not have part outside part, or it will occupy place.

XI. Finally if place is a surface, place will not be immobile, and with the placed not being moved, place will be able to be changed, and will in fact be changed. As if the air diffused around a tower or stake, is driven by the wind. What Scotus says that nevertheless it is the same place, by equivalence, is nothing. For in that way a flying bird will always be in the same place, by equivalence, and, if we believe Scotus, will not be moved. Thomas for this reason says that place is immobile, because it preserves the same distance from the center and poles of the world. Which is no more solid. For imagine that something is moved around the whole circle of lands, so that by its motion it makes a circle parallel to the equator. This will always be equally distant from the center and poles of the world; and therefore will preserve the same place: and nevertheless will be moved. Those who want immobility to be fitting only to the place of the elements, and to that a natural one, philosophize too negligently. For Aristotle says that place is immobile, because it is not moved together with what is placed, just as a vessel. §. 41. Therefore he does not speak only about the place of the elements. Keckermann wants place to be immobile by reason of the base, by which it sustains what is placed. But neither does this solve the difficulty. For what is to be said, if a bird in moved air so sustains itself poised by its wings, that it is not moved? What if someone swims against the force of a stream in such a way, that he remains in the same place? Where will that base be here, which makes place immobile?

XII. That we may avoid these disadvantages, we think that place is nothing other than space full of body. Nevertheless this space is not a body, or something of such a sort, which is truly a quantum. Indeed it is not even a being: and nevertheless it is equal to what is placed, obviously in that way, in which shadows are in the air, and equal to the shadowed air. The remaining attributes of place which we have reviewed, can be adapted to space no less fittingly, certain ones even more fittingly, than to a surface.

XIII. And so about place. Vacuum follows: which is nothing other, than space without body. And therefore it is opposed to place, as a privation to a form. That a vacuum is not given in nature, nor can be given naturally, which has a notable magnitude, is sufficiently clear from the vehement endeavor of nature, fleeing & impeding a vacuum, as a wound of the universe. By which it happens, that both heavy things ascend, and light things descend against the inclination of their own nature. For since sublunary things do not subsist without the power of the heaven, and the power of the heaven cannot be propagated to inferior things with a vacuum interposed, nature for the sake of conserving itself ought to impede a vacuum.

XIV. But that the ancients thought that a vacuum was necessary for local motion, is so false, that a vacuum is an impediment of motion, nor can anything be moved in a vacuum. Which nevertheless is not from this, because it would follow that it would be moved in a moment (for this would not follow) but because the celestial power could not conspire to that motion, without

which nothing seems to be able to be moved in this sublunary world. But in what way rarefaction & condensation are given without the admission & expulsion of body, if a vacuum is not given in things, which undergo these motions, although at first sight it may seem not to be able to be understood, I think nevertheless that it can be explained without a vacuum, provided it is conceded, what we have demonstrated in the preceding disputation, that magnitude does not consist of indivisible particles.

DISPUTATION VII. On Motion in general.

Respondent DANIEL of SONNEVELT.

I. The natural Philosopher must treat of Motion not only for this reason, because it is a general affection of natural bodies; but also, because it is necessary that nature be unknown, if it is unknown, I do not say, whether there is motion, (for he who doubts, whether there is motion, takes away all certainty from the senses, and by the same work overturns the whole of natural Philosophy) but, what its nature and definition is. For motion is contained in the definition of nature.

II. Motion is defined ἐντελέχεια τοῦ δυνάμει ὄντος, that is, the act of that, which is in potency, insofar as it is such, that is, insofar as it is in potency: book 3. Phys. §. 6. It is called ἐντελέχεια, as if ἐν τέλει ἔχειν, or ἐν αὐτῷ τὸ ἐντελὲς ἕξις, as if with Hermolaus Barbarus you were to say perfectihabia, that is, the possession of perfection, or indeed the perfection itself, which is had and possessed. For ἔχειν is something such, which is not considered absolutely, but insofar as it is in another thing, which it perfects, not as an efficient cause, but as a form. The Latin interpreters call it act. Ἐντελέχεια is either first, or second: of which the former is related to the latter, as knowledge to contemplation, or as sight to vision, and indeed as the principle of operating is related to the very ἐνέργεια or function itself. But now motion is not first ἐντελέχεια, but second, or ἐνέργεια, that is, operation or function, as is clear from §. 18. where motion is openly called ἐνέργεια κινητική. and a little later motion is said to be ἐνέργεια of both, obviously of the mover and the mobile. Therefore motion is second ἐντελέχεια, but so, that by reason of the terminus to which it tends, which is most deeply included in the essence of motion, it is also in some way first ἐντελέχεια. It is added τοῦ δυνάμει ὄντος, that is, of that which is in potency. By which words the mobile is designated. For although motion is the act of the mover and the mobile, nevertheless it is more rightly described through the mobile, than through the mover; the reason of which thing will be given later. But that the mobile is said to be in potency, that is not to be understood in order to motion, (for how can that be said to be in potency to motion, which is already actually moved?) but in order to the form, which is now partly introduced into the mobile, partly still to be introduced. For with respect to the part introduced the mobile is said to be actually such, and the introduced part itself, is the ἐντελέχεια of the mobile: but with respect to the part to be introduced, the mobile is said to be potentially such, as it will actually be with the motion having been completed. When nothing of that form has been introduced, the mobile cannot yet be said to be moved; when nothing more is introduced, it has already ceased to be moved. What that is, which is said to be moved, because it is not so known, is not expressed by Aristotle in the definition, but demonstrated later, book 6. Phys. §. 86. & what follows. And

therefore, ὄν is not to be taken, as a transcendent name, as if it were hinted, that motion is fitting to every being, but as a participle from the verb εἶναι, by which it may be signified, that the mobile, whatever it is, is in potency to a greater perfection of the form, which is now being introduced. Finally it is said ᾗ τοιοῦτον, that is, insofar as it is in potency. by which words it is indicated, not only that motion is something imperfect, and such, whose essence consists in becoming; but also that motion is not called motion unless insofar as it is in becoming, or insofar as it is referred to those parts of the form, which are not yet introduced into the mobile, but are still to be introduced. for example, when water is heated, it is now partly hot, partly is not. Therefore calefaction is ἐντελέχεια of water, not insofar as it is water, not also insofar as it is in some way hot, (for water is actually water, and actually hot) but insofar as it is in potency to further heat, or rather, insofar as the introduced heat, is still intensified in it. And thus in the remaining species.

III. But that the nature and essence of motion may be known more distinctly and accurately, we will consider four things in motion separately, the mover, the mobile, the terminus from which, and the terminus to which. All of which are so necessary to motion, that with one lacking, motion cannot be motion. The mover or motor is, from which motion, as from an agent proceeds. And it is either first, or second, or subordinate. For there are two moving principles, says the Philosopher, of which the one is not Physical, because it does not have in itself the principle of motion. Such is, if something moves, and is not moved: just as, what is altogether immobile, and is first of all: book 2. Physic. S.73

IV. In the first motor the existence and attributes are to be considered. The existence of the first motor can be concluded from motion itself, in this way: Whatever is moved, is moved by another. For whatever moves, introduces some form into the subject which is moved. Therefore it is necessary, that the mover actually contains that form; the mobile does not actually contain it, but potentially. But it cannot happen, that the same, qua the same, actually contains the same form. Therefore nothing is moved by itself: but whatever is moved, is moved by another. And that either by an immobile mover, or by that which is moved. If by an immobile mover, the matter is settled. If by that, which is moved, since it cannot be moved by itself, it will again be moved by another, and so either there will be given a progress into infinity, or a circular dependence in efficient causes. But a circular dependence is not given in causes: otherwise the same would be the cause of itself. For if a were the cause of b, & b of g, & g of d, & d of a, a would be the cause of itself. But if nothing can be moved by itself, much less can it happen, that the same is the cause of itself. Nor is a progress into infinity given; for because the infinite cannot be passed through, the motive force would not be able to arrive at the last cause, if infinite subordinate motive causes were given. Wherefore it is necessary, that every motion be referred to a principle of motion of such a kind, which is immobile, and therefore first.

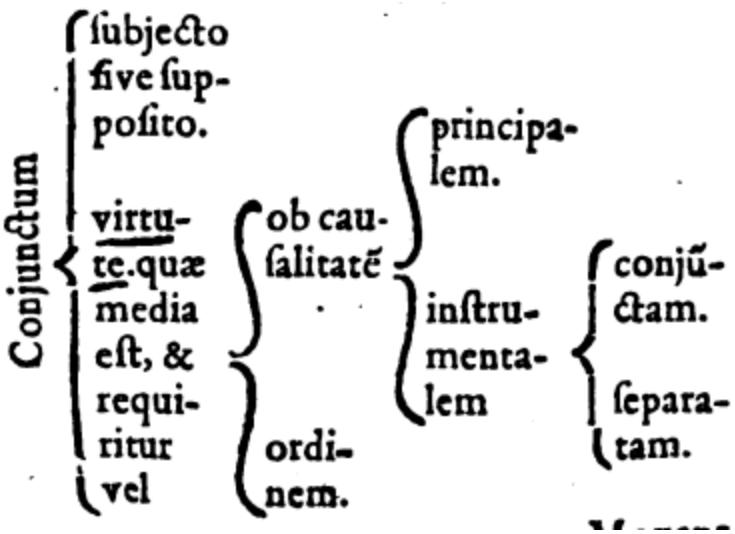
V. Therefore the first motor ought to be immobile: and that either per se only, or per se & per accidens. And hence arises the distinction of the first motor, into the absolutely first, and the first in its kind. The absolutely first motor can in no way be moved, neither per se, nor per accidens. For what is moved per accidens, cannot be the principle of perpetual motion. I say perpetual

motion, not what did not begin, but what, after it began, is not interrupted. But the absolutely first motor, ought to be the cause of perpetual motion. therefore it ought not to be moved even per accidens. A motor first in its kind, can be moved by another per accidens. Thus a sailor is moved in & with a ship; a soul, in a body.

VI. The attributes of the absolutely first motor, which indeed are made known from motion, are these principal ones. I. It ought to be incorporeal. For a body cannot move, unless it is moved. II. It ought to be impassible. For if it were acted on, it would be moved by another. For although not every change is motion, nevertheless none happens without motion. But if the first motor were moved by another, it would not be first. III. It ought to be eternal: nevertheless it is not necessary that motion be eternal. For the eternity of the first motor can be demonstrated even from motion not eternal; for if the first motor were not eternal, it ought to have had some beginning of existence, and that from another: but what receives the principle of existing from another, that, if it has the force of moving, ought to be said to have received it itself from another, and therefore cannot be called an absolutely first motor. IV. It ought to be one. And that not only for this reason, because no reason can be given, why there are many, when one suffices; but also because the order of the world seems sufficiently to argue unity. And these things indeed about the first motor.

VII. Subordinate movers are, which receive from another prior motor, either existence, or the force of moving, or both. And indeed all second and subordinate movers have existence at the same time and the force of moving from the first motor. Some of the second depend on others, either only as to existence; as animals on the one generating; or as to the force of moving alone; as all things which move being moved: or as to both, as nature, insofar as it is opposed to soul, on the one generating. A second motor is either principal; as soul, and nature: or instrumental; as motive qualities, which are either from nature, or impressed on the mobile by an external motor. Between soul however and nature strictly said there intercedes so much difference, that the former can be called the first cause of animal motion; first I say in its kind; the latter cannot be called the first cause of natural motion. And this is from this, that animals can be said to be moved by themselves; inanimates not likewise.

VIII. Mobile is said what undergoes motion. And that always ought to be distinct from the mover, either as thing from thing, or as part from part. Because, as was said before, nothing can be moved by itself. Which is so true, that it also has place in the motions of the mind.



The mover however ought to be conjoined to the mobile, either by subject, or by power. For since operation follows existence, a thing cannot operate where it is not, either per se, or by its power. Scotus objects first: That principle is false. Secondly: If it is true; it has place in infinites. I respond: False: because all finite agents require equal propinquity. Thirdly: To what will it be conjoined in creation? I respond: To space. Fourthly: It will be conjoined to power. I respond: Rather to the suppositum. Fifthly: It follows it is in the whole world. I respond: Supposing creation also everywhere. And hence it is permitted to collect the immensity of the first mover. For because it operates everywhere, it is everywhere: & if it were not everywhere, it could not operate everywhere.

IX. Whatever is moved, ought to be substance. For to be moved presupposes to be. Therefore what is not per se, cannot also be moved per se. Wherefore, just as accidents do not exist, unless in substance; so also they are not moved unless in & with substance. But can every substance be moved? Aristotle endeavored to demonstrate; that whatever is moved, that ought to be divisible. Which if he effected, it follows, that incorporeal substance, and indivisible, such as are angels, demons, & the human soul, cannot be moved. About growth & alteration properly said, there cannot be controversy. For it is certain, that incorporeal things are not subject to those motions. But what is to be stated about local motion, you may rightly doubt, since we learn from sacred writings, that also incorporeal substances are moved in place, & sent here & there by God, whence they are called ἄγγελοι, that is, messengers. Therefore it is not to be denied, that some motion is fitting to angels, which is agreeable to their nature, but that nevertheless does not seem to be able to be contained under that definition, which was posited at the beginning of this disputation. For motion is the act of that which is in potency; as was said before: and therefore whatever is moved in that way, proceeds from potency to act. But angels, when they are moved in place, do not seem to pass from potency to act. For because they neither fill place, nor are commensurated to place, nor are circumscribed by it, or perfected, I do not perceive, what accrues to angels, when they are moved, by which name they can be said to pass to act. But bodies, because they are both commensurated to place, and are circumscribed

by it, and also are perfected, acquire a new mode of existence, which you could name either local presence, or ubiety, if it were permitted: and by that name they are said to pass from potency to act. But if you imagine bodies to be moved in a vacuum, I know not whether the definition of Physical motion handed down before, can be adapted to them any more, than when angels are moved. For bodies do not seem any more to pass from potency to act, than spirits in a plenum.

X. Motion, as we said before, is ἐνέργεια of the mover & the mobile, or rather ἐνέργεια τοῦ κινητοῦ ᾗ κινητόν. From which it follows, that motion is not in the mover, but in the mobile. Further motion is in that subject in which is the terminus ad quem. For motion is nothing other than the terminus or form which is produced. but the terminus ad quem, or form, is without doubt in the mobile. for if it were in the mover, either the mover would impress that form on itself, or receive it from another. If it received it from another, now it would not be the mover, but that which is moved. If it impressed it on itself, it would be moved by itself, which we have said cannot happen. Besides if it were in the mover, every mover would be moved, or something would not be moved, in which nevertheless there would be motion. Which since it is absurd, it is to be concluded, that motion is in the mobile.

XI. Motion insofar as it is from the mover, is ἐνέργεια ποιητική, or action; insofar as it is in the mobile, is ἐνέργεια παθητική, or passion. Nor is it to be thought, that these are two ἐνέργειαι diverse in reality, but only one; which is so related, as the ascent & descent in a mountain; which differ not in reality, but by reason and definition alone. And certainly if action & passion differed in reality, to each one would be its own terminus. But that there are two termini really diverse, is alien to reason. Meanwhile the mobile pertains more to the essence of motion, than the mover. Hence it is that in the definition of motion mention is made of the mobile, & not of the mover, as we said before, and that to the numerical unity of motion is required the unity of the mobile.

XII. The terminus from which is said, which is left by the mobile; the terminus to which, which is acquired. Between these termini there intercedes opposition, and that either privative or positive. For the terminus from which in motion is always the privation of the terminus to which. And this terminus is called internal, because it is essential to motion, and is so included in its essence, that without it it can neither be nor be understood. This privation is nearly always conjoined with some positive form: which, if it is deserted with the privation, and perishes in the motion, is judged contrary to the terminus to which; if it is not deserted, but perfected, as in growth, there is hardly anything, that it can be called contrary, unless in a broad sense. Therefore every motion is a progression from privation to form, or, as we said before, from potency to act: certain ones also from form to form; as alteration & local motion. Nevertheless in circular motion this diversity and opposition of termini is not from nature, but from reason. For everywhere is the terminus from which, & the terminus to which.

XIII. The terminus to which ought to be divisible either into parts or into degrees. For motion is an imperfect act, which partly is, partly is not. But what is indivisible, cannot partly be, partly not be. Therefore motion is divisible. And this it has from nothing other, than from the terminus to which. Hence it follows that motion is not momentary, but successive. For what happens in a moment, cannot partly be, partly not be.

XIV. Motion is also continuous. And therefore it does not consist of moments disjoined by an indivisible rest, but of parts continuous and of their own kind. So that every part of motion is also motion, and that again divisible into its parts. Nevertheless this continuity does not necessarily follow succession (for it is not necessary that whatever is successive, is also continuous) but the equal force of the mover, and the potency of that which is moved. For the same cause, qua the same, always does the same. Therefore those who want, that whatever is moved, is moved by alternating moments, & rests, let them state the cause of this diversity in that which moves, or in that which is moved.

XV. To motion is opposed ἀκινησία, rest & change. Ἀκινησία is the negation of motion in things, which cannot be moved. And therefore it is opposed to motion contradictorily. Rest is the cessation from motion, and has place in those things, which can be moved. Although it is in a thing, which has a propensity to motion, & when it has it, it is the privation of motion; If it is in a thing when it has set aside the propensity, obviously having attained that to which it was moved, it is the perfection of motion. Motion is contrary to motion, either when the termini are contrary, as calefaction & frigefaction: or when the terminus from which of one motion is the terminus to which of the other, & vice versa: as descent & ascent.

DISPUTATION VIII. On the species of Motion.

Respondent DAVID DE HARO.

I. Motion in general has been treated; there follow the species, and other divisions, by which the diversity of motion is explained, and it is shown, what in each one is proximate and peculiar. Therefore before all things it is to be established, that there is some nature common to all motions. For what is not one, cannot be divided, but is already divided. But the unity of motion is collected from its definition. For since definition & the thing defined are diverse only by reason, if motion has one definition, it ought also to have a nature, which in itself is one, & is communicated equally to its species. What are said by Aristotle to be from one, commonly analoga, since some depend on others in some genus of causality, & therefore receive the common nature of the genus unequally, cannot be expressed sufficiently by one definition. But although the species of motion are sometimes so connected, that one cannot consist without the other; nevertheless because on account of this any sort of dependence, the common essence of motion, which is explained by the definition, is not communicated unequally to the species, or at least not to all the species: I see no reason, why motion cannot be said to be a genus, at least subaltern.

II. Now if it is a genus, it will either be a highest genus, or will be placed under some highest genus. It cannot be a highest genus; because there are only ten highest genera, among which motion is not accustomed to be numbered. Therefore in what genus will motion be placed? To me it seems it must be stated thus: if motion is considered as it is from the mover, it pertains to Action; if as it is in the mobile, or in that, which is moved, it ought to be referred to Passion.

III. The genus of Motion is change. For every motion is change, but not every change is motion. Wherefore before we hand down the species of motion, it is to be seen which changes are to be received among motions, & which ones not at all. Which will be clear by this division. Some changes are momentary, as generation & corruption, others successive: and these alone can be called motions, as appears from the preceding disputation. For motion is act in potency, insofar as it is in potency, that is, act partly completed and already introduced into the mobile, partly to be completed and to be introduced. But what is momentary, has no parts. Therefore momentary change cannot be motion.

IV. Generation is either of substances, or of accidents: in a similar way also corruption. For accidents also when they come to be and perish, are said to be generated & corrupted, and indeed properly. That the generation and corruption of substances are momentary changes, is clear from this, that the forms of substances in each of their species are indivisible. Wherefore they ought to arise and perish wholly at once: and therefore the origin and destruction of substances is completed in a moment. Then the cause of delay and succession, which is in motion, proceeds from the resistance, which exists in the mobile. But no resistance can be in the matter which is the subject of generation & corruption. For all resistance is either from the contrary, or from indisposed matter. But nothing is contrary to substantial form, and the matter in the moment of generation is sufficiently disposed to the new form. therefore no delay by succession can happen in generation: and therefore neither in corruption. Therefore generation & corruption are momentary changes.

V. The generation of accidents is the beginning of motion; and their corruption, the end of motion. For every motion has a beginning, by which it begins; & an end, by which it ceases. But the beginning and end of motion cannot be called motion equally. Therefore it ought to be a momentary change. And therefore either generation or corruption. For example, when water is heated, it is said to be altered, and that alteration is a true motion. But the beginning of this alteration, by which heat first begins to be, cannot be called alteration or motion equally, because it is momentary, but the generation of heat. Similarly when water is cooled, it can rightly be said to be moved: for in time it is altered: but the extreme of this alteration, by which heat ceases to be in water, is not motion, but a certain corruption, which happens in a moment.

VI. Nevertheless these generations and corruptions of accidents, although they are not motions, or parts of motion, are nevertheless not diverse in reality from that motion, of which they are the beginning & end: but they are so related to that motion, just as two extreme points are related to a line. But those two points, although they are not lines, or parts of a line, nevertheless are not distinct in reality from the line, but are included in it, as boundaries in bounded things. Therefore also the generation and corruption of accidents, are the boundaries of motion, and are essentially included in it, not as parts, but as extreme points in lines.

VII. When it is agreed, which changes are not motions, let us see which ones are contained under motion, as species under genus. But this is to be drawn from nothing other, than from the terminus, to which motion tends. For since nothing equally makes to the essence of motion, as the terminus to which, the unity & generic & specific distinction ought to be sought from its unity and distinction. Therefore if the termini are diverse in genus, the motions also will differ in

genus: if the termini agree in genus and differ in species, or if they agree both in genus & species, the motions also will be related in a similar way. Therefore since the terminus of motion is found in three categories, in quantity, quality, & where, motion by the first division is to be distributed into three species. Motion to quantity lacks a common name, and of that unnamed kind there are two species, growth & diminution: to quality is alteration; to where lation or local motion. To action or passion motion is not given: because they are motion itself. but motion does not tend to motion. Relations come to things without motion, and with the foundation & terminus posited in the subject they arise without change. When, or time, follows motion. Position & habit are changed by local motion. Nevertheless motion follows motion: as, alteration in the first qualities follows alteration in the second qualities & growth.

VIII. Growth is motion to greater quantity: and that either happens by external apposition of parts (thus inanimate things are augmented) or by internal reception of quantity. thus animate bodies grow. Diminution is motion to lesser quantity. And that ought to be judged no less a true species of motion, than growth.

IX. Alteration properly said is engaged between contrary qualities: and those either first; as calefaction, frigefaction, &c. or second; as rarefaction, condensation, concretion, liquefaction, &c. If there are any changes, which tend to qualities of such a kind, to which nothing is contrary, as illumination, those cannot be recensed among the species of motion, because they happen in a moment. The species of alteration are intension & remission: and indeed each one is true alteration, and true motion. Although since alteration is engaged between contrary qualities, no true intension is without remission, nor remission without intension. For the intension of one contrary, is the remission of the other. Intension either happens from the similar, or from the contrary through ἀντιπερίστασιν. For a contrary quality expels and unites the contrary, and by that unition intends it.

X. Local motion does not tend to place (for place is quantity, or certainly follows quantity) but to where, or rather, so to speak, to whereity, that is, to that form, or mode of existence, which a body receives from place. For every motion is the act of the mobile, and so indeed, that it is in the mobile, as in a subject. But motion is not distinguished in reality from the imperfect terminus, or as it still is in becoming, as they say. Therefore the terminus ought to be in the mobile, as in a subject. Wherefore since place is not in the thing located, as in a subject, (for it is an external adjunct) it follows, that place is not the terminus of local motion, but that which the mobile receives, when it enters a place.

XI. And these are the first and proximate species of motion: which are again subdivided into other species; but this is not the place for that. But the numerical diversity comes not only from the terminus, but also from the subject, and from the dissolved continuity. Therefore motions, although they are of the same lowest species, nevertheless will be distinguished in number; if either the mobile is not the same in number, or rest divides the motion interposed. For example, when the same fire heats two men at the same time, there are two calefactions distinct in number; or if a clod projected in the motion itself splits into two parts, all the way to the division it will be one motion; but from the point the clod is divided, there will be two motions diverse in number. Thus also, if someone rests a little while walking, that walking will not be one, but two

diverse motions. Therefore when a ball having struck a wall rebounds, since between the projection & the rebound rest is interposed, it cannot be said to be one motion. For that rest takes away the continuity: which being removed motion is not one. And this Aristotle pronounces and demonstrates about every motion. book v. Phys. ch. xii.

XII. And these things about the division of motion into species: there follows another division of motion, into natural, violent, & mixed: and that is sought from the principle, whence motion happens. Natural motion is said, which happens from nature: violent which happens from an external principle, with nature resisting or at least contributing nothing to the motion. Each one is found in all the species of motion. For the growth and diminution of animate things is natural; of inanimate things, partly natural, partly violent. Alteration although for the most part it is violent, nevertheless some is natural: as when water having been heated of its own accord grows cold. Mixed motion from natural and violent, seems to be found only in lation or local motion; as when a stone is projected downwards with great violence.

XIII. Natural motion to place, either is fitting to inanimate things, or to animate, the former is uniform and simple; the latter multiform and composite. Simple motion is said, which happens upon a simple line. And it is either circular, or straight. Circular motion is said, which happens around the middle of the universe. This is said to be competent to the heaven. Straight is, which either tends from the middle to the circumference, or from the circumference to the middle, the former is called ascent; the latter descent. This is found in the elements, and also in mixts, insofar as they are moved by the motion of the predominant element. Multiform motion is said, which tends to all the differences of places. And this is found only in perfect animals. Plants, & imperfect animals, as shellfish, are not moved naturally, but only grow.

XIV. Those which are moved by simple motion, although that motion is from nature, are nevertheless said to be moved by the one generating no less. For what is the cause of the cause, is also the cause of the thing caused, when the causes are subordinated per se and essentially. wherefore since simple motion necessarily proceeds from nature with impediments removed, & nature acknowledges some cause and author of itself, motion also ought to be said to proceed from that cause. Which cannot be said about animal motion. For that is so from nature, that the judgment and appetite of phantasy intervenes. Wherefore since the judgment and appetite of animals cannot be said to be from the one generating, neither ought the motion, which follows appetite, be ascribed to the one generating. And indeed not only straight motion is from the one generating, in the way, which has been said, but also circular.

XV. Those which are moved naturally by straight motion, are moved more slowly in the beginning, more swiftly in progress, most swiftly in the end: and that not only if violent motion preceded, but also, when a long rest preceded. And that experience itself teaches. For a falling stone strikes so much more vehemently, from how much higher a place it comes. The cause of this thing, that we may omit the opinions of others, I think is to be referred to the medium, through which the motion happens. For that before the motion is immobile: and therefore in the beginning resists the mobile more, & succeeding from the back to impede a vacuum, urges more. For if the mobile by its natural power surpasses the resistance of the quiescent medium, it will surpass it much more easily, when now the medium has begun to be moved. And so, while

the resistance of the preceding medium gradually decreases, & the impetus of the succeeding medium increases, motion also gradually becomes swifter. Circular motion, because it does not experience resistance of this kind, is altogether equable.

XVI. Violent motion is either traction, or pulsion. Traction is motion, by which the mobile is moved towards the mover itself; pulsion, by which the mobile is moved from the mover. Carrying and rolling can be referred to these species. For he who is carried, as the carrier, is moved per accidens: but the wagon in which he is carried, is either pushed, or pulled. Rolling consists of traction & pulsion. Pulsion is either sluggish, impulsion, or ἔμψυχος, depulsion. Impulsion is said, when the mover is not separated from the mobile; depulsion, when it is separated. To this pertains projection. But since the mover ought to be conjoined to the mobile, it is asked in this place, by what cause the motion of projectiles is continued. Some think it proceeds from the air: which moved by the projector, carries with it the projected thing, say a stone, meanwhile the air also urging from the back, which succeeds the stone to impede a vacuum. But that this is false is clear from this, that the preceding air quiescent by its own nature is moved by the projected stone: or, if it is not impelled by the stone, it is no less difficult for the intellect, how the motion of the air is continued, than how the stone is moved by the hand not touching, which impelled it per se in the first place. The following air cannot impel the stone, unless the preceding is impelled by the stone. For it succeeds only to impede a vacuum. Since therefore that motion cannot be continued by the medium, it remains, that some force or quality is impressed on bodies, by which that motion is continued, as natural motion by gravity and levity.

DISPUTATION IX. On Time.

Respondent SAMUEL CARLIER.

I. How certain it is, that there is time, and that natural things are in time, so abstruse and difficult to explain is its nature. The cause of this thing among others also is the neglected homonymy of the term which gave occasion to many hallucinations. For time is taken either broadly, or strictly. Time broadly taken is fitting to absolutely all things, which are not momentary. Time strictly said is found only in natural things, insofar as they are natural, that is, insofar as they undergo motion. And this is of Physical consideration. And although time broadly taken pertains to Metaphysics; nevertheless because it is as it were the genus of Physical time, its nature and species are to be delineated by us in a few words, that we may understand the nature of Physical time more easily and exactly.

II. Time therefore broadly used seems to be nothing other, than the duration of each thing. or the quantity of duration. For duration is the permanence of a thing in its existence. Which permanence since it is in its way divisible, and has parts some outside others, ought also in its way to be called quantity, or to be said to have quantity. But that quantity is neither magnitude, nor multitude. Therefore it is time. Hence it follows, that momentary and temporary things, are immediately opposed to each other. For because momentary things have an indivisible existence, and in no way permanent, they cannot be said to endure or to have time. Just as on the other hand, whatever is not momentary, is rightly said to endure or to exist for some time. I

said that time broadly taken is duration or the quantity of duration, that I might suggest, that time differs from duration not in reality, but by reason alone. For when some thing is understood to exist and to remain in its existence, it is said to endure; and that duration is called time, insofar as it is understood to be divisible into its parts. So that time does not seem to be related otherwise to duration, than magnitude to corporeal substance.

III. Time broadly taken is either eternity, or aevum, or time strictly said, or Physical time. Eternity, according to Boethius, is defined the whole, simultaneous, and perfect possession of interminable life. Which definition I know not whether it is most accurate. For what is that, possession of life? For although whatever is eternal lives, nevertheless therefore life does not seem to pertain to the definition of eternity. Then nothing is posited in this definition, which is in place of genus, in which eternity is understood to agree with the other species of duration or time broadly taken. And therefore perhaps more openly, and more accurately eternity may be defined the quantity of invariable duration, lacking beginning and end. In which definition the quantity of duration, or time broadly taken, obtains the place of genus, which is also fitting to aevum & Physical time, and excludes moments, which because they are indivisible, cannot be said to endure, as was said before. And although the duration of God, which alone is eternal, if it is considered in itself, is indivisible; nevertheless because it contains the whole extension of time, and coexists with it according to all differences, it is apprehended by us as divisible, when it is compared with time strictly said. When it is said invariable, Physical time is excluded, which is conjoined with motion. It is added, lacking beginning and end, to exclude aevum; which has a beginning: whether it also has an end, we will now see.

IV. Aevum, in Greek αἰών, otherwise denotes either an age, that is, a long time, or eternity itself, as if ἀεὶ ὄν, that is, always existing. But in this place it is distinguished both from Physical time and from eternity, and is nothing other, than the time or quantity of the finite duration of permanent things insofar as they are permanent. Aevum either has a beginning and lacks an end, and that is fitting to angels, and other incorporeal substances; or is finite on both sides; and has place in corporeal substances, insofar as they are considered as substances. If any bodies are stated to be going to endure eternally, their duration also, if it is abstracted from motion, seems to have to be called aevum.

V. There follows now time strictly said, or Physical time, which we have said is of this consideration. And first let us see the definition of Aristotle; then let us add, if anything further will seem to pertain to explaining the nature of time. The definition of Aristotle holds itself thus: Τοῦτο γάρ ἐστιν ὁ χρόνος, ἀριθμὸς κινήσεως κατὰ τὸ πρότερον καὶ ὕστερον. That is, Time is the number of motion according to before and after. book 4. Phys. §. 101. Where first it is to be observed that time is called number, not because it has a discrete nature, just as number; but because it is a measure, because multiplied, we measure motion through parts, and number those parts. Which nevertheless are not diverse in reality, but distinguished only by the designation of our mind. Thus we measure cloth; and its parts, although continuous, we number by the ell multiplied sometimes.

VI. Of motion is added: obviously because Physical time, so follows motion, that without it it can neither be nor be known nor be explained. For when we perceive motion, neither by sense nor

by mind, no time seems to flow by for us. Of which thing an argument can be sought from sleep. For those who sleep, because meanwhile they do not observe motion, so conjoin that moment in which they wake up, with that moment, in which they had begun to sleep, as if no, or a very small time had flowed by. Hence is to be sought the cause why to the miserable time seems much longer, than to those, for whom all things flow from the feeling of the mind. For these indeed in enjoying pleasure, occupied with the whole mind, notice hardly any motion: when on the contrary those most attentively consider individual motions. For this reason also it is said in Sacred Scripture, that after the last judgment time will no longer be. Because when we will intuit God face to face, and our minds will be filled thence with ineffable joy, meanwhile every change having been taken away, a thousand years will be as one day. But the Philosopher did not make mention of rest; because time does not measure rest, or the duration of permanent things, unless insofar as they are referred to some motion.

VII. Finally it is added according to before and after. For motion is a successive being, that is such, whose parts continuously flow, and some succeed others. In this succession some parts are prior, others posterior. Therefore before and after do not denote in this definition the succession of time (for thus the same would be defined through itself) but the succession or order of parts in motion: which order is prior and more known than that succession, which is in time. And so it is understood, how Physical time is distinguished from eternity and aevum: in which we said before that no true succession is found.

VIII. We said a little before, that time, according to the opinion of Aristotle, is a measure. This how it is to be taken, is to be explained more fully. To measure, that I may begin thence, is to explore the unknown quantity of something through a known quantity. And therefore measure will be nothing other than a known quantity, by which an unknown quantity is explored, and becomes known. But quantity becomes known, when it is compared with a known quantity. Those which are compared among themselves, ought to be of the same genus: but those which are of a diverse genus, as number, time, weight, magnitude, cannot be compared among themselves. Therefore it is necessary, that measure and the measured are in the same genus. Wherefore, since nothing can be measured by time, unless motion, it follows that time is motion. Meanwhile in time the material and the formal ought to be distinguished. the material is motion; the formal is the duration of motion, as it is known. And hence it happens, that, although one motion is swifter or slower than another, nevertheless time is not said to be one swifter or slower than another, but only longer or shorter: obviously, because the velocity or slowness of motion does not pertain to the essence or form of time, which is posited in the duration of motion alone.

IX. Besides a measure ought not only to be known, but also equable. Wherefore since no motion is more known or more equable, than the motion of the heaven, it happened, that by common consent all men use celestial motion to measure the duration of all things. For hence are taken the terms of times, hour, day, month, year, age, &c. Therefore celestial motion is a measure: the remaining motions, are measured by the motion of the heaven. For when we want to investigate the unknown duration, or quantity of duration of some motion, we compare its duration, with the celestial motion, whose duration is most known to us, as with a measure. The flux of sand or water, or other horary instruments, by which we are accustomed to measure

the duration of motion, are only vicarious measures: of which moreover the quantity would be unknown to us, unless it were measured by the motion of the heaven.

X. From those things, which have been said, it can be understood, that to be in time is nothing other, than to be at the same time with the celestial motion, and to be measured by it. Therefore although many motions happen at the same time in the world, nevertheless there is one time: but which is divisible into many parts. Hence also it can be understood, which motions are at the same time in time, or are not at the same time; and which are equal or unequal: of which the former pertains to the species of time, or to when; the latter, to quantity, or to how long. Motions are said to be at the same time in time, which are measured by the same part of the celestial motion: equal, which are measured by an equal motion; unequal, which are measured by an unequal motion.

XI. The parts of time are the past and the future: which are coupled by the now. Which is not time, but something indivisible in time, as a point in a line. Therefore time does not exist according to itself as a whole, nor according to its parts, but according to the now, by which the past is conjoined with the future, or in which there happens a transition from the future into the past. And this is the condition of a successive being, that then it is, when certain of its parts have passed, others are future. No parts of time can be said to be present; because the present is something indivisible: but no part of time is indivisible, as was said in its place. When no part of time has passed, time does not yet exist; when none is future, it no longer exists. But now, since what is past is, it is actually past, and what is future is, it is actually future: time also will be said actually to be, when it actually flows, that is, when certain parts are past, certain are future. For its essence is posited in flux.

XII. Time began with motion, and therefore with the world. But time does not begin in time: but in its first now, just as motion begins in its first moment. For it is altogether false, what Aristotle teaches, that in time a first is not given, if the discourse is about Physical time, and in motion a first moment is not given.

XIII. And indeed so far about time from the opinion of Aristotle. But in truth, because time defined in this way, is not an inseparable property of natural things, it is to be declined a little from this doctrine. For first, that the motion of sublunary things, is measured by the celestial motion, is arbitrary. Then when in the time of Joshua the sun stood for a whole day in the middle of the heaven, and when in the time of Hezekiah it went back ten degrees, meanwhile without doubt time flowed by. Finally the motion of the heaven cannot be said to be in time; if it itself is time. For if time is said to be in time, it will be necessary to proceed to infinity. Therefore a distinction will have to be made between time and the measure of time. for the essence of time is not constituted in this, that it is the measure of motion, but in the quantity of flowing duration (just as eternity and aevum in the quantity of permanent duration) which can be measured by motion. Therefore as truly as celestial motion is called the measure of time, so falsely is it said to be time itself of Physical things.

XIV. Time itself with Varro seems to be able to be defined the interval of motion, book 6. on the Latin language. or more openly, the quantity of duration, which is in motion. Which definition,

that it may be understood, it is to be stated that place and time are analogous. For just as place follows magnitude, so time follows the duration of motion. Wherefore just as to understand the nature of place, an infinite local space is to be conceived: so to understand the nature of time an infinite temporal interval is to be conceived. And just as a body is said to be in place, when by its magnitude it occupies some part of the infinite space equal to itself: so also motion, is said to be in time, when it perseveres through some part of the infinite temporal interval. Besides just as local space is not some true thing distinct from the magnitude of body: so neither is temporal interval a thing diverse from the duration of motion.

XV. This analogy of place and time fails in a twofold way. For first local space itself is place, when it is full of body; but the temporal interval in which motion and other things are understood to endure, is not time, but the duration itself of motion, indeed not if it is considered in itself, but if it is compared with some part of the temporal interval, and is understood to be coextended to it. Then each body has its own place, nor can two bodies be at the same time in the same place: but although any motion has its own duration, nevertheless many motions can happen at the same time in one and the same time.

DISPUTATION X. On the nature & affections of the Heaven.

Respondent NANNIUS FORESTUS.

I. Natural body has been treated, and its principles and affections in general: there follow the species, which arise from its division. Natural body is divided most conveniently into simple, & composite. Simple body is said, which is not compounded from other bodies. And that is known from motion. For because natural motion follows the condition & nature of the mobile, the motion of a simple body ought to be simple; & whatever is moved by simple motion, that itself ought to be simple; or, if it is composite, that motion ought to proceed from a simple nature, which dominates and overcomes in it. Simple motion is said, which happens upon a simple line. A simple line is either circular, or straight. Therefore also simple motion is divided in this way. And therefore since to one body not unless one motion can be natural, it follows that there are two kinds of simple bodies; celestial, which are moved naturally by circular motion; & elements, which are moved naturally by straight motion. And about these Aristotle treats in the books on the Heaven.

II. Among simple bodies we give the first place to the heaven: and that because all the rest depend on the heaven, as we will say later. The disputation about the heaven will be for us bipartite: in the former we will consider the nature of the whole heaven, and the affections which are fitting to the whole heaven; in the latter we will speak about the stars. And before all things we want it to be conceded to us, that the heaven is a true and natural body. Which is manifest from all those things, which are apprehended to be in the heaven. For what is endowed with quantity and figure, what occupies place, and embraces the remaining bodies with its circuit, what has rarity and density, what finally shines with its own light, and runs into the senses, that

ought necessarily to be a body. And this no one, as far as I know, has ever drawn into controversy.

III. Hence now further we conclude against Averroes and his followers, that the heaven equally with other bodies, is compounded from matter and form, as from component principles. For because corpulence arises from the union of matter and form, by the same arguments corpulence is demonstrated, and composition from matter and form. Wherefore the heaven, either is not a natural body, or if it is conceded to be a natural body, it ought to be compounded from matter and form. For simple body, is a fiction, which is taken away by its own contradiction. Further if the heaven were a simple substance, it would be either matter, or form. It cannot be bare matter; because matter is not a this, nor a quale, nor a quantum, but pure potency, and therefore cannot exist in act without form. But the celestial body exists in act, and moreover is defined by essence, quality and bulk. Therefore the heaven cannot be bare matter. The heaven also cannot be pure form: I. Because form per se cannot be moved: II. because it does not run into the senses: III. because it does not admit quantity, rarity, density, light, and things of that kind: IV. because form without matter understands: but to attribute intelligence to the heaven, we will prove later to be exceedingly absurd.

IV. This assertion is not overturned by the constancy and incorruptible nature of the celestial bodies. For although matter is the root of corruptibility, and nothing is corrupted without matter: Nevertheless it is not to be thought that everything, which is compounded from matter and form, has a corruptible nature. For every corruption is from the contrary: contrariety, which has the force of corrupting, is engaged among the first qualities. Therefore nothing ought to be judged corruptible besides that, which is affected by the first qualities. Therefore that you may conclude that the heaven is corruptible, it does not suffice to urge its composition; but it must be proved besides, that the first qualities, which are in the elements, are fitting to it. About which we will speak later. But indeed composition from matter and form became known by no other indication, than from corruption: and therefore what is not corrupted, ought to be immune from that composition. This consequence is exceedingly infirm. For after once composition from matter and form was apprehended from corruption in sublunary things, many other arguments of that composition offered themselves, which are common to the heaven, and to subcelestial bodies; as motion, magnitude, figure, rarity, density, light, &c.

V. Since therefore it is agreed that the heaven is compounded from matter and form, it is to be seen further, of what sort that matter and form is. About the matter it is doubted, whether it is of the same ratio with the matter of elementary bodies, or diverse. In this question, if we want to hear Aristotle, the same matter does not seem to be attributed to the heaven and to sublunary bodies. For he openly distinguishes the one from the other. book 1. on generation & corruption §. 43. & 87. Met. ch. 4. book 12. ch.2. & elsewhere. This opinion seems supported by not contemptible arguments. For first, since every matter is referred to form, it does not seem to be able to happen, that one and the same matter respects form in so dissimilar a way. For celestial matter is informed in an indissoluble way, subcelestial, in a dissoluble way. Then a sufficiently suitable reason does not seem to be able to be given, why the heaven is incorruptible, if it is from the very matter, from which are subcelestial bodies. For since sublunary matter contains in

itself potency to non being, certainly everything seems to be able not to be, which has matter of this kind: and this seems to be nothing other, than to be corruptible.

VI. And these arguments seem to prove the diversity of celestial and subcelestial matter: but arguments of no less weight militate for unity. For first, in each genus some first cause is given, therefore also some one first matter seems to have to be given, in which all materiated things agree. Then, since matter is pure potency, it does not seem to be able to differ one from another. For if they differ, each one will have to agree with the other in the common ratio of matter. Whence therefore will the difference be, if each one is pure potency? For by what a thing is agreeable to another, by that it cannot be diverse from the same. To these I add what is said in book 8. Metaphys. ch. 2. ἔοικε δ' ὁ λόγος τῶν διαφορῶν ἀπὸ τοῦ εἴδους καὶ τῆς ἐντελεχείας εἶναι. That is, the ratio of differences seems to be from the form and from the act. But in pure potency neither εἶδος nor ἐντελέχεια is found. And these are the principal ones from the reasons, which are accustomed to be brought forth for each part. Which since they can be solved sufficiently fittingly, and moreover on both sides the force of concluding seems to be equal, assenting to neither part, we will respond to the reasons brought forth on both sides, in the course of disputing.

VII. Therefore whatever the case may be concerning the matter, let us see the form. And since it cannot be said, what is the form of the heaven, let us at least do this, that it may be understood, what or of what sort it is not. Therefore first let us state that the form of the heaven is not some elementary form, and therefore that the heaven is neither fire, nor air, nor water, nor earth, nor something compounded from the elements, but a certain fifth nature, and essence diverse from all subcelestial bodies. For if the heaven were of an elementary nature, it could not be incorruptible. For whatever is endowed with the first qualities, all that can be corrupted, and at last also is corrupted, either according to itself as a whole, or according to some of its parts. But the heaven cannot be corrupted, as we will say in thesis 9.

VIII. Secondly, we state that the form of the heaven is not a soul, or a vital form. For the soul is the act of an organic body, and the principle of vital operations. But in the heaven there is no apparatus of organic parts, no vital operations. Therefore the heaven is not animated. Further since there are three kinds of souls, which one will we attribute to the heaven? The vegetative? But it is not nourished, it is not augmented, it does not grow. The sensitive? But a simple nature cannot be endowed with the faculty of sensing. Therefore the rational? But neither is this agreeable to reason. For in the genus of bodies an intellect is not given without sense.

IX. And so far we have said nothing other, than that the heaven is a simple natural body, and that inanimate, and diverse from the elements. By which words although the nature of the heaven is not sufficiently circumscribed, nevertheless we cannot progress further at present. Wherefore let us consider the affections which are either to be attributed to the heaven, or to be removed from it. We remove from the heaven first the first qualities, and therefore corruptibility. For these mutually follow each other, as we said before. That the heaven is not corruptible, can be concluded from this, that hitherto no species of corruption or mutation, such as is accustomed to proceed from the first qualities, has been apprehended in the heaven. For that celestial comets seem to be arguments of mutation, about them we will state our opinion in the

following disputation. Secondly we remove from the heaven right and left, before and behind. For these are fitting only to animals.

X. We attribute to the heaven, first figure, and that round. For since the heaven is a most perfect body, most simple, and most capacious, (for it embraces all things with its circuit) it was agreeable to its nature, to have the most perfect, most simple, and most capacious figure. But none is more perfect, more simple or more capacious than the round, or orbicular. Therefore this is to be judged most agreeable to the heaven. Then the heaven ought to be contiguous to the elements; but the elements are circumfused around the earth with a round figure. Therefore also the concave surface of the heaven ought to be round. Rarity also and density is in the heaven: but about that we will speak in the following disputation.

XI. Qualities also are fitting to the heaven; and those either motive, or alterative. Whether the whole heaven is moved, or its parts, we will inquire in the following disputation. In this place we only posit this; that circular motion which is in the heaven, so proceeds from its form by means of some motive quality, just as the natural motion of the elements proceeds from their form, by means of gravity and levity. And therefore we judge it superfluous, to feign incorporeal substances (they call them intelligences), which circumvolve the celestial bodies by an indefinite rotation. For why should we deny, that simple and uniform motion can proceed from a non-intelligent principle? Nor indeed is it more to be wondered at, that the celestial bodies complete their periods by so certain and immutable a law, than that heavy things are borne from wherever perpendicularly to the center of the universe. These bodies are indeed greater than the elements: but also a greater force is in them, which so responds to their bulk, as gravity and levity responds to the elements.

XII. That that motion is not finished, is in the cause, because it is for the good of the whole universe, in which is contained the good both of the heavens and of the remaining bodies. And for this end the elements also are moved: but because it pertains to the good of the universe, that the elements rest somewhere, and there defend the safety of the universe, their motion ought to have been finite, and the place, in which they rest, certain and definite. From which nevertheless they recede, when it is in the interest of the universe: but it is in the interest of the universe, when a vacuum is to be impeded. But the heaven ought to be moved indefinitely, because not by rest, but by its motion it defends the safety of the universe, and consequently its own.

XIII. The alterative qualities are, by which the heaven acts on inferior things. But the heaven doubtless produces in inferior things the first qualities, (especially active heat) and whatever follows the first qualities. Besides it produces inanimate substances, as elements, meteors, stones, metals, and other things of that kind. To the generation of living things I think the heaven concurs no otherwise than insofar as it rightly disposes the matter. It does not act directly on the human will, but only indirectly, obviously insofar as the will follows the temperament of the body. For the effecting of these things it uses not only motion and light, but also occult qualities. Motion and light are the cause of heat, and of all those things, which follow heat: but occult qualities, are also the causes of the rest of things, which cannot be effected by calefaction alone. Of which sort certainly there are very many. For the motion of the sea is from the Moon,

nor nevertheless does it seem to be able to be reduced to its motion or light. Besides in the innermost bowels of the earth the effects of heaven are apprehended: to which place nevertheless neither light nor motion penetrates. Therefore occult qualities are necessarily to be attributed to the heaven, through which it acts on inferior things.

XIV. From which it is clear, what ought to be attributed to Astrological predictions. For those things which are above the elementary world, as the conjunctions, oppositions, eclipses of the stars, &c. are predicted most certainly: because obviously the heaven is moved equably. As to meteorological changes, to fertility, or sterility, to plague, and other epidemic diseases; likewise as to the natural endowments, and to the customs of those being born, insofar as they depend on the temperament of the body; we confess that these can be predicted to some extent, but so that not too much is to be attributed to predictions of this kind. For because the power of the stars is received very diversely by sublunary things, and it is most difficult, and above the human condition, to know exactly all the powers of the stars, it is necessary, that those Prophets & interpreters of the stars very often hallucinate, and also much more often, than speak the truth. Those things which depend on the free will of men, as marriages, treaties, wars, good and adverse fortune, and other things of that kind can be predicted by men so little, that God claims this as proper to himself: and thence is called καρδιογνώστης.

DISPUTATION XI. On the ordinary & extraordinary Stars.

Respondent MATTHIAS DE BRUNE.

I. The nature of the Heaven has been treated, and its affections absolutely; there follow the stars: which, because they are observed by our eyes with their light, supply to us whatever can be known about the heaven. For whatever of bodies is beyond the elementary orb besides the stars, all that flees our senses. Although also the stars themselves, on account of the nearly immense distance from our sight, can be known not so perfectly. For our sight apprehends nothing in them besides light, and whatever is connected with light; as, motion, figure, &c. Therefore it is not to be expected, that what is the nature and condition of the stars, be demonstrated by certain and indubitable arguments; but only, that those things be said, which can happen, and are probable, and agreeable among themselves.

II. Since a star is a lucid body, it seems to be nothing other, than a most dense part of the celestial substance. For pellucid bodies, when they grow dense, become lucid: as is clear by the example of fire: which when it is pure, cannot be seen; but when mixed with terrestrial substance it is condensed, it begins to shine; and that so much the more, by how much it becomes denser. Therefore light seems to be nothing other, than a certain as it were color of condensed pellucid bodies. But the heaven, in the part where it does not shine, is pellucid. For otherwise the highest stars would not be discerned. Therefore, since the stars shine, it is very probable, that they are nothing other, than denser portions of the celestial substance.

III. Light is the form of the stars, not through which they are natural bodies, but through which they are stars. And therefore since light is an accident, (for substance per se does not run into the senses, nor receive more and less) it follows, that a star does not differ in species from the substance of the celestial body, in which they are, but only by greater density, and, what follows density, light, and efficacy. For although it is credible, that also the invisible parts of the heaven act on inferior things, nevertheless doubtless the stars act far more efficaciously: and that not only by light, but also by occult qualities; which you should not doubt to be more powerful as much in dense, as in rare bodies.

IV. The first action of light is, to illuminate; the second, to produce heat. To illuminate is to produce light in a perspicuous body. Whence light is defined the act of the perspicuous, insofar as perspicuous. Light is not a body, (for a body is neither moved, nor produced in an instant, nor consists with another body under the same dimensions) but a quality, and indeed such a one, which perishes in a moment, unless it is continuously conserved by a lucid body. Light is generated by rays both straight, and reflected. But although reflected light is per se weaker than direct, nevertheless it greatly augments the efficacy of direct light: and indeed so much the more, by how much more acute an angle it is reflected. When light is reflected by a polished body, it is called splendor. How light by illuminating generates heat, I know not whether it can be explained: the mode certainly escapes me.

V. The light of all stars is of the same species. For when it is confused in the medium, it is united. But it is diverse in intension. For in the Sun it is exceedingly copious; in the Moon very weak & remiss. For that light, by which the Moon offers itself to be seen with a full orb, is from the Sun, and is reflected from the body of the Moon, as from a mirror: and thence it is, that its light, as it approaches the Sun, seems to decrease; or as it recedes from it, to increase. That nevertheless also something of native light is in the Moon, is clear both from eclipse (for then it is conspicuous by its own light, but very weak and shady) and from this, that recent from new moon it is seen not only in that part, which is already illuminated by the sun, but in its whole body. To the rest of the stars doubtless more of native light is in: otherwise indeed their light would also increase & decrease with spherical segments according to the various position to the Sun, as happens in the Moon; which hitherto has not been apprehended. But that besides native light, they receive something of light from the Sun, although it cannot be apprehended by the judgment of the senses, nevertheless seems probable. For the Sun both by the bulk of its body, and by the splendor of light seems so to conquer all stars, that as a certain fount it augments their light.

VI. The cause of this diversity is from unequal density, and from the greater and lesser purity of the substance of the celestial bodies. For just as any star seems to be of the same species with the celestial substance of the orb, from whose condensation it was generated: so I judge it probable, that the Planets differ among themselves, and from the fixed stars in species. And that seems to be able to be concluded from their most diverse operations, (which do not seem to be able to be reduced to diverse density) and from the position and order which they obtain constantly. for just as the elements differ in species, and therefore in position, and place: so also the diverse position and order of the celestial bodies seems to argue a difference of nature. Nevertheless I would not say that the fixed stars are distinguished in species: because whether

they obtain a diverse position, and, whether they act diversely on subcelestial things, is not agreed: indeed it is more probable, because they always stand apart from each other by the same interval, that they do not differ from each other in species.

VII. Certain parts of the heaven were made dense by God from creation; and these are the ordinary & sempiternal stars; certain ones are condensed afterwards, and again rarefied. And these constitute new stars and celestial comets. For by the indubitable demonstrations of Astronomers it has long since been effected, that it cannot any longer be denied, that new stars or comets are generated in the heaven. And that is evinced from parallax. For a celestial phenomenon is doubtless so much more sublime, by how much less parallax it has. But many comets and new stars have appeared, which were seen with much less parallax than the moon. Therefore they were doubtless above the Moon. Let the example be the new star of Cassiopeia, which appeared in the year 1572: And the comet of the year 1618, and many others, which it would be too long to recount.

VIII. The ordinary stars are either fixed, or wandering or Planets. Of which the former seem to us to be moved indefinently from east to west, and to complete a period all together in the space of twenty four hours, without any perturbation of their order and position. By the same motion the Planets also seem to be carried around, and to complete a period in the same space of time; and moreover to be borne by another certain motion in the Zodiac from west to east, cutting the first and common motion obliquely; and to complete the period of that motion in various spaces of times. Besides these, other Planets, and those very many, have been apprehended by the aid of telescopes; which cannot be seen without such an aid of the eyes.

IX. That the reason of the motion, which is seen to be fitting to the stars, might be explained more easily, celestial orbs have been devised, and those not fluid, in the manner of air, but solid & consistent, in the manner of ice: which are indefinently turned around, and carry around the bodies of stars infixed in them. And indeed all the fixed stars are said to be moved in the same orb; the individual Planets in individual orbs. And because the Planets are sometimes nearer to the earth, sometimes farther from it; sometimes they are moved more swiftly in the Zodiac, sometimes more slowly; because also the parallax varies: eccentric orbs have been found, by the aid of which the reason of this diversity seems to be able to be given. For it is stated that the whole orb of each Planet consists of three orbs; of which the two exterior ones are eccentric only in one surface; the middle one, in which the body of the Planet is infixed, in both. This is unequally distant from the center of the world, and is called the place nearest the center, perigee; the most remote, apogee. Therefore as the middle orb, carries around the body of the Planet; so the exterior ones, carry around the apogee & perigee. Besides since all the planets, except the Sun, even in the apogee & perigee itself are sometimes nearer to the earth, sometimes more remote; and there sometimes are moved more swiftly, sometimes more slowly, and sometimes seem to stand in the Zodiac, sometimes also to go back; epicycles have been added to declare this anomaly, likewise equant circles, & other things of that kind. Which if, as feigned hypotheses, are employed by Astronomers, to explain the celestial phenomena, and to reduce them to a certain law of calculation, we approve their ingenious institution. But if anyone thinks that all those things are really in the heaven, we judge that he errs by the whole heaven. For that the Moon is not moved in an epicycle, appears manifestly from its spots always

retaining the same position. Nor can a suitable reason be given, why epicycles are conceded to the other Planets, or even why eccentric orbs are stated, if the Moon does not have an epicycle. Then that concameration of solid orbs, at least in the Planets, seems a mere figment.

X. It is therefore more probable, that the Planets are moved per se through the liquid body of the heaven, as birds are moved through the air, or fish through the sea. Nor nevertheless would I posit the celestial body to be immobile. For if the heaven were altogether immobile, the stars could not be moved per se in it. What nevertheless is the reason of that motion, what the velocity or slowness, because it is not perceived by the senses, I confess cannot be explained. It is probable that the fixed stars, either are altogether immobile, according to Copernicus, or, if they are moved according to Ptolemy, which is the more received opinion, are moved by the motion of their orb. For why, when to the individual Planets its own motion has been conceded, would the fixed stars all be moved by one and the same motion at the same time, if they were not infixed in some body, by whose motion they are moved, but were freely moved through the celestial body as the Planets.

XI. But whether the hypotheses of Ptolemy, stating the earth alone to be immobile, or of Copernicus, asserting the earth to be moved by an annual and diurnal motion, and the fixed stars together with the sun to be at rest, are truer, is not so easy to explain. For on both sides there are urgent reasons. But others having been omitted this most urgent one for the opinion of Copernicus is adduced by Lansbergius: If a diurnal motion is attributed to the fixed stars, and not to the earth, Saturn will have to complete in a single moment or second of an hour, more than 900 thousand German miles & the fixed stars more than 643000. Which no one will easily concede to be able to happen. But if the earth is moved by a diurnal motion, it is easier that you believe it to be moved by an annual motion. But if Lansbergius has not hallucinated in Uranometry, it will have to be thought about the solution of the arguments, which militate for the opinion of Ptolemy. Which we will attempt in this disputation.

XII. And these things indeed about the ordinary and sempiternal stars: there follow new and extraordinary stars. Of which indeed the generation is exceedingly obscure. We, having omitted the opinions of others, in a few words will disclose, not what seems certain, but what probable. New stars seem to be able to be made in two ways, obviously by the condensation of the celestial substance, which was rare, & by the congress of many Planets, which are invisible apart. Of which sort we said before that many have been apprehended in the heaven by the aid of telescopes. The celestial substance is condensed by the most vigorous motion of the ordinary & sempiternal stars; by which it is necessary that it be variously impelled, and stirred by an inordinate motion. And so it is credible that it happens, that certain parts denser than the rest come together, and compacted begin to shine in the manner of ordinary stars.

XIII. But those stars shine either by their own, or by another's light: by their own, when purer parts; by another's, when more impure parts of the heaven coalesce. For that not all parts of the heaven are equally pure, is clear from the difference of the sempiternal stars in light, & from the spots of the moon. For it is very probable, that the substance of the Moon is more impure than the substance of the Sun, & of the other stars, and that its parts are not of the same purity; but that the spotted parts are more impure than the rest. A similar difference is to be thought in the

parts of the pellucid substance. Therefore if purer parts coalesce, a star will arise conspicuous by its own light; if more impure, and such, as is the substance of the Moon, by another's.

XIV. Those which are made from a purer substance, are either denser, or less dense: of which the former are seen without an appendage; the latter, with a tail, beard, or hair. Whence they are also called comets. For the tail or hair seems to be nothing other, than the brightness of the sun or another star, penetrating through the substance of the comet less compacted with evident refraction. Whence it happens, that the hair or tail of the comet is averted from that star, whose light penetrates through its substance. Those which are made from the impure substance of the heaven, do not have a tail or hair: just as neither do those, which are made from pure substance greatly condensed.

XV. By the congress of invisible Planets new stars are made, in that way in which a multitude of locusts seems to make a cloud, which takes away the light of the Sun from those looking. This assembling seems to be able to happen in two ways: 1. if small stars are conjoined in the same orb. 2. If stars of diverse orbs are so placed some under others, that referred to sight by the same line, they seem to constitute one star. The stars of the same orb can be conjoined, not by the motion of the orb, but by the epicyclic motion proper to the Planet.

XVI. To new stars either regular motion is attributed, or irregular. Regular motion, is either diurnal, or greater than diurnal. If a diurnal motion is stated to be in the earth with Copernicus, it is not to be labored about; if in the heaven, it must be said, that new stars are carried by the motion of the first mobile, in the same way as the Planets. If any motion proper to new stars is greater than diurnal, but nevertheless regular, it is to be stated to be from their own nature. Irregular motion is from the inordinate impulse of the celestial body, in which new stars consist.