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IMPRECISION, LEVELS OF INTENSITY, GRADES OF REALITY

PRESUPPOSITIONS OF NICHOLAS OF CUSA'S CONCEPTS OF PRECISION, CONTRACTION AND 'MORE AND LESS' IN MEDIEVAL PHILOSOPHY

In traditional medieval ontology, based primarily on Greek and specifically on Aristotelian presuppositions, every being is well defined by its proper noetic structure or by its substance. The corresponding or adequate conceptual counterpart of this noetic structure, what Aristotle called the “logos tēs ousiās”, and Plato, before him, the “idea” of it, is essentially a definition with the logical basic form of a proposition which connects a predicate term with a substantial term indicating the relation between genus, specific difference and accidents.

1.

In traditional medieval ontology, based primarily on Greek and specifically on Aristotelian presuppositions every being is well defined by its proper noetic structure or by its substance. The corresponding or adequate conceptual counterpart of this noetic structure, what Aristotle called the *logos tēs ousiās*, and Plato, before him, the *idea* of it, is essentially a definition with the logical basic form of a proposition which connects a predicate term with a substantial term indicating the relation between genus, specific difference and accidents. The ‘being’ of a thing consists precisely in that intelligible or noetic structure, for Plato in its *idea* for Aristotle in its essence or *ousia*. At least in the realm of what the medieval thinkers called the *lumen naturale*, which refers to the natural, explicitly non-theological potencies of the human intellect *in statu viatoris*,¹ the equation between the ontological structure (the essence or being of a thing) and its

¹ MARSILIUS OF INGHEN, *Quaestiones sententiarum*, I, qu. 42, art. 2, Argentorati 1501 (Frankfurt/M 1966), f. 176va: „(...) lumen naturale vocatur lumen intellectus creati fundatum in principiis per se notis vel in principiis notis per sensum, memoriam et experientiam, vel quod est aliquid

rational definition (the concept or ratio of a thing) is valid (but not always absolutely precise) and, therefore, every rational and sense data based knowledge could be a trustful mirroring of nature's real being. Naturally there are different levels of precision regarding this real being of natural things, precision, however, which originally lies not only on the side of epistemology (human knowledge), but in the very being or nature of being itself.² Just in traditional Greek ontology: nature or *physis*, for example, could never arrive, from its very structure of being which is subjected to space, time and movement (or change), to the level of precision that is proper to mathematics or logical dialectic (referring to Aristotle this is also the position of Albertus Magnus, *Commentaria in libros Analyticorum posteriorum II*, pars III, 6; Ed. Borgnet, Paris Vol. II, 203a-

eorum, vel omnia ista simul, seclusa illuminatione superiori quae fit per fidem. Unde lumen naturale ita habetur ab infidelibus sicut a fidelibus. Lumen supernaturale voco quod non potest intellectus viatoris attingere, nisi adiutus revelatione divina vel fide (...)" II, q. 1 (1392-94?), art. 2, f. 205rb-va; *Quaestiones super libros Metaphysicorum Aristotelis*, VII, q. 6, Biblioteka Jagiellonska, Kraków, Cod. 709, f. 157v: „Lumen naturale voco noticiam veritatis surgentem ex principiis per se notis vel notis per experienciam, vel ex his duobus simul, vel que est noticia alicuius talium per se notorum principiorum probabilitum, quam suorum oppositorum“ (quoted in Mieczyslaw Markowski, Die wiederaufgefundene ursprüngliche Fassung des Kommentares des Marsilius von Inghen zur Nikomachischen Ethik des Aristoteles, in: MAARTEN J.M. HOENEN, PAUL J. J. BAKKER (Eds), *Philosophie und Theologie des ausgehenden Mittelalters. Marsilius von Inghen und das Denken seiner Zeit*, Brill, Leiden-Boston-Köln 2000, p. 175-195, p. 193. Avicenna's discussion of light (lux, lumen, radius, color) and light-radiation/-communication in his *Liber de anima seu sextus naturalium* (ed. Simone Van Riet, Louvain-Leiden, Peeters-Brill 1972, Pars tertia, cc. 1-4, p. 169-212 is a good example for a basically naturalistic approach (following Aristotle's *De anima*, naturally) to the problem. On his influence see Hasse, Avicenna's *De anima* in the Latin West (note 13), p. 107-127. The problem of intensity (*intensio-remissio; magis-minus*) is only one time mentioned in the context of vision (*visio*) and problems of optics, but not discussed more deeply see c. 5, p. 220-221. It is, however, interesting that Avicenna at times refers to metaphysical processes to be able to keep an open horizon for tricky physical problems, see c. 7, p. 260: "possibile est enim ut affectiones aliquorum in aliqua (f. e. light-radiation on surfaces or mirrors) fiant sine offensione, sicut est possibile ut non corpus agat in corpus sine offensione, sicut Deus et intellectus et anima. Ergo [!] non est mirum si unum corpus agat in aliud corpus sine offensione (...)" Most important is here the meaning of "simulacrum", "similitudo" and "forma", see p. 260-267; c. 8, p. 268-272.

² NICOLAUS CUSANUS, *Idiota de sapientia* I n.40; h V, p. 73: „in mundo [!] enim praecisione carente adaequata mensura ac similitudo est impossibilis“. In Cusanus' perspective this categorical non-precision leads to compensational and positive concept of 'conjecture' on the side of epistemology (avoiding recently upcoming developments of late-medieval scepticism as, for example, in Nicholas of Autrecourt and others). See his ingenious text *De coniecturis* (h III).

b).³ This kind of imprecision holds also for the realm of moral acting just because all our ethical

³ But, nonetheless, the problem is present, see the discussion Albert presents in his *Physica* (an explanation of ‚scientia naturalis‘ with Aristotle and Avicenna in the background), Lib. I, tract. 1, c. 2; *Opera omnia*, Monasterii Westfalorum, Vol. IV/1, f. 3 B-5 A regarding the position of Heraclitus who is presented as having argued: „(objектa) Heracliti, qui licet de omnibus diceret nihil sciri de eis [?], dixit tamen hoc specialiter de physicis“ (f. 3 B). Heraclitus, as referred by Albert, put three main reasons why we could not ‚know‘ anything precisely (scire secundum esse, secundum rem) about nature or natural beings: (i) secundum suum esse et in eo quod sunt et secundum quod sunt, sunt infinitas differentias habentia“ – these infinite differences and determinations human intellect is unable to grasp and to know (f. 3 B); (ii): because there exist only particular or individual objects, knowledge would only give definitions of these, „secundum esse cuiuslibet particularis (...) erit altera [sc. definitio]“ and therefore equivocal, „nunquam erit scientia de aliquo quaesito in physicis, sed tantum existimatio quaedam“ (f. 3 B); (iii): the fundamental unstableness of natural beings hinders any substantial concept of them, „omnia physica motui subiacent et mutationi; nunquam ergo in eode statu permanent. De talibus autem non est scientia, quae solummodo necessaria est“ (f. 4 A). Alberts answer ad (i): „Nec est verum quod esse completum in naturalibus diversificetur in individuis signatis quemadmodum in speciebus, quoniam in speciebus per principia essentialia diversificatur, sed in individuis multiplicatur tantum per dispositionem materiae, ad quae nunquam ex principali intentione respicit natura“, this means: there is scientific knowledge regarding the essential dimension in nature, and there is only estimative (aestimativa) or problematic knowledge regarding the realm of accidental (individual) being (c. 6, f. 11 B: aestimativa, quae est pars animae sensibiis), ad (ii): we have to differentiate the „esse physicum“ between „ea a quibus est“ and „ea in quibus est“, the first are the principles „quae uno modo secundum rationem diffinitionis sunt constituentia esse in tota specie, et ideo ibi univocatur [!] diffinitione“ and these are nonetheless varying between different species: „sunt variata, sed non impediunt scientiam, quia sunt producta a natura per accidens (...) et non per se“ (f. 4 B) – the individuality is radically based on matter (dispositio materiae); ad (iii): the natural being, f. e. „lignum“, secundum esse (secundum esse ligni) is not „instabilis“ and therefore object of knowledge and science; the same being, „in eo quod est hoc lignum, quod est haec cedrus vel haec palma“, is only object of sense experience and meaning (f. 5 A). See for „individuum vagum“ Lib. I, tract. 1, c. 6; f. 11 B: „Dicamus ergo, quod individuum vagum est, cuius natura contracta et particulata certificatur per suppositum indeterminatum“; f. 12 B: „secundus autem modus cognitionis totus est in sensu et est per viam compositionis, ubi proceditur a simpliciori indistincto ad compositius distinctum. Et ille processus est scientiae naturalis proprius et nullius alterius scientiae, quia nulla alia hoc modo accipit universale pro confuso (!) secundum esse in particulari nisi ipsa, et ideo universale secundum solam ipsam est in sensu notius“. See the formulation „intentio qualitatis essentialis“, Lib. II, tract. 2, c. 2; f. 101 A, „quae de re abstrahitur secundum quod sub forma ultima perfecta significatur“.

activities are necessarily submitted to spacio-temporal conditions and beforehand, to psychological intentions. It is not justice, that is ‘more or less’ justice or just, but it is our acting that could be ‘more or less’ just. For Aristotle, a substance or an *eidos*, cannot receive different grades of intensity, as, for example, accidents like colours can do: there are, evidently, different grades of red or blue (*Categoriae* 8, 10b) – but we cannot say that there are substantially different grades of essential being like man or, in its individual representation, Socrates, or, even, triangles – because a triangle as a triangle cannot be ‘more’ or ‘less’ triangle, it can differ only in size, extension, quantity (*Categoriae* c. 14; *Physica* V 1-2, *Metaphys.* X 12).⁴ In late antique commentary tradition, for example in the doxographic parts referring to Plato’s philosophy, and I want to take as example Simplikios’s commentary on Aristotle’s *Physica*⁵, we can read the following: since

⁴ Therefore Aristotle, and with him the Scholastic tradition, introduced the difference between continuous motion (*motus*) and immediate change (*mutatio*), the latter, for example, exemplified by generation and corruption of substances, *Metaphysica* X 12: there is no succession of ‘more or less’ intensive states of a substance in its coming into being! Motion is, however, a continuous succession of states of an accidental determination of a substance or essence (regarding quantity, quality or place). Our problem here concerns, naturally, qualitative change as a continuous process with different stages or ‘grades’. The process itself was conceived, since Aristotles *Categoriae* c. 14, as a “*fluxus alicuius entis in id quod est terminus motus (=perfectio)*”, AVICENNA, *Liber primus naturalium, Tractatus secundus*, cap. 2, ed. Van Riet, Janssens, Allard, Louvain (Peeters) 2006 (Avicenna latinus VIII/2), p. 174-185, p.180: “*intensio nigredinis est eius fluxus, aut intensio subiecti in sua nigredine et eius pertransitio in ea, motus est, non nigredo intensa*”; Albertus Magnus, *Physica* III, tract. 1, c. 3; Opera ed. Borgnet III, Parisiis 1890, f. 183a-202b. Becoming black, as a qualitative process (*nigrescere*), or getting higher (*ascendere*), are processes as ‘*fluxus*’ (*nigredo fluens, ubi fluens*) in direction of a certain end, see Anneliese Maier, *Die Wesensbestimmung der Bewegung*, in: *Die Vorläufer Galileis im 14. Jahrhunderts*, Romae (Edizioni di storia letteratura) 1949, p. 11-13 and note 14 below. It is important to see that the ‘*fluxus formae*’ is explicitly not to understand as a modification of the form itself (of its essence), but only as a *modus essendi* of it (of its *esse*). This prepares exactly the systematic differentiation we are introducing in section II. The ‘*fluxus*’, insofar as it becomes (for example with Peter of Alnwick, *Quaestiones*, Bononiae ca. 1323, Ms Vat. Palat. Lat. 1805, f. 148-151) a ‘*formal*’ determination of motion (*motus est formaliter fluxus*), extends in and with itself a kind of ‘realm’ or ‘*latitudo*’ with a sequency of states of the moved thing, comparable to the ‘*latitudo*’ of qualitative grades we will find in the process of qualitative change (of, for example, colors).

⁵ SIMPLIKIOS, *Commentaria in Aristotelis Physicam*, p. 247,30-248,20 Diels = Hermodoros fr. 7 Isnardi-Parente (Test. Plat. 31 Gaiser). Simplikios, trying to demonstrate the Platonic-background of Aristotle’s concept of matter, is referring to Porphyrios’ *On Matter* (*Perì hýlēs*), where he found a report of Derkylides’ book on Plato philosophy (book XI on matter) presenting a long quotation of the direct pupil of Plato Hermordor See J. HALFWASSEN, *Mehr oder weniger ein Prinzip: Platons unbestimmte Zweihheit*, in THOMAS KISSE, THOMAS LEINKAUF (Eds), *Intensität und Realität. Systematische*

in the hermeneutical perspective of Simplikios Plato is presupposing firstly that matter (*hylē*) is in itself infinite and without limits (*apeiron kai ahoriston*) and that it is therefore, secondly, in all its existing parts dominated by the principle of 'more and less' (*mâllon kai hêtton*), it follows, thirdly, that: "in all being some beings are on or in themselves (*kath'hautá*), like man or horse (Aristotle, Cat. 1b28), others are in relation to others (*pròs hétera*), and from these some are in relation to their opponents (*enantía*), as good to bad, others in relation to related things (*tà pros ti*)". And, as Simplikios continues his interpretation: "In regard to all being that is structured by the relation 'big-small' (*mega kai mikrón*), these are all receiving a 'more and less' (*mâllon kai hêtton*)". The 'more and less'-beings are again subdivided in defined (*hôrisména*) and non-defined (*ahórista*). For Plato, in fact, all being is divided in eternal-noetic, unchangeable entities, the ideas, on the one side, and in material and phenomenal changing entities on the other side, a division which later authors compared to Aristotle's *kath'hautó* and the accidental being. In this division the changing, undetermined entities are submitted to the 'more and less', that is to degrees of intensity or of mass.

Generally, one can say, Plato and Aristotle, and with them the tradition up to the times of Nicholas of Cusa and the early 16th century thinkers, put the realm of relativity and differences of intensity on the side of accidental and non-perfect being. In the Greek tradition positive being is always autonomous and independent, negative being, on the other side, relational and dependent. Even in the realm of relational-accidental being, as we just heard from Simplikios, the opposite or contrary beings are 'more' beings than purely relational beings: the opposition of good-bad or just-unjust, for instance, is qualified by exclusive existence – if there is something good or just it is impossible that it could be at the same moment and in the same viewpoint bad or unjust. The good doesn't exist because its being depends on the existence or the necessary presupposition of the non-good or bad. Instead, the relational beings as for example 'big-small' or 'up-down' are always and only existing in relation to each other: the big is big only and exclusively in relation to the small, what is up is this only insofar there is something (at the same time) down. And, additionally, the 'good', the 'beautiful', the 'just' are seen by Plato and Aristotle as self-sufficient, independent, and perfect unities, their contraries are dependent and imperfect depravations of the formers. Consequently, they are submitted to the quasi-material realm of the 'more-and-less', they (the bad, ugly, unjust beings) show a nearly infinite number of variations and gradations. It is impossible in ontologies of this basically Platonic background that what is submitted to processes of perfection or degradation, or coming to be and vanishing, of growth and decay, could exist without levels or grades of intensity and the criteria of 'more and less'. On the other side, what is perfect and ideal, the ideas, is not and cannot be part of these processes of infinite unfolding and enfolding, of expression and recession and so forth.

2.

The real problems arises with the concept of ‘quality’: if quality is an accident, as it is for example in Aristotelian ontology⁶, then the following question is unavoidable: ‘is a change of intensity or of grades of a quality x something that happens regarding that quality itself (as an abstract form) or something that takes place only regarding the being that participates in that quality x, id est: the quale or the qualia?’ It is important to see that the decision for the qualia, that is the different individual beings which partake in a quality, as bearers of the gradation of ‘intensio-remissio’, which excludes that the quality itself (*kath’ hautá*) has grades, is a consequence of Porphyry’s commentary of Aristotle’s Categories, c. 8 (CAG IV/1, p. 137s), taken over by Simplikios in his own Commentary (CAG VIII, p. 283ss): the modes of participation (participaciones) take place in the participants (participantes), not in the participated, abstract quality (or form) itself. The scholastic tradition, knowing the Aristoteles Latinus perfectly, reformulated the basic problem as “intensio secundum formam ipsam (or: secundum essentiam)” or “intensio secundum participationem subjecti (or: subjectum inhaesisionis)”. The main question in the whole

⁶ I give the text of the Aristoteles Latinus, Praedic., pars 2 div. 4 [c. 8, 8b25-11a38]: “Est autem qualitas eorum quae multipliciter dicuntur. Et una [1] quidem species qualitatis, habitus et dispositio dicitur … Aliud … genus qualitatis [2] est secundum quod pugillatores vel cursores, vel salubres vel insalubres dicimus, et simpliciter quaecumque secundum potentiam naturalem vel impotentiam dicuntur … Tertia vero species [3] qualitatis, passibiles qualitates et passionis: sunt autem huiusmodi, ut dulcedo et amaritudo et austeritas et omnia his cognata; amplius autem et calor et frigus, et albedo et nigredo … Quartum vero genus qualitatis [4] est forma et circa aliquid constans figura; amplius … rectitudo et curvitas”. It is important to see that qualities of the type 4, that is geometrical figures, do not receive the ‘more and less’: a bigger rectangular is no ‘more’ rectangular than a smaller one! Just Aristotles makes Categ. 14, 15a a clear cut difference between quantitative change = augmentation and a qualitatice change = alteration, and their independent movements. See generally Anneliese Maier, Das Problem der intensive Größe in der Scholastik (De intensione et remissione formarum), Leipzig (Keller) 1939, p. 7-15, Maier quotes at p. 7 Categoriae, c. 8, 10 b 26 ss in the version of Boethius (Migne PL 64, col. 256-7): “Suscipit autem qualitas magis et minus, album enim magis et minus alterum altero dicitur, et justum alterum altero magis et minus dicitur. (...) Alia igitur, quae secundum eos affectus dicuntur qualia qualia, indubitanter recipiunt magis et minus. Grammaticior enim alter altero dicitur, et justior, et sanior; similiter et in aliis”; Solère, The question of intensive magnitudes (note. 36), p. 584-585. On Richard’s of Kilvington Utrum qualitas suscipit magis et minus (Paris, Ms. Bibliothèque nationale latin 16.401, f. 149v-166v; Biblioteca San Marco Marciana Ms VI 72, 2810, f- 89rb-101va) see E. D. Sylla, The Oxford Calculators and the Mathematics of Motion 1320-1350, New York-London 1991, p. 435-446; Paul J. J. Bakker, Marsile d’Inghen, est-il l’auteur d’une question De tactu corporum duorum?, in: Philosophie und Theologie des ausgehenden Mittelalters. Marsilius von Inghen und das Denken seiner Zeit, ed. Maarten J.F.M. Hoenen, Paul J.J. Bakker, Leiden-Boston-Köln (Brill) 2000, p. 121-122.

debate was: 'how precisely is the relation between a form or a formal quality and the addition or diminution of intensity'? If forms are, in the Platonic and, also Aristotelian tradition unchangeable unities, representing a genus a species or an individual substance, they were understood 'sicut numeri',⁷ and if qualities are such formal entities, how can there be any change in intensity or in regard to in-or decrease of quantity-quality, for example 'more or less' red, warm, big, fast etc.? For the debate which I cannot outline here in any more differentiated way, a further argument entered the scene with Augustine's argument that one has to be aware that there is a difference between the *quantitas molis*, that is: the pure quantitative extension of a being (more or less big, more or less extended in the sense of *constrictio-dilatatio*), and the *quantitas perfectionis* or *virtutis*, that is: the perfection of a qualitative dimension of a being (more or less warm, luminous, red). If an individual is, for example, ethically more perfect (*maius virtute*), we cannot say that it is quantitatively bigger (*maius mole*)⁸ or that the intensity or the grade of ethical perfection would be comparable to, for example, its length. In the scholastic discussion between 1100 and 1300 the main concern has been, however, not the dimension of sensitive qualities or modes of individual affection like luminosity or temperature, but a typical Christian question, discussed in the Peter Lombard's *Sentences*, regarding divine charity and its reception by individual believers and "subjects" of faith⁹. The problems: how is charity communicated from the Holy Spirit

⁷ (GILBERTUS PORRETANUS), *Liber sex principiorum*, ed. A. Heysse: *Opsucula et textus VII*, p. 8: „forma est simplici et invariabili essentia consistens“, see also the last chapter on *De magis et minus*, p. 30ss: Gilbert gives more a semantical or logico-semantic interpretation, as also Albertus Magnus (see Aristotle, *Topica* III 5); Aristoteles, *Metaphysica* VIII 3, 1043a-1044a, Aristoteles Latinus: „formae sunt sicut numeri“; V 14, 1020b: every number is equivalent to a species. The Platonic background, preserved in Aristotle *Metaphysica* X 1, 1052b, is referring all numbers substantially to the One as their respective source and fundament, see Dante, *De vulgari eloquentia* I 16, 2; *De monarchia* III 11, 1. Avicenna discusses in his *Liber de philosophia prima sive scientia divina*, *Tractatus* 3, c. 2, ed. Van Riet, p. 107-109 different grades or intensities of unity (*unum*) as "unum per accidens" or "unum per essentiam", the latter realizing unity in a "higher degree" (dignior), p. 113: "ex praedictis cognosces quae earum est dignior unitate et quae prius meretur eam, et scies quod unum genere dignius est unitate quam unum comparatione, et unum specie dignius est eo quod est unum genere, et unum numero dignius est uno specie". This concept of a concomitant unity is essentially non Neo-Platonic, because the 'unum' or 'unitas' is ontologically not independent from being or thinking what it is, for example, in Plotinus.

⁸ AUGUSTINE, *De trinitate* VI, c. 7: „Deus dicitur magnus, bonus ... non enim mole magnus est, sed virtute; c. 8: „in iis enim quae non mole magna sunt hoc est maius esse quod est melius esse“.

⁹ Therefore, the locus classicus of the whole debate on intensity is: Petrus Lombardus, I sent., dist. 17, 5 (Quaracchi 1916, I, 111; PL 192, col. 566s): "Utrum concedendum sit quod Spiritus Sanctus augeatur in homine, vel magis vel minus habeatur vel detur"; II, dist. 27, c. 2-3 (Quaracchi I, 444s): "sicut Deus dicitur magnificari et exaltari in nobis, qui tamen in se nec magnificatur nec exaltatur". In confrontation to Aristotle the important change is: charity or light has no opposites

to the subjects of faith? Where is the origin of the differences of intensity or modes? How is the increase or augmentation to be understood? In the pre-Thomist scholastic debate the increase of charity is understood, therefore, following Augustine, as an augmentation (augmentum), not of the quantity of mass (quantitas molis), but regarding the quantity of perfection or virtue (power). In the following debate the increase of charity has been compared or understood for reasons of clarification, analogically to the increase or “intension” of perceptive qualities as light or colour. There is also a systematic analogy to Aristotle’s difference between increase-diminution secundum modum participati (quality itself) or secundum (modum) participationis (the quia in rebus). I cannot discuss all that here now, important is, as a result, the identification of the quantitas virtutis with quality! All differences of power, dynamics, intentionality could, therefore, be interpreted in analogy to sense phenomena like levels of brightness or heat or velocity. Also, in 14th century and early modern prolongation of that particularly Christian debate on charity, that is: primarily in the Commentaries on the Sentences of Peter Lombard, this basic insight is present. For example, in the *Ordinatio*, the Oxford Sentence-commentary of Duns Scotus, always in the 17th distinction of the first book we can read a direct quotation from Augustine: “in iis enim quae non mole magna sunt, hoc est maius esse quod est melius esse”, “in those beings which are not great in their mass or weight, what is bigger is what is better” – Augustine-Duns Scotus switches here from *maius/maior* to *melius*, that is: from quantity to quality.¹⁰ In his *Ordinatio* Duns is saying also, and this comes now closer to what I’m intending to do here, that the

(as, for example, other qualities) and, therefore, cannot be submitted to alteration in Aristotle’s sense, where the alteration of a quality (becoming more or less so) presupposes its preponderance over its opposite via the dominance of act over potency (*Physcia* V 2, 226b; VII 4, 229a; *Topica* III 5, 119a). Nevertheless, since Peter Lombard medieval thinkers accepted an increase (augmentation, *auxēsis*) of quality, presupposing countable parts where there are, exactly speaking, no parts at all. “Intensification is addition without quantities: an addition of parts of a quality” (see Solère, The question of intensive magnitudes [note 31], p. 585). See our alternatives A and B below and the problem of introducing ‘parts’ in the unity of an essence.

¹⁰ DUNS SCOTUS, *Ordinatio* I, dist. 8, p. 1, q. 3, n. 138-142; HONNEFELDER, *Ens inquantum ens*, S. 367-375, 383-386; dist. 19, q. 1, n. 8 (Vat. V 267 f): *quantitas virtutis*. See Augustinus, *De trinitate* VI, c. 8, n. 9: “In iis enim quae non mole magna sunt, hoc est maius esse quod est melius esse”); *De quantitate animae* III,4; XVI,30: “ea vero inter virtutes quae appellatur animi magnitude, ad nullum spatium, sed ad vim quondam, id est potestatem potentiamque animi relata recte intelligitur”, this (see Solère, *Les degrès de forme*, note 13, p. 130) goes back to Plotinus II 9, 17, 9-10: τὸ γὰρ εκεῖ mega (en toū noētoū) consists in power or force (*dýnamis*), Porphyri, *Sententiae* XXXV, ed. Lamberz 1975. In the Greek, and also the Latin, tradition there has been established, since late antiquity, a terminological difference between quantitative and qualitative differences: the quantitative is called *meīzon* kai *élatton* = *maius* et *minus*, the qualitative, instead, *mâllon* kai *hêtton* = *magis* et *minus*, see Martianus Capella, *De nuptiis* IV 370-382; Boethius, *Consolatio* III,10; Thomas Aquinas S. th. II/1, q. 52, a. 2.

quantity of perfection or power in the Augustinian sense of ‘quality’ is, as a certain determined grade of perfection, only to be found in the contracted individual beings, for example in values or grades of color, not in the quality of this or that color (red, green, blue) itself. Several discussions are merging here: Firstly, the heritage of the Thomist debate on the difference between *essentia* and *esse* – with Thomist authors like Aegidius Romanus, Henry of Gent and others, this difference has been connected with the difference of *secundum essentiam* and *secundum participationem subiecti* (is intensity or gradation regarding essence or being?).¹¹ Secondly and here, naturally, the Aristotelian division between the quality and the qualified, between the participated and that which participates, between the quality as form or essence and the formed substrate (suppositum) reemerges, because of the ongoing continuous commentating on his text on the categories.¹² Are the levels or grades of intensity to be located in the essence of an x, in the ‘*qualitas ipsa*’, in the Sentences-commentaries this is always the ‘*caritas ipsa*’ (but Thomas introduces in his *Summa theologiae* also light or color),¹³ or in the mode of the participation of this essence-

¹¹ Marsilius of Inghen, for example, accepts degrees of perfection in being (*entitas*) in so far as this perfection of an entity is proportional to its ‘being’ (*esse entitatis* as *esse essentiae* or *esse entis*?), so that the amount of being (as the amount of colour) determines the degree of perfection, see *Sent.* I, q. 38, a. 3 (ed. Hoenen [note 21]) p. 28-30; Marten J. F. M. Hoenen, Marsilius of Inghen. Divine knowledge in late medieval thought, Leiden-New York-Köln (Brill) 1993, p. 111-112. More basically, in interpretations on Aristotle’s *Physicia*, ‘*magnum-parvum*’ or ‘*densem-rarum*’, ‘*additio-diminutio*’ could be easily understood as traditionally coined distinctions regarding matter (*materia*) insofar as matter is understood as ‘*corpus (esse)*’, see Albertus Magnus, *Physicia*, Pars I, lib. 1, tract. 3, c. 7, ed. Paul Hossfeld, *Opera omnia*, T. IV/1, Monasterii Westfaliorum (in aedibus Aschen-dorff) 1987, f. 49 AB.

¹² Duns Scotus, *Ord.* I, dist. 4, p. 2, q. unica, n. 12: “color ‘hic’, singularis exsistens, non determinat sibi rationem suppositi (quia ratio suppositi propria non est in accidentibus [color=accidens], et licet sit in supposito substantiae, tamen in quantum intelligitur absque illa substantia in supposito – ut ‘hic color’ exsistens – potest esse principium operationis realis, sicut si eadem albedo esset in tribus superficiebus, haberet unum actum reale, scilicet unam rationem disagregandi. Et si quaeras a me, de veritate huius propositionis ‘hic color disagregat’, pro quo supponit ly ‘color’, - dico quod supponit pro primo significato suo, puta pro ‘hoc colore’ exsistente, non autem pro aliquo colore inferior ad hunc colorem, puta pro ‘hoc colore’ in hac superficie vel illa, quia illa contrahentia colorem non sunt causae veritatis huius propositionis, sed est vera propter prima extrema”.

¹³ Thomas Aquinas, *I sent.*, dist. 17, q. 2: “sicut lux in aere: lux enim non augetur nisi per intensionem sicut aliae qualitates”, presupposition, q. 2, a. 1 (Mandonnat 1929, I, p. 416): “augmentum caritatis simile (!) est augmentum qualitatum naturalium”; *S. th.* II/2, q. 24: „sic ergo charitas augetur solum per hoc quod subiectum magis ac minus participat qualitatem, i. e. secundum quod magis reducitur in actum illius ac magis subditur illi. Hic enim est augmenti modus

quality in a ‘subjectum’ and in its very being (esse)?

Basically, I would say, there are two opposite strategies of solution:

A) the gradations and levels of intensity were put on the side of the form or essence (as is the position of Henry of Gent),¹⁴ but this evidently violates the ontological principle of the stability, non-changeability and identity of the form (the *kath'hautá*), based on its identity with the species (species sunt sicut numeri) – a position also held by Thomas Aquinas (I sent., dist. 17, q. II, a. 1; Quodl. IX, q. 6: intensio secundum essentiam, essentialiter) or Gottfried of Fontaines (Quodlibeta II, q. 10; IX, q. 11: renovatio formae/essentiae), or

B) the gradations and levels of the unfolding of intensities are lying exclusively on the side of the different participating ‘subjects’ (the ‘kat’alla’, secundum participationem subjecti, Giles of Rome: grades or degrees of the *esse in subiecto*)¹⁵ and, as one could say with some members of

proprius cuiuslibet formae quae intenditur, eo quod esse huius formae totaliter consistit in eo quod inhaeret susceptibili“ (this is: in the participating subject); Quodl. IX, q. 13. Possible background Avicenna, Liber primus naturalium, Tractatus secundus, cap. 2, ed. Van Riet, Janssens, Al-lard, Louvain (Peeters) 2006 (Avicenna latinus VIII/2), p. 179-180: intensio nigredinis, qualitas per-transiens, stabilis (qualitas est simplex una) et variatio mensurae (augmentum); cap. 3, p. 187: „forma substantialis non recipit magis et minus (...) in unoquoque puncto quo fit magis generabitur alia substantia et prima destruetur“; p. 192. There is even no possibility of gradation in change, because the coming to be or being destroyed of any substance is immediate (subito)! See also Metaphysica V, sect. 1. Since Avicenna is, beside Aristotle, „the most eminent philosopher for Albertus“ (D. N. HASSE, *Avicenna's De anima in the Latin West*, London-Turin, Warburg Institute – Aragno 2000, p. 62, generally p. 60-69), mediation could have been through Albertus’ writings accessible to Thomas (but see Hasse p. 71-73).

¹⁴ See SOLÈRE, *Les degrés de forme*, note 13 p. 140: „l’indétermination intrinsèque de certaines essences“; Richard of Mediavilla, II sent. dist. 14, art. II, q. 2: „Certum est quod multae formae accidentales habent gradus in sui essentia (!), per quod participari possunt a materia secundum magis et minus“; „certum est quod caliditas participatur a materia secundum magis et minus (...). Hoc esse non posset, nisi contingere ipsam caliditatem habere plus et minus in sua essentia (!). Per hoc enim dicitur materia participare ipsam caliditatem secundum magis et minus, quod plus vel minus habet de ipsius caliditatis essentia“; Quaest. Disp. 41: utrum ipsa forma substantialis recipiat magis et minus, ed. Ms Vaticanus latinus 868, f. 119va-vb. Durandus de Sant Porciano, In sententias commentaria, Antverpiae 1561, I, dist. 17, q.V, §§ 23-28.

¹⁵ ARISTOTLE, *Categoriae* 8, 10b-11a, interpreted by BOETHIUS, *In Categorias Commentaria* (PL 64, col. 257 B-C: “ipsas quidem habitudines nulla intensione crescere, nec diminutione decrescere putat, sed eorum participantes posse sub examine compositionis venire, ut de his magis minusve dicatur”), see also Porphyrios, in Cat. ed. Busse CAG IV/1, p. 138; ALBERTUS MAGNUS, *Liber de praedicamentis*, tract. V 12, in *Opera Omnia*, Borgnet I, Parisiis 1890, f. 267b; Thomas Aquinas, S. th. II/2, q. 52, a. 1: „non autem ista distinctio (sc. secundum formam or secundum subjecti) procedit

the Thomist School (Hervaeus Natalis),¹⁶ on its mode of being (esse, modus essendi). But in that case the identity of the participated quality is no more logically explicable: any ‘subject’ participates only in a certain part of the quality or a certain degree of it or in a different mode according to the way how its very own ‘material’ substrate is affected.

B is nothings else than the destruction of the substantial identity of the formal quality on the cost of the maintained particular identity of the individual or singular subject (or, as we can say, of the inherent quality);¹⁷

secundum hoc quod forma habeat esse praeter materiam aut subjectum; sed quia alia est consideratio eius secundum rationem speciei suae et alia secundum quod participatur in subjecto“; a. 2: the incraesing or decaesing (intensio-remissio) of the sense-qualities proceeds „secundum participationem subjecti“ [the B-solution] „pern hoc quod subjectum magis vel minus perfecte participat unam et eandem formam“. It is, in this context, impossible for Thomas that the form as such could change, if this would be the case than, as in sense-qualities, for example colors, the species would also change (we would haven an other x, a different species coloris): „quando de pallido fit album“. For Plato, as we well know, big things are participating in the ‘bigness’ (makróthēs), small things in the ‘smallness’ (mikróthēs), Phaidon 100 B-101 A; Politeia 507 B; Aristotle, Metaphysica A 6, 987a. On the imprecision of the participating being see Epistula VII, 342 B: idea of the circle, the circle in the sand or on the board. Ideal numbers are different from counted or applied numbers: there are no two ‘tens’ or ‘fives’ when applied to dogs or horses, see Politeia 525 D and Aristotles Metaphysica N 5, 1092b; Physica D 4, 224a.

¹⁶ HERVAEUS NATALIS, I sent., dist. 17, q.4-5, Venetiis 1505, Quodlibetum II, q. 9, Quodlibeta ed. Zimara, Venetiis 1513: utrum causa suscipiendi magis et minus in accidente cui hoc convenit sit diversitas subjectorum secundum speciem vel separabilitas a subjecto; q. 13: utrum in qualibet alteratione sint infinitae formae realiter differentes sive si intensem et remissum realiter differunt; Quodl, VI, q. 11: utrum aliquod accidens suscipiat magis et minus? It is important to see in background the Neo-Platonic axiom that ,what is recieved in a being is recieved according to its capacities‘ (οἰκεῖῶς εν ἡκάστῳ) or ,secundum capacitatem recipientis‘, Liber de causis n. IX 99; XIX 157-158; XIX 170; XXIII 177-179. Nicolaus Cusanus, De docta ignorantia II, c. 2; h I, p. 63 (f. 14r): „communicat enim piissimus Deus esse omnibus eo modo, quo percipi potest“. Basically just Albertus Magnus interpreted the realisation of movement through the „fluxus“ of an essential form as a gradually differring participation of the substrates or being in that essence, see Physica III, 1, 2; Borgnet 183a-186b, 202b; E. J. McCullough, St. Albert on Motion as forma fluens and fluxus formae, in: J. A. Weisheipl, Alberts Magnus and the sciences. Commemorative Essays, Toronto 1980, p. 129-153, p. 141. In the ,fluxus‘ there is an essential identity of the form, the ,forma fluens‘ and the formed, but gradual difference (through participation).

¹⁷ This inherence is the particular mode of being in which a quality as an accidental determination can subsist in its substrate or subject. The inherence articulates thereby a specific participation of a quality x in its substrate y. Even, so the argument by Aegidius Romanus (In Physicam

A is nothing else than the destruction of the particularity and individuality of the individuals on the cost of the over-all identity of an abstract form regarding its concrete singular contraction in any singular ‘subjectum’.

Evidently, a solution is difficult, and historically seen one of the first, dominant and radical solutions is the ontological eradication of quality as an ideal, formal or essential entity and its substitution by quantitatively interpreted sense-perceptions which are ‘representing’ quality on the level of affections in the soul’s consciousness, as we can see it in René Descartes (*Dioptica I*; *Meteora VIII-X* on refraction and rainbows; *Principia III* 52) and, with even more influence on the later discussions, in John Locke. But between the Thomist approach to the problem and its radical alteration in Descartes’s project we can find interesting strategies of solutions, particularly the strategy of Duns Scotus and his School.

From a systematic point of view, the possibility of grades or levels or intensities presupposes a certain kind of imprecision or of something un- or not-defined in the recipient – be it in A or B, in essence or being, in form or the formed (Maier p. 28-30).

Let’s look at A: if a theory argues that it would be possible to defend the existence of grades of intensity also in essences or pure forms, then for this theory arouses, as we just said, necessarily the problem of the consistency and identity of an essence, idea or species.¹⁸ We cannot, as

Aristotelis lib. IV, c. 9, Paduae 1493, f. 6rb), if there are differences in ‘more and less’ (maius et minus) in the ‘inhaerentia’, the form and its ‘virtus’ can remain without these differences: “sicut videmus in virtute respectu agere sic imaginary debemus in forma respectu esse. Videmus enim quod una et eadem virtus non (!) augmentata magis et minus agit prout invenit passum (!) magis et minus dispositum” (quoted in Maier, *Das Problem der intensiven Größen* p. 26, note 60). The unaltered identity of the quality is differently received by the different dispositions of the materiel substrate, the classical ‘secundum modum (or: capacitatem) recipientis’ of the Platonic tradition (*kata tēn oikeîan dynamin, oikeîōs en hekástōi*). Burlaeus, *De intensione et remissione formarum*, c. 1 (quoted in Anneliese Maier, *Die Calculationes des 14. Jahrhunderts und die Wissenschaft von den Formal-Latituden*, in: Ead., *An der Grenze von Scholastik und Naturwissenschaft*, Essen (Verlagsanstalt) 1943, S. 257-287, S. 258, Anm. 1: “Si forma intenditur per additionem partis ad partem, sequeretur quod nulla forma augeretur (...). Si forma augeretur per additionem partis ad partem, tunc nec pars praecedenes augeretur, nec pars sequens, nec aggregatum ex utrisque augeretur, et per consequens nulla forma augeretur (...). Unde potest argui in terminis (sc. nach der neuen Methode der Buchstaben-Indikation) sic: sit a tota pars et praecise illa, quae praefuit in principio augmentationis, et sit b tota pars et praecise illa, quae acquiritur per motum totum augmentationis, et sit c aggregatum ex a et b. Tunc a non augetur, quia non habet partem intrinsecam, quam prius non habuit. Nec b augetur, quia b non praefuit in principio augmentationis (...). Nec c augetur, quia c non praefuit in principio augmentationis, nec etiam in tota augmentatione”.

¹⁸ See the critique Gottfried of Fontaines utters regarding Henry of Gent’s hypothesis that an ‘intensio-remissio’ would be possible in essences (*essentiae*) in his *Quodl. II*, q. 10 (ed. Wulf-Pelzer, *Philosophes belges II*, Louvain 1904, p. 139ss). On the position of Henry of Gent see: Jean-

one might think, argue with Thomas Aquinas's brilliant early treatise *De ente et essentia*, that for example in the ideal, essential realm or range of angelic being we can find a hierarchy or gradation of this specific being – from the Dominations to the Seraphim (as Thomas maintained with Dionysius's hierarchical ontological concept). And why precisely? Just because any angel is in itself a species, the multiplication via intensity of grades, for example more power or virtue in any level, is not destroying one species or essences, but, instead, producing as much individual species as grades. To solve the problem of A one would need a different strategy, a strategy that would allow to introduce differences in a specific or essential unity without a multiplication of this unity. Internal or intrinsic grades, so to say. Or, alternatively, a theory which introduces the argument of a capacity of the form to be participated by a certain subject.¹⁹

Luc Solère, *Les degrés de forme selon Henri de Gand* (Quodl. IV, q. 15), in: Guy Guldentops, Carlos Steel (Eds), *Henry of Ghent and the Transformation of Scholastic Thought*, Leuven (UP) 2003, p. 127-155: the main source here is the *Quodlibetum* IV, q. 15 in: *Quodlibeta Magistri Henrici a Gandavo*, ed. Badius, Parisiis, 1518, f. 124v-130r, f. 124rK: “quod cum deus habet rationem unitatis in esse et essentia sua infinita, omnis creatura procedit ab ipso sub ratione unitatis in esse et essentia sua limitatae limitatione tali, quod secundum gradus perfectionis (!) naturalis procedit a summa creatura producta in esse vel etiam producibili (...) usque ad infimam creaturam, quod est pura substantia primae materiae (...) ita quod ordine naturali gradatim (!) se habent sic ut semper una sit superior alia et primo principio propinquior”. For Henry, all differences in grades are differences in essence and existence (quantity and quality are modification of essence), Quodl. IV, f. 124rL: “semper superior creatura secundum gradus maior est secundum quantitatem, in bonitate perfectionis naturalis et essentiae et esse sui, et minor est illa quae est inferior”; f. 124vO. Therefore: ‘gradus perfections’ are “types de quantité” (Solère p. 132).

¹⁹ Gottfried of Fontaines introduced in his *Quodlibetum* II, q. 10 (ca. 1286) the concept of „gradus virtuales“ (ed. Wulf-Pelzer p. 139ss): the capacity of a quality (form, essence) to be participated by a subject corresponds to the disposition of this subject to participate and this disposition is basically a formulation of B (intension et remissio secundum esse): “Si ergo habeant gradus aliquos virtuales (...) per hoc non videtur intelligi nisi quod virtus et natura tium qualitatum hoc habet, quod secundum diversos gradus sive secundum magis et minus natum est subjectum perfici secundum illas. Hoc autem est recipere magis et minus non secundum se sed secundum esse in subjecto sive secundum participationem subjecti”. It is nonetheless quite unclear, how these gradus virtuales come into being: if the disposition of the subject is also a certain accidental form and this form would need another subject, there would emerge an infinite regress. Gottfried proposes an explication on natural reasons of material condensation and rarefaction of the basic, first qualities, but without further explication. In Aristotelian Scholastic philosophy, at least, the possibility of grades of rare-dense is primarily based on the adequacy of the material substrate to receive these status'es, see Thomas Aquinas, *In Physicam Aristotelis commentaria*, IV, lect. 14; S. th. III, q. 77, art. 2.

If we go to B, we have, as we also just said before, the following scenario: any receptive or passive substrate (the ‘passum’ as we can often read in the Latin texts) which receives an extrinsic qualitative form, receives this form under its singular or individual conditions and, therefore, variates, distributes, and divides the very unity of the received form (Thomas Aquinas, I Sent. dist. 17, q. 2, a. 2) – Duns Scotus and his School will call that specific modification an individual or singular contraction.²⁰ A color x will be contracted in the individual y to the individual or singular color that subsists in y (y^x) or in z (z^x), and so on. The question is only on what regards the identity between the different singular instances of x? Do we have here an extrinsic qualitative unity, for example ‘red’,²¹ internalized and contracted to a plurality of instances of this quality? But how could we say that that what is in the quality which accedes to the substrates, is the same or identic as what is then received by these substrates? Inversely: if the unity is in itself, that is, in its inner being differentiated, how is it possible that it remains nonetheless un-affected by this intrinsic differentiation?²² Interesting questions and, as I see it, not really answered up to our own time.

²⁰ Based, naturally, on the precedent use of “contrahere” or “contractio” in Thomas Aquinas or Henry of Gent and others, see Henry of Gent, *Quodlibet* IV q. 15, f. 126v.

²¹ This was the Neo-Platonic position, see Plotinus II 6, 1, 7-10: *ekeî tí, entaûtha poiá, ou tí;* 3, 15-22: all quality is just participated form (énhylon) and has, therefore, a *diáthesis* or *héxis* and different grades; PORPHYRIOS, *Commentaria in Aristotelis Categorias*, CAG IV/1, p. 138; SIMPLIKIOS, *Commentaria in Aristotelis Categorias*, CAG VIII, p. 284, 13-17 on Plotinus, p. 286.

²² DUNS SCOTUS, *Ordinatio* I, dist. 8.pars 1, q. 3, nn.138-142 (p. 222-224) introduces the difference between a „conceptus perfectus proprius“ who concernes the singular such and such qualification of substrate x, for example to white-colored „in decimo gradu intensionis“ (n. 138) – a reality in a certain, precise „modus“ and „sub ratione albedinis tantae“ – and a „conceptus imperfectus (...) absque illo modo“ and only „sub ratione albedinis“. The concept which grasps the reality of a distinctly colored being or reality only in a general sense as ‚white‘ is defective regarding the concrete and contracted whiteness that subsists in that same being as such and such an intensity of ‚whiteness‘. Scotus says here n. 139 (p. 222) that thinking requires a distinction between ‚conceptus communis‘ (albedo) and ‚conceptus proprius‘ (albedo tanta), „non ut distinctio realitatis et realitatis, sed ut distinctio realitatis et modi proprii et intrinseci eiusdem“. Generally, Scotus seems to prefer the concept which represents the „rem sub modo“ (n. 140; p. 223) as more adequate than the abstract „conceptus communis“, and he argues that such a distinction between the perfect and imperfect reality of a being presupposes the introduction of ‚modi essendi‘ that are able to grasp the degrees of the singular contracted presence of an essence in the existent being. Consequently, the „conceptus communis“, take ‚albedo‘, is „indeterminatus et potentialis ad specialem conceptum“ (n. 141; p. 223). It is even so, that the common concept is also „indifferens“ in regard to the quantity (be it finite or infinite) (p. 224) – exactly the concepts we use here to describe the structur or being of the ‚latitudo graduum‘ in processes of intensification.

3.

But I want to come back to my interest: this lies in the fact that gradations in general and levels of intensity in particular seem to presuppose infinity and undetermined space and realm in nature! We know that this has been present in antique thinking – for example is nature, for Plato and Aristotle, as such indefinite and imprecise, and therefore also not fully intelligible. Simplikios, we mentioned his important commentary on Aristotle's lectures on natural philosophy before (see note 1), calls this space and realm of imprecision in his Commentary on the Categories a “plátos”, the Latins translated it in “latitude” and identified it with the possibility of intensification (*intensibilitas*).²³ The question, naturally, was: on which side of the general problem, on A or B, shall we put this kind of specific possibility for a property or quality to be intensified, or: where should we put the *latitude*?²⁴ On both sides we cannot avoid the problem of species-form consistency in its relation to material indifference. Gottfried of Fontaine seems to be one of the first to introduce the *ratio individui*, that is, the hypothesis that intensity is in no way a property of the essence or even accidental mode of an essence (be it in A or in B), but only a property of the individual being as such: any change or grade of the intensity of a quality results in a *transmutatio individui* or *transmutatio secundum individuum*. Any change of intensity produces

²³ A. SCHMIDT, *Duns Scotus über intensive Größen*, in *Intensität und Realität*, note 1 p. 65-86, 74 with reference to Simplikios, *Commentaria in Aristotelis Categorias*, ed. C. Kalbfleisch, Berlin 1907, CAG VIII, p. 284,21; 286,26; 287,31: τὸ μᾶλλον καὶ τὸ ἡττόνον κατὰ τὴν ἐν πλάτει μέθεξιν. The Latin translation for ‘plátos’ with ‘latitudo’ is from Wilhelm of Moerbecke, see Solère, *Les degrés de forme* (note 13), p. 133.

²⁴ As Anneliese Maier, *Das Problem der intensiven Größen* p. 29 has shown: more important for the debate was not so much a definite solution, but a new denomination of the problem, that enabled thinkers to shift the discussion from theology (charity) to metaphysics-ontology (being, qualities). Hervaeus Natalis develops in I sent., dist. 17, princ. 1, q. 2, a. 1 and in Quodl. II, q. 13 the conception of a “*contineri virtualiter*”, in which a form increases in the sense that its later more intense status is virtually contained in its former weaker or lesser mode of being: “*fit tale augmentum per hoc quod forma eadem (!) quae prius erat imperfecta fit perfectior (...) et facta intensa (...)*” has ‘more’ as before, but not “*secundum diversas partes signabiles, sed virtuales, ita quod primus gradus continetur in secundo virtute*”. Analogously to the – basically Aristotelian theory (see *De anima* II-IV) – that the lower level of the Soul, for example the sensitive soul, is virtually contained in the higher or the intellective soul (see Thomas Aquinas, *S. th. I*, q. 76, art. 3-4), this concept of “*contineri*” is a dynamic a powerful mode of containment, Intensification (intension) means here not, that what is x will be transformed in y (the sensitive in intellective soul). Instead y has all the potential of x and ‘more’ (et plus). On ‘*latitudo*’ see also Maier, *Die Caluclationes des 14. Jahrhunderts* (note 12) *passim*; Jean-Luc Solère, *Plus ou moins. Le vocabulaire de la latitude des formes*, in: J. Hamesse, C. Steel (Eds), *L'elaboration du vocabulaire philosophique au Moyen Age*, Turnhout (Brepols) 2000, p. 437-488.

a change of the individual substrate. The reason for this is the inherent quality and its (range of) potential-potentiality. To say it radically: every new grade is a new individual (no more, as in A, a new species). The discussion on intensity and grades shifted, at least in the Franciscan tradition, so to say, from the *qualitates ipsae*, which has been always treated analogously to essences and forms, to the *qualitates ad individua contractae* with their specific extension. The indifferent, undetermined and quasi material *latitudo* is filled up with these individual contracted instances,²⁵ which are thought of as form-individuals (contracted forms). This is the path that leads finally to the theory of contraction in Duns Scotus, Franciscus Mayronis and the Franciscan School in

²⁵ Gottfried of Fontaines, *Quodlibetum* IX, q. 4, ed. Hoffmann, *Philosophes belges* IV, p. 216ss: “subjectum sit illud a quo dependet natura specifica accidentis, cum tale accidentis sit quid indeterminatum, vel quia potest separari a subjecto vel quia est indifferens ad diversa specie. Ideo tale accidentis (...) est variabile”. This ‘tale accidentis’ is the quality (f. e. a color) contracted in an individual substrate and its ‘*latitudo*’, as I understand it, is indifferent, undetermined, variable! On ‘*latitudo*’ see THOMAS AQUINAS, *De virtutibus in communi*, a. 11 ad 16; HENRY OF GENT, *Quodlibetum* IV, q. 15 (note 13), f. 125rS: “in latitudine quadam”, f. 125vX: “in entibus quedam ex sua natura et essential sunt determinate in gradu (...) alia vero ex natura et essentia non sunt determinata in gradu essentiae et naturae (...), sed in latitudine quadam”, on the grades f. 128v-129r; Wilhelm of Ware, I sent., dist. 17, ed. Vat, *Chis B VII* 114, f. 54rb: “latitudo non est quantum ad partes formales, sed quantum ad partes materiales, sicut dictum est. Vel aliter, quod illi est consequens, quia latitudo non est in forma ut est in ultimo gradu nec in primo, sed ut in ratione graduum mediorum inter primum et ultimum, quia de ratione formae nec est latitude actualis nec potentialis, sed latitudo in communi”; Marsilius von Inghen, *Sent. I*, q. 38, a. 1 (ed. Marten J. F. Hoenen, Nijmegen 1989, II 12-14): “omne dirigens appetitum naturalem cognoscit. Sed Deus dirigit appetitum naturalem, igitur. Patet maior quia certum est quod ignis [qualitas as ‘essentia’ or ‘participatum’] non est plus determinatus ad producendum sua caliditate [essentialis] caliditatem ‘a’ [accidentalis], quam quamlibet illi consimilem quam postea producit in eodem vel in alio subiecto [participans]”. Then Marsilius gives the reason why the quality communicates its energy or power more to ‘a’ than to ‘b’ or ‘c’ and so forth, namely, why a superposed power or cause (God) is orientating it to ‘a’ instead to ‘b’: “Nisi dirigeretur ab aliquot agente cognoscente ‘a’ caliditatem et volente [!] illam produci, non plus produceret ‘a’ quam aliquam aliam ad cuius productionem ignis indifferens est. (...) Unde dicit Commentator [= Averroes] quod opus naturae est opus intelligentiae”. The indifference lies here not in the material substrate but in the quality itself, because the essence is, as such, not yet contracted or determined. The other type of indifference is, as I’m arguing, the quasi-material indifference of the substrate(s) of the possible communication of the qualitative form. Thomas Sutton, *Quodlibet II*, q. 18 (ca. 1285), Ms. Ottob. Lat. 1126, f. 89r-90r: “quantitas indeterminata est subiectum (sc. istarum transmutationum [rarefactionis et condensationis specie]); et voco nunc quantitatem indeterminatam quantitatem prout est indifferens [!] ut fiat maior per rarefactionem et ut fiat minor per condensationem”.

general²⁶ and, also, to the concept of “contractio” that we will find in Nicholas of Cusa. In this perspective, only the material form (*forma in concreto*) or the ‘hic et nunc’ inherent quality – the ‘quale’ in difference to the ‘quality’ – is the subject of grades of intensity²⁷. But, the Franciscans understood this aspect of individuality or contraction as a property of the form itself: it is, so to say, inside the form or essence where the difference between quality and *quale*, between universal, ideal form and particular, contracted form is located (by the way, even regarding the

²⁶ See the insight of Anneliese Maier, *Das Problem der intensive Größen*, p. 35: “Die Einstellung kommt der Lehre sehr nahe, die für die jüngere Franziskanerschule, besonders den Scotismus, typisch geworden ist”. Gottfried of Fontaines has just the concept of “forma contracta” for the individual grade of participation: “forma contracta ad individuum”! *Quodl. IX*, q. 4; ed. Hoffmann, *Philosophes belges IV*, p. 216 with reference to Aristotle *De generatione et corruptione I 5*, 320a-321b): “Dicendum quod natura, quantum ad individuum, puta humanitas Socratis sive homo qui est Socrates vel aliquid tale, potest duplicitate considerari, scilicet vel secundum speciem (A) vel secundum materiam (B). Secundum speciem (A) autem dico non absolute et abstracte consideratam sed in hoc individuo vel in illo contractum (A in B) prout I. De generatione distinguitur caro secundum speciem et secundum materiam. Quae quidem distinctione non (!) est sic intelligenda quod caro secundum speciem dicatur forma carnis vel caro secundum formam considerate, et caro secundum materiam dicatur material carnis vel caro secundum materiam considerate, sed (!) sic est hoc intelligendum quod dicatur caro vel homo vel liquid tale secundum speciem prout natura speciei contracta in individuo consideratur ut habens partes sine quibus natura specie non potest salvari, sicut natura humana non potest salvari sine carne et anima. Ipsa vero natura specie contracta dicitur talis secundum materiam prout consideratur ut habens tales partes sine quibus potest salvari, sicut natura humana potest salvari sine manu et sine pede, unde tales partes non mutant diffinitionem. (...) ideo natura specifica specie potest habere magis et minus de substantia vel esse perfectior et imperfectior secundum tales partes materiales (!), non quidem secundum intentionem eiusdem formae”. See also (close to that) Wilhelm of Ware (Varon), I sent., dist 17, Vat. Lat. 1115, f. 60r (61v): “Et appello hic partes formales [et] essentials illas partes, sine quibus non potest salvari forma ipsa (sc. essentia) (...) unde pars formalis est differentia specifica et ideo dempta illa non manet species; partes vero materiales et accidentales sunt illae sine quibus postest ipsa forma specifica manere, quae adveniunt et recedunt stante forma; sicut essential calor is est aliquando intensior aliquando remissior manente essentia specifica caloris”.

²⁷ DUNS SCOTUS, *Quaestiones super praedicamenta*, q. 36, art. 28; ed. Wadding I, p. 173-174: “essential specie in se considerate, abstrahendo a suppositis, non habet in se magis et minus; quia ipsa sic considerate est indifferens ad omnem gradum; sed ipsa in suo supposito est perfectior seipsa in alio supposito, et ut est in supposito, sic denominat subjectum, quia per se suppositum eius non est subjectum, sed qualitas in hoc subjecto: non igitur justitia abstracte intelligendo, sed justum, id est haec Justitia, ut denominat subjectum, est maior alia”. See MAIER, *Das Problem der intensiven Größen*, p. 47-48.

complex discussion on the substance and essence of *amor*, later medieval-early humanist authors tended to use the verbal form *contrahere* or the noun *contractio*: so the passion of the lover reflects the individual humoral contraction of his astral “dispositions”).²⁸ The process of increase and decrease of intensity – *intensio et remissio* – is a formal, not a material, process, involving the formal accidental aspects or, what the Scotist tradition since Scotus called the *haecceitas*.²⁹ As a problematic result the grades of intensity have been seen as an addition of essential-universal and essential-individual or particular forms – but how can a unity result of such an addition. Surely not as one stone is added to another stone – the result are two stones, but possibly as one quantity of water is added to another quantity: the result is more water as before and, more important, as a unity (as it was before). That what is added as *haecceitas*, therefore, cannot have the same specific unity as that to which it is added, the individual just existing charity: the *charitas* added to the intensified charity, is, as Petrus Aureoli is says, not in itself the full charity, but a kind of *concaritas*, a reductive but formally identic charity³⁰. Consequently, this added charity is not specifically or formally different from its subject, as the water which is added to water. It immediately becomes one substance with it, not a composite unity or aggregate (as two or more stones). Or, if the ‘*latitudo*’ is just part of the essence or species, then ‘part’ must have the meaning of *pars secundum speciem*, not *secundum rationem speciei*: the species is here in itself open or ready to receive new grades of its own quality (a clear modification of A).³¹ In opposition to this more or less Scotist solution of the problem of intensities or grades in formal and qualitative processes, the school of Occam comes back to the alternative solution of B, that is: to locate these

²⁸ DINO DEL GARBO, *Incipit scriptum super cantilena Guidonis de Cavalcantibus* (1327), in E. FENZI, *La Canzone d’Amore di Guido Cavalcanti e i suoi antichi commenti*, Genova 1999, reprint: Milano (Leditizioni) 2015, p. 86-133, II, n. 25, p. 96: „In prima parte (ostendit) quod dispositio naturalis, per quam aliquis inclinatur ad incurandum faciliter in aliquam passionem, ex principiis proprie nativitatis hominis contrahitur“.

²⁹ FRANCISCUS DE MAYRONIS, I sent., dist. 17, art. 40, ed. Vat. Lat. 896, f. 84rb: “Dico quod illud quod addit gradus ad naturam specificam non est nisi haecceitas, quia individuum non addit ad naturam nisi haecceitatem”. Every individual adds something to the nature (essence, form) which subsists in him, this ‘additum’ is a formal aspect, for example a certain, individual color!

³⁰ PETRUS AUREOLUS, I sent. dist. 17, pars III, Romae 1596, f. 435-436; see also FRANCISCUS MAYRONIS, I sent., dist. 18, q. 2, ad 4 (Basileae 1489, Venetiis 1520): „dico quod dictum illius doctoris scil. Aureoli si sic intelligatur quod gradus ille adveniens est charitas non tamen ratione illius quod praecise de novo venit quod est haecceitas, sed est solum concharitas et non charitas: dico ergo quod per istum modum potest bene intelligi quod haecceitas non est formaliter charitas, sed tamen bene potest dici satis proprie concharitas, eo quod ad idem genus et ad eandem speciem ad quam pertinet charitas et ipsa pertiner, reductive (!) tamen“.

³¹ JOHANNES DE BASSOLIS, I sent., dist. 17, q. 2, Parisiis 1516; JOHANNES BACONTHORPE, I sent., dist. 14-16 (ca. 1318); Quodl. II, q. 4 (ca. 1324), Cremonae 1618.

qualitative processes on the side of the subject or of the material substrate,³² so in Walter Burleigh's treatise *De intentione et remissione formarum*: Here, we were told, it is not the subject in itself, as individual or singular existence, that has the indifferent *latitudo* as an horizon of reception of formal qualities, but the *species formae*, so that the different instantiations of singular qualitative forms are constituting a sequence of singular different instances. Not one and the same individual form or quale could receive intension or remission, only the *species formae* can communicate these differences to the different singular recipients – the problem is only, as analogously regarding movement: how will the individual quale 'a' be substituted by its follower 'b', and then 'c' and so forth? Are there always 'new' beings or items (nova individua), as in movement-theory of late 14th century there are in kinetic processes always new 'ubi's or 'wheres'? For Burleigh it seems that quality remains the same and only the qualia are changing (but this is the Scotist doctrine),³³ but it is not quite clear, how they are doing that. With Durandus de Porciano we are coming back to our solution A, which puts the range of differences and the process of intension and remission that requires a realm or indifferent basis – the *latitudo* – in the essence: one has, as Durandus says, to put the *latitudo graduum* in the quality itself and not in the *qualia*.³⁴ That is why the succession of forms which corresponds to the succession of different 'wheres' in motion requires a supervening or, better, higher-superior form (which, so to say, covers all the many others) and this form is the 'unus terminus totalis' of the whole process of succeeding instances which constitutes the "unitas continuitatis".³⁵

³² WALTER BURLEIGH, *In artem veterem commentaria*, Venetiis 1485, f. 2r: „Dico quod nulla forma (!) suscipit magis et minus, sed forma suscipitur in subjecto (!) secundum magis et minus, secundum esse magis perfectum et minus perfectum; unde nulla albedo (= qualitas ipsa) suscipit magis et minus, sed album (= quale) suscipit magis et minus, quia suscipit albedinem magis perfectam et minus perfectam“. It is the „subjectum qualitatis“ that receives the quality more or less perfect, not the quality or form or essence.

³³ JOHANNES CANOCNICUS, *Quaestiones super octos libros Physicorum Aristotelis*, lib. V, q. 3, Venetiis 1492, 1516. 1520: als „opinio Gerardi Odonis“ (but, as Maier, *Das Problem der intensiven Größen* p. 62 makes quite clear, most probably Gottfried von Fontaines) „quod cum aliquid fit de albo albius vel de albo minus album tota forma praecdens corrumpitur et novum individuum formae generatur“.

³⁴ DURANDUS DE S. PORCIANO, I sent. dist. 17, q. 5-7, Parisiis 1508, q. 7: Utrum eadem forma numero possit esse intensa et remissa.

³⁵ DURANDUS, I sent. dist. 17, Parisiis 1508, q. 6: „forma intensa et remissa possunt esse partes unius formae numero, et quae non est una indivisibilitate, sed contintuitate (!) suarum partium, quae non sunt simul sed successive (!) et una supervenientie alia desinit esse“; Compare Avicenna *Metaphysica* III, sect. 2, f. Ventiis 1508, f.78rb. In his *Libri naturales* Avicenna also introduces a formal cause as 'supervenient' (superveniens), insofar as its formal constitutive power is not directed to genera or species, but to 'figurae' or 'colours', see *Liber primus naturalium*, tractatus primus, capitulum X, ed. Simone Van Riet, Louvain-Leiden (Peeters-Brill) 1992 (Avicenna latinus VIII),

Let us leave all these unsolved problems aside, they remain more or less the same in the school debates up to late 16th century, for example in Franciscus Suárez.³⁶ What is introducing a new side is evidently the nominalist position that shifts the debate from ontology to logic and language (from being to denomination), or from metaphysics to empiricism (Ockham I sent. dist. 17, q. 4; *Expositio aurea* = Lib. Praedic. c. 14, Bologna 1496): we can get knowledge about qualitative changes of colors or heat from one ‘quale’ to another ‘quale’, from one instance to the next instance, from one grade to the next lower or higher grade only through sense experience: “subjectum alterari secundum qualitates sensibiles non potest aliter quam per experientiam probari”.³⁷ Therefore, the sense experience required a new focus on empirical description more than to ontological definition, and, even more important for the development of early modern discussions, the exclusion of ‘abstract’ categorical differences and the identification of quality and its individual instantiation in a subject (qualitas = quale, see *Expositio aurea* c. 14). Evidently, the implications of A and B have not been solved in a clear and convincing mode: it is more the case, and even more with the Scotistic and formalist authors, that A, the side of form, idea and essence, is pushed, so to say, in the B-sector: the qualia are treated as if they were qualities in the full sense.

In the development of early modern discussions, independently from the fact that in the late-scholastic debate the general problem remains unresolved the same (see Francisco Suárez, *Disputationes metaphysicae*, Disp. 46, sect. I, general recapitulation; sect. 33-35: Suarez’s theory of addition as eduction out of potency into actuality),³⁸ we can see a reaction of these insufficiencies: the qualities and forms are emigrating from the continent of ontology, or at least from the realm of nature to the new, or seemingly new, horizon of empiricism and sensualist theories: the quantification of qualities is the consequence in natural philosophy and also in psychology, quantification in the sense of a destruction of the formality or the substantiality of qualities, denomination in the sense of a destruction of ontological autonomy of these qualities (they exist, so to say, only as concepts or sensations).³⁹ On the other side concepts and strategies of

p. 94: „Causa etenim formalis aliquando est respectu generis aut speciei, et haec est forma quae constituit materiam, aliquandp est respectu alias modi, et haec est forma sine qua materie fit species, quia ipsa superveniens, est sicut forma figurae ad lectum et albedo respectu corporis albi“.

³⁶ See J.-L. SOLÈRE, *The question of intensive magnitudes according to some Jesuits in the 16th and 17th centuries*, in “The Monist”, LXXXIV, 2001, pp. 592-608.

³⁷ OCKHAM, *Philosophia naturalis (Summulae in libros Physicorum)*, Romae 1637, lib. III, q. 22; I sent., dist. 17, q. 6: to the question why one form has a higher grade or degree in quality than the other: „dico quod nulla est ratio, nisi quod ista natura est talis et alia est alia“.

³⁸ Suárez, *Disputationes metaphysicae*, disp. 46, sect. 1, § 3, col. 770 A ss.: addition as extraction of new instances out of the potential of the same essence; cfr. SILVESTRO MAURO, *Quaestiones philosophicae*, *Opera*, Lugduni 1598, T. II, q. XXVII, f. 546-551.

³⁹ F. NAGEL, *Nicolaus Cusanus und die Entstehung der exakten Naturwissenschaften*, Münster 1984, p. 26-31. Nagel points on p. 27-29 to the fact that the discussions in the 13th and 14th on grades

measuring are entering the scene: different colors or levels of heat are nothing more than different amounts of quantities or of radiations of particulars in natural processes. As we saw, theories of intensity require concepts like *dispositio*, *latitudo*, *contractio*, *indeterminatio* and 'unity' – unity as ontological singularity and unity as homogeneity in a field of instances.⁴⁰

4.

Nicholas of Cusa stands in between the late medieval or late scholastic and the early modern treatment of qualities or intensities: with his concept of *contractio* he is inspired by different medieval traditions: the more general use of contraction by high medieval authors like Albertus Magnus, Thomas Aquinas or Henry of Gent, and the technical use of *contractio* by Duns Scotus and his followers in the context of individualization, and with his idea to measure all existent beings he stands in the tradition of Albertus Magnus and the Epicurean and atomistic

and intensities of velocity or of light or of heat have been dominated by the insight that, since the absolute principle of these phenomena is the act of God's creational measuring (Sap.11,21), human technique would never be able to reach precise results regarding the measuring or calculating of natural processes. This is quite close to Cusa's position, who seemingly is influenced by that discussion. See Wilhelm of Alnwick, *Quaestiones disputatae* (1323), referring to Robert Grosseteste's conviction that it is impossible to know the precise quantity of the parts of a continuous line, although this line is in itself "certissime et finitissime" measured; WALTER BUGLEIGH, *Physica* IV, tract. 3, cap.2, Venetiis 1491; JOHANNES BURIDANUS, *Physica* IV, q. 14.

⁴⁰ On homogeneity and continuity see T. LEINKAUF, *Philosophie des Humanismus und der Renaissance*, Hamburg, Meiner 2017, Bd. I, p. 6-12; II 1531-1540 and s.v. On 'indeterminatum' see ALBERTUS MAGNUS, *Physica* Pars I, Lib. II, tract. 2, c. 2, ed. Paul Hossfeld, *Opera omnia*, Tomus IV/1, Monasterii Westfalorum (in aedibus Aschendorff) 1987, f. 99 A: „forma naturalis triplex habet esse (...) unum enim habet in privatione, quod est esse formae confusae et imperfectae et indeterminatae“; c. 15, f. 121 B: „Infinitas autem causas necesse est esse, a quibus fit id, quod est a fortuna, cum fiat ab accidente per accidens, quod est accidens commune. Et hoc fit indeterminatum et infinitum, eo quod indeterminata sunt, quae sic accidere possunt uni et eidem. Constat fortunam hoc modo esse infinitam, unde etiam quia taliter indeterminatio non potest haberi scientia, ideo visa est fortuna esse infinita et incognita homini“. This would imply that indeterminate intensity is out of sight for science – just because it is at random or conceptually indifferent that this particular being x is 'now' red in the intensity a and not in the intensity b or c, or one would have to define 'indeterminate' in a different way, regarding, as I tried to put it, being not as a particular being (esse hoc et hoc), but as a kind of homogeneous cluster-existence where it is equally right to say that it is 'red' in different intensities a, b, c ... on the level A and, at the same time, red^a only in the individual being x and 'red' in y and so forth – by participation of 'red', at level B.

presuppositions which has been adopted by thinkers of the 14th century – but, and that is the decisive difference, with his manifest Platonic background, he modified since his first steps in philosophy considerably the heritage of the medieval discussion.⁴¹ This brings him, therefore, closer to thinkers like Ramon Llull, Henrico da Campo or Marsilio Ficino. In what follows now, I will try to look at a possible connection between contraction, measure, precision and *latitudo*

⁴¹ On ‘contractio’ in Nicholas of Cusa see for example *De docta ignorantia* II in general, bearing in mind what Cusa says in the prologue to book III (h I, p. 117 [f. 24r]): “de universo (...) quomodo in contractione subsistat”, that is, the whole existing universe is the “maximum contractum”, and reflecting also the utterance c. 4, h I, p. 75 (f. 15v finis): “Contractio dicit ad aliquid, ut ad essendum hoc vel illud”. But, to know the nature of the contracted individual existence which is caused by a original cause, presupposes the knowledge of that cause itself, *Prologus (ad secundum librum)*, h I, p. 59 (f. 12v): “patet difficile contractionis naturam attingi exemplari absolute incognito”; II, c. 1; h I, p. 65 (f. 13v): “ipsum (sc. universum) autem non est actu nisi contracte, quod sit meliori quidem modo, quo suae naturae patitur conditio”. The ‘quod est’ is the consequence of the creative power of the “ipsum esse”, c. 2, ib.: “necesseque esse omne, quod est, id quod est – in quantum est – ab ipso esse”. The ‘what’ (quid) is, therefore, necessarily reduced and contracted to the conditions of the ‘is’ (quod). In *De docta ignorantia* II, c. 4; h I, p. 73 (f.15r) Cusa says: “ipsum contractum seu concretum (note the identification of contract and existing) cum ab absolute omne id habeat, quod est, tunc illud, quod est maximum, maxime absolutum quantum potest concomitatur. Igitur (...) illa, ut absoluto absolute maxime convenient, contracto contracte convenire affirmamus. (...) mundus sive universum est contractum maximum atque unum, opposita praeveniens contracta, ut sunt contraria; existens contracte id, quod sunt omnia”. The universe is the unity (of God or the maximum absolutum) contracted by and to plurality, the infinity contracted by and to finitude, the simplicity contracted by and to composition, the eternity contracted by and to sequency (time) and so forth. In this vision Cusa, then, unfolds a field of universal explication-contraction where the universe “is contracted by or through three grades to every particular being”, II, c. 6; h I, p. 79 (f. 16v): “universum per gradus tres in quolibet particulari contrahitur”; p. 80: in the universe generic and specific modes of being are gradually contracted to ever specific modes (universals have an “esse universale contrahibile per singula”), but actual existence is exclusively conceded to individual being: “individua vero sunt actu, in quibus sunt contracte universa (...) solum enim singulare actu est, in quo universalia sunt contracte ipsum”. Contraction is, in Nicholas, not restricted to individuality or singularity, it is, instead, the general qualification of all that is ‘outside’ (praeter) the first being or God, II, c. 8; p. 88 (f. 18r): “omnia praeter primum necessario sint contracta”, that is, even the first and absolute possibility has to be just contracted or determined, otherwise the being of the world (universe) would be, as in Epicurus, contingent (because there would be no reason ‘why’ this world came into being and not another world, or why a world at all came into being and not nothing).

with regard to the medieval and late antique background that I sketched before⁴². In short one could say that Nicholas's argumentation shifts basically from numbering to measuring, from calculation to quantification. In his *Idiota de mente* Cusa says – in an etymological allusion which is typical for the medieval tradition – that mind, in Latin *mens*, has its philosophical meaning from the act of measuring, *mensurare*, and is, substantially and essentially, nothing else than the measure or *mensura* of all being.⁴³ In being so and acting so the mind gives all being a certain measure or definition – here we should remember that definition is implying, at least in its original Latin semantic, the activity of limiting and defining (Latin: *finire*, Greek: *horízein* and *horismós*). If the mind is the measure of all being and if the real being of any existing thing, that "what it is" (*id quid est*), is its definition, then the mind 'is' in a certain sense the being of all things, namely in its substantial or essential precise definition. But the mind is, consequently, also the measure of its own being. The juncture of being, definition and measure has been fundamental in metaphysics and theology and Nicholas quite often refers in his writings to the famous sentence of the biblical Sapientia 11,21: "deus omnia creavit in numero, pondere et mensura".⁴⁴ Here and also in

⁴² See Stephan Meier-Oeser, *Cusanus' Metaphysik des 'Mehr oder Weniger' (magis aut minus)*, in: *Intensität und Realität*, note 1, p. 87-101. With regard to Ramon Llull see M. D. JOHNSTON, *The Spiritual Logic of Ramon Llull*, Oxford (Clarendon) 1987; on our problem here C. LOHR SJ, *Ramon Lull's Theory of the Quantification of Qualities, Constantes y fragmentos del pensamiento luliano*, ed. Fernando Domínguez y Jaime de Salas, Tübingen (Niemeyer) 1996, p. 9-17.

⁴³ NICOLAUS CUSANUS, *Idiota de mente*, c. 1, n. 57; edidit R. STEIGER, Hamburg, Meiner 1983 = h V, p. 90: „mentem esse, ex qua omnium rerum terminus et mensura. Mentem quidem a mensurando dici conicio“. Albertus Magnus, *Summa theologica* I, tr. 3, q. 15 a 2 (ed. Borgnet XXXI, Parisiis 1895, p. 91a); In *de divinis nominibus* Dionysii *commentaria*, c. 31, *Opera omnia* XXXVII/1, p. 16b: „mens enim accipitur hic pro metiri“ (Nicolaus in Marg. Cod. Cus. 96, f. 231va: mens accipitur pro intellectu metiente). Bonaventura I sent., dist. 3, pars II, a. 2, q. 1; THOMAS AQUINAS, *De veritate* q. 10, a. 1: „dicendum quod nomen mentis a mensurando est sumptum“; CUSANUS, *Idiota de mente* c. 9, n. 116; h V, p. 171, n. 123-124, p. 176-177; *De beryllo* c. 5, n. 6; h XI/1, p 6; *De venatione sapientiae* c. 27, n. 82; h XII p. 79.

⁴⁴ Nicolaus Cusanus, *Idiota de staticis experimentis* n. 162, h V, p. 222 (ed. Paris. f. 94v). In this context we can read: „per ponderum differentiam arbitror ad rerum secreta verius pertingi et multa sciri posse verisimiori coniectura“; *De docta ignorantia* II, c. 13; h I, p. 110-111. What is important, and a genuine 'humanist' attitude is the shifting of the creative power of God, using mathematical principles (measuring), from God to the human mind which gets the exclusive potential to create 'all' mathematically „in numero, pondere et mensura“, see *Idiota de sapientia* I, n. 5; h V, p. 8-9: "haec sunt opera rationis illius, per quam homines bestias antecellunt, nam numerare, ponderare et mensurare bruta nequeunt", for further occurrences of 'ponderare ..' see the apparatus ad locum in h V, p. 9; *Compenium* n. 8; h XI/3, p. 19: "et hinc in se reperit primum et

Cusa's own fundamentally theological perspective, God is the absolute creative measure of all being, because every existing being has through his act of creation an adequate and, therefore, a precise position that makes it being 'itself' in its singular identity, and at the same moment 'not itself' as the negation of all other being.⁴⁵ That "true" and only "precise" being coincides with the substance and essence of that being. If we try to grasp this very substance or essence by thinking and defining (or: pondering),⁴⁶ we are unable, as Cusa sees it, to grasp it precisely as it is (taken by itself), we can only denominate it by extrinsic acts. If God is the absolute measure of being as it is and in its respective identity, human mind is the relative measure of all being as it is in our concepts (*notiones*) and in the respective intuitions and definitions. But here, regarding the identity of the divinely measured being, we are unable to get it precisely as it is.⁴⁷ The dignity of human being for Cusa consists now in the fact, that only the (human) mind, in its singular self-reflexivity, is aware of the constitutive impreciseness of its human measuring by epistemic, ethical or artistic acts – all other epistemic capacities like sense experience or rational arguing, instead, pretend, if they are not critically (or: sceptically) controlled, to be able to grasp the very being of an existing thing or of any complex constellation lying behind intentions or volitions, and so forth.⁴⁸ The epistemic impreciseness and the unavoidable confusions growing around the limits and the limitedness of our rational and sense-based processes is only the other side or inversion of the fact that being is, ontologically, not precise and articulates its dynamics in the limits of an ontological *latitudo* or a realm of indifference.⁴⁹ And here we are, finally, back to our

propinquius signum conditoris, in quo vis creative plus quam in aliquot alio noto animali relucet". See the instructive pages in NAGEL, *Nicolaus Cusanus und die Entstehung*, note 31, p. 57-61.

⁴⁵ NICOLAUS CUSANUS, *Idiota de mente*, c. 10, n. 127; h V, p. 179 (f. 89v): „nam non scitur pars nisi toto scito; totum enim mensurat partem“; *De docta ignorantia* II, c. 5; h I, p. 76-78 (f. 15v-16v): *Quodlibet in quolibet*; p. 76 (f. 16r): „omnis res actu existens contrahit universa, ut sint actu id, quod est“; p. 77: „est universum in quolibet contracte id, quod est ipsum contracte“. This anticipates clearly Leibniz's later monadological interpretation of the structure of being.

⁴⁶ Nicolaus Cusanus, *Idiota de staticis experimentis* n. 193; h V, p. 239 (f. 98v): „Immo pondus rei est proprie harmonica proportio ex varia combinatione exorta“. Weight (pondus) is, in this experimental approach, in itself a complex structure and composition of proportions, a multitude in a unity.

⁴⁷ Nicolaus Cusanus, *Idiota de staticis experimentis* n. 173; h V, p. 228 (f. 96r): „praecisio manet inattingibilis“; n. 176; p. 230 (f. 96r): „et venantur sic elementa veriore conjectura, licet praecisio sit semper inattingibilis“.

⁴⁸ NICOLAUS ORESME, *De commensurabilitate vel incommensurabilitate motuum caeli*, see MAIER, *Metaphysische Hintergründe*, Roma, Storia e Letteratura 1955, pp. 28-29.

⁴⁹ Being has its own exactness and precision only in the mind of God, see *Idiota de mente* c. 9, n. 117; h V, p. 172: „et ligna et lapides certam mensuram et terminus habent praeter mentem nostrum, sed ex mente increate, a qua rerum omnis terminus descendit“; *De docta ignorantia* II, c.

problem of quality and its different grades of intensity and our insight that a possible solution of the inherent further problems of the *quaestio vexata* would and should presuppose the hypothesis of an indifferent receptive ‘space’ of potentials for a being to be qualified. Also, Nicholas is approaching his idea of a total measuring of being through the presupposition of such a *latitudo* or a *nulla determinata quantitas* which marks a field of contraction or, also, extension: *omnia in diversis gradibus esse*.⁵⁰ In a general intellectual move from a primarily negative conception of the capacities of human knowledge in the late scholastic period, which has been strongly influenced by Augustine and late antique Sceptic,⁵¹ to a positive evaluation of the intrinsic limits of human epistemic potentials Nicholas sees the unavoidable imprecision of our knowledge more as an enhancement and an instigation than as a fatal weakness ‘post lapsus’. In his system of “*docta ignorantia*” the ‘*latitudo*’ of the quasi-material substrate of a form or quality became the mode of being which is determined by the property of “*excedens et excessum*”, as he says

5; h I, p. 78 (f. 16r-v). Proklos, *Elementatio theologica*, prop. 117; Dodds p. 102: *pâs theòs métron estì tôn óntôn*. See also *De dato patris lumen*, I, n. 94; h IV p. 69: “*Quoniam autem non omnis natura data gradum possibilis perfectionis specie suae actu attingit, sed quaelibet individualis contraction specie ab ultima perfectione activitatis potentiae (...) abesse dinoscitur, tunc opus habet intellectus, cuius potential ambit omne, quod non est creator eius, ad hoc, ut ad apprehensionem actuetur, dono gatiae creantis*”; c. V, n. 114; p. 83: “(...) unde est natura intellectualis secundum receptionem in descensus varie graduate (...)”.

⁵⁰ NICOLAUS CUSANUS, *De docta ignorantia* II, c. 5; h I, p. 78 (f. 16r): that is, being exists in these grades in its respective singular perfection (*quoniam aliter et melius esse non potuerunt*), that extends in a realm (*latitudo*) of instantiations (*omnia in quolibet essent eo modo [!], quo possent secundum id, quod est quodlibet*) so that in the universe there is a whole multitude of resembling modes (or contractions) of existence of one being (essence, form) and of one species and so forth – these create the reality of the universe as the totality of grades: “*quoniam non posset unus gradus esse sine alio*” (as in an organic body its parts!); *Idiota de mente*, c. 9, n. 124; h V, p. 177 (f. 89v): „*quando enim attendis mentem esse absolutam quandam mensuram, quae non potest esse maior nec minor, cum sit incontracta ad quantum*“; n. 125; h V, p. 178 (f. 89v): „*intelligo simile in circino nullius determinatae quantitatis i eo, quod cicrinus [that is: in ist being], et tamen extenditur et contrahitur, ut assimiletur determinatis. Sed an se assimilet modis essendi, dicito*“. *De docta ignorantia* II, c. 4; h I, p. 74 (f. 15v): „*Ac si albedo haberet in se esse absolutum sine abstractione nostri intellectus (sc. like an essence in being), a qua album esset contracte album: tunc albedo per non-albedinem in actu albo terminatur, ut hoc sit album per albedinem, quod absque ea album non esset*“; II, c. 9; h I, p. 94 (f. 19v): „*ipsa humanitas a qua descendit homo sicut ab albedine album (...) eadem (sc. humanitas Platonis et separata, albedo foris et separata [=essentia]) secundum diversos modos essendi*“.

⁵¹ T. LEINKAUF, Article ‘*Skeptizismus*’, in: *Der Neue Ueberweg, Die Philosophie des 14. bis 16. Jahrhunderts*, Basel (in print).

(probably with reference to the Platonic ‘hyperbolē kai ἐλλείψις’):⁵² outside the pure, absolute and transcendent unity of God all being is different and, therefore, identic with itself and different to all others and in its identity differing in grades of intensity, of ‘more and less’ or ‘overwhelming and being overwhelmed’.⁵³ In the scholastic understanding all being has been created in his own ontological precision by God and it is our intellect which tries to approach the essence of that being without reaching its precise and definitive structure (*adaequatio intellectus ad rem*); in Cusa’s understanding all created being is intrinsically non precise and defective, it is not to blame our intellect that he is unable to be precise, because there is, in a radical and absolute sense, no precision in being at all. With Nicholas we have to say it dialectically: the non-precise knowledge is the most precise knowledge possible. Looking at the indifference, the undetermined nature and the materiality of the *latitudo* of possible grades of a quality, we could say that in Nicholas all being is part of such a latitude and its being and its concepts have a kind of amplitude or horizon in its existence. It is no more only the problem of the subsistence of accidental

⁵² See K. GAISER, *Platons ungeschriebenen Lehre. Studien zur geschichtlichen und systematischen Begründung der Wissenschaften in der platonischen Schule*, Stuttgart 1962, 2. Auflage 1968, p. 481-484 [Testimonia 23 B: Simplikios in Physicam Aristotelis p. 453,22-455,11 Diels]; Halfwassen, Mehr oder Weniger. Ein Prinzip (note 1), p. 21-25, p. 24.

⁵³ NICOLAUS CUSANUS, *De docta ignorantia* I, c.3- 4; h I, p. 8-11 (f. 2r-v): difference of maximum *absolutum* and maximum *contractum* (*excedens* and *excessum*); II, c. 1; h I, p. 61 (f. 12v): „in excessis et excedentibus ad maximum in esse et posse non deveniri (...) omnia dabilia praeter ipsum (Deum) differre“. The ‚*excedens-excessum*‘-structure is close to the ‚*maius-minus*‘ structure, and it is interesting to compare the fundamental structures, *De venatione sapientiae*, c. 26; h XII, p. 76: „haec est ratio regulae doctae ignorantiae, quod in recipientibus magis et minus numquam devenitur ad maximum simpliciter vel minimum simpliciter“; *De circuli quadratura*, Bayerische Staatsbibliothek ms. Clm 18711, f. 743v (Mathematische Schriften p. 40): „in recipientibus maius et minus non devenitur ad maximum simpliciter et esse et posse“. As Nagel (Nicolaus Cusnaus und die Entstehung [note 31] p. 67-68) convincingly shows, together with *De docta ignorantia* I, c. 3; h I, p. 9, where the human intellect, compared to a polygon, is incapable to match with God, compared to a circle, we have to understand *De circuli quadratura*, Ms. Clm 18711, f. 744r (Mathematische Schriften p. 41): “capacitas enim circularis est quoddam maximum simpliciter (=God) in comparatione ad capacitates poligonarium (=human intellect) quae recipient maius et minus et (...) circulum non attingunt“. There is no grade of intensity or extension for a being “simpliciter”, this would come close to essences without “intensio et remissio”, there are many (infinite) grades for any being “secundum quid”, like triangles or other polygons. But this is not (!) the relation between a quality and the derived (infinite) qualities. See also *De ludo globi* I, n. 15; h IX, p. 16: “Et haec regula universaliter est vera, quoniam in omnibus recipientibus maius aut minus non devenitur ad maximum et minimum simpliciter, quo maius aut minus esse non possit”; *De venatione sapientiae* c. 26, n. 79; h XII, p. 76, c. 37, n. 108; p. 102.

qualities or modes of being and, consequently the solutions of A introducing grades and intensities in the essences themselves, or B to put it on the side of the particular participants of the quality, the multitude of the qualia. But it is now the insight that all being exclusively is submitted to *excedens et excessum* instances, to indifference and imprecise modes of existence,⁵⁴ and that the totality of grades and levels of intensity of being, the universe, is, as the universe, the *latitudo* of explication of the one principal essence which is God: as the ‘humanity’ (*humanitas ipsa*) is contracted principally in regard of the individual human being (*homo*) and secondarily in every part and member, so that the ‘*humanitas contracta*’ is in the eye as eye and in the heart as heart and so forth, and, generally, in “every particle whatever contracted”, so the Deity (*deitas*) is contracted principally in the first range beings, secondarily in the second and so forth, but so, that it (God) is in every contracted being this contracted being itself.⁵⁵ The absolute being, God, as maximum *absolutum* or absolute essence is, therefore, contracted to the whole realm or latitude of being, analogously as, in the late antique and medieval positions, a quality as an essence is participated by or communicated to a range of qualities as existing individual beings. This is clearly a combination of A and B insofar as, for Cusa, not only the essence is participated by and contracted to these ‘*essentiata*’, but also the participated beings are as such manifestations and internal differentiations of the essence itself: [version A] all being is in God as God (all qualities are in the quality as that quality, there is only the quality and its inner modes) and [version B] God is in all being as respectively all that being (the quality is in all qualities as these qualities, there are only the qualities participating gradually the essence-quality). This is the Platonism of Cusa: putting the former opposite interpretations in their dialectical exclusivity in one speculative unity, preserving their specific positions in it.

Another important difference to his scholastic forerunners is the fact that knowledge of nature or natural processes is no more something different from the mind’s own being – as an utterance, a product or a fact of epistemic content – but it is something that changes mind itself: the mind is trying to get knowledge and information about the world just and primarily to get consciousness of its own essence (*Idiota de mente* c. 9, n. 123-124 (h V, p. 177 [f. 89v]): “mens est viva mensura, quae mensurando alia sui capacitatem attingit. Omnia enim agit, ut se cognoscat (...) ut se in omnibus attingat”).⁵⁶ And in this process mind is unfolding its possibilities like qualities are unfolded in the range and latitude of a material substrate. Mind is launching its epistemic powers and exploring the reality and in the same moment enfolding all these activities in

⁵⁴ NAGEL, *Nicolaus Cusanus und die Entstehung*, note 31 p. 69 calls this „die Einsicht in die Impräzision als Seinsprinzip“.

⁵⁵ NICOLAUS CUSANUS, *De docta ignorantia* II, c. 5; h I, p. 78 (f.16v).

⁵⁶ With Plato and Aristotle and the Scholastic tradition, instead, one would have to say: the mind-intellect ‘acts’ (agit) scientifically to ‘touch’ (attingat) not itself, but the reality of the things themselves, their independent being; PLATON, *Euthydemus* 290 C: the astronomers are ‘hunters’, because they are not producing numbers and figures (to measure) the movement of the stars and heavens, but they are only finding them as just in and for themselves existing.

its inner core: explicando complicat!⁵⁷ At first glance, Cusa's solution seems to stick on the side of A: the relation quality-qualia is a self-differentiation of an essence in its possible manifestations and instances, a self-unfolding without diminution of the essence itself. All participated or communicated qualities, even the most perfect, are an imprecise instantiation of a certain quality (a 'contractio'), with the consequence that this essence-quality in its ideal status has no (real) existence at all. It is only preserved in God's intellect, but there it is fused without confusion with all other absolute being⁵⁸. Existent being can, as a real being, never get the status of non-contractedness or of an ideal perfect 'rotunditas' or 'praecisio', these are all or, on one side, conceptual and abstract noetic 'beings' (the equity in a rational concept has no precise equivalent *in rebus*,⁵⁹ or, on the other side, absolute transcendent beings in God's mind. Real, existing being, and this sounds more as the solution B, is always and necessarily contracted, obeying the conditions of the *necessitas complexionis* and the *possibilitas determinata*.⁶⁰ It follows the reason that to

⁵⁷ See my analysis in THOMAS LEINKAUF, *Nicolaus Cusanus. Eine Einführung*, Münster, Aschen-dorff 2006, p. 46-68, 102-110. The gerundive 'mensurando' in the quotation above from *Idiota de mente* ch. 9, has the same verbal function in the sentence as the gerundive 'explicando' I am dis-cussing here: in the process of measuring the individual intellect (mens) is constituting and form-ing itself. Measuring has to sides: an explicative act of taking the quantitative dimensions of a thing outside the conscious subject and an 'complicating' act of forming the qualitative inner di-mensions of the thinking being itself.

⁵⁸ NICOLAUS CUSANUS, *De docta ignorantia* II, c. 9; h I, p. 94 (f.19v): „Unde formae rerum non sunt distinctae, nisi ut sunt contractae; ut sunt absolute, sunt una indistincta [!], quae est Verbum in divinis. (...) Unum enim infinitum exemplar tantum est sufficiens et necessarium, in quo omnia sunt ut ordinata in ordine, omnes quantumcumque distinctas rerum rationes adaequatissima com-plicans“ – here, as Cusa says, there is no 'maius et minus': „non maior, nec minor, nec diversa“. For the genuinely Neo-Platonic insight that in the hypostatic intellect all ideas or forms are fused without confusion (asýngchytôs sýngchysis), see Plotinus V 8, 3-4; VI 7, 15-18.

⁵⁹ NICOLAUS CUSANUS, *De docta ignorantia* II, c. 1; h I, p. 62 (f. 12v): „veritas abstracta in mate-rialibus ut in ratione aequalitatem videt, quam in rebus experiri per omnia impossibile est, quoniam ibi non est nisi cum defectu“; p. 64 (f. 13r): „cum maximum aut minimum simpliciter dabile in rebus non sit“.

⁶⁰ NICOLAUS CUSANUS, *De docta ignorantia* II, c. 7; h I, p. 83 (f.17v): „ipsum contrahens (sc. ipsum Verbum) quidam formam aut animam mundi et possibilitatem materiam vocaverunt; alii fatum in substantia, alii, ut Platonici, necessitatem complexionis, quoniam a necessitate absoluta descendit, ut sit quasi quaedam contracta necessitas et forma contracta, in qua sint omnes formes in veritate. (...) nexus contrahentis [verbum, filius] et contrahibilis [pater, unitas absoluta] (...) determinata possibilitas a quibusdam nominari consuevit (...) a Spiritu Sancto descendere“. This terminology of the School of Chratres was for great importance in Cusa's basic argumentation since the *De docta ignorantia*, see Thomas Leinkauf, *Sein und Denken. Die Bedeutung und Funktion der*

contract is always a process or activity that leads to something other where the contracted exists then as contracted (contraction dicit ad aliquid) – if the quality red is contracted it exists in another substrate as the quality or accident of that being a ‘being red’. In Cusa’s mathematical writings, occupied mostly with the riddle of the quadrating or squaring of a circle, we can see a calculated confrontation of two different or, better, opposed ‘qualities’, the curved and the rectal line (no curve is a rectitude an vice versa) – if we can take ‘quality’ here in the sense of a figurative property, for example ‘being curved’ or ‘round’.⁶¹ Here the process of equating (accedere ad aequalitatem) represents the process of measuring in a horizon which corresponds to the ‘latitudo’ of the grades of the intensities of a quality like red (being redder – being more curved).⁶² In his Experiments with the scale he proposes one experiment which allows a certain quantification of the magnetic power (vis/virtus magnetis): you put a certain weight of iron on one side of the scale and a correspondent equal weight of stones or other material that serves for ‘counting’ or ‘quantifying’ the weight on the other side, then you put a magnetic stone in a fixed position above the shell filled with the iron. Because of the magnetic power (attraction) the shell with iron will be lifted in a certain degree, now we must add so many weight-stones as needed to equal the position of the two scale shells. The quantity of the added weight of stones corresponds now, that is the hypothesis of Cusa, to the quality of magnetic power exercised on the mass of iron.⁶³ Cusa’s innovation is the coordination of the quality of magnetic power (traditionally seen as “qualitas occulta”) to the quantity measured by numbers. But also innovative is the functionality

artes liberales im Denkansatz des Cusanus, Trier 2017 (Cusanus Institut, Trierer Cusanus-Lecture Heft 21) with further literature.

⁶¹ See also *De docta ignorantia* I, c. 12-13; h I, p. 24-26; c. 2, p. 65; on the following see NAGEL, *Nicolaus Cusanus und die Entstehung* (note 31), p. 83-85.

⁶² Cusa calculates with the ‚inner‘ (perimetric) and ‚outer‘ (peripheral) polygons to one circle, see *Quadratura circuli*, Ms Melk 3677 (= Cushing Collection cod. 24, Yale Medical Library) f. 450: “Ob hoc scimus, omnes medias poligonias isoperimetras et isopleuras secundum capacitatem in illis ad aequalitatem semidiametri circuli accedere (...) omnis poligonia media secundum suam capacitatem in excessu semidiametri sibi inscripti super semidiametrum inscripti trigono et diminutione semidiametri sibi circumscripsi a semidiametro circumscripsi trigono proportionaliter se habebit”.

⁶³ NICOLAUS CUSANUS, *Idiota de staticis experimentis* n. 175, h V p. 229 (f. 96r): *virtus magnetis ponderata*; the same strategy in n. 179; p. 231 (f. 96v) regarding the measure or the weight of air, if one compares, for example, different states of wool (from being in a certain dryness to a certain humidity, accompanied by shrinking/extending). Is is astonishing, if one would like to look ‘forward’ to Newton’s concept of inertia as a property of matter, how close Cusa’s idea of measuring matter comes to Newton’s concept of a “*quantitas materiae*”, see *Philosophiae naturalis principia mathematica* (1687), def. 1: “*quantitas materiae* est mensural eiusdem orta ex illius densitate et magnitudine coniunctim”.

he presupposes, he takes the magnet not as an isolated, individual substrate or matter, but primarily in relation or function to something different: in our case the quantity of iron. Or he takes, for example, water not as an element as such but with regard to the differences of its qualitative instances or instantiations in different circumstances (*differentiae*). And he introduces matrixes or “collationes” of these resulting numbers of weights or extensions and so forth – all, we should bear in mind, products of measuring and not counting – to control these relations regarding stability, continuity or precision.⁶⁴ The whole experimental procedure reflects for him the necessity, particularly with the background of his theory of conjectures, of human knowledge to be always self-reflexive and self-critical and to insist in the calculated repetition of the experiments to be able to have ever more precise results.⁶⁵

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⁶⁴ Nicolaus was quite aware of his innovative approach, *Idiota de staticis experimentis* n. 161, h V, p. 221 (f. 94v): “an ne quisquam experimentales ponderum conscripserit differentias?”.

⁶⁵ NICOLAUS CUSANUS, *Idiota de staticis experimentis* n. 162; p. 222 (f. 94v): „Per ponderum differentiam arbitror ad rerum secreta verius pertingi et multa sciri posse verisimiliore coniectura“; n. 164; p. 223 (f. 94v): „et sic staticis experimentis omne scibile praecisiori coniectura accederet“; n. 176 (f. 96r): „coniectura verior“.