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Philosophy and Experimental Science

M. Charles DeKoninck
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To make precise the subject matter of natural doctrine we will examine the proemia to all the natural works. Two adverse opinions which we will have in mind as we proceed are the following: 1. That which maintains that modern science has made a philosophy of nature obsolete, and 2. That which calls spurious the distinction between philosophy of nature as science and experimental science dialectical and which would invoke positive and negative abstraction in explaining their relationship.

Cf. I Physic., lectio 1: The proemium is not a part of natural doctrine; it is the work of the metaphysician and is very general and common. First, let us consider the four orders which St. Thomas notes in his proemium to the Ethics (I, lectio 1, n.2) in order to eliminate an ambiguity in the notion of philosophia naturalis. The order which reason only considers and does not make is said to be the task of natural philosophy. Natural philosophy here is not synonymous with philosophy of nature, but is rather to be opposed to philosophia rationalis. In the Ethics, philosophia naturalis embraces all the speculative sciences: physics, mathematics and metaphysics.

" Quia liber Physicorum, cuius expositioni intendimus, est primus liber scientiae naturalis, in eius principio oportet assignare quid sit materia et subjectum scientiae naturalis. Sciendum est igitur quod, cum omnis scientia sit in intellectu, per hoc autem aliquid fit intelligibile in actu, quod aliqualiter abstrahitur a materia; secundum quod aliqua diversimode se habent ad materiam, ad diversas scientias pertinent. Rursus, cum omnis scientia per demonstrationem habeatur, demonstrationis autem medium sit definitio; necesse est secundum diversum definitionis modum scientias diversificari."

Physics is the first work of natural science. It should be studied first. We ask, does one have to begin here even today, or can he proceed as is usually done today? Is there any reason to change Aristotle's order either on the part of the science or on the part of the one learning, i.e. due to the contingent circumstances of the day?

What is natural science about and what aspect of things does it consider? Subjectum et materia... To understand this first paragraph, we must go to De Trinitate, q. 5, art. 1. (For the doctrine of Aristotle on the sciences, cf. VI Metaphysics, Chap. 1)

De Trin., q.5, art. 1. First of all, the speculative differs from the practical in its end: the former merely knows the truth; the latter knows it to order it to practice.

"...habitus vel potentia..." A distinction, not synonyms. Habitus: a determination to an object, knowing the subject and its passions. Potentia: the power thus determined. To wherein the habitus resides we seek the potentia. The difference of objects qua objects. Color distinguished the object of the eye. There are among sensibili various species, e.g. dog, man, etc. but we do not require a differ-

ent sense for each of these. The differences of the sensible as sensible. The dog as dog is not the object of sense, but as red, as barking, as smelling, etc.

So too the speculative sciences are divided by the speculabilia qua speculabilia. There is something due to the knowing power (potentia) and sometning due to the habitus (science). This is stated in the Physics: omnis scientia in intellectu and omnis scientia per demonshrationem.

immaterial - the mind is such: potentia
speculabilia:
necessary - science is of such: habitus

The two conditions are distinct; something could be one w/o being the other. (?)

Immaterial - quid sit? Negation of matter - what de we mean by matter? Meaning of words - the first imposition is "building or construction wood" So, generally, matter comes to mean that out of which sometning is made - id ex quo aliquid fit et insit.

The immateriality of the intellect. What is it to know? How do I differ from a tree? When I know a tree, I am in possession of it and yet this doesnt effect the tree. The being of the tree is super added to my being - the tree I know is in me in a way differing from the way it is in itself. Not that my concept of the tree is not consonant with the actual tree: formal truth. I have within me a similitude of the tree which makes me be the tree withou ceasing to be myself. What is left benind when I know the tree is the tree in its state of physical existence - were this not se I would have to eat the tree and then it would cease to be itself and become me. But the tree must be in both matter & form or my idea of it will be untrue, for a tree is both matter and form. But what is form? Let us think only of figure or shape; not of substantial form. The tree is not just a shape, a geometrical object - it has matter. How tnen can we say that knowing is immaterial? Obviously, matter must be distinguished into kinds, for some matter must enter into knowledge - of those things whose beings require matter.

De Trinitate, q. 5, art. 1 (suite)

Immateriality common to all knowledge - even sense knowledge - form without matter quodammodo. The knower has the form of another without losing his own. Primary meaning of matter and form (cf. supra). In sense knowledge assimilation of form without matter. We assimilate, however, the matter as well as the shape. Matter here does not retain its first meaning, nor does it lose entirely its first imposition. If we know the sensible object, we know it shape and matter.

Cf. De Veritate, q. 2, art. 2. The problem of knowledge. S Thomas approaches the problem by observing that there are two ways of bein He does not raise the problem in terms of form alone as we have been doing. Res aliqua invenitur perfecta dupliciter:

(1) Entatively - secundum perfectionem sui esse quod competi ei sec. suam speciem. Insofar as its perfection does n include other perfections, it will be imperfect - there is a scale of perfection - things are confined to their own degree of being. A perfection confined to a mode of being is not simply perfect - p fecta imperfecte. The perfection of the universe is the ensemble its parts - each part, tamen, is confined to itself.

(2) Intentional - sec. quod perfectio unius rei invenitur in alio re - as a compensation for imperfect perfection, t there is the remedy of knowledge: acquiring the perfection of an other. There is the perfection proper to the knowing being - plus the perfection of becoming something else without losing its own being. The whole universe exists quodammodo in the knowing being. I am more than myself - not with regard to my specific perfection, but with regard to the perfection of knowledge. Anima est quodammodo omnia inquantum nata est omnia cognoscere.III De anima.

Note the procedure of S Thomas - observation, not demonstration of the existence of knowers. The dispersion of the universe is remedied by knowledge. Thus philosophers say that the ultimate end of intelligence is the description of the world and its causes. This is still the finis scientiae with regard to philosophy, but it is no longer the finis scientis. Now we have the beatific vision for our ultimate end.
A universe of non-knowing beings would still be a universe for they would be ordered one to another. But de facto the end of the universe is knowers and all other things are ordered to knowers. The union of knower and known is not some thinrd thing. The thing in itself is called determinatum esse, and it is determined by matter. That which prevents the tree's being in me must be foregone - the forms and perfections of things are determined by matter. What is this matter so rebellious to being assimilated? How can matter determine form or perfection? Is not form the determinant?

The one who knows must not have that which prevents a thing from being known. If the knower received the form as matter receives it, the known would determine the knower as a new determinate being Both from the known as known and the knower as knower is excluded the kind of reception which constitutes the first perfection of things. Matter of that kind is excluded. I do not receive the

known as my matter received my form - that would be contrary both to the form received and the receiver in knowledge.

Both the matter and form are received by the knower as form. Usually a discussion of knowledge assumes all this as known - but is it so known? One must not ,ook for demonstration in this article - we accept the distinction between knowers and non-knowers.

Moderns are most confused on knowledge, defining connaitre as " to have present to the mind a certain true or real object of thought." This is a circular definition - though enters into it. We would like to know what is meant by "object". St Thomas defines knowledge as : habere formam alterius; esse aliud. The modern defintion does not refer to sense knowledge, which is turly knowledge. Nor does it take account of entia rationis.

Various modes of receiving immaterially: in sense knowledge; in intellectual knowledge. Material things are not intelligible in themselves; they must be rendered so by intelligence. We, inasmuch as we are material, are not intelligible. Corsicus has to be rendered intelligible in act by us. Beings entirled devoid of matter are intelligible in themselves - but they are less intelligible for us.

Quidquid recipitur ad modum recipientis recipitur. Speculabilia are in the intellect according to the mode of the intellect - intelligible in act. Why is it that the intelligible in potency is not intelligible in act? Sense knowledge is truly knowledge and is only of singulars. In intellectual knowledge we must get away from condiciones materiales. Material singularity must be left behind. I know directly the material singular - i.e. by my senses, which are part of me. Why cant I know the material singular directly by intellectual knowledge? Not because it is singular - God is most singular. But the sensible singulars owe their individuality to matter. Plato is Plato due to matter - why, due to it, is he intelligible only in potency? What do we mean by the matter which prevents sometning's being intelligible in act? Why should it be an obstacle to intelligibility? Consideration of individuation. Two absolutely homogeneous billiard balls - they can only differ by matter.

Cf. De Trinitate, q. 5, art. 1, c. p. 26, l. 10. - From the part of the intellect, we must abstract from the material singular - the material singulars imply a certain infinity which cannot be known. Two perfectly homogensous things: diversity without formal difference. Why diverse? Why this outside that? By reason of the subject, but not as subject, but as the demensions of one subject are outside those of another. The subject of these demensions differs from the subject of those demensions. It reduces to a distinction of demensions - this set of demensions is received in this subject, that set in that subject (we are taking the demensions as being the same). Cf. IV Phys., lectio 13, last paragraph: "Quod duo corpora..." Bodies are those things extended in three demensions and limited. Equal demensions differ according to situs. Cf. Textes choisies sur la matiere intelligible for doctrine on individuation.

Cf. VII Meta. 11, n. 1530. "Singularia (materialia) non definiuntur. "The individual matter is infinite and indeterminate." What does this mean? E.g. 2, 2, 2,,,,...instances of 2 can go on infinitely. But this two from that two, no infinity. They are distinguished by their thisness, si vous voulez. Two material singulars (Sortes and Plato can be so much alike that they are indistinguisnable. Matter as subject of this quantitas sigmata - material singular. No formal description can attain the individual in its singularity; designation is the most we can do: this one here. How could we know the individual as this individual sans sense knowledge? We couldnt. Materia signata quantitate - very important. From the viewpoint of speculative sci we do not know directly the material singular. If Sortes owed his individuation to form he would be intelligible in act.

Why is it that we cannot know the material singular directly with intellectual knowledge? God does and angles do. God does because He is the cause of them - He knows them in Himself. The thing is in the knower according to the mode of the knower - intelligible. We cann because our knowledge is posterior to things in themselves. God's prior, and so is that of angels in that it participates in God's knowledge. Thanks to our senses we are passive to things p the thing w acts upon us is composed of matter and form. Matter is essential to these things. Whatever acts acts insofar as it is in act. We must leave behind what is not agent - we have something abstracted from individual. Abstraction is necessary for scientific knowledge; otherwise we would be lost in the indefiniteness of the singular.

A material singular can be known only by its active cause, God or by a knower acted upon by it due to the senses of the knower. When an individual is known directly by sense, it can only be indirectly kn by intellect. One cannot say that the object of science is to know the individual as such (experimental science) we need singulars, bu they as such are not the objects. Science is of the universal. Fro the viewpoint of practical science the singular is all important. I experimental sciences too it is all important, for experience is of the individual.

Every science must abstract from the material individual: this is abstractio communis, a common condition of all science. Necessary because the speculabile must be in the intellect quae est omnino immaterialis. Due to the potency it must be immaterial; due to the habitus it must be necessary.

p. 26, line 18. "simpliciter", substance, e.g. Sortes; "secundum quid", celestial bodies - corruptible secundum quid because this clestial body leaves this place and goes there. Yet they are always in motion, so not in potency to motion, hence necessary; yet now here and now there.

line 19. Objectum scientiae speculativae: cf. Cursus Theologicus, T. I, d. 2, Utrum Deus sit subjectum Theologiae, nos. 1 et 2. What do we mean by the object of a science? That which one knows scientifically; the conclusion of the demonstration. Something complex; a proposition. What is the subject of the science? The subject of which something scientific is known; the subject of the conclusion.

Object and subject are divided into formal and material:

Material object: the truth known as an inferred truth, scientifically known.
Formal object: that by reason of which the conclusion is manifested as true; ratio sub qua conclusio manifestatur. The formal object of a science is to be found in the principles as that which proves the conclusion.
Material subject: that thing about which there is demonstration; illa de qua. E.g. in natural doctrine, all natural bodies and in metaphysics all things.
Formal subject: the respect in which those subjects are considered; ratio secundum quam subjectum consideratur; e.g. in scientific study of nature sub ratione mobilitatis; in metaphysics sub ratione entis.

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The principle subject of the science is not necessarily the main study or subject of the science, but that about which we mainly seek knowledge, e.g. in metaphysics God who is neither the subject nor a part of the subject, but an extrinsic principle of it. In philosophy of nature the Prime Mover is the main term. Cf. De Trinitate, q. 5, art. 1, a la fin du corps; art. 2, ad 3. "Terminus principalius" would be a happier expression than "subjectum principale." God is the formal subject only of sacred theology.

Speculabilia: distinguished by what respect: if there are radically different kinds of media probabativa, there will be different sciences.
p. 26, line 20. Separation from matter and motion. Cross refer to I Phys, 1, n. 1. Defintions: if they differ in the manner in which they are separated from matter and motion; and since they are the media probabativa, sciences will differ.

In I Phys. 1, n. 1 - both matter (explicitly) and motion (implcitly) are mentioned. Every motion contains contingency: possibile ad esse vel non esse. If this were not so we could not understand n. 3. (Numerus est multitudo mensuratur per unum)) In I Phys. 1, n. 4 - Metaphysics praemittitur omnibus scientiis - the one teaching the particular sciences should know metaphysics; no denial of natural order. N. 3. "Et quia omne quod habet materiam mobile est..." Presupposes everytning we have seen. Materia - not signata, but materia

sensibilis communis. Mobile: cf. "Rursus..." n.1.

Matter means potency; mobile means posse esse vel non esse; donc, everytning whose definition requires sensible matter is mobile.

Why ens mobile? Formal object (ratio sub quae) and formal subject of this science.

Not ens materiale - we are concerned with science; we abstract from matter, but this common abstraction does not suffice for science; necessity also is required. Not about this concrete motion, but about the ratio of motion. (It would seem an equally good reason to say that matter is but one principle of motion, or of the subject of the science.)

Abstraction from singular sensible matter - existing immaterialiter in intellectu - is a common condition of all science and does not serve to differentiate natural philosophy. The ratio mobilitatis is not mobile just as the ration contingentiae is not contingent but necessary. The ratio mobilitatis is what chracterizes phil of nature.

All sciences prescind from singular sensible matter, but they differ in the manner in which they prescind from ratio materiae.

Cf. De Trinitate, q. 5, art. 2. The 1st 2 objections exemplify confusion between singular and common sensible matter. In the body: of things insofar as they are in movement we cannot say anything determinately true or false. Cf. I Meta. l. 10; I, q. 84, art. 1.
On page 33, line 27 ff. " ipsum integrum, i.e. compositum" means this house wherein are found both the ratio domus and its realization here. When I make a house I do not make the ratio domus, but this house. Per accidens the ratio, per se this house becomes. In knowing we abstract from that of which nothing determinately true or false can be said. When I define a house, I have knowledge of singulars, but not as singulars.

Science is of the universa. (this can be misunderstood). Singulars are necessary for the generation of science. Also when we have knowledge of the universals, we can apply it to singulars of which the universal can be said. (cf. p. 26 "...vel applicatio ad ea..." how reconcile?) Page 34, line 8 - movement in the singular must be hic et nunc and thus be measured by time.

Physical abstraction is not abstraction of form from matter absolutely (for it includes matter) but rather of the universal from the particular. This should not be confused with total abstraction. Universal abstraction is from the material individual and in the direction of intelligible actuality. Total abstraction is in the direction of the more potential. Cf. art. 3; de veritate, q. 2, art. 6, ad 1. especially 2nd paragraph, "Unde patet quod abstractio..." Abstraction here means from sensible singulars. What this abstraction gives us is actual intelligibility.

Cf. De Trin., q. 5, art. 2, line 20. Universal abstraction as opposed to abstraction of form absolutely. line 25 "particulari" = material singular and not the less universal as in total abstraction.

"Possunt ergo... uno modo..." with the ratio motus et ratio materiae, but without this particular motion as matter. This can only be true of the existence which they have in intellect. "...alio modo..." comparison of the rationes ad res in rerum natura. These res are the principles of knowledge: the ratio is as form with regard to the material singulars. (This form is not to be confused with the form which is the act of the individuals matter. This form, the principium cognoscendi, also comprises matter and form. This composite form is as form to the singulars; it manifests the singular, but depends on singulars as principle. Forma totius; forma partis. When I speak of the form of Sortes: forma totius = man; forma partis = soul.

What is the universal as universal is not equal to Sortes or he would be man; but the essentials of man can be predicated of Sortes.

"...omnis res cognoscitur per suam formam..."

Forma partis - equivocal - either this man's soul; or the definition which is a universal but a part of the singular.

Mathematics is true only insofar as it is true of the abstract due to the mind. Yet not ens rationis, but reale.

Universal and particular.
Confusion of modus rei in intellectu et modus rei in se. "The particular is universal" says Lenin and says Aristotle held this. This dog is not unum de multis et in multis.

ad 2: Composite dupliciter:
a) "ipsum integrum" - matter and form
b) ratio (e.g.) animalis - matter and form

(Anything that natural doctrine considers will be in terms of common sensible matter. Matter is never considered save in relation to form, meme in philosophy naturelle.)
If we considered matter as the subject of the science, we would be wrong. The object is a composite - neither the form or matter alone can be so studied. "Omne quod habet materiam = id quod est mobile" not = "id quod est materia."
Could one say ens materiale is the subject? Or ens sensible?

ad 3: Prime Mover - neither the subject or a part of the subject - but term. The Prime Mover is not forgotten in 8th book but comes into consideration as in De Partibus Animalium - we examine the works of art to know them as things but also to know the Artisan of nature. There is a habitudo between the Prime Mover and things in motion, in that sans lui no explanation of motion.

ad 4: "Per reflexionem" The way intellect knows singulars. "Adminiculo inferiorum virium" - senses.

The sciences of the contingent and the mobile only attain the contingent and mobile things indirectly and by means of the universal.

ad 7: Mutability and contingency on which this is based is extrinsic contingency.

In the 1st art. we saw that the speculabile must be intelligble in act - must be in mind without individua matter - and it must be necessary. Remotion from matter and movement. Also there are taree kinds of speculabilia. Consideratio rationis brought in in a special way in the speculables which cannot exist sans matter, but can be so considered. It seems that they cannot be object; sans consideration of the intellect. 1st art. raises a three-fold problem. To be a speculabile alicujus scientiae, must be without matter and motion. But philosophy of nature is about material and mobile things.
In the 2nd art. we answered this. Ratio mobilitatis; ratio formae, etc. Ratio sive forma (abstracta) rei which is a compositum: common sensible matter. The science is primo et directe about the universal rationes, and indirecte et quasi-secundarie, per reflexionem et per modum applicationis of the singulars. The object here owes its being obj. to the minds ability to abstract universals. But S. Thomas also calls this ratio, forma p. 33, line 28, idest forma ejus. We attain this form grace a l'abstraction de l'universel de singulier. (We are defining the notion of three degrees of formal abstraction). The 1st also is formal abstraction - abstraction of universal form from singular - and this is a condicio communis scientiae - so in this sense, there is formal abstraction in every science. (Whether we should thus use the term 'formal abstraction', is another question)

The mind can consider apart from singulars a universal nature; this is a universal operation of the intellect in every science.

Art. 3: the operation of the intellect comes in in a very special way. Here the intellect knows something which cannot be said of the things in reality. In the 1st art. there was no consideration of an operation of the mind; only a propos of the 2nd kind of speculabile we spoke of a consideration of the mind.

In Mathematics we separate a part and consider tho' in reality it could not thus exist (a very great difference from the object of philosophy of nature). Not just a question of abstracting 'circle' from this and that circle - wouldn't differ from the 1st. This 2nd degree abstracts beginning from the level of the speculabile in 1st degree. Taking of the form even from common sensible matter.

On the totum abstractum due to abstractio totus we operate to abstract the speculabile of mathematics.

How do these abstractions really differ? There is a reason in reality for the possibility of the 2nd, but without the mind objects could not thus exist.

Difference of abstractio totius and total abstraction.

a) abstraction of the universal is of a necessary and immaterial thing - - we go to the intelligible, toward actuality. Passage from intelligible in potency to intelligible in act - perfectio simply speaking - abstractio totius.
b) Abstractio totalis - from less universal to more universal; from more actual to more potential. It is very easy to confuse these because both have predicability in common.

Art. 3 The problem discussed was raised in art. 1.
Corpus: concerned now with the process of abstraction whereby objects attain the different states discussed in art. 1.
Foundation in reality for abstraction.

1st operation apprehends both wholes and parts, e.g. man, point, etc.
falsehood would be had
(If the mind said about the objects of mathematics that they are thus in reality; to be true, the mind passes judgment on mathematic objects as they are in the mind. When the modern mathematician says mathe. is not about things which are true or false, we say: distinguo.)

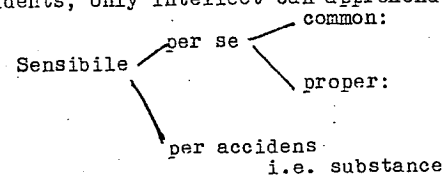
It is according to the 1st operation that we can consider the curve separated from the snub nose - and this precisely because there is no affirmation or denial in this operation.

Separation in math. is not absolute; only in mind, not in reality. Just as there is formal abstraction in Physics, but not absolute abstraction of form from matter.
p. 39, line 20 - forma: not substantial form, but closer to 1st imposition: figure. (In math. - the form is the quantity; and the matter will be sensible matter.) When a form can be understood sans the matter in which it is found, it can be abstracted.

An accident is as form to its matter. Cannot be separated from its recipient.

Quantity: the order of the parts of the substance. Thus quantity depends on substance whose parts it orders. This is the proper reason; the common is, that there can be no accident sans substance. The substance will be called materia sensibilis, not because of quantity but because of sensible qualities.

Materia intelligibilis est substantia; called "materia" because of the parts which quantity orders. Why 'intelligibile'? Sans sensible accidents, only intellect can apprehend it.



Page 39. Mind can consider quantity separate from sensible matter because sensible matter is due to sensible qualities which are posterior to quantity. This is the foundation of mathematical abstraction.
Sensible qualities presuppose a quantified substance; there could not then be an abstraction of sensible qualities from quantity.
Abstraction of form from matter, of quantity from sensible matter, takes place in the 1st degree of abstraction, so we do not say quantity thus exists. Propositions in mathematics are of the abstracta as abstracta so they are true.
Only one science de hujuswodi abstracta, of things indifferent to esse in reality. We prescind from the composing and dividing operation of the mind.
(We could define from this very precisely what is now called Essentialism - only mathematics. Not Logic - every 2nd intention must have some reference to 1st intentions. To call Aristotle an Essentialist would say that every science is like mathematics, indifferent to esse. But mathematics is unique in this.
To be concerned with the good is to be preeminently interested in existence, for only the singular is good. But final causality is of the good and we know how Aristotle brought in finality.)

"Et ita sunt duae abstractiones..." two abstractions, one separation.

Page 40, line 3-7; "nec etiam potest intelligi esse..." Why mathematics abstracts from motion.

Materia intelligbilis - per se known only by intellect; it is a per accidens sensible. (may be understood thus)

Quantified substance:
a) actual: parts outside each other.
b) possible: has that which makes it apt to receive quantity and have parts outside parts.

(Whether there can be a substance which is neither sensible or intelligible matter is another question.)

Line 44 - separatio proprie - because there is also separation in rerum natura.

Indivisibilium intelligentia (ist operation)
a) mathematic abstraction
b) physical abstraction - universalis a particulari

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We cannot say a thing is other than it is. But mathematics Cf. De Trin. q. 5, art. 3, ad. 1. The answer is contained above; we prescind from esse. "de natura lineae" i.e. sec. linea est.

Ad 2: read soignensement. The line is in the substance as having three demensions. However, there would be no quantity sans sensible matter. Quantity is in the sbustance as it is a substance composed of matter and form.

Ad 3: When we have abstracted quantity there is still differentiation. They differ by situs. Exteriority by designation.

Ad 4: Mathematics demonstration by a kind of material cause. From the lines to the nature of triangle. But intelligible matter! All demonstrations from form insofar as quantity is as form.

Ad 5: Think of Descartes saying motion is most evident so why define so obscurely. That there is motion is, of course, immediately known: quid nominis. But what motion is is hard to know.
Motion has a measurable aspect, is somehow reduced to a demension.
C went from A to B at such a speed - this can be very clear, Rene.

Scientiae mediae can treat dialectically this aspect of motion. Reduction to a certain dimension, a kind of variable. Is this really movement? Likewise is the measuralbe aspect of time what time is? But time is numerus. But, respondeo, time is the measure of movement, cannot be reduced to measurable aspects. But when we ask "how much time" can be so reduced. Sic physique Moderne.

Ad 6: Scientiae mediae.
Simple - - - composite.

The composite has some things derivitive from simples, some things proper to itself. The simples are sore applicable than the composite.

Scientiae mediae are more math. because the propter quid of their principles is math. This is formal: the propter quid. But they are ordered to the physical and are thus more physical.
What is formal in these sciences is abstract selon l'abstraction mathematique.
When we say light goes in a straight line.
We have:
(a) linea sensibilis - how straight is this line? Approximately so.
(b) linea geometrica seu abstracta - this is the one we calculate about. We apply this to the sensible line and this gives us a composite whole.

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The foundation in rerum natura of this medietas is that physical things can be considered without singular matter, math. can not exist sans sens. matter.

Cf. II Physics lectio 3 - esp. # 8.

We do not relinquish math. abstraction except in the application where the degree of will be dependent on the assimilation possible.

Ad 7: Conclusions of scientiae mediae can be the same as purely physical science, but from different principles.

Order of q. 5.
Art. 1 Sciences differ by object qua object. Immateriality is a common condition of science ex parte intellectus; necessary ex parte scientiae.

If there are radically different degrees of remotionfrom matter and motion, there will be different sciences. This does happen and in three ways - donc triplex genus scientiae.
This distinction brought out three modes of definition. So these sciences will have different principles.

Art. 2: This raises a problem concerning each science and first phil. of nature. To wit, how can there be such a science when natural things are mobile and material. Ratio universalis and les choses en existence. Also common sensible matter. Abstraction of universal from particular, not form from matter.

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The order (cont'd) of q. 5, De Trinl:

Art 2: Ratio res mobilis which is necessary and immobile as opposed to res existentes in motu et materia. Likewise motus which is hic et nunc in signate matter as opposed to ratio mobilitatis which is immobile, immaterial and necessary.

Abstraction of ratio from the ipsum interum, the material composite - so an abstraction of form, though not absolutely. This is formal abstraction in a sense. The ratio has the nature of form with regard to singulars. It is abstractio universalis a particulari. Considered as a passage from individual sense matter to that definable in terms of common sens. matter, it is characteristic of natural doctrine. The other sciences go from the particular to a different kind of universal.

Art 3: How can there be a science of reality so abstracted that what is said of it in abstraction cannot be said of existing reality? (There is a natural continuity in this question) How can math. be a true science? It could not be if this abstraction of what is defined from that sans which it cannot exist were an abstraction like the 1st degree. If man is mortal, Sortes is. In math. no. What is true of the part is not necessarily true of the whole - true of curve, but not of snub nose.
S. Thomas shows in 5 steps the abstraction proper to mathematics.

Accidental parts dupliciter.
(a) of the whole as whole - semi circle and foot.
(b) partes signatae - the individuals which owe their singularity to signate matter.

Separatio - how do we know that there are separate substances. It is not obvious that there is an object for this science. We must demonstrate that there is separated substance, substantia incorporea. If we want to show that substance has greater extension than corporal substance, must demonstrate.
Cf. XI Meta, lect. 7 # 2262 - If there are such substances, Meta. will be different science. To reach the subject of Meta., we must demonstrate - do not demonstrate the subject. Analogy of ~~xxxx~~ being - an accidental whole. Things that are or can be in separation, we must demonstrate.

Abstraction common to all the sciences - therfore not characteristic of natural doctrine: suit-il?
~~Abstractio totius not characteristic of natural doctrine, but there is a positive abstraction typical of natural doctrine. From particulars to definitions with common sensible matter. These definition~~

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De Koninck

Abstractio totius not characteristic of natural soctrine, but there ia a positive abstraction typical of naturla doctrine. From particulars to definitions with common sensible matter. These definitions are principles of a distinct science. There is a diversitas formalis objecti - opposed to things which can be defined sans sensible matter. There is an immateriality characteristic of natural doctrine. This diversitas is established, of course, by the mode of definition.
Cf. I Post. l. 41, n. 9, esp.

Abstractio totius (dupliciter):
(a) a partibus accidentalibus (from potentially to actually intelligible)
(b) a minus universal ad magis universale - (sec. praedicationem) From more actually intelligible to less actually intelligible.
(Both of these are common to all the sciences.)

Can we speak of three degrees of formal abstraction?

Cajetan and JSTh do; but S. Thomas seems not to and Aristotle even less. What do we mean by abstraction? This terminology is correct and a nominal basis for it in S. Thomas (Cf. I, q. 85, art. 1, ad 3 "Quod quidem..." Abstraction used throughout, even of the separatio of Meta. - the abstraction differentiates the sciences.)

The degree to which the thing in itself, owing to its nature, can be abstracted. Of course, the same thing can be the object of the three degrees.

What is the ultimate reason for the differences of sciences? The definition - from this the difference of objects, principles, immateriality, etc. Cf. In VI meta. lect. 1, # 1156. All differences attach to the definition.
S. Thomas sometimes uses abstractibility, sometimes separability.

Cf. In I, q. 1, art. 3 (Cajetan) and JSTh in the end of Logic, on three degrees of formal abstraction (DeKoninck would disagree with the doctrine on subalternation there.)

~~xxxxxxxxxxxxxxxxxx~~
In I Physic. 1 n. 4 The proper passion of the subject is movement; proper subject = ens mobile. Mobile due to matter.

End