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# An Essay on *Experimentum*\*

## IV. AN ATTEMPT AT DEFINING "EXPERIMENTUM"

### A. A *Résumé* of the Genesis of "*Experimentum*" as Knowledge

Central to our interpretation of *experimentum* is the fact that the human intellect, dependent on sensible things and sense, must compare in order to attain to a universal term as universal, that is, precisely as it is an *unum praeter multa*. Such knowledge inevitably involves perceiving that things are similar or the same. To grasp similitude as it is an order or relation inevitably involves separate and distinct acts that bear upon the things compared. Our minds cannot understand comparisons without first and separately understanding the things to be compared. Now the only way the human intellect can get at the things to be compared is through the presentation of sense. Sense is responsible for the very content of perception; it first of all brings the human knower into contact with the sensible things that are the measure and source of his intellectual knowledge. *Experimentum* is an important step in the generation of this intellectual knowledge.

Presuming the presence to the knower of the singular, sensible thing, Socrates, for example, we shall let Dominic of Flanders reconstruct that part of the process (presupposed to *experimentum*) leading to memory, the *thesaurus intentionum insensatarum*:

Omne habens formam in actu, potest eam univoce, vel aequivoce, causare in susceptivo apto: sed sensus exterior habet in se speciem repraesentantem formam sensibilem, secundum esse sensatum, vel intentionale. Ergo potest eam causare in alio susceptivo, scil. in sensu communi, et sensus communis, in phantasia, et ex speciebus sensatis, in phantasia causatis, potest estimativa elicere species insensatas, et eas causare in memoria. Et sic ex sensu potest fieri memoria.<sup>1</sup>

To be sure, intellect is operative with respect to the first phantasm presented by the internal sense. Abstraction takes place. (For in the human knower cogitative and intellect are joined in the same subject, man.) The thing — let us say the whiteness of Socrates — is considered apart from its material, singular conditions. The level of *esse intelligibile* has been reached: something under the light of agent intellect (in this case, whiteness) is impressed upon the possible

\* See the first part of this study in *Laval théologique et philosophique*, Vol. XXII, 1967, pp.76-115.

1. *Qq. Super XII Libros Metaph.*, I, q.4, a.4.

intellect. There is an act of intellectual cognition (knowing whiteness) in which both agent and possible intellect concur.<sup>1</sup> But though what intellect understands be common,<sup>2</sup> intellect does not yet understand it as common, as a nature capable of being shared by many, as an *unum praeter multa*: as yet there is but one instance. For purposes of illustration, let the *intentio* from which the abstraction was made be stored in sense memory. (It would seem that the as yet confused grasp of whiteness, not yet understood as common, would also be stored in intellectual memory, a potency not distinct from intellect.) Finally, let Plato, Callias, etc.— all of whom are white — be principles of the same process, at the term of which something is stored in memory.

Now St. Thomas, let it be recalled, states that *experimentum* is out of or from the *collatio* or gathering together of the *plurium singularium in memoria receptorum*. It is precisely these *intentiones* that are taken out of memory in the movement toward an intellectual knowledge of their comparison or similarity — in the case in question, their similarity with respect to whiteness. There is a succession of acts of knowledge in the cogitative — bearing on Socrates, Callias, Plato, etc. These very acts of the cogitative — again, a power one in subject with intellect — are parallel to and provide the content for a succession of intellectual acts moving toward the intellectual grasp of the first universal, that is, toward the understanding of an order or relation. In this process there is a collation or putting together of the singular intentions in the particular reason precisely “inquantum aliquo modo participat rationem, obediendo rationi, et sequendo motum ejus.”<sup>3</sup>

#### B. Particular Reason : The Proper Subject of “*Experimentum*”

That the internal sense power called *ratio particularis* has to do with the production of *experimentum* is clear: *experimentum* proceeds from its discourse; it is the product of its discourse. But where is *experimentum*, this product of discourse? Is it knowledge (and it certainly is that) in a sense power or in the intellect? St. Albert, the reader will recall, at one point calls it universal knowledge.<sup>4</sup> That would seem to place it in the intellect. Yet, as we have seen, *experimentum*, though a product or result and though ordered to the grasp of the *primum universale*, is regarded as a step short of the universal itself.

1. Cf. *Q. D. de Anima*, q.un., a.4, ad 8.

2. The first act of intellect, which attains something common but not as common, represents confused knowledge with respect to knowing the universal as universal.

3. *In III de Anima*, lect.10, n.745.

4. *In II Post. Anal.*, Tr.5, c.1.

In the texts already attended to from both Aristotle and St. Thomas the focus of *experimentum* is always the singular. If it is knowledge of the singular — and to reject this would be to reject what the tradition and common sense have to say about experience — then it inevitably involves sense, which alone knows the singulars directly. Only by the reflection of the intellect on its own act and its objective source, the phantasm, can man form the singular proposition.<sup>1</sup>

Dominic of Flanders clearly associates it with internal sense when he speaks of four kinds of knowledge possessed by the soul:

... quattuor sunt cognitiones animae. Prima est cognitio sensitiva, quae pertinet ad sensus exteriores Alia est cognitio memorativa. Tertia est experimentalis, et haec duae pertinent ad sensus interiores. Quarta est cognitio intellectiva: Quae pertinet ad intellectum. Secunda praesupponit primam. Et tertia secundum. Et quarta tertiam.<sup>2</sup>

And in another place he explicitly states: "... experimentum autem pertinet ad rationem particularem, et non universalem."<sup>3</sup>

St. Thomas, of course, makes it clear that *experimentum* is not a perfection of the external sense. It presupposes that: "... experientia procedit ex sensu ..." <sup>4</sup> Nonetheless it properly belongs to sense. An objection and response in *Q.D. de Malo* make St. Thomas's position on that point unmistakable. The objection reads in part as follows:

... experientia fit ex multis memoriis, quae fit ex sensu praeteriti, ut dicitur in principio *Metaph.*, et sic ubicumque est experientia, est sensus. Sensus autem non est sine corpore naturaliter unito, eo quod sensus est actus organi corporalis.<sup>5</sup>

St. Thomas continues the objection by pointing out that Augustine speaks of experience in the demons, therefore the demons must have bodies. We shall attend to experience in the angels later. What is at the moment of interest to us in the response is St. Thomas's assertion that "... experientia proprie ad sensum pertinet."<sup>6</sup> It is, he says, only in a transferred sense that "experience" is applied to intellectual knowledge.

By way of further evidence for *experimentum* as a perfection of sense, it should be recalled that at the beginning of his commentary on the *Metaphysics* St. Thomas associates *experimentum* with *ratio*

1. Cf. *Ia*, q.86, a.1.

2. *Op. cit.*, I, q.4, a.4, c.

3. *Ibid.*, q.4, a.2, ad 4.

4. *Q. D. de Malo*, q.16, a.7, ad 12.

5. *Ibid.*, a.1, obj.2.

6. *Ibid.*, a.1, ad 2. Cf. *In Job*, c.12, lect.2.



*particularis*, just as custom belongs to memory and art to intellect.<sup>1</sup> And that it is indeed a perfection of internal sense he explicitly states in the *Summa Theologica*. Prudence, he points out, is not in the external sense but in an interior sense “qui perficitur per memoriam et experimentum.”<sup>2</sup> Further, in his commentary on the *Physics*, St. Thomas states: “Si . . . non sit impedimentum, statim ad praesentiam obiectorum per experimentum acceptorum, advenit ei species intelligibilis . . .”<sup>3</sup> Here he places *experimentum* in the line of the presentation of the object to intellect; and the role of sense is precisely that of presenting object to intellect.

Finally, St. Albert (who, as we have seen, in another context refers to *experimentum* as “cognitio universalis”) states that *experimentum* is “cognitio singularium ex multiplicatis accepta memoriis.”<sup>4</sup> For St. Albert, then, *experimentum* obviously is or at least involves a cognitive perfection of sense.

Before passing to an attempt to gather together the definition of *experimentum*, however, we wish to make clear that, in our view, if *experimentum* is knowledge in internal sense, it is indeed there with dependence in some way on universal reason. If this is not so, then *experimentum* is not something proper to man.

### C. A Definition of “*Experimentum*”

In our view, fundamental to the understanding of *experimentum* is the recognition that in attaining the *unum praeter multa* the intellect is making a kind of judgment. This judgment inevitably involves an act of comparison, of collation. In order to reach the *primum universale*, intellect engages in a collation which bears upon and is joined, through the cogitative power, with the singular — a singular which, through the sense, is responsible for the determination of human knowledge. Here, of course, the intellect is not composing natures already understood as universal. But even here, in the movement from sensible singular to the first universal, we see man as a rational knower: “ab uno incipiens, per multa procedens, ad unum terminatur.”<sup>5</sup> There is a multiplicity of acts of apprehension. The *apprehensa* are brought together. The issue is an *unum ex multis*: intellect understands an order — similitude, for example.

The separate and successive acts in the particular reason — following upon (and necessary to) the comparative movement of universal reason toward the understanding of an *unum ex multis et*

1. Cf. *In I Metaph.*, lect.1, n.16.

2. *IIa IIae*, q.47, a.3, ad 3.

3. *In VII Phys.*, lect.6, n.927. Cf. *ibid.*, n.923.

4. *Metaphysica*, I, Tr.1, c.9 (ed. Geyer, vol.xvi), p.13.

5. *In de Divinis Nominibus*, c.7, lect.2, n.713.

*praeter multa* — issue in *experimentum*. For *experimentum*, as we take the name, though implying a process, is not a process; it is not the gathering together, rather it is what is gathered together from memory by the cogitative and in the cogitative. At some point it was necessary that the thing be present to external sense, but *experimentum* itself is not a perfection of external sense; it presupposes that. It is the memories of the past sensible that are collected. And at the end of the succession of acts in the cogitative, which collects (by following the movement of universal reason) these intentions out of memory, the issue is an ordered *unum* that corresponds in some sense to the ordered *unum* involved in the judgment of universal reason bearing upon the universal *ut sic*. The judgment in the internal sense called *ratio particularis*, which judgment parallels that in universal reason and is its ground, is not, of course, a judgment that involves the perception of order as order; for the cogitative is only a sense power. But there is an *unum ex multis* there too: a collection of singulars that issues from the bringing together of the singular intentions conserved in memory.

In his *Quaestiones* on the *Metaphysics* Dominic of Flanders makes the following significant remark: "... universale accipi non potest, nisi ex multis singularibus, quorum collectio est experimentum."<sup>1</sup> That gives us courage to place in the definition of *experimentum*, as it is in particular reason or (to inject a note of caution) as it has something of it in particular reason, the phrase *collectio singularium*. And it is indeed a noetic *collectio*. "... Experimentum est cognitio, seu collectio multorum singularium," says Dominic.<sup>2</sup>

Let us attempt to piece together a definition. *Experimentum* is an organized or ordered collection of singulars (an *unum ex multis*) proceeding from the collation by the internal sense power, called *ratio particularis*, of the past singular intentions preserved in memory. (And, of course, it is necessary to understand these singular intentions as having their ultimate basis in the presence of a singular, sensible thing to the external-common sense complexus, for human knowledge depends on things as perceived by exterior sense.) The ultimate end or final cause of this collection and of the process leading to it is the attainment of the universal. As knowledge, *experimentum* is an act of particular reason, an act which is ordered (for it follows the movement — a comparative process — of reason in its search for an understanding of order). Universal reason, inasmuch as it is extrinsic and active with respect to particular reason, is principal agent cause of *experimentum*. The successive acts of particular reason then, share in the order of universal reason as does indeed the collection of singulars that issues from this succession of acts.

1. *Op. cit.*, I, q.4, a.5. Cf. *ibid.*, q.4, a.2, c.; ad 7; *ibid.*, a.4, ad 4.

2. *Ibid.*, q.4, a.5, ad 7.

We have earlier made reference to St. Thomas's commentary on the *Physics* in order to place *experimentum* — as we have defined it, a perfection of internal sense — in the order of the presentation of the object to intellect.<sup>1</sup> In our view, its role in relation to intellect is *ex parte objecti*: it has to do with the content of intellectual knowledge. Now the singular intentions comprising *experimentum* provide the content of knowledge in the measure that each presents, *in singulari*, a similitude of a determinate thing. It is this similitude to which, under the light of agent intellect, universality accrues. But the first phantasm (supported by one singular substance) presented to intellect, while providing the similitude of a determinate thing, is not, in the first generation of knowledge, the ground for grasping the nature at issue precisely as common. More than one instance of a thing the same in nature (*eadem res*)<sup>2</sup> with another is needed for that. As we see it, *experimentum*, a collection, precisely adds the ground for the grasp of the universal as common. Perhaps this is the reason for St. Albert's saying that *experimentum* is universal knowledge, for the universal is mixed and confused in this collection, which is the proximate ground or support for grasp of the universal *ut sic*.

But before passing on to a closer consideration of a difficulty raised by Cajetan (a difficulty which, in our judgment, will serve a clearer understanding of *experimentum*), we would like to account for some other features or notes of *experimentum*. First of all, *experimentum* assuredly carries the note of a kind of passivity; for the experimental knower is dependent upon the action of external things. *Experimentum*, itself a cognitive perfection of internal sense, is, in the first generation of knowledge, dependent upon external sense and the sensible for its noetic content.

But *experimentum*, though a sense knowledge (and St. Thomas points out that sense *magis movetur*<sup>3</sup> — the passion of intellect is, of course, of another order because of the active power of agent intellect), also connotes activity on the part of the knower. St. Thomas, in remarking that the human intellect *forms* the *quid*, the proposition, etc.,<sup>4</sup> consistently points to the human knower as more active. Intellectual knowledge, though essentially dependent upon sense and the sensible, proceeds more from within the knower.<sup>5</sup> This emphasis on the active character of the human knower we count as reference to his capacity, through agent and possible intellect, to attain to order by way of discourse. "The soul is so constituted..."<sup>6</sup>

1. Cf. *In VII Phys.*, lect.6, n.927. Cf. *ibid.*, n.923.

2. Cf. *In II Post. Anal.*, lect.20, n.592.

3. Cf. *Cont. Gent.*, II, c.88.

4. Cf., for example, *Quodl.* VIII, q.2, a.1; *Q. D. de Anima*, q.un., a.5, ad 7.

5. Cf. *Cont. Gent.*, IV, c.11.

6. ARISTOTLE, *Posterior Analytics*, II, c.19, 100 a 13.

"Scientia," says St. Thomas, "praeexistit in addiscente in potentia non pure passiva, sed activa, alias homo non posset per seipsum acquirere scientiam."<sup>1</sup> It exists *originaliter*<sup>2</sup> in the active capacity of agent intellect. St. Thomas states the matter clearly: "... intellectus possibilis factus in actu non sufficit ad causandam scientiam in nobis, nisi praesupposito intellectu agente." And he goes on:

... ita patet quod intellectus in actu principiorum non sufficit ad reducendum intellectum possibilem de potentia in actum sine intellectu agente; sed in hac reductione intellectus agens se habet sicut artifex, et principia demonstrationis sicut instrumenta.<sup>3</sup>

In strictly demonstrative discourse, then, the principal agent is agent intellect, a power *simpliciter activa*. The principles of demonstration are its instruments. Similarly, in the process that leads to the universal, whether term or proposition (immediate or *universalis ut nunc*), the principal agent of discourse is agent intellect.<sup>4</sup> It is ultimately because of agent intellect that there is discourse in particular reason, which gathers *experimentum*. On that account, *experimentum* connotes more than sheer passivity with respect to the knowable; for it is a collection ultimately dependent upon the movements of a reason that must gather the truth from singular things.<sup>5</sup> There is no *experimentum* without universal reason.

This last point — that there is no *experimentum proprie loquendo* without an immaterial power called reason as an active and extrinsic cause — deserves expansion. As we have already seen, particular reason, an internal sense, is a rational power. As we have also indicated, its susceptibility to be moved by universal reason is not only at issue in practical affairs, that is, in the context of *motus ab anima ad res*; its rational character also emerges in its role, under intellect, in the generation of the universal whence science proceeds. Moreover, *experimentum* itself is a collection of sensible species in particular reason as in its subject. This collection is the term or quasi-product of an act or acts immediately elicited by the particular reason itself. Of course, this power is precisely rational insofar as it is somehow subject to the collative power of universal reason. Therefore, although *experimentum* is in particular reason as its subject, universal

1. *Q. D. de Ver.*, q.11, a.1.

2. Cf. *ibid.*, q.10, a.6.

3. *Q. D. de Anima*, q.un., a.4, ad 6. Cf. *ibid.*, aa.5, 16; *Q. D. de Ver.*, q.9, a.1, ad 2 *ibid.*, q.11, a.3; *ibid.*, q.12, a.3.

4. A major difference, of course, between the discourse from universal principle to conclusion and the discourse from singular to universal is that the latter involves no formation of a syllogistic (universal) middle term.

5. Cf., for example, *Q. D. de Anima*, q.un., a.15.

reason is principally responsible for it. At issue here is that one power is somehow ordered by and to another.

Now St. Thomas indicates that whenever two things (which are acts of potencies or habits) concur toward the constitution of something one, then one of these two is formal with respect to the other.<sup>1</sup> To give instance to the principle we shall attend to the application St. Thomas himself makes of it in ascertaining whether election is an act of will or reason:

Est autem considerandum in actibus animae, quod actus qui est essentialiter unius potentiae vel habitus, recipit formam et speciem a superiori potentia vel habitu, secundum quod ordinatur inferius a superiori: si enim aliquis actum fortitudinis exerceat propter Dei amorem, actus quidem ille materialiter est fortitudinis, formaliter vero caritatis. Manifestum est autem quod ratio quodammodo voluntatem praecedat, et ordinat actum eius: inquantum scilicet voluntas in suum obiectum tendit secundum ordinem rationis, eo quod vis apprehensiva appetitivae suum obiectum repraesentat. Sic igitur ille actus quo voluntas tendit in aliquid quod proponitur ut bonum, ex eo quod per rationem est ordinatum ad finem, materialiter quidem est voluntatis, formaliter autem rationis. In huiusmodi autem substantia actus materialiter se habet ad ordinem qui imponitur a superiori potentia. Et ideo electio substantialiter non est actus rationis, sed voluntatis: perficitur enim electio in motu quodam animae ad bonum quod eligitur. Unde manifeste actus est appetitivae potentiae.<sup>2</sup>

That principle is formal, then, which is more moving and so prior in actuality. This is the case of charity with respect to courage and of reason (in the matter of election) with respect to appetite. And so just as an act of courage done out of love of God is formally an act of the virtue of charity insofar as charity is a principal agent which is *primum movens* or ordering, so also is choice formally of reason; and just as an act of courage done out of love for God is materially (substantially or essentially) an act of the virtue of courage, so also is choice materially an act of the will. And to make our meaning clear, we add that choice is immediately an act of the will just as command (*imperium*), though of the will as *primum movens*, is immediately<sup>3</sup> and essentially<sup>4</sup> an act of reason.

Inasmuch as universal reason and particular reason are agent principles ordered with respect to one another, application of the above doctrine can be made to the case of *experimentum*. The colla-

1. *Ia IIae*, q.13, a.1: "Quandocumque autem duo concurrunt ad aliquid unum constituendum, unum eorum est ut formale respectu alterius."

2. *Ibid.* — For other texts in which the same principle is used see *Ia IIae*, q.17, a.1; *Quodl.* IX, q.5, a.2; *Q.D. de Ver.*, q.22, a.5; *ibid.*, q.14, a.5; *Ia IIae*, q.23, a.8; *Ia IIae*, q.4, a.3.

3. Cf. *Quodl.* IX, q.5, a.2; *Q.D. de Ver.*, q.24, a.5.

4. Cf. *Ia IIae*, q.17, a.1.



tion from which *experimentum* proceeds is essentially (materially or substantially) an act of particular reason. Formally it is an act of universal reason, which is *primum movens* insofar as it orders the act of the inferior power. And if *experimentum* proceeds from an act that is essentially of particular reason and is itself essentially sense knowledge,<sup>1</sup> what is formal in this internal sense knowledge which is the term or effect of the collation of particular reason is from the superior agent. St. Thomas gives the principle: "Quandocumque enim duo sunt principia moventia vel agentia ad invicem ordinata, id quod in effectu est ab agente superiori est sicut formale; quod vero est ab inferiori agente, est sicut materiale."<sup>2</sup> And he follows it with an application to moral virtue:

... cum ratio inferioribus potentiis imperet, utpote concupiscibili et irascibili; in habitu concupiscibilis, hoc quod est ex parte concupiscibili, utpote pronitas quaedam ad utendum aequaliter concupiscibilibus, est quasi materiale in temperantia; ordo vero, qui est rationis, et rectitudo, est quasi forma eius. Et sic est in aliis virtutibus moralibus; unde quidam philosophi omnes virtutes scientias appellabant, ut dicitur in VI *Ethicorum*.<sup>3</sup>

What is material in *experimentum* is an aggregate of sense memories. What is formal in it as in an effect is the order or organization of these memories — an order ultimately rooted in the power of universal reason. We can, in fact, speak of universal reason itself as the form of *experimentum*. It is important to recognize, however, that universal reason is not the form of *experimentum* as part of its essence,<sup>4</sup> that is, as something intrinsic.<sup>5</sup> Rather, universal reason is the form of *experimentum* as that which is effective of it.<sup>6</sup> An extrinsic active cause is not of the essence of its effect: one does not identify what is in some sense, at least, an agent with its effect. Similarly one would not say that moral virtue is reason or knowledge, though reason or knowledge in some way enters the very definition of moral virtue:

... ratio recta prudentiae non ponitur in definitione virtutis moralis, quasi aliquid de essentia eius existens; sed sicut causa quodammodo effectiva ipsius, vel per participationem. Nam virtus moralis nihil aliud est quam participatio quaedam rationis rectae in parte appetitiva ...<sup>7</sup>

1. Throughout this discussion it must be remembered that *experimentum*, knowledge of the singular, is sense knowledge. And if we speak of *experimentum* as an effect or product of the collation of particular reason, it is not an effect that is outside the power that produces it; for knowledge is an immanent activity. The proper subject of *experimentum* is internal sense.

2. *Q.D. de Ver.*, q.14, a.5.

3. *Ibid.*

4. Cf. *ibid.*, ad 1; *IIa IIae*, q.23, a.8, ad 1.

5. Cf. *IIa IIae*, q.4, a.3, ad 2.

6. Cf. *ibid.*, q.23, a.8, ad 1.

7. *Q.D. de Virt. in Communi*, q.un., a.12, ad 16.

In our view universal reason enters the definition of *experimentum* in the very same way reason enters the definition of moral virtue: *experimentum* is not reason nor is it universal knowledge in universal reason; rather, as organized knowledge of the sensible singular in particular reason, it is essentially a participation of universal reason in that internal sense.<sup>1</sup> The superior agent, universal reason, does in fact order the activity of the inferior agent, particular reason (as well as account for the order in the product, *experimentum*, of the inferior agent), to its own end, the apprehension of the universal as such: "Omnis ... virtus vel potentia superior dicitur movere per imperium inferiorem, ex eo quod actus inferioris ordinatur ad finem superioris ..."<sup>2</sup>

*Experimentum* — which, taken properly, implies *collatio* — is, then, the ground for the grasp of the universal as universal. But is it, taken properly, the ground for the grasp of the universal notion of a simple object, which can serve as a term in a proposition, or only

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1. In speaking of free choice — and choice is essentially an act of the will — St. Thomas (*Ia IIae*, q.17, a.1, ad 2) says that the will is the root of liberty as subject and that reason is the root as cause. We can say here, it seems to us, that the particular reason is the root of *experimentum* as subject and universal reason is the root as cause. — Particular reason, because it is a rational power, can be said, in some sense, to be the seat of habit, habit being taken to mean here a participation in reason by a power inferior to reason. In *Q.D. de Virt. in Communi*, q.un., a.4, ad 6, however, St. Thomas points out that the case of the sense knowing powers is not wholly similar to that of the sense appetites, inasmuch as the former are "naturaliter praeviae rationi, cum ab eis ratio accipiat." In *IIa IIae*, q.50, a.3, ad 3, however, while attending to the fact that sensitive appetites are more appropriately said to have such habits than the apprehensive sense powers precisely because the reason more naturally takes from the latter, St. Thomas nonetheless distinguishes between external and internal sense: "Quamvis ... in ipsis interioribus viribus sensitivis apprehensivis possint poni aliqui habitus, secundum quos homo fit bene memorativus vel cogitativus vel imaginativus: unde etiam Philosophus dicit, in cap. (2) de Memoria quod consuetudo multum operatur ad bene memorandum: quia etiam istae vires moventur ad operandum ex imperio rationis. Vires etiam apprehensivae exteriores, ut visus et auditus et huiusmodi, non sunt susceptivae aliquorum habituum sed secundum dispositionem suae naturae ordinantur, ad suos actus determinatos; sicut et membra corporis, in quibus non sunt habitus, sed magis in viribus imperantibus motum ipsorum." Because of the rationality of these internal sense powers the intellectual virtues (both *intellectus principiorum* and prudence may be included) can be said to be in them in subsidiary or secondary ways. (Cf. *Ia IIae*, q.50, a.4, ad 3; *ibid.*, q.56, a.2; *IIa IIae*, q.47, a.3, ad 3.) St. Thomas (*Q.D. de Ver.*, q.20, a.2) describes an intellectual habit as a "collectio specierum ordinarum ad cognoscendum." We have described *experimentum* as a collection of singular intentions. It can, it seems to us, be taken as the name for a secondary habit ordered to intellectual virtue properly speaking. It is precisely a secondary habit because it is ordered to presenting the object to intellect. *Experimentum* is *ex parte objecti*. In the context of showing that an intellectual habit is not principally in the passive intellect (the cogitative power) but rather in the immaterial faculty of mind, St. Thomas (*Cont. Gent.*, II, c.73) explicitly makes the point that the dispositions of the sense powers are "ex parte objecti, scilicet phantasmatis, quod propter bonitatem harum virtutum praeparatur ad hoc quod faciliter fiat intelligibile actu per intellectum agentem."

2. *Q.D. de Caritate*, q.un., a.3.



for the grasp of the universal proposition itself? In our judgment one can speak of *experimentum proprie loquendo* as the ground for the universal term. In fact, in our reading of St. Thomas's commentaries on the beginning of the *Metaphysics* and the end of the *Posterior Analytics*, *experimentum* is first of all and principally discussed as the ground for the grasp of the universal notion of a simple object. That this is a legitimate reading is especially clear in St. Thomas's commentary on Aristotle's second account of the generation of the universal at the end of the *Posteriora*.<sup>1</sup> Our interpretation is substantiated by the fact that St. Thomas seems to indicate that the universal principle (a proposition) comes from the universal which, in its own turn, came from experience.<sup>2</sup> Finally, the fact that St. Thomas asserts that the universal principle from which other things are concluded comes from *multa experimenta* tends to confirm it: if *experimentum* is in some sense responsible for the grasp of a universal term as universal, we would indeed expect that *multa experimenta* are somehow required to a grasp of a universal proposition, which is a composition of universal terms.<sup>3</sup> But while it seems that for St. Thomas *experimentum* is first of all taken to mean what is on account of the grasp of the universal term, it does not follow, it seems to us, that he means to exclude the need for *experimentum proprie loquendo* as a ground for the universal proposition. In any case, a brief analysis of Cardinal Cajetan's answer to the question — an answer with which we do not agree — may at least serve to make our own view clear.

#### D. A Difficulty Presented by Cardinal Cajetan

In the last chapter of the *Posterior Analytics* Cardinal Cajetan analyzes *experimentum* in terms of the need for something beyond simple internal sense knowledge in order to account for the generation of the first principles. He asks the question "an habitus principiorum praeexigat experimentum ratione cognitionis terminorum, an ratione complexionis eorundem."<sup>4</sup> Is *experimentum* needed in order to attain to the universal term or for the bringing together of these universal terms in a proposition? Cajetan cites the opinion of Antonius Andreas. The latter insists that *experimentum* is not needed for the complex knowledge of the principles, but simply for the universal

1. Cf. *In II Post. Anal.*, lect.20, nn.594-595.

2. Cf. *ibid.*, n.592.

3. *III Sent.*, d.14, a.3, sol.3: "...ex hoc ipso quod noster intellectus accipit a phantasmatis, sequitur in ipso quod cognitionem collativam habeat in quantum ex multis sensibus fit una memoria et ex multis memoriis unum experimentum et ex multis experimentis unum universale principium ex quo alia concludit..." Cf. *II Sent.*, d.23, q.2, a.2, ad 2; *In I Metaph.*, lect.1, n.18.

4. *In Post. Anal.*, II, c.13.

terms involved in the principles. As Cajetan relates Andreas's position, the latter apparently holds for the capacity of intellect "ex seipso... conceptos terminos componere et dividere, et consequenter cognoscere principia, quoniam cognitio complexa principiorum ex solis terminis cum lumine intellectus agentis resultat."<sup>1</sup> Andreas seems to have based his position on Aristotle's account of the immediate proposition; that is, that the predicate of such a proposition is of the very notion of the subject.<sup>2</sup>

Cajetan answers the difficulty by first of all appealing to the very text of the *Metaphysics*,<sup>3</sup> where the Philosopher says that experimental knowledge involves knowing that this herb helped this man in this disease and so on in similar cases. This experimental knowledge is, in turn, the basis for asserting that such a species, man, is cured of a kind of disease by a certain type of herb — clearly a universal proposition in which common natures are composed.<sup>4</sup> Secondly, Cajetan asserts that Andreas's position contradicts the text of the *Posterior Analytics* where Aristotle asserts that knowledge of the first principles comes from sense by way of induction; and induction, Cajetan continues, is that which "ex particularibus complexis ad complexum tendit."<sup>5</sup>

Cajetan's final argument against Andreas's position — namely that experimental knowledge is not needed by reason of the complexion of the terms — is one with which we indeed agree. Such a view, the Cardinal insists, is against reason:

... quoniam oportet ponere aliquod motivum et terminativum intellectus ad talem complexionem faciendam. Termini autem accepti, licet si componerentur haberent ex se evidentiam, non sufficiunt tamen ad movendum et determinandum intellectum ad hanc compositionem potius quam illam. Experimur namque continue in nobis ipsis quod habemus diu multorum terminorum conceptus absque notitia principiorum complexorum, quae ex illorum terminorum coniunctione constat. Fateor enim me cognovisse, quid 'aequale,' quid 'demere,' et quid 'remanet,' nescivisse tamen hoc

1. *Ibid.*

2. Cf. ARISTOTLE, *Posterior Analytics*, I, cc.2 and 3; ST. THOMAS, lect.7, n.67.

3. Cf. I, c.1, 981 a 1-10.

4. Cf. CAJETAN, *loc. cit.*

5. *Ibid.* — Can we speak of induction as a process leading to the attainment of a universal term as universal? (That is the way St. Thomas *seems* to be using the word in *In II Post. Anal.*, lect.20, n.595.) It would seem that the universal to which the inductive process leads — as the word "inductive" is ordinarily taken — is a universal proposition. There seems to be no reason, however, why the attainment of the simple universal term could not be called an induction, at least in some sense of that word. But whatever be the propriety of the use of the word "induction," it seems clear that the grasp of the universal as universal — a grasp that includes the recognition of a similitude among things — depends upon a comparison of singulars. At least the singulars must be collated at the beginning of the life of the intellect.

principium: 'si ab aequalibus aequalia demas, quae remanet sunt aequalia'; et similis ratio est in aliis.<sup>1</sup>

Certainly natures must be seen together and *in singulari* — in some cases, again and again. (Sometimes, of course, not so great a collection is involved. The need for a greater or lesser number of singulars in order to give some determination to mind depends upon the matter and upon the quality of the mind viewing the matter.) An example may help to make the matter clear. The human knower notes in a particular instance that this white thing is sweet, and in another instance that this white thing is sweet, and so on. On the basis of this collection, in whose members the knower repeatedly observes the coincidence of white and sweet, he forms, though shakily, the proposition "every white thing is sweet," which will only stand, in this case, so long as the knower does not put something like salt to his lips. In any case, seeing these natures repeatedly together in the members of a collection is what moves him to attempt to compose them in a universal way. All inductions, of course, do not issue only in a proposition which is a provisional universal. Sense, *experimentum*, and induction are needed for immediate propositions too. Furthermore, in the latter case, it is also necessary to see the common characteristics together *in singulari*. A careful reading of the following text from St. Thomas makes it clear, it seems to us, that his position is that, before grasping the truth "any whole is greater than its part," we see whole and part first of all and together in the singular, sensible whole:

... ex hoc, quod videmus aliquod totum singulare sensibile, perducimur ad cognoscendum quid est totum et pars, et cognoscimus quod omne totum est maius sua parte, considerando hoc in pluribus. Sic igitur universalia, quibus demonstratio procedit, non fiunt nobis nota, nisi per inductionem.<sup>2</sup>

Of course, if, in the case of immediate propositions, we suppose the vision of the characteristics together *in singulari*, then, once we have grasped the meaning of the terms, we know that one belongs necessarily to the other; for one is of the very notion of the other.<sup>3</sup> In any case, we agree with Cajetan that seeing characteristics together *in singulari* — whether those characteristics be white and sweet or whole and part — is first motive for their composition *in universali*.

1. *Ibid.*

2. *In I Post. Anal.*, lect.30, n.252.— An immediate proposition such as "a whole is greater than any one of its parts" obviously does not require as much experience as those self-evident principles referred to as "known to the wise."

3. Cf. *ibid.*, lect.7, n.67; *II Sent.*, d.24, q.2, a.3; *Ia*, q.17, a.3.— Cf. Charles DE KONINCK, "Abstraction from Matter," *Laval théologique et philosophique*, XIII (1957, n° 2), pp.139-141, for an account of the inductive processes that lead to "temporary" universals and those that lead to immediate propositions.

In the following passage, however, we find cause to disagree with Cajetan:

... ad cognitionem incomplexam terminorum primorum principiorum, experimentum non proprie dictum exigitur, sed multiplicata apprehensio illius termini in parte sensitiva sufficere videtur, quoniam cognitio incomplexa terminorum requisita ad cognitionem primorum principiorum non est notitia completa 'quid rei' terminorum, sed est notitia confusa et parum vel nihil excedens cognitionem 'quid nominis.' Ad talem autem cognitionem habendam, quia universalis est et quiescens, oportet frequentem cognitionem sensitivam adunantem praecedere; quia vero confusa cognitio est, experimentum proprie dictum, quod collationem et complexionem sonat, exigi non video, etc.<sup>1</sup>

Our quarrel with Cardinal Cajetan here, to repeat, is not based on a denial of the need for *experimentum* with respect to the composition involved in propositions or in the attainment of the *quid rei* of, say, a natural thing. The attainment of a universal proposition or of a definition implies distinct knowledge and, consequently, supposes comparative or collative processes. These processes begin with the sensible singulars — singulars which determine our knowledge. Anyone at all acquainted with the Aristotelian corpus is well aware of the Stagirite's emphasis on the need for observation and experience as the ground for a distinct knowledge of the definitions of natural things.<sup>2</sup> There is no other way, save recourse to an infused or an innate kind of knowledge. Further, that definitions first of all require comparisons or collations of sensible, accidental differences is quite clear in St. Thomas.<sup>3</sup> The human scientist's concern is "de quidditatibus rerum in eis existentibus."<sup>4</sup> The only way for him to get at those quiddities is through sense, first of all presenting sensible things.

Our quarrel with Cajetan here is with his assertion that there is no *experimentum proprie dictum* with respect to the universal notions. It seems to us that, while Cajetan has recognized the collative, comparative character (and *experimentum* does indeed imply *collatio*) of the processes that lead to proposition or definition, he has apparently not sufficiently attended to the *collatio* of particular reason necessary for the grasp of the *primum universale*. "Ex memoria autem multoties facta circa eandem rem, in diversis tamen singularibus, fit experimentum."<sup>5</sup> This phrase, if we read it correctly, can indeed be taken

1. *In Post. Anal.*, II, c.13.

2. ARISTOTLE (*Prior Analytics*, I, c.30), after giving the logical rules for the discovery of middle terms, points up the need of *experimentum* for definitions. There is, for Aristotle, no substitute for observation. Cf. ST. ALBERT, *In I Priora Anal.*, Tr.6, c.8.

3. Cf. *Q.D. de Anima*, q.un., a.7, ad 1; *Q.D. de Ver.*, q.10, a.6, ad 2.

4. *Q.D. de Spir. Creat.*, q.un., a.9, ad 6.

5. *In II Post. Anal.*, lect.20, n.592. The emphasis is ours.

to apply to the generation of knowledge of a universal term as universal. Further, we think that greater attention on Cajetan's part to the second account of the generation of the principles as it is given by Aristotle in the *Posterior Analytics* together with greater attention to the commentary of St. Thomas himself (especially numbers 594-595) would have made clear that attaining the universal term (which involves or supposes the recognition of a relation, namely, similitude or difference) indeed involves a comparative process.<sup>1</sup> In sum, attaining the universal term as universal *sonat collationem* (though not a composition of common characteristics). We see no reason to hesitate to speak of *experimentum proprie dictum* here.<sup>2</sup>

V. "EXPERIMENTUM" OF THE SENSIBLE:  
THE PRINCIPLE AND TERM OF ALL SCIENCE

A. "*Experimentum*": *The Principle*

If the invention or discovery of the first, common, and immediate principles upon which all human science depends presupposes and depends upon a pre-existent *δύναμις* called sense, it also depends upon *experimentum*. "... Ex rebus visis per viam experimenti accipitur universale, de quo est scientia."<sup>3</sup> The traditional philosophy is unequivocal in its insistence that all acquired human science and art are somehow rooted in *experimentum*; and on this account all such disciplines can be and are denominated "experimental."<sup>4</sup>

1. It seems to us that our definition of *experimentum* applies to the *experimentum* needed for the grasp of the universal notion as universal and to that needed for the grasp of the universal proposition. An organized collection of sense memories is needed as support for the grasp of similitude and for the grasp of the identity of the universal terms — in the first case a collection of memories of similar singular characteristics and in the second case a collection of memories of observed coincidences of singular characteristics.

2. As possible confirmation of our position that *experimentum* can be said properly with respect to the attainment of a universal terms as universal we offer the following text of St. Thomas: "Ex ipso enim lumine naturali intellectus agentis prima principia fiunt cognita, nec acquiruntur per ratiocinationes, sed solum per hoc quod eorum termini innotescunt. Quod quidem fit per hoc, quod a sensibilibus accipitur memoria et a memoria experimentorum [sic] et ab experimento illorum terminorum cognitio, quibus cognitis cognoscuntur huiusmodi propositiones, quae sunt artium et scientiarum principia" (*In IV Metaph.*, lect.6, n.599).— Further, in *In I Post. Anal.*, lect.42, n.381, St. Thomas says: "... ex rebus visis per viam experimenti accipitur universale, de quo est scientia." Science is not about propositions but about the subjects of propositions. Perhaps we can attach the phrase "de quo est scientia" to what St. Thomas says (*ibid.* lect.18, n.157; *ibid.*, lect.43, n.394) in distinguishing principles *ex quibus* from those *de quibus*, the *de quibus* being the subjects of science.

3. *In I Post. Anal.*, lect.42, n.381.

4. Cf. *IIIa*, q.12, introductio.



*Experimentum*, as we have seen, goes beyond simple external sense knowledge. It is a collection of singulars made by an internal sense power as that power follows the movements of universal reason, a universal reason which is moving toward the grasp of a comparison.<sup>1</sup> In the inductive process which leads to a proposition — a proposition which is in turn principle of further considerations — *experimentum*, while not the same as induction, plays a fundamental role. St. Albert the Great, in a passage from his commentary on Aristotle's *Topics*, not only makes clear the basic role played by *experimentum* but its distinction from the inductive process, of which it is but a part:

... quia sensibus percipiuntur et obiciuntur singularia, dicitur inductio secundum sensum notior: propter quod etiam inductione ex singularibus collatis ad universale infertur universale, et sic principium sunt, et universale illatum vel principium.<sup>2</sup>

*Experimentum* (or, it seems to us, one may say many *experimenta*), a collection of singulars, which, in this case, is the seat of at least two common characteristics, is that from which universal characteristic is collated to universal characteristic. *Experimentum*, the collection, is in some sense, then, the principle of induction; and the universal

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1. Is a collection of singular instances necessary for the attainment of every universal as universal? It would seem, in answer, that this is not universally true. First of all, one must attend to the fact that the generation of the most common principles or, for that matter, any self-evident principle does not suppose having seen every single instance. Supposing some sort of basis for seeing the communicability of the natures to many (that is, supposing some sort of collection of singulars), once the terms of self-evident propositions are known, the knower immediately sees that predicate belongs to the subject inasmuch as the former is of the very notion of the latter. But in every instance is a collection of more than one instance necessary for the attainment of the universal or universal proposition? It would seem not. For a knower, by reason of his experience in previous matters, seems able to recognize that what he is considering is at least capable of being found in others. Perhaps that is what St. Albert has in mind when he says: "Patet quidem igitur quod ex sensu fit memoria, sola mansione sensibilis in anima: ex memoria autem multoties facta fit experimentum sive compositio experimentatis: et hoc dupliciter, quod si fiat multiplex acceptio similis sensibilis, et semper iudicativa potentia accipiatur esse ad hoc vel illud conferens vel nocens, vel quod hoc ex illo est consequens: tunc fit experimentum. Iterum si semel tantum sit acceptum et iudicio inveniatur in omnibus similibus idem, iterum factum est experimentum" (*In II Post. Anal.*, Tr.5, c.1).— The need for more or less *experimentum*, of course, is contingent upon the matter being considered (Cf. *Ia IIae*, q.14, a.3; *In I Metaph.*, lect.2, n.47; *In I Post Anal.*, lect.44), the level of consideration (more universal considerations demand less), and the quality of the intellect involved. When we speak of quality of intellect, we have in mind what St. Thomas says of those whom he calls *rudes*; these latter, with weaker intellects than their superiors, have need of more examples in order to see a principle. And so their teachers must multiply instances and analogies. That is true of them in a situation in which they are being taught. And, *mutatis mutandis*, it is also true of them when they are being taught by nature, that is, when they are trying to acquire science on their own; they simply require far more *experimenta* than those whose intellectual light is stronger.

2. *In I Topic.*, Tr.3, c.4.

proposition is *principiatum* or conclusion. And in this collection the individual intentions are responsible for the content of the universal proposition, while the fact that the distinct singular things are collated according to the same natures founds the universality of the terms in the universal proposition inferred.

The last chapter of the *Posterior Analytics* proposes sense and *experimentum* as necessary to the attainment of the first, self-evident, indemonstrable principles upon which the proper principles of the various sciences depend. "Omnia ... propria principia cuiuscumque scientiae dependent ex principiis primis indemonstrabilibus per se notis, quorum cognitionem a sensibilibus accipimus, ut patet in fine *Posteriorum*."<sup>1</sup> In the measure, of course, that *experimentum* is principle of the inductions which lead to such common principles, it is at the root of all human scientific investigations. But what is the role of *experimentum* with respect to the proper principles of the particular disciplines, that is to say, with respect to the principles proportionate to manifesting the proper subject of such disciplines?<sup>2</sup> An investigation of this matter will not only further reveal the fundamental and permanent function of *experimentum* as a source of all human acquired science; it will also serve to bring into better focus an essential characteristic of *experimentum* as knowledge — a characteristic which up to this point has only been touched upon in a rather implicit way.

The Aristotelian corpus is plain on the need for an enormous amount of experience in moral science, a science concerned with the direction of human activity. Moral matter is run through with variability, contingency.<sup>3</sup> In his search for sound and more proximately directive principles, the moralist must take into account what happens for the most part,<sup>4</sup> what works, what in such and such circumstances in point of fact is likely to bring about such and such a good or such and such an evil with respect to the goals of moral life. He takes as principle "quia ita est,"<sup>5</sup> and this through inductions based on highly circumstanced experience.<sup>6</sup> For, with respect

1. *Cont. Gent.*, III, c.41.

2. For a discussion of the distinction between common and proper principles of science see Father Lorenzo ROY, "La certitude en matière morale," *Laval théologique et philosophique*, XIX, 1963, n° 1, pp.124-129.

3. Even more so than in art; therefore more experience is required. Cf. *In III Eth.*, lect.7.

4. Cf., for example, *Ia IIae*, q.84, a.1, ad 3.

5. *In I Eth.*, lect.4, n.53.— Cf. *In de Sensu et Sensato*, lect.1, n.17, where St. Thomas points out that to manifest something "absque ratione" is by way of *experimentum*.

6. "... Quia infinitas singularium non potest ratione humana comprehendi, inde est quod sunt *incertae providentiae nostrae*, ut dicitur *Sap.* 9. Tamen per experientiam singularia infinita reducuntur ad aliqua finita quae ut in pluribus accidunt, quorum cognitio sufficit ad prudentiam humanam" (*IIa IIae*, q.47, a.3, ad 2).



to directing moral activities, knowing the right thing to do is of more importance than knowing the reason why such is likely to work.<sup>1</sup>

Similarly, in the consideration of nature there is enormous need of experience — a need that grows as human investigations descend to the considerations of the lowest species. "Lack of experience," says the Stagirite in his work *On Generation and Corruption*,

diminishes our power of taking a comprehensive view of the admitted facts. Hence those who dwell in intimate association with nature and its phenomena grow more and more able to formulate, as the foundations of their theories, principles such as to admit of a wide and coherent development: while those whom devotion to abstract discussions has rendered unobservant of the facts are too ready to dogmatize on the basis of a few observations.<sup>2</sup>

The principles of natural science "...ex sensibilibus experimento accipiuntur..."<sup>3</sup> To neglect the "sensibilia, circa quae est experientia"<sup>4</sup> is to neglect what "magis in rebus naturalibus fidem faciunt."<sup>5</sup>

The traditional philosophy is clear: a proper knowledge of nature and a proper knowledge, to give an example taken from among the practical disciplines, of human actions as they are susceptible of direction to an end require much experience. Indeed, the proper subjects of such disciplines, in some sense at least, fall under *experimentum*.<sup>6</sup> In mathematics, however, this is not the case.

Aristotle and, following him, St. Thomas assign the mathematical disciplines a place in the order of learning which follows upon the logical sciences and precedes the natural sciences. Mathematics can be taught to the young — *patet experimento*.<sup>7</sup> For mathematics, while not going beyond the imagination, which is the limit of the considerations of the *vulgus*, does not suppose the experience needed for natural science. St. Thomas makes the point clear in the following passage taken from his commentary on Aristotle's *Nicomachean Ethics*:

Movet circa hoc quaestionem, scilicet quare puer potest fieri mathematicus non autem potest fieri sapiens, idest metaphysicus vel physicus, idest naturalis. Ad hoc respondet Philosophus, quia haec quidem, scilicet

1. Cf. *In I Eth.*, lect.4, n.54.

2. Trans. by H. H. Joachim (ed. Oxford), I, c.2, 316 a 5-10.

3. *In VIII Phys.*, lect.3, n.994.

4. *In I de Gen. et Corr.*, lect.3 (ed. Leonine), n.8.

5. *III Sent.*, d.3, q.5, a.1.

6. For an analysis of the role of *experimentum* with respect to both common and proper principles in moral science we refer the reader to Father L. ROY, "La certitude en matière morale," *Laval théologique et philosophique*, XIX (1963, n° 2), pp.120-170.— For a consideration of the method of the physical sciences see George J. McMAHON, S. J., *The Order of Procedure in the Philosophy of Nature* (Québec: Librairie philosophique M. Doyon, 1958).

7. Cf. *In VI Eth.*, lect.7, n.1211.

mathematicalia, cognoscuntur per abstractionem a sensibilibus quorum est experientia; et ideo ad cognoscendum talia non requiritur temporis multitudo. Sed principia naturalia quae non sunt abstracta a sensibilibus, per experientiam considerantur, ad quam requiritur temporis multitudo.<sup>1</sup>

To be sure, the naturalist abstracts from individual sensible matter; for science is of this *kind* and not of a *this*.<sup>2</sup> Yet the naturalist's judgment bears upon the natures of the kind of thing presented to sense. His considerations, his definitions include what is called common sensible matter: they bear upon the sort of thing within reach of *experimentum*. On the other hand, mathematical considerations touch what is known by way of abstraction from sensibles — not only by way of abstraction from individual sensible matter, but also from common sensible matter, that is, from matter understood as underlying qualities such as hot and cold, soft and firm, etc. Reference to such qualities is not found in the definitions of mathematical entities. And so *mathematica* are said in a special way to be *abstracta* — *secundum considerationem intellectus*.<sup>3</sup> While things such as a line do not exist without sensible matter, they are, nonetheless, defined by the mathematician without such matter.<sup>4</sup>

*Mathematica*, as the mathematician considers them, then, do not fall under *experimentum*. From this we conclude what has already been involved in what we have said of *experimentum*. While *experimentum*, internal sense knowledge (in an organized or compared state), has to do with the presentation of the object to intellect inasmuch as intellect looks to *experimentum* as to its content, it does not make abstraction from the data of the external-common sense complexus; for *experimentum* is sense knowledge of sensible, material things. The principles of natural things are taken "ex sensibilibus experimento."<sup>5</sup> What the naturalist considers is, *secundum rationem definitivam*, the kind of thing *experimentum* bears upon and presents. This is not so for the mathematician. Of course, he does not understand body or line, for example, as not being in sensible things; but he does understand them, not understanding the sensibles.<sup>6</sup> Again, mathematical circles, lines, etc., do not fall under our experience; for *experimentum* is of the sensible.

1. *Ibid.*, n.1209.— Cf. *ibid.*, n.1211; *In Boethii de Trin.*, q.5, a.1, ad 3; ST. ALBERT, *Metaphysica*, I, Tr.1, c.1 (ed. Geyer, vol.xvi), p.1.

2. We suppose for the purpose of these discussions the reader's acquaintance with the Thomistic doctrine on the distinction of the sciences and the kinds of abstraction involved. For the classic texts see *In Boethii de Trin.*, q.5, aa.1-3; *In VI Metaph.*, lect.1; *In I Post. Anal.*, lect.41; *In III de Anima*, lect.8; *Ia*, q.85, a.1, ad 1; ad 2.

3. Cf. *In II Phys.*, lect.3, n.162.

4. Cf. *In I Phys.*, lect.1, nn.1-2.

5. *In VIII Phys.*, lect.3, n.994.

6. Cf. *Q.D. de Spir. Creat.*, q.un., a.3, ad 14.

But if we grant that *experimentum* implies knowledge of sensible things, which are not the proper and direct concern of mathematician (or metaphysician), we seem, in placing mathematics before natural science in the order of learning, to gainsay—at least at first view—the primacy of sense and *experimentum* in the generation of human intellectual knowledge. St. Thomas, however, assures us that there are no contradictions:

... quamvis naturalis post mathematicam addiscenda occurrat, ex eo quod universalia ipsius documenta indigent experimento et tempore, tamen res naturales, cum sint sensibiles, sunt naturaliter magis notae quam res mathematicae a sensibili materia abstractae.<sup>1</sup>

The natural thing remains the first known to intellect — and that supposes sense and *experimentum*, though the knowledge of natural things supposed to mathematics is a relatively confused knowledge and the amount of experience and time is minimal.

The same doctrine — on the fundamental character of the knowledge of nature and so of sense and experience — is taught by Aristotle in Book One of the *Posterior Analytics*:

It is also clear that the loss of any one of the senses entails the loss of a corresponding portion of knowledge, and that, since we learn either by induction or demonstration, this knowledge cannot be acquired. Thus demonstration develops from universals, induction from particulars; but since it is possible to familiarize the pupil with even the so-called mathematical abstractions only through induction — i. e. only because each subject genus possesses, in virtue of a determinate mathematical character, certain properties which can be treated as separate even though they do not exist in isolation — it is consequently impossible to come to grasp universals except through induction. But induction is impossible for those who have not sense-perception. For it is sense-perception alone which is adequate for grasping the particulars: they cannot be objects of scientific knowledge, because neither can universals give us knowledge of them without induction, nor can we get it through induction without sense-perception.<sup>2</sup>

St. Thomas comments on this passage as follows:

Si ... universalia, ex quibus procedit demonstratio, cognosci possent absque inductione, sequeretur quod homo posset accipere scientiam eorum, quorum non habet sensum. Sed impossibile est universalia speculari absque inductione. Et hoc quidem in rebus sensibilibus est magis manifestum, quia in eis per experientiam, quam habemus circa singularia sensibilia, accipimus universalem notitiam, sicut manifestatur in principio *Metaphysicae*.<sup>3</sup>

1. *In Boethii de Trin.*, q.5, a.1, ad 10.

2. *Trans. G. R. G. Mure* (ed. Oxford), c.18, 81 a 37-81 b 9.

3. *Lect.30*, n.251.

After having asserted the need of induction for science, St. Thomas goes on to raise a doubt about the *abstracta* of mathematics:

Sed maxime hoc videtur dubium in his, quae dicuntur secundum abstractionem, sicut in mathematicis. Cum enim experientia a sensu ortum habeat, ut dicitur in principio *Metaphysicae*, videtur quod hoc locum non habeat in his, quae sunt abstracta a materia sensibili. Et ideo ad hoc excludendum dicit quod etiam ea, quae dicuntur secundum abstractionem, contingit nota facere per inductionem; quia in unoquoque genere abstractorum sunt quaedam particularia, quae non sunt separabilia a materia sensibili, secundum quod unumquoque eorum est hoc. Quamvis enim linea secundum abstractionem dicatur, tamen haec linea, quae est in materia sensibili, in quantum est individuata abstrahi non potest, quia individuatio eius est ex hac materia. Non autem manifestantur nobis principia abstractorum, ex quibus demonstrationes in eis procedunt, nisi ex particularibus aliquibus, quae sensu percipimus. Puta ex hoc quod videmus aliquod totum singulare sensibile, perducimur ad cognoscendum quid est totum et pars, et cognoscimus quod omne totum est maius sua parte, considerando hoc in pluribus. Sic igitur universalialia, ex quibus demonstratio procedit, non fiunt nobis nota, nisi per inductionem.

Homines autem carentes sensu aliquo non possunt inductionem facere de singularibus pertinentibus ad sensum illum, quia singularium, ex quibus procedit inductio, est *solum cognitio sensus*. Unde oportet quod omnino sint huiusmodi singularia ignota, quia non contingit quod aliquis carens sensu accipiat talium singularium scientiam; quia neque ex universalibus potest demonstrare sine inductione, per quam universalialia cognoscuntur, ut dictum est; neque per inductionem potest aliquid cognosci sine sensu, qui est singularium, ex quibus procedit inductio.<sup>1</sup>

The Aristotelian doctrine is that induction, sense being supposed, is universally necessary. In this passage it is to be noted carefully that St. Thomas insists that the *principia* of the *abstracta* are only known through sense. His example is significant: surely the common principle that "a whole is greater than any one of its parts" first of all is understood by us with respect to sensible wholes and their parts just as "line" first of all refers to sensible line and "one" to a sensible unit and "surface" to a sensible surface.<sup>2</sup> Of course, we do not have the experience of the line, circle, surface, etc., as these fall under the consideration of the mathematician, i.e., without sensible matter.

1. *Ibid.*, nn.252-253.

2. *In I Post. Anal.*, lect.2, n.17: "*Supponuntur* ... in his scientiis ea quae sunt prima in genere quantitatis; sicut unitas, et linea, et superficies et alia huiusmodi. Quibus suppositis, per demonstrationem quaeruntur quaedam alia, sicut triangulus aequilaterus, quadratum in geometricis et alia huiusmodi. Quare quidem demonstrationes quasi operativae dicuntur, ut est illud, *Super rectam lineam datam triangulum aequilaterum constituere*. Quo adinvento, rursus de eo aliquae passionis probantur, sicut quod eius anguli sunt aequales aut aliquid huiusmodi."— Note that we are dependent upon sensible line to get to the notion of mathematical line, but once given that, we can discuss a polygon of thirty-seven sides — the likes of which we have never seen.

Mathematical abstraction, however, presupposes *experimentum* of that whence the mathematician abstracts, i. e., the sensible.

St. Thomas continues his commentary on the passage cited from the *Posterior Analytics* with the following remarks important to a complete understanding of the fundamental role of experience for all human learning:

Est autem considerandum quod per verba Philosophi, quae hic inducuntur, excluditur duplex positio.

Prima quidem est positio Platonis; qui ponebat quod nos habebamus scientiam de rebus per species participatas ab ideis. Quod si esset verum, universalia fierent nobis nota absque inductione; et ita possemus acquirere scientiam eorum, quorum sensum non habemus. Unde et hoc argumento utitur Aristoteles contra Platonem in fine I *Metaphysicae*.

Secunda est positio dicentium quod possumus in hac vita cognoscere substantias separatas, intelligendo quidditates earum; quae tamen per sensibilia quae cognoscimus, quae ab eis omnimode transcenduntur, cognosci non possunt. Unde, si ipsae cognoscerentur secundum suas essentias, sequeretur quod aliqua cognoscerentur absque inductione et sensu: quod Philosophus hic negat, etiam de abstractis.<sup>1</sup>

All human knowledge, then, even mathematics and metaphysics, depends upon sense and so upon *experimentum* for its generation.

An important distinction is, of course, at issue here: "... in qualibet cognitione duo est considerare, scilicet principium et terminum."<sup>2</sup> The principle of all our scientific knowledge is in some way sense and, we do not hesitate to add, the *experimentum* (which adds "comparative collection" to sense knowledge) that is the ground of the first and common principles. But the term, St. Thomas explains,

... non semper est uniformiter. Quandoque enim est in sensu, quandoque in imaginatione, quandoque autem in solo intellectu. Quandoque enim proprietates et accidentia rei, quae sensu demonstrantur, sufficienter expriment naturam rei, et tunc oportet quod iudicium de rei natura, quod facit intellectus, conformetur his quae sensus de re demonstrat. Et huiusmodi sunt omnes res naturales, quae sunt determinatae ad materiam sensibilem. Et ideo in scientia naturali terminari debet cognitio ad sensum, ut scilicet hoc modo iudicemus de rebus naturalibus, secundum quod sensus eas demonstrat, ut patet in *III Coeli et Mundi*, et qui sensum negligit in naturalibus, incidit in errorem. Et haec sunt naturalia, quae sunt concreta cum materia sensibili et motu, et secundum esse et secundum considerationem.

But there are others, he goes on,

... quorum iudicium non dependet ex his, quae sensu percipiuntur, quia quamvis secundum esse sint in materia sensibili, tamen secundum rationem

1. In *I Post. Anal.*, lect. 30, n. 254.

2. In *Boethii de Trin.*, q. 6, a. 2.



definitivam sunt a materia sensibili abstracta. Iudicium autem de unaquaque re potissime fit secundum eius definitivam rationem. Sed quia secundum rationem definitivam non abstrahunt a qualibet materia, sed solum a sensibili, et remotis sensibilibus conditionibus remanet aliquid imaginabile, ideo in talibus oportet quod iudicium sumatur secundum id [quod] imaginatio demonstrat. Huiusmodi autem sunt mathematica, et ideo in mathematicis oportet cognitionem secundum iudicium terminari ad imaginationem, non ad sensum, quia iudicium mathematicum superat apprehensionem sensus. Unde non est idem iudicium quandoque de linea mathematica, quod est de linea sensibili, sicut in hoc quod recta linea tangit sphaeram solum secundum punctum, quod convenit rectae lineae separatae, non autem rectae lineae in materia . . .

Finally there are some, he says,

quae excedunt et id quod cadit sub sensu et id quod cadit sub imaginatione, sicut illa quae omnino a materia non dependent neque secundum esse neque secundum considerationem, et ideo talium cognitio secundum iudicium neque debet terminari ad imaginationem neque ad sensum. Sed tamen ex his, quae sensu vel imaginatione apprehenduntur, in horum cognitionem devenimus vel per viam causalitatis, sicut ex effectu causa perpenditur, quae non est effectui commensurata, sed excellens; vel per excessum vel per remotionem, quando omnia quae sensus vel imaginatio apprehendit, a rebus huiusmodi separamus. Quos modos cognoscendi divina ex sensibilibus ponit Dionysius in libro *de Divinis Nominibus*. Uti ergo possumus in divinis et sensu et imaginatione sicut principiis nostrae considerationis, sed non sicut terminis, ut scilicet iudicemus talia esse divina, qualia sunt quae sensus vel imaginatio apprehendit.

In natural science, mathematics, and metaphysics, then, we are indeed dependent upon sense and *experimentum*, at least for our beginnings; but we do not thereby judge that *mathematica* are, *secundum rationem definitivam*, of the kind that *experimentum* presents;<sup>1</sup> nor, for that matter, in the case of the divine science do we judge that separated substances, for example, are of the kind presented by *experimentum* and mathematical imagination — unless we be among the *vulgi*.<sup>2</sup>

#### B. "*Experimentum*": The Term in Resolution

Because the first common principles of all speculative science are taken through sense and *experimentum*, the whole consideration of the speculative sciences, says St. Thomas, "... non potest ultra extendi quam sensibilibus cognitio ducere potest."<sup>3</sup> Our considerations can ascend to a certain knowledge of separated substances insofar as we as we are led by the hand through sense and experience — "inquantum

1. *Ibid.*, ad 2.

2. The *vulgi* are incapable of transcending imagination. Cf. *Ia*, q.75, a.1.

3. *Ia IIae*, q.3, a.6.

[possumus] per species a phantasmatibus acceptas manuduci"<sup>1</sup>— and to a knowledge of God Himself with respect to His existence and what He is not. *Ad invisibilia per visibilia*. But howsoever lofty be the heights of human intellectual achievement, sense remains the principle. And so, even though the mathematician and the metaphysician do not judge that what they consider is the sort of thing which sense and *experimentum* present, nonetheless *quodammodo* they, too, must resolve to sense and *experimentum*:

...quia primum principium nostrae cognitionis est sensus, oportet ad sensum quodammodo resolvere omnia de quibus iudicamus; unde Philosophus dicit in III *Coeli et Mundi*, quod complementum artis et naturae est res sensibilis visibilis, ex qua debemus de aliis iudicare; et similiter dicit in VI *Ethicorum*, quod sensus sunt extremi sicut intellectus principiorum; extrema appellans illa in quae fit resolutio iudicantis.<sup>2</sup>

For the naturalist, mathematician, and metaphysician sense and *experimentum* are the beginning of all science and the final courtroom of appeal. For it is through sense and so *experimentum* that we attain to exterior, sensible, material things which are the ultimate "causa et mensura cognitionis nostrae."<sup>3</sup> Not only, then, is *experimentum* something fundamental with respect to the generation of our knowledge, but it is also a kind of *fundamentum permanens*<sup>4</sup> insofar as, being knowledge of the sensible, it is associated with what is an ultimate in judgment. For Aristotle and St. Thomas all intellectual knowledge must *quodammodo* meet the test of *experimentum*.

### C. "*Experimentum*": Measured by the Common Sense

One of the reasons for our emphasis on the fact that *experimentum* is of the sensible is that *experimentum* itself, at least as we have defined it, is a perfection of internal sense. Now the role of the internal senses, as we have seen, is the presentation of object to intellect. But though internal sense is necessary to human intellectual knowledge (a knowledge dependent upon singular, sensible things), it is nonetheless a source of danger for the human intellect, whose good involves the attainment of things as they are; for things are the ultimate cause and measure of our science.

The internal senses (exclusive of the common sense) act even in the absence of the sensible. They therefore enjoy a kind of liberty with respect to things. It is not surprising, then, that Aristotle and St. Thomas

1. *Q. D. de Anima*, q.un., a.16.

2. *Q. D. de Ver.*, q.12, a.3, ad 2.— With respect to *sensus sunt extremi* see *In VI Eth.*, lect.7, nn.1198, 1214.

3. *Q. D. de Ver.*, q.18, a.7, ad 3.

4. Cf. *In Boethii de Trin.*, q.6, a.2, ad 5.



after him point to imagination as the source of falsity.<sup>1</sup> "Phantasiae," says St. Thomas, "attribuitur falsitas: quia repraesentat similitudinem rei etiam absentis..."<sup>2</sup> And in another place we find: "...deceptio ... in nobis proprie fit secundum phantasiam..."<sup>3</sup> Imagination or its act, *phantasia*, is described as "dominus falsitatis,"<sup>4</sup> "principium errandi,"<sup>5</sup> and as that "cujus proprium est falsitas."<sup>6</sup> The Angelic Doctor makes it clear that "imaginationes extraneae"<sup>7</sup> are the enemies of science. The investigations of human reason, though in need of internal sense, are salted with much that is false both "propter debilitatem intellectus nostri in iudicando, et phantasmatum permixtionem."<sup>8</sup> The danger is that, in the absence of the sensible, the human intellect will adhere to these similitudes in imagination as if they were the things themselves; in such a state men are assimilated to those who are asleep and dreaming or to the insane, whose organs are somehow deranged or disturbed.<sup>9</sup>

Now in this connection it is important not only to attend to the fact that, in the case of the sleeping and insane, the common sense (again, of which the external senses are the instruments) is bound (*ligatus*),<sup>10</sup> but also that out of pride and love of glory the human knower can simply attend to what he fancies, neglecting things as sense presents them. In such a case fancy replaces science. (The disordered intellect "dicitur phantasia."<sup>11</sup>) In such a state, a man speaks from himself and not from his knowledge of things:

A se autem loquitur qui ea quae dicit nec a rebus nec ex doctrina humana accepit, sed de corde suo ... Sic ergo confingere aliquid a se ipso, est propter humanam gloriam: quia, sicut Chysostomus dicit, qui aliquam propriam vult instruere doctrinam, propter nihil aliud hoc vult quam ut gloriam acquirat. Et hoc est quod Dominus dicit, probans doctrinam suam a Deo esse. *Qui a semetipso loquitur*, de certa cognitione veritatis quae est ab alio, iste quaerit gloriam propriam propter quam et propter superbiam, haereses et falsae opiniones introducuntur.<sup>12</sup>

1. Cf. ARISTOTLE, *Metaphysics*, IV, c.5, 1010 b 1-3; ST. THOMAS, lect.14, nn.692-693.

2. *Ia*, q.17, a.2, ad 2. Cf. ST. ALBERT, *Librum III de Anima*, Tr.1, c.3 (ed. Borgnet vol.v), pp.318-319 and c.8, pp.326-327.

3. *Ia*, q.54, a.5, ad ea in contrarium.

4. *Q.D. de Ver.*, q.1, a.11.

5. *Q.D. de Anima*, q.un., a.19, ad 8.

6. *II Sent.*, d.7, q.2, a.1, ad 1.

7. *Ia IIae*, q.53, a.3.

8. *Cont. Gent.*, I, c.4.

9. Cf. *Ia*, q.17, a.2, ad 2; *ibid.*, q.54, a.5, ad arg.; *ibid.*, q.84, a.8, ad 2; *Q.D. de Ver.*, q.28, a.3, ad 6; *ibid.*, q.13, a.3, ad 2.

10. Cf. *Ia*, q.84, a.8, ad 2.

11. *II Sent.*, d.7, q.2, a.1, ad 1.

12. *Super Joan.*, c.7, lect.1, n.1040.

Now *experimentum*, inasmuch as it is a perfection of internal sense, does not demand the actual (here and now) presence of the sensible to the external-common sense complexus. "... *Experientia fit ex multis memoriis, quae fit ex sensu praeteriti...*"<sup>1</sup> But in the measure that *experimentum* is a principle in the invention of human science and a term with respect to its resolution — in the measure it says evidence<sup>2</sup> — the content of *experimentum* must imply a reference to the data of the common sense, which, through its instruments, first of all puts the human knower in touch with the things that are its measure.<sup>3</sup> *Experimentum* is indeed a name for internal sense knowledge in a collated state, but internal sense knowledge measured by the common sense. *Experimentum* indeed implies evidence, and in human science that means attending to things as they are. That is a matter for common sense, and not for fancy.

VI. CAPACITY FOR "EXPERIMENTUM":  
SOMETHING PROPER TO MAN

A. "*Experimentum*" and the Beasts

It is observable that the beasts can learn, at least in some sense of the word "learn." Sometimes they are trained by men, sometimes they are trained by other beasts. Beyond that, the brutes, in varying degrees, give evidence of a certain capacity to accommodate themselves to their surroundings. Is there, then, a kind of *experimentum* to be found in the animals inferior to man? "The animals other than man," we recall the words of Aristotle, "live by appearances and memories and have little [*μῆτερχει*] of connected experience..."<sup>4</sup>

1. *Q. D. de Malo*, q.16, a.1, obj.1; ad 1.

2. Thus one frequently encounters in the works of St. Thomas expressions such as "patet experimento" and "probat per experimentum."—That *experimentum* says "evidence" in the tradition is clear from its use in the expression "Fides non habet meritum, ubi humana ratio praebet experimentum." (Cf. *Ia*, q.1, a.8, obj.2; *IIa IIae*, q.2, a.10, obj.1; *Cont. Gent.*, I, c.6.) — Of course "experimental" in its modern uses implies "evidence" too. Frequently it refers to the sense verification of an hypothesis.—The experimental method, in the sense of trying out one's hypothesis or making "attempts" on nature, is not a modern discovery. St. Albert was certainly aware of such "experiments": "Scimus ex his quae in *Meteoris* probata sunt, aqueum humidum esse de facili evaporativum. Indicant experimenta alchimica, quoniam si aqua vel ea quae simpliciter aqueum habent humiditatem sive naturalem et propriam, sive alienam et infusam, in alembico supposito lento igne vaporant per modicum ignem et operationem, et distillat ex eis aqua, et arida ipsa remanent" (*In III Mineralium*, Tr.1, c.2 [ed. Borgnet, vol.v], p.61).

3. Cf. *IIa IIae*, q.51, a.3, where St. Thomas indicates that, while the capacity for invention or discovery is linked to the good disposition of an imagination "quae de facili potest formare diversa phantasmata," the capacity for intellectual judgment is linked to the good disposition of the *sensus communis*.

4. *Metaphysics*, trans. W. D. Ross (ed. Oxford), I, c.1, 980 b 25-26.

And St. Thomas, carefully attending to the Greek verb chosen by Aristotle, states the matter thus: "Supra memoriam... in hominibus... proximum est experimentum, quod quaedam animalia non participant nisi parum."<sup>1</sup>

*Experimentum*, as we have treated it, is a psychical quality. In a passage from his treatise *The History of Animals* Aristotle turns his attention to the psychical qualities which men and beasts have in common:

In the great majority of animals there are traces of psychical qualities or attitudes, which qualities are more markedly differentiated in the case of human beings. For just as we point out resemblances in the physical organs, so in a number of animals we observe gentleness or fierceness, mildness or cross temper, courage or timidity, fear or confidence, high spirit or low cunning, and, with regard to intelligence, something equivalent to sagacity. Some of these qualities in man, as compared with the corresponding qualities in animals, differ only quantitatively: that is to say, a man has more or less of this quality, and an animal has more or less of some other; other qualities in man are represented by analogous and not identical qualities: for instance, just as in man we find knowledge, wisdom, and sagacity, so in certain animals there exists some other natural potentiality akin to these. The truth of this statement will be the more clearly apprehended if we have regard to the phenomena of childhood: for in children may be observed the traces and seeds of what will one day be settled psychological habits, though psychologically a child hardly differs for the time being from an animal; so that one is quite justified in saying that, as regards man and animals, certain psychical qualities are identical with one another, whilst others resemble, and others are analogous to, each other.<sup>2</sup>

Men and beasts, to be sure, have certain sense apprehensive powers and sense appetites that are the same in kind. Among them, however, some quantitative differences are to be attended to. Man's sense of touch, for example, is superior to that of any of the beasts.<sup>3</sup> Some beasts, on the other hand, possess a more acute sense of vision or a better sense of hearing or smell.<sup>4</sup>

But what of those qualities that are "analogous and not identical" in men and beasts? ("Analogous" does not necessarily mean here, it seems to us, that the names of the qualities are applied to man and beast analogously in some strict sense. They may well be metaphors as they are applied to the beasts.) We do refer to some beasts as savage or vicious; and yet, in the *Nicomachean Ethics*, the

1. *In I Metaph.*, lect.1, n.15.

2. Trans. D. W. Thompson (ed. Oxford), VIII, c.1, 588 a 18-588 b 4.

3. Cf. ARISTOTLE, *On the Soul*, II, c.9, 421 a 20-26; ST. THOMAS, *In II de Anima*, lect.19, nn.482-485; *Q. D. de Anima*, q.un., a.8; *Ia*, q.91, a.1, ad 3; *ibid.*, a.3, ad 1.

4. Cf. *Ia*, q.91, a.3, ad 1.

Philosopher insists that the lower animals cannot be called, in any proper sense, "incontinent." And he gives as reason that "... they have no universal judgment but only imagination and memory of particulars."<sup>1</sup> And if this be the case with respect to moral vice (or something like incontinence, which approaches vice), it is similarly so with respect to those moral virtues in man which involve a sharing in the order of reason by the sense appetites. St. Thomas is quite clear that things such as fortitude, which we might attribute to, say, the lion, are but the similitude of moral virtue. And, again, he gives as the reason that

... in brutis animalibus appetitus sensitivus non obedit rationi. Et tamen in quantum ducitur quadam aestimativa naturali, quae subiicitur rationi superiori, scilicet divinae, est in eis quaedam similitudo moralis boni, quantum ad animae passiones.<sup>2</sup>

This text suggests an important point for our considerations. The movement of any appetite, whether it be a natural appetite (as in the case of non-knowing beings such as stones or plants) or an animal appetite (where the appetite is moved by a good in some fashion apprehended by the subject), follows upon the apprehension of intellect — but with some obvious and important differences:

... voluntas movetur ex apprehensione intellectus coniuncti: sed motus appetitus naturalis sequitur apprehensionem intellectus separati, qui naturam instituit; et similiter appetitus sensitivus brutorum animalium, quae etiam quodam instinctu naturali agunt. Unde in operibus brutorum animalium, et aliarum rerum naturalium, apparet similis processus sicut et in operibus artis.<sup>3</sup>

The brute, while being moved by what it perceives as good, is nonetheless not moved by a conjoined intellect. For such an animal is not, as we have seen, capable of end as end nor of means as means. Its appetites move through natural, instinctive, non-collative estimates of the *nocivum* or *conveniens*. *Bruta magis aguntur*.<sup>4</sup> Further, inasmuch as it does not have intellect and is not master of its judgment, the brute has no dominion with respect to the use of any determination of its powers that may come from man, another beast, or its surroundings. Because of that, says St. Thomas, "... proprie loquendo, in eis

1. Trans. W. D. Ross (ed. Oxford), VII, c.3, 1147 b 4-5.

2. *Ia IIae*, q.24, a.4, ad 3.— Cf. ST. ALBERT, *Qq. de Animalibus*, Lib.I, q.8, ad 1 (ed. Geyer, vol. xii), p.86: "... homo est animal sociale per naturam, sed sua socialitas fit mediante discretionem; sed aliorum animalium est instinctu naturae; et ideo alia animalia non habent proprie politicam nec oeconomicam."

3. *Ia IIae*, q.40, a.3.

4. The beasts when compared to man, says St. Thomas (*Cont. Gent.*, III, c.111), "... ad opera propria magis aguntur quam agant..." Cf. *Cont. Gent.*, II, c.76.

habitus esse non possunt."<sup>1</sup> For that there be such dominion is of the proper notion of habit.

Aristotle, in the passage cited from *The History of Animals*, counts among the "analogous and not identical qualities" such things as "knowledge, wisdom, and sagacity." There exists in the inferior animals, he says, "some other natural potentiality akin to these." The brutes represent a kind of approach to intellect: through knowledge they transcend the determination of nature in some degree. St. Thomas points out — and we count this worthy of being considered commentary on the passage cited — that the beasts participate or share in intellect "... per quamdam obscuram resonantiam, in quantum sentiunt; sicut et voluntate participant, in quantum habent appetitum sensualem; unde et in brutis voluntarium invenitur..."<sup>2</sup> Obviously, theirs is not intelligence properly speaking. Neither is will nor the voluntary found in them except *secundum rationem imperfectam*.<sup>3</sup>

Now we mean to place *experimentum* among those psychical qualities which, taken properly, are found only in man and are found in the brutes only according to a certain proportion (and not identically). Virtue, vice, incontinence, the voluntary — these have already served as examples. But of special service to our purposes are the differences between human and brute prudence, human and brute *disciplina*.

When, at the very beginning of the *Metaphysics*, Aristotle points out that some brutes are more intelligent or prudent (*φρόνιμα*) and more capable of learning than others, he assigns as the reason that they are possessed of memory.<sup>4</sup> Of course, their prudence is but a "similitudo participata."<sup>5</sup> They have something of prudence, but not prudence itself — at least not in any strict sense of that word "prudence." What is it that they have of prudence? It is memory, says St. Thomas. Having that, they have "aliquid prudentiae."<sup>6</sup> For memory is an integral part<sup>7</sup> of human prudence, a virtue concerned with the direction of human moral activity.

... prudentia est circa contingentia operabilia ... In his autem non potest homo dirigi per ea quae sunt simpliciter et ex necessitate vera, sed ex his quae ut in pluribus accidunt: oportet enim principia conclusionibus esse proportionata, et ex talibus talia concludere... Quid autem in pluribus

1. *Ia IIae*, q.50, a.3, ad 2.

2. *III Sent.*, d.27, q.1, a.4, ad 3.

3. Cf. *Ia IIae*, q.6, a.2.— The estimative power and sense appetites in the beasts represent, says St. Thomas (*In de Sensu et Sensato*, lect.1, n.12), a certain "approquinationem ad genus rationalium."

4. Cf. *Metaphysics*, I, c.1, 980 b 22-24.

5. *In de Mem. et Rem.*, lect.1, n.298.

6. *In I Metaph.*, lect.1, n.11.

7. Cf. *IIa IIae*, q.48, a.1.

sit verum oportet per experimentum considerare: unde et in II *Ethic.* Philosophus dicit quod *virtus intellectualis habet generationem et augmentum ex experimento et tempore.* Experimentum autem est ex pluribus memoriis... Unde consequens est quod ad prudentiam requiritur memoriam habere. Unde convenienter memoria ponitur pars prudentiae.<sup>1</sup>

Similarly, in the measure that beasts possess a natural estimative power, "... participant aliquid prudentiae..."<sup>2</sup> For *intellectus* or *intelligentia*, as it is an integral part of human prudence, is an act of the human counterpart of the brute estimative power.<sup>3</sup> And so, having something of prudence, the beasts produce works similar to those of human prudence. (Indeed, these principles, natural estimation and memory, are responsible not only for works similar to those of human prudence<sup>4</sup> but also for works similar to those of human art.<sup>5</sup> We perceive in their activities a most orderly process, which proceeds from an ordered judgment.<sup>6</sup> This judgment, of course, is a natural and not a collative estimate. For the brutes, though they may possess memory and estimation (but not a memory and estimative power which belong to an animal which also has intellect), are ignorant of order *ut sic*, and so incapable of judging their own judgment.<sup>7</sup>

The point of our observations is to make clear that to have something of prudence is not to have prudence itself. That is why St. Thomas speaks of prudence as being in man and beast "aliter et aliter,"<sup>8</sup> and brute prudence as "natural,"<sup>9</sup> "particular,"<sup>10</sup> "a participated similitude."<sup>11</sup> Thus St. Albert, attending to the beasts which are capable of remembering, calls them prudent "... non secundum perfectam prudentiae rationem, quae est habitus activus cum ratione vera eorum quae in nobis sunt, ad vitam conferentium."<sup>12</sup> Rather, their prudence is *secundum rationem imperfectam*.<sup>13</sup> For true prudence

1. *Ibid.*, q.49, a.1.

2. *In III de Anima*, lect.4, n.639.— Cf. *Q. D. de Ver.*, q.25, a.2.

3. Cf. *Ia IIae*, q.49, a.2.

4. Cf. *Ia IIae*, q.3, a.6.

5. Cf. *ibid.*, q.13, a.2, ad 3.— For the question of art in brutes see ST. ALBERT, *Qq. de Animalibus*, Lib. VIII, q.4 (ed. Geyer, vol.xii), p.189-190. There St. Albert points out that one does not speak of art "proprie" with respect to the brutes but only "metaphorice accepta et per similitudinem considerata."— Also see ST. ALBERT, *Metaphysica*, I, Tr.1, c.6 (ed. Geyer, vol.xvi), p.9.

6. Cf. *Ia IIae*, q.13, a.2, ad 3.

7. Cf. *Q. D. de Ver.*, q.24, a.2.

8. *In I Metaph.*, lect.1, n.11.

9. *Q. D. de Ver.*, q.15, a.1. Cf. *ibid.*, q.24, a.2.

10. *In de Sensu et Sensato*, lect.2, n.25.

11. *In de Mem. et Rem.*, lect.1, n.298.

12. *Metaphysica*, I, Tr.1, c.6 (ed. Geyer, vol.xvi), p.9.

13. Cf. *In de Mem. et Rem.*, lect.1, n.299; *Ia IIae*, q.3, a.6.



implies *vera ratio*, which is an active power; it is seated principally in a power which collates and perceives order. That is why Dominic of Flanders says that human prudence is "*prudencia proprie dicta*" and brute prudence is "*improprie, et transumptive sumpta.*"<sup>1</sup>

Something similar to what has been said of brute prudence can be said with respect to brute learning (*disciplina*). This is especially the case with respect to those beasts which possess powers of memory and hearing, capacities so essential to the process of learning.<sup>2</sup> The bear can be trained to dance, the seal to toot a horn, the horse to trot at a given pace. In short, the brutes can become accustomed (and custom calls for a certain frequency in actions<sup>3</sup>) to certain patterns of behavior — *patet experimento*. And the possibility of custom is in the beasts, of course, precisely in the measure that their natures are more open<sup>4</sup> and less determined, that is to say, in the measure that their natures transcend the utter determination of inanimate and, by way of comparison, the determination of plant nature. ("Naturalia ... non consuescimus ..."<sup>5</sup> It is only in the measure that things transcend the determination of nature that they become capable of some additional acquired perfection with respect to acting.) But *disciplina* in the beasts falls short of the *ratio perfecta disciplinae*. "Nec attendimus hic proprietatem doctrinae vel disciplinae, quae intellectualis est," says St. Albert, "sed vocamus disciplinam eruditionem per sensibilia signa factam, sicut erudiuntur canes nutibus et simiae et psittaci et huiusmodi."<sup>6</sup> For *disciplina*, properly taken, implies intellect or reason, a power intrinsic to the learner which is the principal agent of his learning, a "*potentia activa completa.*"<sup>7</sup> It is "*ratio discurrens*"<sup>8</sup> which is the proximate effective cause of knowledge that is taken. It is not, then, *secundum proprietatem disciplinae* that *disciplina* is said of the beasts. Rather, according to Dominic of Flanders, it is said of the beasts only "*communiter et improprie.*"<sup>9</sup> The beasts, through the threat of punishment or the enticement of a

1. *Qq. super XII Metaph.*, I, q.3, a.4, ad 1: "...prudencia est duplex. Quaedam est prudencia proprie dicta, secundum quod diffinitur 6 ethic. lec.4. quae scil. est recta ratio rerum agibilium a nobis & talis est habitus intellectualis, & non convenit brutis. Alia est prudencia improprie, & transumptive sumpta, secundum quod est naturalis aestimatio, determinata de convenientibus prosequendis, & nocivis fugiendis, & talis non est habitus intellectualis neque ad rationem pertinens: unde talis bene ponitur in brutis."

2. Cf. ARISTOTLE, *Metaphysics*, I, c.1, 980 b 21-24.

3. *III Sent.*, d.23, q.1, a.4, q.2.

4. The beasts possess a kind of liberty of action. Cf. *Q.D. de Ver.*, q.24, a.2, ad 3.

5. *In I Metaph.*, lect.1, n.28. Cf. *Q.D. de Virt. in Communi*, q.un., a.1, ad 17; *In II Eth.*, lect.1, n.248.

6. *Metaphysica*, I, Tr.1, c.6 (ed. Geyer, vol.xii), p.9.

7. *Q.D. de Ver.*, q.11, a.1.

8. *Ibid.*, ad 4.

9. *Op. cit.*, I, q.3, a.5, ad 1.

(9)



reward,<sup>1</sup> are able to share in the reason of their masters.<sup>2</sup> But the master's reason is not conjoined in subject with brute memory and hearing. Again, especially when compared to man, *bruta aguntur*.

The beast, then, may have something of *disciplina*, of *prudencia*, of moral virtue, of the voluntary, etc.; and yet what is properly signified by these names is never verified in the brute. The proper significations — at least the most proper significations — of these names always involve reference either to reason or to a power (conjoined in subject with reason) capable of sharing the order of reason.

We hold the case of *experimentum* to be similar: the brute *habet aliquid experimenti*, but not *experimentum proprie loquendo*. The brute, when compared to man, does not have a small amount of *experimentum*; it does not have *experimentum proprie loquendo* at all.

In the context of his investigation of conscience St. Thomas enunciates a rule which is useful in determining what constitutes the application of a name *proprie loquendo*:

In ... nominationibus sequendus est usus loquendi; quia nominibus utendum ut plures ...

Illud quidem secundum usum loquentium esse videtur ut conscientia quandoque pro *re conscita* accipiatur, ut cum dicitur: Dicam tibi conscientiam meam; id est quod est in conscientia mea. Sed *potentiae* vel habitui proprie loquendo, hoc nomen attribui non potest, sed solum actui; in qua significatione sola concordant omnia quae de conscientia dicuntur.<sup>3</sup>

We make application of the rule to the word *experimentum* by asking a question. In what signification of *experimentum* do all of the things said of it come together? In our judgment, *experimentum*, as we have already defined it, is *experimentum proprie loquendo*. But in order to disengage what it is of *experimentum* that the brutes do have, we shall briefly lay out what seem to us to be the elements involved in its signification.

First of all, *experimentum* is clearly a name for a cognitive perfection in a knower which is passive with respect to things which are the cause and measure of its knowledge. This is indeed evident in the English usage: "to experience" is taken to mean "to undergo." Similarly, in the Thomistic tradition experimental knowledge is frequently taken to refer to what is obtained by undergoing things. This is reflected in the following passage in which St. Thomas speaks of the acquired knowledge of Christ: "... duplex est scientia: scilicet simplicis notitiae ... Est etiam scientia experientiae, et secundum

1. Cf. *Q.D. de Ver.*, q.24, a.2, ad 7.

2. Cf. *Ia IIae*, q.50, a.3, ad 2.

3. *Q.D. de Ver.*, q.17, a.1.

istam [Christus] didicit obedientiam. Unde 'didicit' ex iis quae passus est, id est, expertus est."<sup>1</sup>

Now a knower dependent upon the singular, sensible things requires a power proper to that contact, that is to say, the power of sense, the instruments of the common sense. One becomes experienced through touch,<sup>2</sup> hearing,<sup>3</sup> etc. *Experimentum* is not the same as the external sense knowledge, which demands the actual presence of the sensible; it does, however, presuppose such knowledge. "... *Experientia procedit ex sensu, in quantum sensus est cognoscitivus alicuius praesentis.*"<sup>4</sup> Of course, this element (external sense) and the consequent capacity to know singulars man shares with the brutes.

But *experimentum* does not only imply external sense; beyond that it demands the power of memory. It presupposes, in fact, many memories in memory. This multitude of memories, of course, is not *experimentum* as we have defined it; for *experimentum* implies or connotes a gathering together or a collecting of what is stored in memory by the cogitative power. (Of course the collection gathered by the cogitative can itself be stored in memory.)

Indeed, if *experimentum* implies a knower passive with respect to singular, sensible things, it also implies, as we have defined it, a knower who is active. That is reflected in the meanings "trial" and "attempt" that are associated with it. For *experimentum* says a collative process, and this is a process in which the knower is a collector in search of order. The cogitative, in bringing together or collating the singular intentions, is following the movements of a reason which is in pursuit of the universal. If *experimentum* is a collection, it is a collection that shares something of a power of reason conjoined in subject to the cogitative power.

What precisely is there of *experimentum* in the beasts? They share with man the capacity for sensation — certainly presupposed

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1. *Super Hebr.*, c.5, lect.2, n.259. Cf. also *IIIa*, q.9, a.4; *III Sent.*, d.14, a.3, q.1a. 5, ad 1; *Ia*, q.96, a.1, ad 3.—"Experimental" can be taken to refer to *experimentum* itself or, as in the passage just quoted, to the knowledge which proceeds from *experimentum*. Sometimes, too, the knowledge of external sense can be referred to as experimental. In this latter case external sense knowledge is denominated "experimental" as that through which *experimentum* is acquired. When John of St. Thomas (*Cursus Philosophicus*, T.III, p.195) argues that external sensation involves no expressed species, he gives as the reason for this that this knowledge is essentially experimental. While we do not dispute the truth of his conclusion, his reason strikes us as curious. For it seems to us that external sense knowledge is denominated as experimental first of all because it leads to *experimentum*. *Experimentum*, while it has external sense as its principle, is not, it seems to us, a name for immediate knowledge of the thing.— For experimental certitude see *III Sent.*, d.14, a.3, q.1a.5.— For experience and its connection with appetite, which bears upon the singular thing, see *Ia IIae*, q.15, a.1, c.; ad 2.

2. Cf. *Super Joan.*, c.20, lect.6, n.2565.

3. Cf. *In I Post. Anal.*, lect.25, n.209.

4. *Q.D. de Malo*, q.16, a.7, ad 12.

to *experimentum*. But it is memory and the possibility of a collection of memories that account in a more proximate way for the fact that they have something of *experimentum*, even if only a little.

Brute memory is the *thesaurus* of *intentiones insensatae* perceived by the brute. These judgments (concerned with the singular, of course) account for the movement of brute appetite, a movement supposed to the execution of brute activities; they bear upon what is *conveniens vel nocivum* with respect to the limited conscious life proper to the brute — *ad cibos et venerea*.<sup>1</sup> But further, out of memories of past benefits or evils — whether these benefits or evils be offered or threatened by man, parents,<sup>2</sup> or simply the circumstances of its own environment — the brute can become accustomed to judging certain things as friendly and to be sought after or hoped for, or harmful and to be avoided. St. Thomas, attending to common experience, remarks that repeated whippings, for example, can move the animal to obey the nod of the master.<sup>3</sup> For a nod can be, if one supposes the memories of what has gone before, the occasion of arousing the passion of fear in the brute, a fear which moves it to a certain pattern of action in order to avoid a certain evil. Repeated offerings of a reward accomplish something similar.

The beasts, says Dominic of Flanders,<sup>4</sup> "... ex multis sensibus et memoriis ... assuescunt ad aliquid prosequendum, vel fugiendum." And that, he continues, "... aliquid ad rationem experimenti pertinere videtur. Ideo aliquid experimenti, licet parum, participare videntur." In the case of the brutes, he insists, there is only *experimentum improprie*, as *experimentum* is taken "pro quadam assuefactione ad aliquid prosequendum, vel fugiendum." *Experimentum* properly taken, he maintains, means a "collectio plurium singularium in memoria retentorum" which is the work of *ratio particularis*. And so *experimentum proprie* "... solum convenit hominibus." In another passage Dominic succinctly presents the same doctrine:

... experimentum accipitur dupliciter. Uno modo pro suo materiali, & sic bene est in brutis. Alio modo, pro sua formali, & sic non reperitur in brutis. Materiale enim experimenti, est species in memoria retente [sic], quae bene sunt in brutis, sed formale eius, est collectio illarum specierum in unum & comparatio earum inter se, quod solum pertinet ad rationem, ideo non convenit brutis. Et huic sententiae concordat Albertus in proemio huius, tractatu primo cap. 6.<sup>5</sup>

1. Cf. *Ia*, q.91, a.3, ad 3; *Cont. Gent.*, III, c.82.

2. ST. ALBERT (*Qq. de Animalibus*, Lib. VIII, q.3 [ed. Geyer, vol xii], p.189), in describing the learning of the brutes, places learning from parents "in via experientiae."

3. Cf. *Q. D. de Ver.*, q.24, a.2, ad 7.

4. *Qq. super XII Libros Metaph.*, I, q.4, a.2.

5. *Ibid.*, a.4, ad ult.—ST. ALBERT, *Metaphysica*, I, Tr.1, c.6 (ed. Geyer, vol.xvi), p.10: "Haec ... animalia quaecumque ex talibus regimen vitae accipiunt, parum experi-

If the brutes have many memories, these memories constitute only the stuff of *experimentum*. *Experimentum*, properly taken, implies a comparison, a comparison or collation made by an internal sense power, which is different in man and beast:

Nam *cogitativa* apprehendit individuum, ut existens sub natura communi; quod contingit ei, inquantum unitur intellectivae in eodem subjecto; unde cognoscit hunc hominem prout est hic homo, et hoc lignum prout est hoc lignum. *Aestimativa* autem non apprehendit aliquod individuum, secundum quod est sub natura communi, sed solum secundum quod est terminus aut principium alicujus actionis vel passionis; sicut ovis cognoscit hunc agnum, non inquantum est hic agnus, sed inquantum est ab ea lactabilis; et hanc herbam, inquantum est ejus cibus. Unde alia individua ad quae se non extendit ejus actio vel passio, nullo modo apprehendit sua *aestimativa* naturali. Naturalis enim *aestimativa* datur animalibus, ut per eam ordinentur in actiones proprias, vel passiones, prosequendas, vel fugiendas.<sup>1</sup>

And, of course, the cogitative collates only in the measure that it follows the movements of universal reason itself, a reason to which it is conjoined in subject. Both brutes and men are partly moved by what is exteriorly sensed; this determines the content of their knowledge. And both are partly moved from within. In the case of the brute, however, this is nature — a natural judgment — and not reason.<sup>2</sup> Without a conjoined reason there is, properly speaking, no *disciplina*, no virtue, no prudence, no voluntary, no responsibility.<sup>3</sup> Similarly, without a conjoined reason there is no *experimentum* properly speaking.<sup>4</sup>

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menti participant, quia cum duo sint in experimento, unum quasi formale, quod est acceptio similis de multis, alterum materiale, quod est memoria conferentis, non participant, experimento, nisi secundum id quod materiale est in ipso . . .”— ST. ALBERT, *Libri XXVI de Animalibus*, Lib.VIII, Tr.6, c.1 (ed. Borgnet, vol.xi), p.492: “. . . experimentum dupliciter consideratur. Uno quidem modo prout est una quaedam acceptio post plura inducta: et hoc modo experimentalem cognitionem non habet nisi homo. Alio modo consideratur prout est consideratio conferentis ex forma quae est in hac herba vel illa: et hoc modo quaeritur a brutis.”

1. *In II de Anima*, lect.13, n.398.

2. Cf. *Cont. Gent.*, II, c.47.

3. With respect to agent intellect as a source of human responsibility, see *Cont. Gent.*, II, c.6.

4. The tradition moves toward *consuetudo* as a more appropriate name to describe the perfection in brute memory. (Cf. *In I Metaph.*, lect.1, n.16.) Perhaps this is because it implies appetite, which is more natural, more common than an apprehensive power. But even in speaking of a kind of acquired disposition (not a habit) in the brutes, St. Thomas uses the expression “quemdam consuetudinem.” (Cf. *III Sent.*, d.23, q.1, a.4, q.2; *Q. D. de Virt. in Communi*, q.un., a.10, ad 17.) — ST. ALBERT, *Qq. de Animalibus*, Lib. I, q.14 [ed. Geyer, vol.xii], p.90, where he speaks of *mores animalium*, says that *mores* is not said properly of the beasts.

"... Non sentire est movere, sed magis moveri..."<sup>1</sup> But reason, though in some respect it is passive with respect to the similitudes of determinate things, is not the passive power which sense is. Man, through his intellect, is said to form the *quid*, the proposition, the argument. In judging things, the human intellect "... non patitur a rebus, sed magis quodammodo agit."<sup>2</sup> The active, formative, collative character of human knowing first emerges in *experimentum*, a product of an internal sense power ordered by reason.

B. "*Experimentum*" and the Angels

We do not intend a long disquisition on the nature of angelic knowledge; but our purposes here will be served by pointing out some of its salient features. First, it is important to remark that the angelic intellect does not acquire its cognitive species from things. Angels do not come to know "per speciem acceptam a re."<sup>3</sup> Their intellects are not acted upon by things.<sup>4</sup> An intellect with a dependence upon things supposes an apprehensive sense power proportionate to the things from which science is taken; such a power is not a part of the angelic cognitive equipment.<sup>5</sup> Further, inasmuch as the angels are not dependent upon things prior to their knowledge and inasmuch as they are without sense, there is no need for them to collect "cognitionem ex sensibilibus vel sensibus, aut ex rebus divisibilibus."<sup>6</sup> That is to say, angelic knowledge (and for that matter, divine knowledge) is not characterized by *collatio* or discourse.<sup>7</sup> Induction and syllogism are the necessary and proper tools of human, not of angelic or divine intelligence.<sup>8</sup> Angelic knowledge is innate;<sup>9</sup> it proceeds from the divine knowledge, a knowledge which is factive with respect to things;<sup>10</sup> it is, therefore, anterior to things. Angelic knowledge, then, not passive with respect to things and so not dependent upon them for the acquisition of its species, without the need for sense, and non-collative or non-discursive, stands in stark contrast to human intelligence, which must gather the truth from sense and the sensible *per viam experimenti*.

1. *Cont. Gent.*, II, c.82. Cf. *ibid.*, c.76.

2. *Q. D. de Ver.*, q.1, a.10.

3. *Quodl.* VII, q.1, a.3, ad 1.

4. Cf. *ibid.*, c.; ad 1; *Q. D. de Ver.*, q.8, a.9; *Ia*, q.55, a.2; *Cont. Gent.*, II, c.96

5. See references in previous footnote.

6. *Q. D. de Ver.*, q.8, a.9, s.c.1.

7. Cf. *ibid.*, q.8, a.15; *Ia*, q.58, a.3.

8. Cf. *ibid.*, q.8, a.15, s.c.1.

9. Cf. *ibid.*, c.

10. Cf., for example, *Quodl.* VII, q.1, a.3.



And yet, despite the character of angelic intelligence, traditionally a kind of experience has been assigned to the angels. St. Thomas touches upon the question when he asks whether angelic knowledge is only intellectual.<sup>1</sup> Before answering the question affirmatively, St. Thomas raises an objection which is supported by the authority of St. Augustine. The Doctor of Grace asserts that angelic life involves *intelligere* and *sentire*. Therefore, St. Thomas's objection concludes, there must be some sensitive power in them. A second objection proceeds from the authority of Isidore, who says that angels know many things through experience. But given what the Philosopher has said of *experimentum* in the *Metaphysics*, the objection continues, it follows that the angels must possess sense memory, a sensitive power. St. Thomas's answers to the objections read in part as follows:

... auctoritates illae, et consimiles, sunt intelligendae per quandam similitudinem. Quia cum sensus certam apprehensionem habeat de proprio sensibili, est in usu loquentium ut etiam secundum certam apprehensionem intellectus aliquid *sentire* dicatur. Unde etiam *sententia* nominatur. — *Experientia* vero angelis attribui potest per similitudinem cognitorum, etsi non per similitudinem virtutis cognoscitivae. Est enim in nobis experientia, dum singularia per sensum cognoscimus: angeli autem singularia cognoscunt... sed non per sensum. Sed tamen *memoria* in angelis potest poni, secundum quod ab Augustino ponitur in mente; licet non possit eis competere secundum quod ponitur pars animae sensitivae.<sup>2</sup>

It is worthy of attention here that these authorities are speaking "per quandam similitudinem." That is true both of *sententia* and of experience. Now with respect to the first word, *sententia*, St. Thomas attends to the *usus loquentium*. If our interpretation of the text is correct, that word has been extended in common use to mean simply the determination or perfection of any cognitive power, though it is used first of all with respect to the senses. Attending to this common meaning, we can say, it would seem, that *sententia* is said properly with respect to intellect. (If we attend only to the earlier imposition of the names, it would seem *sentire* or *sententia* are said only metaphorically of intellectual knowledge.<sup>3</sup>) But whatever be the case of *sentire* and *sententia* with respect to angelic knowledge (*metaphorice* or *proprie*), it is based upon a certain proportion or similitude.

Experience is also said of men and angels — whether good or bad angels — according to a certain similitude, but not according to a

1. Cf. *Ia*, q.54, a.5.

2. *Ibid.*

3. We have in mind here that something akin to what happens to the word "light" may also happen to *sententia* or *sentire*. St. Thomas (Cf. *II Sent.*, d.13, a.2; *Ia*, q.67, a.1) notes that, if one attends to the first meaning of the word "light," then the word is not used properly *in spiritualibus*; but if one attends to the notion of manifestation, then it is indeed said properly with respect to spiritual things.



likeness of the cognitive powers. (Note, by way of contrast, that both sense and intellectual powers can be said to be determined to their objects.) Rather, experience is said of both sense and angelic intellect according to a likeness or similitude of what is known. Both men and angels know singulars, but the latter without sense and without a dependence upon the singular in the way in which man is dependent.<sup>1</sup> The angelic species, a participation in divine knowledge, which is factive of things both with respect to form and individuating matter, is adequate to knowing all that is actual, though it does not, unlike the divine intellect, know futures in themselves.<sup>2</sup> In speaking of experience in the angels, then, St. Thomas and the authorities cited are attending to one element in its signification: it is knowledge of the singulars.<sup>3</sup> But this the angels have without taking it from sense<sup>4</sup> and without discourse.<sup>5</sup> And yet passivity with respect to things, sense, and *collatio* are elements integral to the signification of *experimentum* as we have defined it. Accordingly St. Thomas points out, in a text we have already cited, that "... experientia proprie ad sensum pertinet ... Transfertur enim experientiae nomen etiam ad intellectualem cognitionem, sicut etiam ipsa nomina sensuum, ut visus et auditus."<sup>6</sup>

### C. "*Experimentum*" and Man

God and His angels are not, as knowers, passive with respect to singular, sensible things; consequently, they have no need of

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1. Cf. *Quodl.* VII, q.1, a.3, c.; ad 2; *Ia*, q.57, a.2; *ibid.*, q.89, a.4; *Cont. Gent.*, II, c.100; *Q.D. de Anima*, q.un., a.20.

2. Cf. references in preceding footnote; *Ia*, q.57, a.3, c.; ad 3; *Q.D. de Ver.*, q.8, a.12, ad 1.

3. *Ia*, q.58, a.3, ad 3: "... experientia in angelis et daemonibus dicitur secundum quandam similitudinem, prout scilicet cognoscunt sensibilia praesentia; tamen absque omni discursu."

4. *Ia*, q.64, a.1, ad 5: "... [angeli] cognoscunt per experientiam longi temporis; non quasi a sensu accipientes; sed dum in rebus singularibus completur similitudo eius speciei intelligibilis quam sibi naturaliter habent inditam, aliqua cognoscunt praesentia, quae non praecognoverunt futura..." Cf. *Q.D. de Malo*, q.16, a.7, ad 12.

5. Cf. *Ia*, q.58, a.3, ad 3; *Q.D. de Ver.*, q.8, a.15, ad 6; ad 7; *III Sent.*, d.7, q.2, a.1, ad 1.

6. *Q.D. de Malo*, q.16, a.1, ad 1.— If we look to the *usus loquentium*, can we discover, by attending to the element "knowledge of the singular," that the name "experience" has in fact been extended so as to be said properly of the angels and, perhaps from a certain point of view, more properly than of man — for surely the angelic knowledge of the singular is more profound? Perhaps one can make the case that St. Thomas and the authorities he has cited have in fact done this. If, however, we and these authorities attend to an earlier imposition of *experimentum*, the *experimentum* is said only, we suspect, *metaphorice* or *improprie* of the angels.

discourse in order to achieve a knowledge of order.<sup>1</sup> On the other hand, man, while he can arrive at the truth, must begin by collecting it or gathering it from the sense and the sensibles, which are principles and causes of his knowledge. His obtention of the truth comes about *per viam experimenti* — through an *experimentum* which involves a sharing in the movements of mind by an internal sense power, the cogitative, which is itself a rational power by reason of its capacity to share in a reason conjoined to it in subject. Man, as a knower who can attain order, is best described as rational. (*Rationale*, strictly taken, implies the origin of knowledge in sense.<sup>2</sup>)

*Rationale, stricte et proprie*, is, in point of fact, the difference in the genus animal which specifies man; so taken, it cannot be said of God, angel, or beast. (St. Thomas points out that largely or broadly taken — that is, if one attends only to the immaterial, inorganic character of human, angelic, and divine intelligence — *rationale* can be said of God, angels, and men.<sup>3</sup>)

Capacity for *experimentum proprie loquendo* is, in our view, rooted in the difference constitutive of man; it is something proper to man. Properly taken, *experimentum* does not belong to the beasts. All of the elements of its proper signification simply are not verified there. For the beast has no conjoined intellect whose movements his internal sense can follow. (The *collatio* in the human cogitative power is proper to man.) Rather, *experimentum* is in the beast, as we have seen, only by way of a certain participation or according to a certain similitude: the beast may have something of *experimentum*, but he does not have *experimentum proprie loquendo*. On the other hand — if one prescind from a possible extension of the name *experimentum* to mean only knowledge of the singulars — *experimentum* is said *proprie et stricte* neither of God nor of the angel, both of whom are intellectual rather than rational or collative knowers. *Experimentum* is *ex collatione* — formally from an act of universal reason; it is from a *collatio* that is proper to the knower who must gather the truth from things.

*Experimentum*, as have we taken it, is an uniquely human product. It is an ordered collection of singulars, an ordered collection dependent upon a mind which is itself dependent upon things.<sup>4</sup> Further, that

1. "... Angeli syllogizare possunt, tamquam syllogismum cognoscentes; et in causis effectus vident, et in effectibus causas: non tamen ita quod cognitionem veritatis ignotae acquirant syllogizando ex causis in causata, et ex causatis in causas" (*Ia*, q.58, a.3, ad 2). — With respect to the non-discursive character of the divine knowledge see again *Cont. Gent.*, I, c.57.

2. Cf. *IV Sent.*, d.1, q.1, a.1, ad primam quaestionem.

3. Cf. *I Sent.*, d.25, q.1, a.1, ad 4; *ibid.*, d.45, q.1, a.1, ad 4; *II Sent.*, d.3, q.1, a.6, ad 2; *IIa IIae*, q.83, a.10, ad 2; *Q. D. de Spir. Creat.*, q.un., a.2, ad 12.

4. In the course of this essay we have repeatedly attended to *experimentum* as an ordered collection. The order or organization, we have insisted, is due to a knower more

same mind is itself dependent upon *experimentum* and time for generation of and growth in intellectual virtue.<sup>1</sup> For if wisdom is to come at all to the rational knower, one possessed of an "intellectus obumbratus,"<sup>2</sup> it can only come after much *experimentum* and so, after much time. For the ancients, at least, that meant that human wisdom could only come at the end of life. A simple and immediate intuition of the truth is not the mark of the human knower. "... Homo ... quodam processu ex multis pertingit ad intuitum simplicis veritatis."<sup>3</sup>

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active than the brute It is man alone who can organize or order his internal sense knowledge. Albert Einstein, we believe, gives testimony to that fact in his "Autobiographical Notes": "What, precisely, is 'thinking'? When, at the reception of sense-impressions, memory-pictures emerge, this is not yet 'thinking.' And when such pictures form series, each member of which calls forth another, this too is not yet 'thinking.' When, however, a certain picture turns up in many such series, then — precisely through such return — it becomes an ordering element for such series, in that it connects series which in themselves are unconnected. Such an element becomes an instrument, a concept. I think that the transition from free association or 'dreaming' to thinking is characterized by the more or less dominating role which the 'concept' plays in it" (translated by P. A. Schilpp and published in *Albert Einstein: Philosopher-Scientist*, ed. P. A. Schilpp [2 vols.; New York: Harper & Brothers, 1959], I, p.7).

1. Cf. *In II Eth.*, lect.1, n.246; *III Sent.*, d.25, q.2, a.2, q1a.2.— There is indeed a succession in human intellect: "...scientia acquisita est tantum ab intellectu agente, qui non simul totum operatur, sed successive" (*IIIa*, q.12, a.2, ad 1). That successive light supposes the similitudes of determinate things — which similitudes are from sense. And the physical mutation of sense is, strictly speaking, measured by time. There is, of course, a kind of succession in the angelic intelligence, but that is another question.

2. *II Sent.*, d.16, q.1, a.3.

3. St. Thomas continues: "Sic igitur vita contemplativa unum quidem actum habet in quo finaliter perficitur, scilicet contemplationem veritatis, a quo habet unitatem: habet autem multos actus quibus pervenit ad hunc actum finalem. Quorum quidam pertinent ad acceptionem principiorum, ex quibus procedit ad contemplationem veritatis; alii autem pertinent, ad deductionem principiorum in veritatem, cuius cognitio inquiritur; ultimus autem completivus actus est ipsa contemplatio veritatis" (*IIa IIae*, q.180, a.3). — Cf. *Q.D. de Anima*, q.un., a.15; *Ia*, q.91, a.3, ad 3; *Ia*, q.76, a.5.— The tradition speaks of a two-fold *difformitas* in the human intellect: first, it is obliged to gather from outside; secondly, it must collate the natures which it has originally gathered. Cf. *IIa IIae*, q.180, a.6, ad 2; *Q.D. de Ver.*, q.8, a.15, ad 3.