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On Metaphysical Principles of a Theocentric Christian Epistemology.

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Abstract.

Galileo Galilei and Isaac Newton unified scientific and religious knowledge under the paradigm of truth. Methodologically they measured by geometric ‘analogous’ cognition, according to the Euclidean theory of quaternate proportions, quantities of material motion and their non-material transcendent generating causes within a reference system at true rest, spread out between standards of absolute space and absolute time. Proportions, as Plato’s *Timaios* puts it, unite different entities (like *cause* and *effect*) with one another through a mediating middle (like *time* and *space*), by the power of love. Analogous ‘synthetic’ cognition allows to determine unknown generating causes from their observable generated effects, in the sense of St. Paul, Rom.1, 19-20. Analogous thinking provides man with the “Weite der Vernunft” (Benedict XVI), i.e. with an expanse of cognition apt to extend scientific research beyond the limits of Aristotelian logic. The “analogy of nature” (Newton, rules of philosophizing) leads to true knowledge of motion, but also of God. As Galileo’s and Newton’s method aims at absolute motion, it aims at truth, and as it aims at truth, it centres on God. Its basis is a ‘theocentric’ epistemology implying the central Christian message of man’s ability to know about truth, i.e. to know about God.

Verum ut Geometris philosophantibus et Philosophis exercentibus Geometriam, pro coniecturis et probabilibus quae venditantur ubique, scientiam Naturae summis tandem evidentiis firmatam nanciscamur. (Isaac Newton).

Does God really exist? This is certainly the most important metaphysical question of all times. In our times, it is a question the answer to which may decide on the fate of Christianity at least in Europe. It was Galileo, and on Galileo’s shoulders it was Isaac Newton who demonstrated the metaphysical principles that establish an epistemology to allow for the reliable scientific answer: Yes, it is true: It is not merely a matter of revelation and belief; rather it is provable, and it has been geometrically demonstrated for long, that God really exists.

1. On reference systems.

Recently I discussed with a German Protestant priest. Does God exist? Can his existence be demonstrated? The priest quoted from the German Protestant theologian Dietrich Bonhoeffer, according to whom “a God whose existence were provable would not be worth to be believed in.” So the priest strongly rejected any attempt of such a demonstration as “blasphemous”.

In September 2006 Cardinal Christoph Schönborn at Castel Gandolfo held a talk on the debate on Evolutionism. He introduced quotes from Isaac Newton’s *Scholium generale* of 1713, and also from my Newtonian studies, to show that Newton had based all his scientific work on the demonstration of the existence of truth, that is, of the existence of God, and on man’s

capacity *to discover* that truth, that is, *to know* about the existence of God. Some few months later the Cardinal received a critical letter from the Roman theologian Martin Rhonheimer, the main parts of which afterwards were published in an Austrian quarterly magazine. Rhonheimer began his letter by stating that he argued against Schönborn – “from an Aristotelian-Thomistic point of view”. Rhonheimer’s conclusion, then, was to reject Schönborn’s position, since it appeared to contradict Rhonheimer’s presupposed Aristotelian-Thomistic conviction.

A third example: In the year 2000, Pope Benedict XVI, Cardinal Ratzinger at that time, after he had read my essay on *Newton, truth and God* in the *Münchener theologische Zeitschrift*, wrote me an affirmative letter. He expressed the hope, that the inspiring new results of my work on the natural philosophy of Galileo and Newton should be thoroughly discussed, because they might contribute decisively to the restoration of metaphysics. Since then I have been trying to find an institution that could establish this discussion program. Now, recently I had to learn that a very Catholic German academy which I had addressed in the Pope’s sense, rejected my offer, because the leading officials of that academy strongly believe in Immanuel Kant’s philosophy, and are not ready to tackle my substantial criticism of the Kantian subjectivist epistemology.

What is the common ground of these three instances? The answer is: They all have to do with reference systems. In the first instance it is “the view of Dietrich Bonhoeffer”, and in the second it is “the Aristotelian-Thomistic point of view”, while in the third instance as a reference system serves the philosophy of Immanuel Kant. Whatever an argument one might put forward, it will be referred to, and measured in relation to, the respective reference system. The argument will be considered valid, if it fits, and it will be rejected if it does not fit with the presupposed reference system. Consequently, one question does not matter under these methodical conditions: It is the question, if an argument is really *true*.

The said examples show that the truth of an argument can only be considered within a reference system that represents *truth itself*.

2. On truth.

The word truth, accordingly, carries a double meaning. Firstly, it characterizes a reference system in relation to which arguments can be demonstrated to be true. Secondly, it means the

specific quality of an argument that refers to, and fits with, the said reference system. Both meanings so far appear as *formal* ones.

But the term truth conveys also a *substantial* meaning. What is the *substantial contents* of a true argument? It is the argument's reference to reality. But what is reality? It is just that what really "is", say what really *exists as a fact*. The substance of a true argument consists in its contents of facts. Consequently, a reference system that allows to identify an argument as "really true", must represent *truth itself substantially*, that is, it must represent *reality* and *truth* itself, or *absolute truth, as a fact*. An argument then derives its truth from the actual truth of the reference system.

Do we know such a substantial and realistic reference system, which one may justly call an "absolute" one, insofar as it actually represents absolute truth itself? Scientists will reject this idea. In the theory of motion, paradigmatic for modern science in general, scientists believe in the equality of variable, arbitrarily chosen reference systems, as a consequence and an expression of the supposed "principle of relativity". No reference system is accepted in contemporary science as an "absolute" one. Nothing that can be derived from a reference system deserves the qualification to be "absolutely true". In modern science, the truth of an argument means nothing but the *formal* characteristic, which consists in the fitting of the argument with its respective, arbitrarily chosen reference system. A striking example is the motion of the earth, respectively of the sun, the former when referred to the sun, the latter when referred to the earth. Evidently for an observer on the earth, the sun moves with respect to the earth when the latter is chosen as the required reference system at rest. But *vice versa* also the earth moves with respect to the sun at rest for an observer placed on the sun. The latter "heliocentric" view is no less a relativistic one than the former "geocentric" view is, the more since already in Galileo's and Newton's time it was well-known that the sun does not remain at absolute rest, and consequently it does not provide a privileged reference system in relation to which the motion of any object could be identified as an absolutely true fact. Newton is very explicit on that. As the heliocentric and the geocentric view both depend on an observer's position, they should both be called "anthropocentric". So Galileo and Newton, when they formulated a theory of absolute motion, related to absolute rest, did not replace the traditional geocentric view with a heliocentric one, as is generally believed. Rather they developed a "theocentric" concept, in which *absolute spacetime* – as an emanation of God – provides the absolute and absolutely true immoveable reference system of true motion. In relation, or relatively to this space-

time system at absolute rest, the earth can be shown to move *really*, and so does also the sun, which actually revolves around a central point within its immense circumference. It is a fact, then, that true motion cannot be determined relatively to any material object, but only in relation to absolute immoveable and non-material spacetime.

Christians do know the non-materiality of the absolute, and they do know absolute truth under the name of God. The question about the existence of God consequently coincides with the question about the existence of absolute truth, that is, of an absolute reference system which allows to decide on the truth of any concrete argument.

The atheist who denies God's existence must also deny the existence of such an absolute, or absolutely true, reference system, and *vice versa*: The scientist who denies the existence of such a system must also deny the existence of God. Here we understand that scientists who believe in the equality of all arbitrarily chosen reference systems, i.e. in the principle of relativity, and consequently in the relativity of all truths, and who at the same time confess to believe in the existence of God, contradict themselves. And so do Christians who *vice versa* confess the existence of God, i.e. of absolute truth, and at the same time believe in the scientific principle of relativity, i.e. in the non-existence of absolute truth.

In its substantial meaning, truth always means *absolute* truth. So if there existed no real, absolutely true reference system, in relation to which one could decide on the truth of an argument, there existed no substantial truth at all. Since in our present context we have already understood the terms "absolute truth" and "God" as synonyms, the missing of an absolute, real, or true reference system would be tantamount to the missing, or non-existence, of God. And *vice versa*: The demonstration of an absolute, really existing and *consequently true* reference system would at the same time mean *a demonstration of the being of God*.

3. On the measurement of truth.

"Thou hast ordered all things in measure, and number, and weight." So says the Bible of God, in the book of wisdom (11, 21). An open mind that investigates nature under the paradigm of truth will find that indeed *everything* in nature can be determined by measurement. Why is that so? It is so because all things, for instance every macroscopic object, have a quantized structure, which means that they all are built of multiples of equal elementary particles. In relation to a proper standard, the extension of every such object then can be measured and thus

it can be identified, or understood. *Every true cognition is based on measurement*, says the Platonist Nicolaus Cusanus (1440/1441).

The most elementary structured entities we know are time and space, wherein everything exists. It is a matter of sensual experience to understand time and space as really existing, and as structured, regularly scaled *standards of measurement*. Should time and space be unstructured continua, no living being would ever be able to determine, that is to measure, its place and its way in space at any given time. As a matter of fact, the identity of reality and truth appears to our senses through the reality and truth of space and time. Absolute space, as an infinite scaled standard, allows for the relative determination through measurement of finite spaces, in the same way as any finite distance can be exactly determined, or measured, in relation – or relatively - to a *proper metre rule* as a standard; and so does infinite absolute time allow for the determination of relative finite times, measured relatively to the standard of absolute time. This principle of measuring finite quantities of time, or relative times, in relation to absolute time, is present at the scaled face of every clock, in relation to which scaled face, as an absolute standard, we measure, as relative times, the minutes and hours of our daily life. The fact that this standard truly represents certain quantities *of time* (seconds, minutes, hours) through certain quantities *of distances*, that is *of space*, moreover demonstrates to the eye the quantized structure of absolute space, and also an underlying rational and lawful mathematical relation between absolute time and absolute space, namely the *geometric analogy, or proportionality*, of the scaled standards of absolute time and absolute space.

On this *analogy, or proportionality*, of space and time, Galileo based his concept of true motion. This can be seen in Galileo's most important, but widely unknown, or not understood, or by bad translators corrupted, book of 1638, the so-called "Discorsi", Third Day (chapter three, that is), first paragraph "De motu locali", in the first theorem "De motu aequabili", that is, on uniform rectilinear motion, which is the most elementary concept of true motion. By studying this geometric concept, one learns that the two straight scaled lines drawn by Galileo, one to represent space, the other to represent time, exactly form an absolute spacetime reference system in the above explained sense. Relatively to this system of reference and measurement, an exact determination of variable finite spaces, and of variable finite times becomes possible. The relation of these variables to each other then forms what we call the *velocity of motion*. This term is known as a quotient "space over time". In Galileo's geometric representation it is harmoniously integrated in and related to the true spacetime reference system spread out bet-

ween the infinite standards of absolute space and absolute time. From that system the concept of velocity, as a relation of finite spaces and times to each other, derives its reality and absolute truth with mathematical precision according to the Euclidean *geometric theory of harmonious quaternate proportions*. Accordingly, in the case of uniform rectilinear motion, the spaces described are to the times elapsed as are to each other the elements of absolute space and of absolute time, and infinite series of these elements form the said infinite absolute standards, that is the infinity itself of space and time.

Galileo on the basis of this analogy demonstrated the measurability of absolute, real, or true motion, but not only. Moreover, by means of this concrete instance he demonstrated geometrically man's general ability to discover, by means of analogous cognition, *truth itself*.

4. On analytic logical reasoning, and on synthetic analogous cognition, and on measuring and calculating as two complementary powers of man.

As I have put it before: To know about truth is to know about God. Since analogous cognition allows to discover real truths, it opens the way to the knowledge that God really exists. Now let me consider the difference between analytic logical reasoning on the one hand, and synthetic analogous cognition on the other.

Logical analysis since the time of the Greek logician Aristotle works by deduction, and it is based on presupposed hypotheses. Now, hypotheses are only thoughts, or ideas; they are concepts, produced by the human brain. Insofar as analytical logic allows methodically to decide if some argument (which argument here is also only a concept) can correctly be deduced from a certain hypothesis, it deals with the *consistency* of human reasoning. If a certain argument is consistent with a certain hypothesis, well – then one concept is consistent with another one; and that is all. Basically, logical deductions consequently are tautologies, since a concept that can be derived from another one, must needs already be given with that other concept. Never can this tautological method *demonstrate anything as really existing, as being a real fact, or as being substantially true*. And this is so because the reference system in relation to which the argument is judged, is itself only a concept, that is *a hypothesis*, conceived at will. From hypotheses, that is from concepts, one can deduce nothing else but other concepts. As a consequence, no hypothesis can be formulated from which *the real existence* of God could be deduced. At best one can conceive *an idea* of God, for instance in the sense of Anselm of Can-

terbury's erroneously so-called "ontological" proof of God's existence, as a concept beyond which nothing greater can be conceived. Evidently this kind of intellectual reasoning produces not a demonstration of the real existence, but only an *idea* of God. As it is based on the erroneous hypothesis that to be conceivable should mean to exist, the deduction of an idea of God is not an *ontological proof*, but only a *logical conclusion*, and in fact it is no proof at all, but again only a tautology. And this has all been well-known for a long time. For instance Duns Scotus at the beginning of the 14th century knew that, in contrast to man's cognitive faculties, his *powers of intellect* do not hold out for gaining a cognition of the existence of non-material (i.e. transcendental) things, including the existence of God.

The fact that most philosophers through more than 2000 years have been using the hypothetical-deductive method of intellectual reasoning that stems from Aristotle may explain why the philosophy of Aristotle and his followers up to the time of Descartes, Leibniz, Kant and followers often appears as dealing with *concepts* only, say, with the names of things, but not with the reality of things themselves. Roger Cotes, the editor of the second edition of Newtons "Principia" (1713), in his preface put it as follows: "Those who have undertaken the study of natural philosophy according to Scholastic doctrines derived from Aristotle and the Peripatetics do not tell us about the causes of nature, and therefore they tell us nothing. And since they are wholly concerned with the names of things rather than with the things themselves, they must be regarded as inventors of what might be called philosophical jargon, rather than as teachers of philosophy." This method even gave to a certain period in the history of philosophy the proper name of "Nominalism". It means the period that began with a second reception of Aristotelism in the 13th century. Many instances of modern philosophical reasoning could be quoted here to show that this nominalistic period has not yet really ended. Actually, its epistemological foundation, which is the hypothetical-deductive method of Aristotelian logic, governs all of modern science, and determines what today is accepted as the only possible "scientific method", in order to define what is and what is not science. Its mathematical representation since the time of Descartes and Leibniz is *the art of calculating* by means of arithmetic and analysis, which intellectual art deals with the continuum of numbers only, and with the numerical calculation of any numerical values even of such non-existing things like the concept of "probability". In fact mathematical analysis, basically an arithmetic art, works with *equalities of equals* only, that is with *numerical equations* – and consequently, as an instance of the tautological reasoning of Aristotelian logic, it is not an instrument able to discover any-

thing that lies beyond the tautological expression $A = A$. No less a person than the inventor of modern arithmetical analysis, Leibniz, once correctly put it exactly this way.

Modern intellectuals, even if they are philosophers of science, do not know anything about man's true cognitive faculties. They do not know an alternative method of thinking besides intellectual logical deduction and arithmetical analysis as its mathematical expression. They do not know anything of the scientific mathematical foundation, and of the power of geometric *analogous cognition*, which they only understand as a part of heuristic proceeding to content oneself with explanations of phenomena through unreliable similarities. But analogy does not mean similarity. Quite the opposite, it means *equal relations* between *dissimilar entities*, that is, relations between geometrically measurable entities of a *different kind*, such as time and space.

The term *analogy* stems from the Greek. In Euclid's "Elements", "analogos" is distinguished from "logos". "Logos" defines the mathematical ratio of *commensurables*, that is of ontologically equal quantities. "Analogos" Euclid calls the mathematical relation of ontologically *unequal* or *incommensurable* quantities, as a subject of *geometric proportion theory*. It was Cicero who translated the term "analogos" into the Latin word "proportio". Euclid's proportion theory is an instrument to allow for the discovery of equal relations between unequal entities such as spaces and times. On this basis it moreover allows to discover the unknown *synthetically from the known*. Classical Euclidean geometry deals not with conceptual inventions of the human brain, but with really existing entities such as space and time. Whatever really exists in space and time, be it material, or be it non-material, as space and time itself, is geometrically measurable. One should well understand classical geometry as a branch of mathematics that deals, as a *measurement theory*, with the *measuring of really existing entities*, which are measurable just because they are real. Consequently this geometry should sharply be distinguished from that other branch of mathematics which deals by means of arithmetic and analysis with numbers only. Classical geometric proportion theory, as Isaac Newton put it, shows lawful relations between "quantitates indeterminatae diversorum generum" – that is, finite quantities of really existing entities of a different kind. This mathematical tool deserves to be qualified as "Platonic". As a matter of fact, an application that throws more light on the subject can be found in Plato's "Timaios". There Plato introduces the proportionality of such unequal and dissimilar entities as fire and earth. In my view, earth stands for matter, and fire stands for non-material spirit. Plato then explains the inner 'logos' of this spirit-matter proportion, using

the image of knotting two things by means of a tape, as a mediating middle. This tape he identifies with “water” (in my view “time”), and “air” (in my view “space”), which both form together with earth and fire a *quaternary proportion* to represent the well-known Platonic theory of the four elements that build the cosmic edifice. According to Plato the power of the tape knotting all this together *is the power of love*, and only the creator of this edifice, who is the source of love, can untie the knot, and can thus destroy the said quaternary proportion which reads ‘the relation of spirit to matter equals that of space to time’.

One may replace the term “spirit” with “energy”, E , and the term “matter” with “momentum”, p , and for the relation “space to time” one may put the symbol c . What then results is the well-known symbolic formula $E : p = c$ to represent the proportionality of energy and momentum, knotted together by a quotient of space and time as constant of proportionality. Under the name of “vacuum velocity of light” this constant governs all of modern physical science. I have been able to demonstrate mathematically (that is geometrically) that this very constant also governed the authentic geometric theory of motion of Galileo and Newton. This realistic and true neo-Platonic theory for a while had been corrupted by neo-Aristotelian interpreters. Mainly they corrupted Newton’s most basic second law of motion at will by eliminating the said space-time constant in order to destroy the law’s metaphysical foundation, that is Newton’s explicit *geometric proportionality* of non-material creative force and material motion as its created effect, and to replace it by an egalitarianistic formula that puts force *equal* to the change of motion. From this materialist corruption resulted continuum mechanics as the arithmetic-analytic art that is undeservedly called “classical mechanics”, and most grotesquely even “Newtonian mechanics”. This unrealistic and in fact un-Newtonian mathematical construct served as the leading paradigm of science for about 200 years until to the middle of the 19th century. Only Michael Faraday and James Clerk Maxwell then restored the synthetic-geometric structure of the true theory of motion. However this was not achieved by means of logic and by analytical deduction from any hypothesis, but rather synthetically, and by means of analogous cognition, on the basis of experimental experience; unfortunately, however, without realizing that the new insight had actually revitalized the authentic geometric theory of Galileo and Newton.

As a matter of fact, the quaternary proportion that forms the underlying true geometric structure of the theory of motion, came to light when John Henry Poynting (1884), and about twenty years later Albert Einstein (1905), and again twenty years later Werner Heisenberg

(1926), introduced their new formulas of the energy-momentum proportionality – unfortunately, however, again being unaware that they had only restored the authentic, uncorrupted foundation of Galileo’s and Newton’s true geometric-synthetic theory of motion. Unfortunately this unawareness of geometry as the key to modern physics continues, and it characterizes the ongoing fruitless discussions about the still not really understood philosophical meaning of Einstein’s formula $E = mc^2$, of the Heisenberg relations, and of modern physics in general. This exciting and distressing history of the temporary triumph of relativism and materialism over truth has already in detail been reported and published in 2007, in my book “Die Rehabilitierung des Galileo Galilei”. *Habent sua fata libelli*. The book has found its way into the hands of His Holiness Pope Benedict XVI who, as I do know from his own hand, has accepted it with pleasure.

5. On reason and consequence, on cause and effect, and on the true existence of God.

Whenever a logician considers the cause of an observable effect, he tends to consider hypothetical *reasons* from which the concrete effect as a *consequence* could be logically deduced. This intellectual method has for long been established to characterize scientific reasoning in general, and to distinguish science from illogical proceedings of for instance pure belief, or blind faith. It evidently characterizes the theory of evolution of Charles Darwin which is fatally going to become the modern paradigm of science in general. Darwin’s method was strictly logical, that is to work by analytical deduction from hypotheses. Just observe a finch with a beak that finely fits to open locally available fruits. What is it that made the beak fit for this work? Well, it is the Darwinian hypothesis of survival. The finch’s survival depends on being able to open these fruits. So the hypothesis of survival then provides the reason, the consequence of which is the finch’s characteristic beak. Evidently the said abstract hypothesis as a reason implies a vast number of concrete conclusions to be deduced from it, which fact enables the theory of evolution to feign a wondrous explanatory power. Accordingly, even the uneducated begin now to “understand” a great many of observable facts of nature, that is to know their “reason why”. Whence does the giraff have such a long neck? Well, every school-child is able to profoundly solve this scientific problem by explaining that the survival of the giraff depends on its faculty to reach the leaves of very high trees. The answer is deduced as a consequence of the hypothetical reason of “survival”. To this relation of reason and consequence evolutionists attach the scientifically demanding term “mechanism”, in order to transform it unnoticedly into a natural *law of cause and effect*, that should moreover represent a mathematical *equivalence* of these two terms. “Survival of the fittest” then should provide not

only the “reason why”, but the *generating cause* of the giraff’s observable long neck to represent the equivalent *material effect* of that cause – notwithstanding the fact that the complex phenomenon of survival of an organism is never a generating *cause*, but at best it is an observable material *effect*, generated by an unknown number of unknown creative *causes* that are *ontologically different* from their generated material effects.

By using the term *creative*, or *generating cause* I want to point to a decisive difference between the *functional logical relation* of “reason and consequence” on the one hand, and the true *causal relation* of “cause and effect” on the other. Everybody who understands “creation”, or “generation”, correctly as a process to happen in space and time, will immediately see that no logical reason can ever “causally generate” a consequence. Rather the intellectual relation between reason and consequence *as a functional one* works *beyond* space and time, say, it works *instantaneously* on principle, because any consequence always is already given with the reason that implies it. Should it take somebody any time to deduce from a reason a consequence, then this depends on the limited powers of intellect of that somebody only, and has nothing to do with the time which any generation of anything ever has required and will always require. Remember that even the creation of the world itself did not happen instantaneously; rather, according to the book of Genesis, it took a certain time.

Hypothetical-deductive reasoning, or intellectual thinking in the way of Aristotelian logic, does not imply a concept of spacetime generation of anything. This is also the case with *calculations according to arithmetical-analytical mathematics*, which mathematics, the functional analysis, has methodically nothing to do with space and time, and consequently also not with a spacetime generation of anything, and not with nature itself. And this is also the case with classical analytical mechanics which, as a tool based on mathematical logic only, does not know a concept of generation of motion. At this point one begins to understand why classical Aristotelian philosophy, contrary to daily experience, ignored the principle of generation and corruption, asserted the eternity of the cosmos, presupposed the immutability of everything including living species, and established the eternal conservation of motion, force and energy as a scientific dogma. This so-called conservation principle, as it forbids the idea of *generation* of motion, consequently also forbids the moving of one’s limbs at will, and so it forbids the will of living beings as a causal and creative principle as well as it denies the presence of the creative will of God. Consequently it refutes the presence, say, the present existence, of the Creator himself. God is only accepted as the “first mover”, which idea results

from the logical requirement alone to avoid a circular argument as to the concept of conservation of motion. Now, as we know from daily experience about the fact of change, of generation and corruption, and about the power of will, it becomes evident that all attempts to understand the world methodically, that is scientifically, by means of intellectual analysis and logical deduction from hypotheses which do not allow for the concept of generation, must needs miss the goal. Whoever during the past 2300 years, from Aristotle to Descartes, Hobbes, Spinoza, Leibniz, Kant and followers, tried to do natural philosophy, that is to understand the world, on the basis of hypotheses and their logical analysis only, took the wrong way and committed a disastrous methodical mistake; disastrous insofar as it made science ignore the omnipresent principle of spiritual power as a source of generation, or creation, and also it forced science to deny the presence and truth of spirit, and of the spiritual will of living beings as a really existing entity, and of the reality of the spiritual Creator himself. This disastrous intellectual dogma of modern science is known under the name of “methodical atheism” or synonymously “methodical naturalism”, or “methodical materialism”. Unfortunately this dogmatic scientific atheism has for long found its way into the debate on evolutionism, and recently it has even been accepted by a prominent Catholic, Cardinal Christoph Schönborn, who called it a principle of “neat scientific method”, in plain contrast to his former statements. The philosopher Robert Spaemann told me in a letter that the Cardinal’s turn was due to the above-mentioned intervention of the Aristotelian and Thomist Martin Rhonheimer, who had successfully intimidated the Cardinal.

The functional logical relation between reason and consequence then has nothing to do with the law of generation, that is the law of creative active causes and their generated effects. Of this law we learn for instance from St. Paul’s first epistle to the Romans, that by perceiving God’s works we can realize the existence and presence of God. The scientific principle to make this method an efficient one is the *strict analogy* that unites observable effects with their true generating causes. Analogy, as I have already put it, does not mean similarity. Rather analogous cognition means a precise mathematical and thus scientific instrument, which under the name of *proportion theory* provides the central part of classical Euclidean geometry, that is the part which makes geometry the key to a true scientific knowledge of nature.

Says in Galileo’s “Discorsi” of 1638, second day, the Aristotelian Simplicio, after having been shown the power of geometry: “Veramente comincio a comprendere che la logica, benché strumento prestantissimo per regolare il nostro discorso, non arriva, quanto al destar la mente all’invenzione, all’acutezza della geometria”. Sagredo answers: “a me pare che la logi-

ca insegni a conoscere se i discorsi e le dimostrazioni già fatte e trovate procedano concludentemente; ma che ella insegni *a trovare* i discorsi e le dimostrazioni concludenti, ciò veramente non credo io.”

Geometric proportion theory is the tool which, thanks to the “analogy of nature” (Isaac Newton), that is thanks to the cognizable mathematical structure of the law of causal creation underlying all of nature, allows to discover from a true knowledge of effects the true generating causes thereof. Analogy is the harmony of true geometric proportions, of equal relations to lawfully unite dissimilar entities with each other, and this harmony is the foundation of beauty. Analogous cognition according to the rules of geometric proportion theory is that part of human intelligence which, extending far beyond the narrow limits of logic and analysis, provides man with the cognitive faculty to discover the unknown truth, and to realize the existence of truth itself.

The method of analogous cognition establishes what Pope Benedict XVI in his famous Regensburg lecture of 2006 called “Weite der Vernunft”, that is the vast cognitive faculty of man to realize not only many truths, but also the truth of all truths, that is the existence of God, not as a concept, and idea, or a hypothesis, but as the real existence of the personal Creator of everything.

It is a historical fact that about 200 years after Christianity in the 13th century unfortunately had adopted the philosophy of Aristotle, and what was more unfortunate, in an Islamic interpretation, European philosophers only in the course of the 15th century came to know the whole corpus of Plato’s philosophy, and the whole geometry of the Platonist Euclid, by then kept in Constantinople. It is also a historical fact that all those philosophers who enthusiastically accepted this ancient wisdom, attributed to that great Platonic overcoming of Aristotelian logical reasoning and Aristotelian anthropocentric (and consequently geocentric) subjectivist worldview, which overcoming under the name of “Renaissance” opened the door for a new age of human knowledge. The great names of those 15th-century philosophers and discoverers of the new are Cusanus and Columbus and Copernicus, followed in the 16th and 17th century by Bruno, Campanella and Leonardo da Vinci, by Kepler and Galileo, by Robert Boyle and Isaac Newton. Some of these men at there time were called “the Geometers”, since they understood the unique epistemic power of classical synthetic geometry, which depends on its relation to spacetime reality, and consequently to reality and truth itself. All these dis-

tinguished Renaissance scholars accordingly were not blind believers, but *scholars* who had access to true knowledge. All these scholars, when they spoke of the existence of God and his creation, did not confess some subjective religious conviction, but communicated true objective knowledge. So did Galileo, when he in the year 1613, in his letter to Benedetto Castelli, stated the indivisibility of scientific and religious truth, and in his work “Saggiatore” of 1621 praised the “book of nature” as God’s second revelation with these words: “La filosofìa è scritta in questo grandissimo libro che continuamente ci sta aperto innanzi a gli occhi (io dico l’universo), ma non si può intendere se prima non s’impara a intender la lingua, e conoscer i caratteri, ne’ quali è scritto. Egli è scritto in lingua matematica, e i caratteri son triangoli, cerchi, ed altre figure geometriche, senza i quali mezzi è impossibile a intenderne umanamente parola.” Isaac Newton, “standing on the shoulders of giants” like Galileo, as he once, with a quotation of Bernard of Chartres, described his historic role, accordingly in the “Auctoris praefatio ad lectorem” to his “Principia” of 1687 praised the power of geometry as the foundation of science. And just like Galileo, Newton also stated the indivisible unity of scientific and religious knowledge when he, in the *Scholium generale* of 1713 to the “Principia”, wrote that “to treat of God from phenomena is certainly a part of natural philosophy”, and accordingly, with the words “Deum summum necessario existere in confesso est”, declared the existence of God an inevitable scientific *fact*.

6. On a new “Christian Renaissance”, based on the metaphysical principles of a realistic and true philosophy, and on the demonstration of the being and attributes of God.

Sir Isaac Newton once said “He who wants to read a book written in a strange language must first learn the language.” With reference to the “book of nature” this means that any human endeavour to understand the principles of nature must needs learn the language in which that book is written. This language, as Galileo said it, is geometry. Plato knew that, when he, two-thousand and some hundred years ago, made knowledge of geometry the admission requirement for entering his philosophic academy in Athens. “Ageométritós mideís eisíto” he wrote at the entrance door. *Persons not well-informed in geometry were not allowed to enter the academy.* Philosophy aims at truth. Consequently, not some hypothesis, but truth itself is the only valid reference system of a true philosophy, and this system is given in the mathematical language of classical geometry. As this is the language of truth, it is also the true language of God’s second revelation, which is his creation, the universe. Euclidean geometry, or analogous cognition, then is the only language that enables man to understand the principles and the *logos*, the reasonable and intelligible *plan* according to which this universe was created at

the beginning, and, since everlasting change is its characteristic, still *is* created, in a “creatio continua”, by the omnipresence of its intelligent and omnipotent Creator, in whom we live and move and have our being.

Analogous cognition is a comparative art. It works by comparing relations. In exactly this manner works the teaching by means of parables, that is of comparable pairs of different entities, which is well-known as the preferred philosophical method of Jesus the Nazarene. Just remember the parable of the rich man’s passage to heaven, and a camel’s passage through the eye of a needle.

Sir Isaac Newton when a student at Cambridge chose for his philosophical leitmotiv an aphorism well-known during the Renaissance: “Amicus Plato, amicus Aristoteles, magis amica Veritas.” This aphorism makes clear that not Platonism and not Aristotelism, *but only truth itself* is the reference system of the Galileian-Newtonian philosophy. It reminds one of the last words of Socrates to his mourning friends, poetically expressed by the German Platonic philosopher Joseph Pieper: “Kümmert Euch nicht um Sokrates, aber kümmert Euch um die Wahrheit”. That is: *Don’t worry about Socrates, but do worry about truth*. Truth, however, is God, and the central message of Galileian-Newtonian philosophy evidently *coincides* with the central Christian message of man’s ability to worry about truth. Whatever members of the scientific community will object against this statement always criticises the concept of truth itself. *But one should never trust in the arguments of somebody who doesn’t worry about truth.*

Of course my considerations result in an appeal to overcome the still dominating Aristotelian intellectualism, that is the analytical logic of science, philosophy and theology of our times, and to restore analogous thinking in order to regain what Pope Benedict XVI in his “prophetic” (Georg Gänswein) Regensburg lecture calls “Weite der Vernunft”, that is the uncorrupted vast power of human cognition. Analogous thinking methodically implies and provides a spacetime reference system the omnipresent centre and source of which is truth itself. As it is centred on truth, it is centred in the omnipresent God. Thus analogous geometric cognition implies a ‘theocentric’ epistemology which was and is the genuine Christian method to discover truth, and the genuine *scientific* method to discover *truth on nature* as well. It was Sir Isaac Newton who, in the footsteps of Galileo, introduced this method, and used it with overwhelming success for the discovery of truth, that is ultimately for the realization of the existence of true reality, and of God. As Edith Stein once said it: *He who strives for truth, inevi-*

tably strives for God. Whatever is true, derives its truth from God. And whatever is true with respect to the created world as a whole, is also true with respect to any of its constituents, or elements, or parts, because of the coincidence of reality and truth.

In the year 1704, the Newtonian and theologian Samuel Clarke, author of a book entitled “A Demonstration of the Being and Attributes of God”, from the pulpit of St. Paul’s Cathedral in London preached Newton’s natural philosophy as the “philosophy of liberty”, because it liberates man from the chains of illusion and of only sensual perception. Clarke also called Newtonianism the only philosophy that is compatible with Christianity, because it knows about the foundation of all human knowledge, be that scientific or religious, in God’s revelations, be it in the Holy Scripture or be it in the created universe. The time has come to recover this true philosophy, as the only means to defend Christianity against God’s enemies, that is to defend it against the modern relativist and materialist enemies of spirituality and truth. With the words of Roger Cotes, in his above-quoted preface to the second edition of Isaac Newtons “*Philosophiae naturalis principia mathematica*” written threehundred years ago: “Newton’s excellent treatise will stand as a mighty fortress against the attacks of atheists; nowhere else will you find more effective ammunition against the impious crowd.”

Recently I visited the castle of the French philosopher Voltaire. Little is it known that this famous bright, a leading figure of the French Enlightenment, was also a distinguished natural philosopher and a Newtonian who, together with Madame du Chatelet, around the year 1735 translated Newton’s “*Principia*” into his native language, which I also did in the 1980ies. Little is it known that this Voltaire, educated by studying Newton’s natural philosophy, clearly expressed to *know for a fact* that the almighty and omnipresent God really exists. For this really existing God Voltaire even built a church which still can be visited at the French village Ferney-Voltaire near Geneva. On the tower of this church, beneath the face of the clock, are written these words: “*Deo erexit Voltaire MDCCLXI.*” Voltaire was not an atheistic intellectual. As he was a natural philosopher and a moralist, he shared the view which Isaac Newton expressed as follows: “If Natural Philosophy in all its parts shall be perfected, the bounds of Moral Philosophy will also be enlarged. For so far as we can know by Natural Philosophy what is the First cause, what power he has over us, and what benefits we receive from him, so far our duty towards him, as well as that towards one another, will appear to us by the light of Nature.” Or, with a word of Blaise Pascal. “He that takes truth for his guide and duty for his end, may safely trust in God’s providence to lead him aright.”

Newton was the very opposite of a religious believer who from blind belief in the existence of God, that is from God as a hypothesis, deduces this and that. His quoted words show quite the reverse: *It is the knowledge of true natural philosophy* that inevitably leads man to moral philosophy, and *to the cognition* of the real existence of God. It may well be that these words imply the epistemological and metaphysical key to safeguard the further existence of Christianity, since this key helps to overcome the schism between science and religion which today more than anything else threatens Christendom with extinction. This key, as a Holy Grail, demonstrates Christianity to be the only religion acceptable for modern man: acceptable and inevitable, because it is *understandable and true*. *Credo quia veritas*. This password opens the way to wisdom, harmony, beauty, and love; to reality, truth and to God. Christianity is built on man's scientific, spiritual, and moral ability to know about true reality, which is tantamount to know about the true existence of God. When the Bible says that only uneducated fools in their hearts deny the existence of God, it says that to know about this existence is not only a matter of belief. Much more it is a matter of true scientific knowledge resulting from a careful education that teaches how to apply the full power of man's faculties, the *intellectual and the cognitive*, in the love of truth, that is in the love of our truly existing God. A Christian and a scientist of today can and must believe in what revelation *and true science* unanimously teach him as an understandable fact: the real existence of God. CREDO QUIA VERITAS.

Appendix: *Quantum Mechanics, Euclidean Geometry, and the Power of Truth.*

Preliminary remark.

Quantum mechanics (QM) as a new theory of energy, matter and motion was born when in the year 1900 Max Planck in Berlin, in open contrast to the then believed continuum theory of light, measured the discrete structure of (the energy of) light. Planck's discovery was based on experience and experiment, and on Euclidean geometry. Methodically it appeared as a result of an approach that is called "heuristic", which means the very opposite of hypothetical-deductive reasoning, that is, of an application of logic and analysis. In order to conceive a consistent mathematical representation of his finding, Planck had to depart from classical analytical continuum mechanics. As he had been educated to strongly believe in this mathematical theory of physics, it cost him, as he confessed, great pains to introduce, against his scientific

conviction as a continuum theorist, the new formula that should describe the quantization of energy, which was later written $E = hf$. In this formula, f should represent the frequency of electromagnetic radiation, while h stood for a constant, later baptized “Planck’s constant”. This constant Planck had to conceive as a mathematically necessary term resulting from the only fact which he had actually measured: namely the analogy, or *proportionality*, of energy E , and radiation frequency f . The constant h had to be introduced, because the classical terms E and f bear well defined different dimensions, so that their quotient $E : f$ results not in just “1” or any other bare number, but in a term that had not been known before, symbolized by the letter h , with its own strange dimensions $[s^2/t]$, or *space squared over time*. Planck could not neglect this new constant that appeared, because proportion theory required it. The constant factor h of proportionality of energy and frequency announced a new age of science.

The process of conceiving Planck’s constant has just been outlined as an application of proportion theory, that is, of classical geometry. Even though neither Planck, nor any other famous scientist after him, so far has realized the geometric structure of the new formula, classical geometry evidently not only underlies Planck’s equation, but also governs modern science in general; just compare for instance Einstein’s $E = mc^2$, which is equivalent to $E = mc \times c$, or $E : mc = c$, with the factor of proportionality, c , that is $E \propto mc$, where the symbol “ \propto ” usually means “is proportional to”. Classical geometry is the “logos”, i.e. the *rational language* of reality, that is of truth. It should not come as a great surprise that analogical cognition, according to the mathematical rules of geometric proportion theory, is even apt to *rationaly explain* open questions in QM. To offer evidence, I shall present two striking examples of the explanatory power of Euclidean proportion theory in the following.

I Why quantum-mechanical operators do not commute.

1. A times B equals B times A . $AB = BA$. This “commutative law”, normally regarded as a matter of course, does not hold in some respects of quantum mechanics (QM). Why is that so?

A quaternary geometric (Euclidean) proportion, or equation of ratios, or ratio equation,

$$A : B = C : D \quad (1)$$

can be transformed into the following equivalent equation of products:

$$A \times D = B \times C . \quad (1a)$$

If one in eq. (1a) alters the order of elements, for instance that of A and D , so that $D \times A$ should be equal to the product $B \times C$, the ratio equation that is equivalent to eq. (1a) will no

longer read $A:B = C:D$ as in eq. (1), but $D:B = C:A$. The result of which is that one cannot alter at will the order of the elements of a defined relation among four elements A, B, C, D; to do so would produce *a different proportion*, that is a different mathematical relation among these elements. To say it otherwise: Provided that the elements A, B, C, D of a proportion form *in reality* a defined ratio equation, $A:B = C:D$, this order of the elements A and B, or C and D, cannot be altered into $B:A$ or $D:C$ without destroying the ratio equation, and replacing the realistic quaternary proportion through an absurd one.

2. The so-called *uncertainty principles* of Werner Heisenberg, $\Delta E \times \Delta t \geq h$; $\Delta p \times \Delta s \geq h$, provided both products result in $= h$, can equivalently be written as an *equation of products*:

$$\Delta E \times \Delta t = \Delta p \times \Delta s. \quad (2)$$

The equivalent *ratio equation* then reads:

$$\Delta E : \Delta p = \Delta s : \Delta t. \quad (2a)$$

It is well-known as a matter of real experience that the order of elements of Heisenberg's relations cannot be altered at will. For instance the product $\Delta p \times \Delta s$ (eq. (2), right side) cannot be changed into $\Delta s \times \Delta p$. The commutative law is not applicable here. According to what we have found above, this means that the united Heisenberg relations (eq. (2)) represent a *defined quaternary proportion*, which is the ratio equation (2a) that shows a proportionality of energy ΔE and momentum Δp as a mathematical relation that refers to some unchangeable reality.

3. The question *why* quantum-mechanical operators so mysteriously do not commute has never been answered before. My answer is:*because they belong to a defined quaternary proportion that shows as a part of true reality the proportionality of energy and momentum*. This proportionality and its true reference to reality would be destroyed if one would alter the order of the elements (ΔE and Δt ; Δp and Δs) of the Heisenberg relations.

II Is it true that Heisenberg's and Schrödinger's theories are equivalent?

1. Heisenberg's QM is based on the relation

$$\Delta E : \Delta p = c \quad (3)$$

to describe the particle picture, or particle aspect, of radiation. Eq. (3) represents a proportionality of energy E and momentum p. The required constant of proportionality is c. If one disentangles the constituents of this constant c in order to reveal it as a quotient of elements of space, Δs , and time, Δt , a quaternate proportion as a ratio equation comes to light:

$$\Delta E : \Delta p = \Delta s : \Delta t \quad (3a)$$

which is equivalent to the above developed quaternate ratio equation (2a). One sees that this ratio equation (2a), as a description of the particle aspect of radiation, on its right side represents a *constant quotient* $\Delta s : \Delta t$ which is identical with the constant c of eq. (3). The Heisenberg relations thus imply the concept of *proportionality of energy and momentum*, in harmony with eq. (3). One should moreover note that according to this proportionality, energy E stands in a *linear relation* to momentum p , which is a *vector quantity*. Consequently, energy E , in contrast to the scalar energy concept of classical mechanics, here must also be understood as a *vector quantity*.

2. The theory of Erwin Schrödinger, essentially the Schrödinger equation, is based on the mathematical concept of the scalar *kinetic energy* of classical mechanics:

$$E = mv^2/2 = (mv) \times v/2 \quad (4)$$

$$\text{And, with } mv = p: \quad E = p^2/2m = p \times v/2 ; E : p = v/2 \quad (4a)$$

The element $v/2$ on the right side of the latter equation is a *variable*, in contrast to eq.(3) where it represents a *constant* factor of proportionality. Now, since according to the definition of proportionality, two elements, E and p , are proportional only, if their relation to each other results in a constant, it follows that in Schrödinger's theory, in contrast to that of Heisenberg, energy E and momentum p are *not proportional*. Moreover, Schrödinger's energy is a scalar, Heisenberg's a vector. Consequently we find that, contrary to what is generally believed, the theories of Heisenberg and Schrödinger are *not* equivalent.

This fact comes also to light, if one analyzes Schrödinger's famous publication of 1926, in which he tried to demonstrate an equivalence of his theory with Heisenberg's. Schrödinger's derivations represent velocity v (which is a variable, of course) by the quotient $\partial s/\partial t = \text{variable}$, which results from $E = mv^2/2 = p/2 \times v$. This *variable* v Schrödinger erroneously puts equal to Heisenberg's *constant* quotient $\Delta s/\Delta t$ in order to show an alleged equivalence of the evidently *unequal* products $p \times v$ (Schrödinger), and $p \times \Delta s/\Delta t$, that is $p \times c$ (Heisenberg).

III How history of science sheds some light on the conceptual background of QM, or: *Brevis demonstratio erroris memorabilis Leibnitii et aliorum*

Heisenberg's quantum mechanics and Schrödinger's wave mechanics imply incompatible mathematical definitions of "energy": One describes a *proportionality* of energy and momentum, $E : p = c = \text{constant}$, which shows a *linear* relation of E and p , and E as a *vector quantity*. The

other one describes a *squared* relation of E and p according to $E = p^2/2m$ to show E as a *scalar quantity*. This latter equation, in which energy and momentum are *not* proportional., is equivalent to Leibniz's concept of "vis viva" which he introduced with a short paper, published in 1686: *Brevis demonstratio erroris memorabilis Cartesii et aliorum* In contrast to the *linear* relation between "force" and "motion" known in the Cartesian theory of that time, Leibniz argued for a *squared* relation which he had developed himself. This squared relation should represent the only *true quantitative measure of "force"*. One year later, 1687, in London Isaac Newton's "Principia" was published, which the leading scientists however ignored for a while. Newton here introduces *force* under the name of "vis motrix impressa" as the *active cause of an effected change of motion*, and this force stands in a *linear* relation to its *proportional* effect.

Leibniz' provocative paper caused the well-known "vis viva controversy" among leading European natural philosophers that centred on the question of the "true measure of force": Was force to be measured by the velocity of effected motion, or by the *square of* that velocity, as Leibniz proposed it? The quarrel went wild for decades among Leibnitians and Cartesians, who defended Descartes against Leibniz's assertion that he should have committed an error in this matter. Only in 1717 a Newtonian joined the squabblers. It was Samuel Clarke, who in the publication of his correspondence with the late Leibniz rejected the Leibnitian measure of force in favour of Newton's. However, the squarrel ended only when in 1741 d'Alembert, and more effectively in 1750 Leonhard Euler, made the concept "force equals mass times acceleration" (which Leibniz 1690 had introduced as "vis mortua") the foundation of analytical classical mechanics. This new concept harmonized with Leibniz's *squared* "vis viva" which, now under the name of "energy", results from an integration of the new concept of "force". Only in 1829 Gustave Gaspard Coriolis from practical reasons added to Leibniz's concept the factor $\frac{1}{2}$. Since that time "kinetic energy" is generally measured by the term $mv^2/2$ that shows a *squared* relation between Leibniz's "vis viva" (the Leibnitian force now called "energy"), and momentum p .

In the year 1884 the *linear* concept of (force, now called) energy and momentum came again to light when John Henry Poynting derived it from Maxwell's equations. Poynting's *proportionality* of energy and momentum, given through $E/p = c = \text{constant}$, served as a basis for Einstein's 1905 equation, $E = mc^2$, insofar as it (through its equivalent representation $E = mc \times c$,

which is also equivalent to $E/mc = c = \text{constant}$) describes the proportionality of energy with the momentum of light, mc , resulting in the constant c

As has been shown above, the Heisenberg formalism of QM favours the *linear* concept of a *vector quantity* of energy E , while Schrödinger's version is based on the *squared* concept of Leibniz to present energy E as a *scalar quantity*. From here one may infer that the well-known mathematical difficulties of the developed QM formalism as well as certain philosophical interpretations to explain some curious consequences of that formalism for reality, depend on ignorance of this most basical mathematical inconsistency. They result from the idea to unite in fact irreconcilable different concepts. The most remarkable absurd consequence perhaps concerns the idea of an instantaneity of spacetime interactions, which implies the magic trick to make QM objects appear at different places in space *at one and the same time*. This absurdity already characterizes Leibniz's 1686 derivation of the "squared" concept of force, which derivation asserts that the velocity of freely falling objects should increase in proportion to the spaces described during the fall: an assertion that inevitably leads to the magic conclusion that the falling body must appear at different places in space at the same time. It was Galileo who in 1638 geometrically demonstrated this absurd consequence, as he found the velocity of fall to increase in proportion not to space, but to time. Leibniz's "wonderfully philosophical error", as Samuel Clarke called it in his 1717 publication, is exactly that one which Galileo cautiously had avoided, in order to present a *realistic* and thus *true* scientific law of free fall.

This very error of Leibniz, as a *proton pseudos* of mechanics ignored by the experts now for 323 years, implicitly is present in the "squared" concept of energy that serves as a basis of Schrödinger's QM. It is responsible for the non-transparency and obscurity of a QM that has been constructed on irreconcilable concepts, that is Heisenberg's realistic proportionality of energy and momentum $E = pc$ on the one hand, and Schrödinger's unrealistic, or absurd, "squared" concept $E = p^2/2m$ on the other. The idea to unify these concepts also has produced the generally admitted fact that no mathematician, physicist or philosopher of our days so far has *understood* the true and realistic meaning of QM, that only comes to light if one understands its foundation on the law of creation, which is *the realistic proportionality of energy* (the creative generating *cause*) and *momentum* (the created *effect*).

To the appendix belong the following references:

Samuel Clarke (1717), *Der Briefwechsel mit G. W. Leibniz von 1715/1716*, Ed Dellian ed., Hamburg 1990, p. 122.

Gustave Gaspard Coriolis, *Calcul de l'effet des machines, ou considérations sur l'emploi des moteurs et sur leur évaluation*, Paris 1829.

Ed Dellian, *Die Rehabilitierung des Galileo Galilei oder Kritik der Kantischen Vernunft*, Sankt Augustin 2007, pp. 333-8.

Euklid (325 B.C.), *Die Elemente*, Clemens Thaer ed., Leipzig 1933, I. Buch p. 3 (Axioms), V. Buch p. 17 (Definitions).

Leonhard Euler, *Découverte d'un nouveau principe de mécanique*, Berlin 1750.

Galileo Galilei (1638), *Discorsi e dimostrazioni matematiche intorno a due nuove scienze attinenti alla meccanica ed i movimenti locali*, Enrico Giusti ed., Florence 1990, p. 178.

Werner Heisenberg, *Physikalische Prinzipien der Quantentheorie*, Stuttgart 1958, p. 93.

Gottfried Wilhelm Leibniz, *Brevis demonstratio erroris memorabilis Cartesii et aliorum circa legem naturae secundum quam volunt a Deo eandem semper quantitatem motus conservari, qua et in re mechanica abutuntur*, *Acta Eruditorum* 5 (1686), pp. 161-3.

Isaac Newton (1687), *Mathematische Grundlagen der Naturphilosophie*, Ed Dellian ed., 2. edition, Sankt Augustin 2007.

Erwin Schrödinger, *Über das Verhältnis der Heisenberg-Born-Jordanschen Quantenmechanik zu der meinen*, *Ann. d. Phys. IV. Folge* Bd. 79 (1926) p. 734-56, especially p. 750 footnote 1.
