

De Motu Cordis

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Quia omne quod movetur, necesse est habere motore, dubitabile videtur quid moveat cor, et qualis sit eius motus.	Since everything that is moved must have a mover, the problem arises: What moves the heart and exactly what kind of movement does it have?
Non enim videtur eius motus esse ab anima. Ab anima enim nutritiva non movetur, quia animae nutritivae operationes sunt generare, alimento uti, et augmentatio et diminutio: quorum nullum motus cordis esse videtur. Haec etiam anima plantis inest; motus autem cordis animalium proprius est.	For first of all, it does not seem that any soul moves it. The nutritive soul does not move it, since its activities are generation, nutrition, growth and diminution. But the motion of the heart is none of these. Moreover, the nutritive soul is also in plants, but the motion of the heart belongs to animals only.
Nec etiam animae sensitivae motus esse videtur, nec intellectivae, quia intellectus et sensus non movent nisi mediante appetitu: motus autem cordis involuntarius est.	Neither do the sensitive and intellectual souls move it, since sense and intellect move only by means of appetite. But the motion of the heart is involuntary.
Sed nec naturalis esse videtur, cum sit ad contrarias partes: componitur enim ex pulsu et tractu; motus autem naturalis ad unam partem est, ut ignis movetur tantum sursum, et terra deorsum. Dicere autem motum cordis esse violentum, est omnino extra rationem. Manifeste enim hoc motu subtracto, subtrahitur sive moritur animal, cum tamen nullum violentum conservet naturam. Videtur autem hic motus maxime naturalis esse, cum vita animalis et hic motus se inseparabiliter consequantur.	In fact the heart's motion does not even seem to be natural, since it is made up of opposite types of movements: push and pull. But natural motion is toward one opposite, not both, such as the motion of fire, which is only up, and that of earth, which is down. On the other hand, to say that the motion of the heart is violent is irrational. For obviously if we do away with this motion, we end up doing away with (i.e., killing) the animal, but nothing violent preserves a nature. Indeed, the heart's motion must be most natural, since animal life is inseparably united to it.
Dicunt autem quidam hunc motum naturalem esse non ab aliqua particulari natura animalis intrinseca, sed ab aliqua natura universale, vel ab intelligentia.	Now some who say that it is a natural motion claim that its source is not the particular nature of the animal, but some outside universal nature, or an intelligence.
Sed hoc ridiculum est. In omnibus enim rebus naturalibus propriae passiones alicuius generis vel speciei aliquod principium intrinsecum consequuntur. Naturalia enim sunt quorum principium motus in ipsis est. Nihil autem proprium magis est animalibus quam motus cordis; quo cessante, perit eorum vita. Sequitur igitur inesse ipsis animalibus aliquod principium talis motus.	But this is absurd. For in all natural things, both common and specific properties in them result from an intrinsic principle. Natural things, by definition, have their principle of motion in them. But nothing is more proper to animals than the motion of the heart, for once it stops, the animal dies. Therefore, it follows that the principle of such a motion must be in the animal.

<p>Adhuc, si aliqui motus in corporibus inferioribus ex natura universali causentur, non semper eis adsunt: sicut in fluxu et refluxu maris patet, qui sequuntur motum lunae, et secundum ipsam variantur. Motus autem cordis semper adest animali. Non est ergo a cause separata tantum, sed ab aliquo intrinseco principio.</p>	<p>In addition, when the motions in lower bodies are caused by a universal nature, such motions are not always present in them. Take, for example, the ebb and flow of ocean tides, which result from the motion of the moon and change in accord with it. But the motion of the heart is always present in the animal. Therefore, the heart's motion does not result from a separate cause but from an intrinsic principle.</p>
<p>Dicunt atuem alii principium huius motus in animali esse calorem, qui per spiritum generatus movet cor. Sed hoc irrationabile est. Illud enim quod est in aliqua re principalius, oportet esse causam. Principalis autem in animali videtur esse motus cordis et magis contemporaneum vitae, quam quaevis alteratio secundum calorem. Non ergo alteratio secundum calorem est causa motus cordis, sed potius e contra motus cordis est causa talis alterationis. Unde Philosophus in lib. De Motu Animalium dicit: "Oportet quod futurum est movere, non alteratione tale esse."</p>	<p>Some others say that the principle of this motion in the animal is heat, which being generated by spirit moves the heart. But this is unreasonable. For the deeper principle is more likely to be the primary cause. But the motion of the heart is a deeper principle in the animal and more contemporaneous with life than even warmth. Therefore warmth is not the cause of the heart's motion, but on the contrary the heart's motion is the cause of warmth. Thus the Philosopher says in <i>On the Motion of Animals</i>: "What is about to create motion, not by means of alteration, is of this kind" (c. 10 703a24-25).</p>
<p>Item animal perfectum, quod est movens seipsum, maxime accedit ad similitudinem totius universi: unde et homo qui est perfectissimus animalium, dicitur a quibusdam minor mundus. In universo autem primus motus est motus localis, qui est causa alterationis et aliorum motuum. Unde et in animali magis videtur motus localis esse alterationis principium, quam e contra. Unde et Philosophus in octavo Physicorum, hanc similitudinem sequens, dicit quod motus est ut vita quedam natura existentibus omnibus.</p>	<p>There is another way of responding to their opinion: A fully developed animal, one that is capable of moving itself, is more like the whole universe than anything else. This is why man, who is the most fully developed of animals, is called by some a microcosm. Now in the universe the first motion is local motion, which causes alteration and the other motions. So we more clearly see in animals that local motion is the principle of alteration, and not the contrary. As the Philosopher says in the <i>Physics</i>: "For all natural things, to move is to live."</p>
<p>Adhuc, quod est per se, prius est eo quod est per accidens. Primus autem motus animalis est motus cordis; calor autem non movet localiter nisi per accidens: per se enim caloris est alterare, per accidens autem movere secundum locum. Ridiculum igitur est dicere, quod calor sit principium motus cordis, sed oportet ei assignare causam quae per se possit esse principium motus localis.</p>	<p>Yet another way: the essential is prior to the accidental. But the first motion of the animal is the motion of the heart. Heat, on the other hand, does not move something else into another place except incidentally. For an essential feature of heat is to warm, and incidentally to move something from one place to another. Therefore, it is ridiculous to say that heat is the principle of the heart's motion. Rather, we need to find a cause that is in its essential makeup a principle of local motion.</p>

<p>Principium ergo huius considerationis hinc oportet accipere, quod, sicut Philosophus dicit in octavo Physicorum, ""quorumcumque principium motus in seipsis est, hoc natura dicitur moveri. Unde animal quidem totum natura seipsum movet; corpus autem eius contingit et natura et extra naturam moveri. Differt enim secundum qualem motum quod movetur eveniat, et ex quali elemento constet." Cum enim animal movetur deorsum, est quidem motus naturalis et toti animali et corpori, eo quod in corpore animalis elementum grave dominatur, cuius natura est moveri deorsum. Cum autem animal movetur sursum, est quidem motus naturalis animali, quia est a principio eius intrinseco, quod est anima; non tamen est naturalis corpori gravi; unde et magis fatigatur animal in hoc motu.</p>	<p>Therefore, from this point on we should take as a principle of our investigation what the Philosopher says in <i>Physics</i> 8 (254b16-20): "Of those things whose principle of motion is in themselves, we say they are moved by nature. So, even when an animal as a whole moves itself by nature, its body can sometimes be moved both by its own nature and by something outside its nature. For there is a difference between the kind of motion that it happens to undergo and its elemental composition." For when an animal descends it undergoes a motion natural both to it as a whole and to its body, since in the body of an animal the dominant element is heavy, whose nature is to move downward. But when an animal rises it undergoes a motion natural to it as a whole, because its source is an intrinsic principle, namely the soul; nevertheless, this motion is not natural to the heavy body. This is why an animal tires out more in this kind of motion.</p>
<p>Motus autem secundum locum in animalibus causatur appetitu et apprehensione sensitiva vel intellectiva, ut Philosophus docet in tertio De anima.</p>	<p>Another point to consider is that animals move from place to place because of their desires or intellect, as the Philosopher teaches in the third book of <i>On the Soul</i> (433a9-b30).</p>
<p>In aliis igitur animalibus totus processus motus naturalis est: non enim agunt a proposito, sed a natura: naturaliter enim hirundo facit nidum et aranea telam. Solius autem hominis est a proposito operari, et non a natura.</p>	<p>Therefore, in animals that act only by nature and not by intent, the whole process of motion is natural. For the sparrow naturally makes a nest and the spider a web. But only man acts from intent and not by nature.</p>

Sed tamen cuiuslibet operationis suae principium naturale est. Licet enim conclusiones scientiarum speculativarum et practicarum non naturaliter sciat, sed ratiocinando inveniatur, prima tamen principia indemonstrabilia sunt ei naturaliter nota, ex quibus ad alia scienda procedat. Similiter ex parte appetitus appetere ultimum finem, qui est felicitas, est homini naturale, et fugere miseriam; sed appetere alia non est ei naturale, sed ex appetitu ultimi finis procedit in appetitu aliorum: sic enim est finis in appetibilibus, sicut principium indemonstrabile in intellectualibus, ut dicitur secundo Physicorum. Sic ergo cum motus omnium aliorum membrorum ex motu cordis causetur, ut probat Philosophus in libro De motu Animalium, motus quidem alii possunt esse voluntarii, sed primus motus qui est cordis, est naturalis.

Oportet autem considerare quod motus sursum est naturalis igni eo quod consequitur formam eius: unde et generans, quod dat formam, est per se movens secundum locum. Sicut autem formam elementi consequitur aliquis motus naturalis, sic nihil prohibet alias formas sequi alios motus naturales. Videmus enim quod ferrum naturaliter movetur ad magnetem, qui tamen motus non est ei naturalis secundum rationem gravis et levis, sed secundum quod habet talem formam. Sic igitur et animal in quantum habet talem formam quae est anima, nihil prohibet habere aliquem motum naturalem; et movens hunc motum est quod dat formam.

Nevertheless, the principle of every human action is natural. For although the conclusions of the theoretical and practical sciences are not naturally known, but rather are discovered through reasoning, nevertheless the first indemonstrable principles are naturally known, and from them we come to know other things. In the same way, the desire for the ultimate goal, happiness, is natural to humans, as is the aversion toward unhappiness. Thus, the desire for things other than what constitute happiness is not natural. The desire for these other things proceeds from the desire of the ultimate goal. For the goal in acts of desire is just like the indemonstrable principles in acts of the intellect, as is said in the second book of *Physics* (200a15-25). And so even though the movements of all the other parts of the body are caused by the heart, as the Philosopher proves in *On the Motion of Animals* (703a14), these movements can still be voluntary, while the first movement, that of the heart, is natural.

Moreover, let us recall that an upward motion is natural to fire as a result of its form, and hence that what generates fire, giving it its form, is essentially a place-to-place mover. In addition, just as a natural motion can result from the form of an element in a natural object, so also nothing prohibits other natural motions resulting from different forms in the same natural object. For example, we see that iron naturally moves toward a magnet, which motion is not natural to it as something heavy, but as something having a particular kind of form. In the same way, therefore, insofar as the animal has a particular kind of form, namely the soul, nothing prohibits it from having a natural motion as a result of that form. And the cause responsible for this motion would be what gives the form.

<p>Dico autem motum naturalem animalis eum qui est cordis: quia, ut Philosophus dicit in liber De motu Animalium, "existimandum est constare animal quemadmodum civitatem bene ac legitime rectam. In civitate enim quando semel stabilitus fuerit ordo, nihil est opus separato monarcha quem oporteat adesse ad singula eorum quae fiunt, sed quilibet facit quae ipsius sunt ut ordinatum est, et fit hoc post hoc propter consuetudinem. In animalibus autem idem hoc per naturam fit: et quia natum est unumquodque sic constantium facere proprium opus, ut nihil opus sit in unoquoque esse animam, scilicet in quantum est principium motus, sed in quodam principio corporis existente alia quidem vivere, eo quod apta nata sunt facere proprium opus propter naturam."</p>	<p>I myself say that the motion of the heart is a natural motion of the animal. As the Philosopher says in <i>On the Motion of Animals</i>, "We should consider the animal as if it was a city under good and legitimate governance. For in a city with this kind of stability of order, there is no need for a separate ruler for each and every event, but instead everyone does everything as planned, and things proceed according to custom. The same thing happens in animals naturally. For every part of the animal is naturally equipped to perform its own special function, so that there is no need for a soul in each and every part as a cause of motion. Rather, with the soul present in the principle of the body, the other parts live and perform their own special work as nature made them."</p>
<p>Sic igitur motus cordis est naturalis quasi consequens animam, in quantum est forma talis corporis, et principaliter cordis.</p>	<p>Thus, the motion of the heart is a natural result of the soul, the form of the living body and principally of the heart.</p>
<p>Et forte secundum hunc intellectum dixerunt quidam motum cordis esse ab intelligentia, in quantum posuerunt animam ab intelligentia esse, sicut Philosophus dicit in octavo Physicorum, motum gravium et levium esse a generante, in quantum dat formam quae est motus principium. Omnis autem proprietates et motus consequitur aliquam formam secundum conditionem ipsius, sicut formam nobilissimi elementi, puta ignis, consequitur motus ad locum nobilissimum, qui est sursum. Forma autem nobilissima in inferioribus est anima, quae maxime accedit ad similitudinem principii motus caeli. Unde et motus ipsam consequens simillimus est motui caeli: sic enim est motus cordis in animali, sicut motus caeli in mundo.</p>	<p>Perhaps this is why some who have understood this go on to say that the heart's movement is caused by an intelligence, for they think that the soul comes from an intelligence (which is similar to what the Philosopher says in <i>Physics</i> Book 8 [255b31-256a3]) about the movement of heavy and light things coming from a generator that gives the form which is the principle of their motion). But it is important to note that every property and movement is a result of a form in a particular condition. So as a result of the form of a subtle element like fire, there is motion to a subtle place, namely upwards motion. Now the most subtle form on earth is the soul, which is most like the principle of the motion of the heavens. Thus, the motion that results from the soul is most like the motion of the heavens. In other words, the heart moves in the animal as the heavenly bodies move in the cosmos.</p>

<p>Sed tamen oportet motum cordis a motu caeli deficere sicut principiatum deficit a principio. Est autem motus caeli circularis et continuus, et hoc ei competit in quantum est principium omnium motuum mundi: accessu enim et recessu corpus caeleste imponit rebus principium et finem essendi, et sua contintuitate conservat ordinem in motibus, qui non sunt semper. Motus autem cordis principium est omnium motuum qui sunt in animali; unde Philosophus in tertio De partibus animalium dicit quod "motus delectabilium et tristium et totaliter omnes sensus hinc incipientes videntur," scilicet in corde, et ad hoc terminari. Unde ad hoc quod cor esset principium et finis omnium motuum qui sunt in animali, habuit quemdam motum non circularem sed similem circulari, compositum scilicet ex tractu et pulsu; unde Philosophus dicit in tertio De anima, quod "movens organice est ubi est principium et finis idem. Omnia autem pulsu et tractu moventur; propter quod oportet sicut in circulo manere aliquid et hinc incipere motum."</p>	<p>Nevertheless the heart's motion is not exactly like the heavens', in the same way that what follows from a principle is never exactly like the principle itself. Now as the principle of all the motions in the universe, the motion of the heavens is circular and continuous. For the approach and departure of a heavenly body coordinates with the beginning and end of existence, and by its own continuous movement it preserves the order among moving things that do not exist forever. The motion of the heart, however, is the principle of all movements in the animal. This is why the Philosopher says in the third book of <i>On the Parts of Animals</i>, "the movements of pleasure and pain and of all the senses seems to arise there," namely in the heart, and they also end there. Thus, in order for the heart to be the beginning and end of all motions in the animal, it had to have a movement that is like a circle, but not exactly circular, composed namely from a push and pull. And so the Philosopher says in the third book of <i>On the Soul</i>, "A natural and organic cause of motion is both the source and termination of the motion. Now since all things are moved by pushes and pulls, it is necessary that something exists in a nearly circular state and that motion arises from it.</p>
<p>Est etiam iste motus continuus durante vita animalis, nisi in quantum necesse est intercidere morulam mediam inter pulsum et tractum, eo quod deficiat a motu circulari.</p>	<p>We can also say it is a continuous movement as long as the animal lives, unless it is necessary to have a rest in between the push and pull (for it is not a perfectly circular motion).</p>
<p>Per hoc ergo de facili solvuntur quae in contrarium obiici possunt.</p>	<p>We are now in a good position to consider objections to the contrary.</p>
<p>Neque enim dicimus motum cordis esse cordi naturalem in quantum est grave vel leve, sed in quantum est animatum tali anima; et duo motus qui videntur contrarii sunt quasi partes unius motus compositi ex utroque, in quantum deficit a simplicitate motus circularis, quem tamen imitatur in quantum est ab eodem in idem. Et sic non est inconueniens si quodammodo sit ad diversas partes, quia et motus circularis aliquid sic est.</p>	<p>For we see that the heart's motion is not natural to it as something having weight, but insofar as it is animated by a particular kind of soul. Moreover, the two motions that make up the complex movement of the heart seem contrary because the heart does not perfectly have the simplicity of circular motion, but it does imitate that motion since where it moves from it also moves toward. Thus, it is not problematic that its motion is in some way to different parts, for even circular motion is like this.</p>
<p>Nec etiam oportet quod causetur ex apprehensione et appetitu, licet sit ab anima sensitiva; non enim causatur ab anima sensitiva per operationem suam, sed in quantum est forma et natura talis corporis.</p>	<p>Next, there is no need to say that the heart's motion arises from either sensing or desiring, although it does arise from the sensitive soul. For the heart is not caused to move by the sensitive soul's activities, but insofar as that soul is the form and nature of a particular kind of body.</p>

<p>Motus autem progressivus animalis causatur per operationem sensus et appetitus; et propter hoc medici distinguunt operationes vitales ab operationibus animalibus, et dicunt quod cessantibus animalibus remanent vitales, vitales appellantes quae motum cordis concomitantur, quibus cessantibus cessat vita; et hoc rationabiliter. Vivere enim viventibus est esse, ut dicitur secundo De anima: esse autem cuique est a propria forma.</p>	<p>On the other hand, the progressive motion of an animal is caused by the activities of sensing and desiring. This is why doctors distinguish vital functions from animal functions and say that even when the animal functions cease, the vitals may remain. They call the vitals those functions that are immediately related to the heart's motion, such that when they cease life ceases. This position is reasonable. For to live for living beings is to exist, as is said in the second book of <i>On the Soul</i>: the existence of anything is from its own form.</p>
<p>Hoc autem differt inter principium motus caeli et animam, quia illud principium non movetur per se neque per accidens, anima autem sensitiva licet non moveatur per se, movetur tamen per accidens: unde proveniunt in ipsa diversae apprehensiones et affectiones. Unde motus caeli semper est uniformis, motus autem cordis variatur secundum diversas affectiones et apprehensiones animae. Non enim affectiones animae causantur ab alterationibus cordis, sed potius causant eas; unde in passionibus animae, puta in ira, formale est, quod est ex parte affectionis, scilicet quod sit appetitus vindictae; materiale autem quod pertinet ad motum cordis, puta quod sit accensio sanguinis circa cor.</p>	<p>We should note that there is a difference between the principle of the heavenly motion and the soul. The former is not moved in any way at all, neither essentially nor incidentally, but the sensitive soul, although unmoved essentially, is moved incidentally. Thus, different types of sensations and emotions arise in it. So, whereas the heavenly movement is always uniform, the heart's movement varies according to the different emotions and sensations of the soul. For the sensations of the soul are not caused by changes in the heart, but just the opposite is the case. This is why in the passions of the soul, such as anger, there is a formal part that pertains to a feeling, which in this example would be the desire for vengeance. And there is a material part that pertains to the heart's motion, which in the example would be the blood enkindled around the heart.</p>
<p>Non autem in rebus naturalibus forma est propter materiam, sed e contra, ut patet secundo Physicorum, sed in materia est dispositio ad formam. Non ergo propter hoc aliquis vindictam appetit quia sanguis circa cor accendatur, sed ex hoc aliquis est ad iram dispositus; irascitur autem ex appetitu vindictae.</p>	<p>But in the things of nature, the form is not the result of the matter, but on the contrary, as is evident in the second book of <i>Physics</i>, matter has a disposition for form. Therefore, although someone does not desire revenge because his blood is burning around the heart, he is more prone to become angry because of it. [correlate with different constitutions of men and women] But actually being angry is from the desire for vengeance.</p>

<p>Licet autem aliqua variatio accidat in motu cordis ex apprehensione diversa et affectione, non tamen illa variatio motus est voluntaria, sed involuntaria, quia non fit per imperium voluntatis. Dicit enim Philosophus in liber De causa motus animalium, quod multoties apparente aliquo, non tamen iubente intellectu, movetur cor et pudenda, et huius causam assignat quia necesse est alterari alteratione naturali animalia; alteratis autem partibus, hoc quidem augeri, hoc autem decrementum pati, ut iam moveatur et permutetur natis haberi permutationibus invicem.</p>	<p>Now although some change occurs in the heart's motion because of different sensations and feelings, nevertheless such change is involuntary, for it does not come about through the command of the will. For as the Philosopher says in <i>On the Cause of the Motion of Animals</i>, often something will be seen which, without any command of the mind, moves the heart and private parts, the cause of which he says is the natural susceptibility animals have to physical changes. For when its parts undergo change, one part increasing and another decreasing, then naturally the whole animal moves and goes through a sequence of changes.</p>
<p>Causa autem motuum animalis caliditas et frigiditas, quae de foris et intus existentes naturales et praeter rationem utique facti motus dictarum partium, idest cordis et pudendi, alteratione incidente fiunt. Intellectus enim et phantasia passionem afferunt, ut concupiscentiae, irae et huiusmodi, ex quibus cor calescit vel infrigidatur.</p>	<p>Now warmth and cold, whether from the outside or occurring naturally within, cause such motions of the heart and private parts in animals, even against reason, by yet another incidental change. For the mind and imagination can cause a feeling of lust or anger or other passions, on account of which the heart is heated or cooled. [and thus creates matter which is more properly disposed to receive the form; matter being the bodily organ affected, and the form being emotion in the soul]</p>
<p>Et haec de motu cordis dicta sufficiant.</p>	<p>And let this be enough said on the motion of the heart.</p>