Christ and Modern Natural Science

J H Diemer

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I.

There blows through all the world
A wild death hurricane.
The creations of men
spring up and perish.
The creations of the Lord
Also belong to death.
His name alone is King,
His name alone is Great.

Schaepman

Winter is again past, the wintertime when living things hide themselves under the protecting cover of Mother earth. The spring wind blows again over the fields and the great Miracle recommences. Creation prepares to celebrate God's wedding and to display His glory. The sun's rays become more powerful, drawing new life out of the seed, and bring to maturity the growing life in blossom, and later in the ripening fruit. The animals awake from their lethargy and take their appointed place in the symphony of creation. Thus new life arises everywhere out of death. Life and death go hand in hand; what lives must one day die, but before disappearing, it gives birth to a profusion of new life. The great Law governs all life and subjects the infinite variety to its unity. The source from which life springs forth is Divine, and the abundance which the Word conceals in his bosom is inexhaustible. The fool is stupefied by this, he continues to cling to a confusing multitude of temporal forms. But he who lives in the Word views Wisdom as the fixed order of the whole creation. The unbeliever knows only of a chaos of temporal causes; the believer on the other hand, knows that Love is the ultimate ground and prime mover of existence. Great wisdom, says Leonardo, is the daughter of great love; great love is the daughter of great wisdom.

Mankind may also participate in this spring festival. Created life has its fullest unfolding in him. Man is the image bearer of God; equipped with divine gifts and powers, he is /63/ called to rule over the rest of creation. He has received a cultural task from God, he has been commissioned to cultivate and investigate the earth. He must place the natural in the service of the spiritual, and glorify God in His works by bringing to light the richness of His creation plan. But Adam is not content with his divine gifts and high task; he wants to be like God himself and does not respect the Law which is placed above him. This is the pride which comes before the fall; afterwards comes spiritual death, the inability to attain righteousness by his own efforts. The burden of sin oppresses fallen man again and again. But God is gracious and himself descends to the world to do for sinful man what he, on account of his blindness, cannot do: to recapture eternal life by going voluntarily through death. Yet sinful man, if he would truly be delivered, must believe in the incarnation of God. He must believe that God the Son is truly God and truly man, and that He can redeem him in all the spheres of his existence. Sinful man must in his being, in his thinking, and in his action, believe in Christ, must in his totality die with Christ and in his totality rise with Him. This is the good news of redemption: a return to the condition

of perfection is possible for those who believe in the cross of Jesus Christ which reconciles to God. The perfect man stands in your place, you sinner, and you must understand this literally. You must begin with Christ; without him you can do nothing.

But from the time that Christianity began to conquer this world and make an alliance with it, from the time that Christianity no longer held redemption through Christ's cross to be primary for each field of culture, it has been increasingly losing its power and influence everywhere. Christianity has slowly but surely lost its grip on the world. How else can one explain why the gospel of Jesus Christ is so little taken into account by those most highly placed in this world, the diplomats and politicians, the business men, the scholars and philosophers, the poets and authors? Is it not because Christianity is no longer the salt of the earth? Has Christianity not lost its prophetic calling, its burning enthusiasm, its holy love? This lack of holy enthusiasm, deep seriousness and courage is the wasting disease of present-day Christianity. It no longer awaits with eager expectation the coming of the Kingdom of God.

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How can and must we prevent the further spreading of this disease? We must above all be convinced that only the Gospel of Christ can help the world out of its misery, in each area of culture. We ourselves are a part of this culture; we are placed by God at a specific post which we may not abandon. History is not a stream of events in which God engulfs us; it is human cultural action. And these cultural actions are always subject to certain normative ideas, ideas which are caught hold of and propagated by people who feel themselves called to this.

Such an idea arises, grips its environment and becomes the common property of many. It drives people on toward a specific goal that must be reached, a goal that is contained in the driving force of historical development. Each human action that is not meaningless has a goal. The person who does not clearly and sharply see that normative goal, set at a specific time, lacks focus and resolution. He does not have a clear and accurate idea of the purpose of his work. He appears to go the way of least resistance and most profit, driven by the current ideas. If he reflects more closely on it, he finds that the road he has taken has been paved by unbelief, and is carrying him away from God. Only when men fix their eyes on Christ can they resist this stream of ideas, which repeatedly attempts to drag them along. Thought and action find a resting place in the Word. Christ is the goal and the driving force of historical development.

Historical activity rests on reflective thought, which in turn is based on sensitive imagination. Just as historical development is subject to a norm, so also is thought bound to a fixed norm. Christians need to break with the conception that science can be neutral in some respect. Yet how many continually fall into this delusion. Thinking needs a criterion for truth. The Christian finds this criterion in the Word that is itself the revealed truth.

This norm for truth in science is the Idea. That is why science is not possible without philosophy, any more than philosophy can exist without religion. Science lays bare the rich diversity of structures which creatures display in all the different aspects of their existence. This diversity is without exception subject to the Law, the logical order of the fully created Logos. This /65/ Law is the Idea, the norm for scientific thought. This Idea is not to be understood in a Platonic sense, nor as a concept; however, it is also not to be understood in the pale and rigid meaning of modern science and philosophy. The Idea is a fullness and the concept is concrete and substantial.

Modern science is a power. It does not exist somewhere in the heads of men or in books, it is a cosmic product of culture. And because it is rooted in sinful reason, in the false self, it is doomed to ruin. That it has been cast adrift, without anchor, becomes painfully clear in its practical application. Only a natural science which is rooted in the renewed heart, in the true Self, can properly fulfill its God-given task.

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II

Modern natural science is a doctrine of function and as such it stands over against the natural philosophy of antiquity, which was a doctrine of form. The Greeks had eyes only for measurable forms and whole numbers, for limitedness and finiteness. True nature was for them a realm of order and harmony, a cosmos of unities which are perfect because they are rational. The diversity, movement and change in the world caused them some anxiety. The thinking soul must turn itself away from the chaotic multiplicity of the sensible world and must focus on the ideas, of which empirical phenomena are only dim images. The world-picture of the Greek was static and limited. It denied movement or limited it to the lower world of matter. Only Heraclitus and Democritus fall more or less outside of this schema, and they formed the smallest school in the heyday of Greek culture.

Classical Greek thought was governed by the antithesis between spirit and substance, between soul and body, between form and function, between thinking and perceiving, between eternity and time. And there are still more of such pairs of antitheses to be mentioned. The first mentioned notion of each pair was the real and the valuable for the Greek; the last-mentioned was unreal and inferior. This dualism is grounded in heathen pessimism. The Orphic doctrine of salvation, a mystic reaction against the religion of the Homeric period, rooted in a very ancient cult, sees man as consisting of two components: an immortal, immaterial soul, and a mortal, material body that was considered to be the earthly prison of the soul. The origin of the imperfect lies according to this teaching **in matter**, in the bondage of the soul to the changing multitude of senses. The soul can only be freed from this entwinement when it has extinguished all earthly life. There is a close connection between the rise of this Orphic teaching of salvation on the one hand and of natural philosophy on the other. The oldest thinkers /87/ were mystics as well; according to them, “nature,” the primeval matter which they sought as the constant amidst the transience of phenomena, is combined with the Divine.

The idea of a rational geometry and natural science first appeared in India. The philosophers believe that through reason mankind can obtain pure knowledge of true reality. Thinking is focused on the eternal, from which and through which the temporal world is formed.

Rationalism finds its extreme expression in the tenets of Parmenides, who held that that which is incomprehensible cannot exist. His pupil Zeno took from this standpoint in combating the view of Pythagoras, that a continuum could be constructed from many discrete points.[1] Through his well-known paradoxes Zeno demonstrated that multiplicity, movement and change were impossible and that only finite, indivisible unity can have reality. It is fear of the inexhaustible that causes the objectivist to cling anxiously to that which is the mean, and causes him to elevate this

[1] See D H Th Vollenhoven, **De noodzakelijkheid eener Christeiijke Logica**, 1932, pp. 20 ff.

average to the timeless norm of truth. And likewise the subjectivist fears the unity of thought which stands above the subject; he elevates the actuality of thought to the form of truth. Nowhere in Greek philosophy does one find a norm which is set between a law-giving creator and the creature who stands under the law. A world standing under the law and created out of nothing by a personal Logos who is Love, and who demands complete submission from mankind, was unknown to the Greek. Whoever begins with the Logos-revelation finds the norm for logical thought in the idea or meaning of this thought, which is the order established by God for thought. For him the concept of created truth about the creation contains both unity and multiplicity; both rest and action; both order and structure; both the norm for thought and the logical object comprehended by the thinking subject. Subject and object are both temporal; the subject stands under the law. But the divine law itself does not belong to the creation; it stands between God and, creature.

The fundamental error of Greek philosophy is that it takes the naive observation of things to be unreliable.[2] It separates the logical subject from its bond with psychical sense perception - the starting point of all science - and then puts it in an /88/ imaginary timeless reality as the logical objective, instead of putting it over against empirical observation in a specific law-sphere. It splits the world in two and tries to explain the lower part by the higher: becoming is explained by being; appearance by essence; change by law; changing matter by static form; the sensible by the intelligible in each case the temporal is explained by the timeless. In this way the different systems current in the heyday of Greek philosophy came into being.

The main concern is always to attain clear knowledge of the true, objective reality, which is seen as lying behind the world of subjective phenomena. This reality takes the place of the gods and spirits of folk mythology. Democritus found it in atoms which limit the infinite, empty space, and which themselves move according to the law of mechanical causality; they cause the sensible things to appear and disappear. Everything that happens is determined, but for the atoms themselves there is no cause. These atoms of Democritus are nothing other than fixed spatial figures, geometrical constructions which the philosopher hypostatises to eternally moving natural substances. The world is reduced to mechanics; the qualitative diversity of the world of phenomena is reduced to a quantitative diversity of moving atoms as the real. But this natural mechanics would only begin to exercise a powerful influence in the 17th century, when the rule of the Aristotelian doctrine of form had been abolished.

Philosophy had threatened to run aground in the relativism of the Sophists, but with Socrates it made a change in the direction of the human subject. Socrates discovered the rationally limited idea. He introduced method to science; according to him true - that is, objective - knowledge is gained only when the universal is seen inductively from a multitude of given cases, when the common is obtained through abstraction from the particulars. This universal is the only concept whose existence is discovered by thinking.

Unlike Democritus and Anaxagoras, Socrates was indifferent to the physical causes of things; it is Reason which has arranged everything efficiently, in the best possible way. We need only use our reason well to easily find the laws for our ethical actions. Plato carried this still further and hypostatised all rational concepts to timeless spiritual substances, to the Ideas. An Idea, which Plato in his later life, under the influence of the Pythagoreans, identified with the whole number, /89/ is a proto-type that appears in many temporal pictures; because of the obstruction of matter, however, these pictures are only imperfect reflections of the Idea. For Plato earthly

[2] See H Dooyeweerd, **De crisis der humanistische staatsleer**, 1931, pp. 85 ff.

diversity is that which is not completely dominated by the Idea. The concept is for him not the result of an active grasping of the temporal logical object – the empirically observed - by the logical subject; rather, it is the result of the contemplation of the logical object, that which Plato identified with the timeless Idea. Plato sees then a certain lowly usefulness in natural science, which according to him bears a partly mechanical, partly teleological character: it must be studied because knowledge of the necessary causes of things can lead to their practical application, even though it does not provide us with true knowledge. The soul which loves truth must withdraw itself from the world of perception which is timebound and is therefore subject to mechanical causality. It must concentrate on the dialectic, on the science of the Ideas, and it must, as preparation for that, study mathematics. Mathematics is the gateway which gives entrance to the realm of truth from the realm of opinion, for its objects stand between the Ideas and the shadows,

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III

> ...that which is immovably the same cannot become older or younger by time, nor ever did or has become, or hereafter will be, older, nor is subject at all to any of those states of generation which attach to the movements of sensible things. These are the forms of time when imitating eternity and moving in a circle measured by number. Time, then, was created with the heaven, in order that being produced together they might be dissolved together, if ever there was to be any dissolution of them; and was framed after the pattern of eternal nature.

Thus writes Plato in the ***Timaeus*** [33]. The heavenly bodies, of divine substance, are according to Plato eternally of the same form in themselves in their uniform motions. The things of this earth, however, go through a cycle of conditions: they "change continually." Only their genera and species have a "being," to be understood through reason, while their temporal figures are only "becoming" representations of the senses, in which the plastic material is set in a mechanical motion by the form it is becoming. These mechanical causes are temporal or secondary causes, which are controlled by Reason, the primary cause. They lie in the things themselves, things which successively set each other in motion corresponding to the multiplicity of numbers. In order to be able to control the powers of nature it is necessary to track these mechanical causes down.

The implementation of this programme for a mathematical natural science began in earnest with Galileo, the pioneer of modern science, who again sharply delineated the boundary between speculative philosophy and natural science. The boundary had been strictly maintained by Plato, but was promptly obscured by Aristotle. Galileo also elevated "temporal" motion and change from their position of inferiority to one of superiority with respect to the static.

First, however, Aristotle was to dominate the scene. Aristotle was the greatest collector and systematiser of antiquity. He brought order to all existing fields of knowledge of the natural kingdom, and outlined various new fields of knowledge. He rejected the doctrine of ideas because static ideas cannot explain change. He held sensible things to be the primary, and concepts of kinds to be the secondary substance. /110/ The concept of kinds is no longer the result of an investigation outside of experience, but one of a process of abstraction. It is a fixed average, a

general type that possesses no connection to truth.[3] Aristotle was an advocate of the Socratic method of knowledge and carried this through to a high degree in his biology.

Aristotle's world is a unity. His philosophy was dominated by the historical principle of entelechy, of the active form which strives to achieve its potential in passive matter. While acknowledging the correctness of the Eleatic criticism of the concept of accomplished movement from point to point, he countered this criticism by introducing the concepts of potentiality and actuality. Motion is the actualisation of the potential being of a thing. The being of a thing is its substantial form; however this only possesses reality in connection with matter. After the impediment of natural movement is removed, the form (= the whole) unfolds itself in a series of qualitatively different conditions (= the parts), whereby each change is a transition from a potential to an actual existence. The potential form is always matter with respect to the higher form, which propels it on until the maximum entelechy is achieved. Movement is directed to its natural resting point.

This principle of a form which actualises itself in matter dominates Aristotle's physics as well as his biology, but comes to the fore most sharply in the latter.[4] The goal or *telos* of the organic unfolding of form lies in the figure of the full-grown exemplars of the species, in the *eidos* (= visible form) and this goal, as final cause (*causa finalis*), is also the driving force of development. The animal is for Aristotle an efficiently functioning natural mechanism constructed out of an appropriate working power; he repeatedly commends its efficiency.[5]

Democritus had already pointed out the efficiency of the structure of the human body, but he ascribed this to a few causal mechanical active powers. Aristotle, reproaching him for this, is more consistent. He introduces teleology from the field of mechanics into the field of natural science and sees a profound analogy between the natural development of an organic being and the artificial development of a human structure. The only difference is that in the former /111/ the goal is constantly present, while the latter has its goal externally. Only when the mechanistic natural science of the Renaissance set the concept of entelechy and the *causae finalis* aside, would this historical conception of the organic individual burst into the theory of biological evolution.

The thought of Aristotle, whose logic and teleology are often highly praised throughout Christianity, was heathen through and through. His anthropocentric world-view stands diametrically opposed to the theocentric world-view of Christianity. Like Plato, Aristotle attributed "irrationality" and "inefficiency" to the resistance offered by passive matter to geometrically construed Reason. "Chance" in nature is scientifically unexplainable. This is the logical conclusion of rationalism, which in its narrow-mindedness assumes that only that which can be construed by the reasoning mind can really exist and only that which agrees with human value-judgements is good. Yet this very rationalism has also permeated the Greek spirit with the idea that a fixed order is revealed in natural processes, thus preparing the way for scientific study in various fields.

The fruits of rationalism began to ripen towards the end of the heyday of Greek culture, in the works of the Alexandrian scholars. The love of analytical research flourished among them. They proceeded from the evidence of observation and did

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3 D H Th Vollenhoven, **Logos en ratio**, 1926, pp. 12-15.

4 Concerning Aristotle's ***Physica***, see E J Dijksterhuis: **Val en Worp, Een bijdrage tot de geschiedenis der mechanica van Aristotles tot Newton**, 1924, pp. 1-45.

5 Especially in "Concerning the parts of animals."

not occupy themselves with philosophical questions; at most they belonged to one or another philosophical school. The methods of different fields of science were delineated in Alexandria, methods which would later be again taken up by humanistic science. Above all they studied mathematics, which increasingly became the foundation for explanations of natural processes in physics and astronomy. Pythagoras and Plato had instilled in their pupils a love for mathematics; Plato himself had contributed much to breaking new ground in this science which in his time, as a result of Eleatic criticism, was undergoing a crisis, Plato considered it a weakness of mathematics that it was forced to build on hypotheses for which it could give no satisfactory account.[6] The possibility of error must, according to him, be limited as much as possible; the mathematician must therefore strictly define his fundamental concepts (point, line, plane, number, etc.) and, proceeding from a few basic constructions /112/ and axioms whose practicability and self-evidence are accepted intuitively without help from sensory representations, must himself deduce and develop the mathematical forms. This is the principle expressed in the method of "pure" geometry, which found its classical formulation in Euclid's famous Elements. This work has had an extraordinary influence on the development of Western thought; it is not improbable that, after the Bible, the Elements has been the most widespread book that Western civilisation has ever known.[7]

Until recently, the mathematical conclusions which were to be deduced on the basis of Euclidean mathematics appeared to be in agreement with the results of the observations and experiments of mechanistic natural science. This applicability of mathematical theories to research in nature corroborated for the Alexandrian scholars the old idea that the cosmos was governed by a mathematical order. The application of mathematics to their research in nature was also a result of the abolition by Aristotle of Plato's distinction between real and perceived space. Both Aristotelian biology and Alexandrian physics and astronomy are doctrines of form, of geometry.[8] The focus of this natural science is knowledge of the dynamic forms which are the forces that move matter and whose essence was sought – in the same fashion as Pythagoras and Plato – in rational numerical relationships.[9] The calculable spatial structures are the true and the real; motion is merely the way in which the possibility of a structure passes into its actuality. Over against this, modern science has focused on precisely this "temporal" mechanistic motion, wanting to infinitely exhaust this motion through an increasingly refined method. It has then also come to a conclusion which is directly contrary to the ancient conception, namely, the rejection of the superiority of any "timeless" geometrical system and the acknowledgement of "temporal" physical motion as objective natural reality.

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IV

This, then, is the doctrine of the Greek philosophy of nature: the world originates from an encounter of Reason and blind chance; of teleological providence and mechanical necessity; of First Cause and secondary causes; of Idea and matter.

6 ***Republic***, Book 6, Chapters 20 and 21.
7 E J Dijksterhuis, **De Elementen van Euclides**, Deel 1. 1929, p. 110.
8 Ad. Meyer, **Das Wezen der antiken Naturwissenschaft**. Archiv fur Geschichte der Medizin, Bd 22, Jan. 1929, pp. 1-23.
9 E J Dijksterhuis, **Het Getal in de Grieksche Wiskunde**, 1930, pp, 13-14.

Ancient philosophy, according to Windelband, has never conquered the dualism between the goal activity of the form and the resistance of matter.[10]

Over against this heathen dualism Christianity now posited the unity of the world. The world is not formed from passive matter made by a geometrically inclined mind: rather, it is created from nothing by the Divine Word by the free will of God.

Christianity rejected every attempt at a causal explanation of the world. The world is as it is because God in His wisdom willed it so. Called into existence through the Word and sustained through the same Word, creation shows an incredibly rich diversity which .has its unity in the Word. This Law-word, to which all creation in its natural existence is subject, and, to which mankind in his spiritual existence must subject himself, is completely revealed in Jesus Christ. Evil does not reveal itself in an "imperfection" or "irrational" existence of earthly things; if that were so, it would have its origin in matter. Rather, it expresses itself in the evil works of a heart smitten with blindness as a result of its disobedience to God's law. And this blindness can be taken away only through the exalted Christ, Who has received power from the Father to deliver mankind from the bondage of sin, so as to make him to see again. The redeemed man is the reborn person who has put his life unconditionally in the service of God and whose walk is with God. The Christian must be a cross-bearer on earth, a follower of Christ, without whom he is nothing, being dead through sin.

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It has been the tragedy of Christianity that, in assimilating what is valuable in Greek civilisation, it has not clearly seen through the radically corrupt character of the whole ancient culture. Certainly it has always combated the absolute character of Greek philosophy, but it has done this with weapons which were themselves provided by this same philosophy and which bear the stamp of radical corruption.

In this connection we cannot totally ignore the role of ancient Christian and scholastic philosophy; after all, they did prepare the soil of thought to receive the seed from which modern science sprouted. It can be said that the outstanding characteristic of this philosophy was its striving to attain the truth as far as possible, without religion, relying instead on the natural powers inherent in mankind which Greek thinkers had discovered. It does, however, acknowledge a boundary which human reason cannot cross; it must be supplemented by an act of faith, which is presented by God as a gift of grace to whom He wills. A thorough mingling of Christian and heathen ideas took place in this period; many concepts from Greek philosophy were equated with Biblical concepts which sounded the same, but which had a totally different significance for the Biblical authors. This has caused great confusion, which still persists today, and which has given rise to many totally mistaken and unfruitful questions. We shall only get out of this confusion when we perceive that the Biblical writers commenced with Revelation and wrote for naïve observation, whereas Greek philosophy commenced with natural reason and wrote for men who knew they were called to the study of exact science. The Bible gives religious truth, which is for everyone; science on the other hand - also theology – seeks theoretical truth, the tracking down of which is a task given to specific people. And the characteristic of scholastic thought is that it tries to achieve this theoretical truth by means of a corrupt logical function. It holds that at least a certain theoretical knowledge is possible apart from Word-revelation. Modern science has afterwards taken over this idea.

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10 W Windelband, **Lehrbuch der Geschichte der Philosophie**, 6th Edition, 1912, p. 119.

This striving was adumbrated already in Augustine, for whom faith is a supplement to the rational knowledge of God; on earth /136/ Truth can only partly be achieved through theoretical reason.[11]

Augustine equates the Platonic concept of God - a God in whom all ideas are comprehended - with the Christian understanding of God as the Word. But the synthetist striving first comes fully to the fore in scholastic Chinking. The Christianised Germanic and Celtic peoples, with their deep sensitivity for the richly variegated reality and for the diversity of events in the world, received with church doctrine a realistic philosophy cast in the mould of Neo-Platonism and Aristotelianism, a philosophy which sought the essence of things in a static hierarchy of general concepts or thought-forms. The conflict between realism and nominalism,[12] eventually won by the latter, can be seen as a struggle for liberation by the young European spirit, which tried to wrest itself from the fetters of an alien philosophy.

Initially only a few of Aristotle's works on logic were known. But when in the 13th century the works on philosophy of nature by him and other Greek philosophers of nature cane to the West by way of the Arabs, a new heyday of scholasticism began. The manner in which Arab philosophers had interpreted Aristotle was, however, totally naturalistic and pantheistic. It was because of, among other things, their tenets of the evolutionistic relationship between God and the world and of the eternity of the material world that the Church initially rejected the new philosophy. According to Averroes, the last great Arab philosopher, the world is a living totality of forms; God, the omnipresent form, is both the moving power, as "*natura naturans*," and the moved world, as "*natura naturata*." Albertus Magnus and Thomas Aquinas devoted their lives to defending Aristotle against this naturalistic Averroeism, and combined his philosophy of nature with theology to form a great metaphysical system. From ca. 1250 on, Aristotle was considered as the highest authority with respect to truth about the world. What natural reason can find in philosophy has complete validity, even in theology; yet Revelation is above reason. According to Aquinas we can come to Yahweh by way of reason; should we want to reach Christ, however, an act of faith is necessary,[13] not presupposed.

Rudolph Steiner has shown that /137/ Aquinas thus identifies the God of Israel with the world-thinker and mover of Aristotle. But the Word, that the O.T. presents to us as creating, is the Logos, who comes in the N.T. as Redeemer, and this Logos stands diametrically opposed to Aristotle's thoroughly humanistically conceived Reason. Albertus and Aquinas believed that theoretical truth concerning the created world can be obtained without the grace presented in Christ. But both scholastic thinkers are still faced with the problem of the redemption through the cross, how thinking is to be redirected through Christ, and how it can be redeemed and be made Christian. Steiner sees the preaching of the redemption of human thought through Christ as the task of present-day Christianity.[14] But mankind must be redeemed by Christ in his totality, including - though not only – logical thought.[15]

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11 D H Th Vollenhoven, **Logos en Ratio**, p. 21.
12 D H Th Vollenhoven, **Christelijke logica**.
13 R Steiner, **Die Philosophie des Thomas van Aquino**, 1930, pp. 47-49.
14 Ibid. p 73.
15 D H Th Vollenhoven, **Christelijke Logica**, p 2.

V

Thomas Aquinas made a sharp distinction between the natural world, which lies under sin and which, as general revelation, can be known through reason as far as the limits of special revelation, and the supernatural world, which was added by God as a gift of grace and which can be seen only by the enlightened eye of faith. Philosophical knowledge of the world is generally valid and can be obtained apart from of the Church and Word-revelation; the knowledge of God however can only be revealed through the Church and is not rationally justified. Prof Vollenhoven points out that Aquinas

> not only turns himself against not only Augustine, but in fact against the whole of Christian philosophy, when he ascribes to philosophy the Aristotelian conception of "nature" as its only source of knowledge and "natural" reason as the only organ, which is understood in Aristotle's sense.[16]

The line of Christian philosophy runs from Paul via the apologists and church fathers to Augustine. Paul laid the foundation for Christian science, or more correctly, sharply rejected the laying of any foundation, for whatever purpose, other than that which is laid by God, namely, Jesus Christ. Paul rejected the philosophy which is based on the first principles of the world and not on Christ; Paul would have **nothing** to do with heathendom. This is not to deny the fact that Paul himself repeatedly made use of existing ideas and concepts in the world of Hellenistic culture to make the message of salvation understood. Paul was a Greek to the Greeks. But acknowledging that there are elements of truth among the heathen as a fruit of the working of the common grace of God certainly does not mean that Christians must acquire these elements in the same way /160/ as preparation for the reception of the Gospel. No, they must go directly to Christ, through Whom all things are made and exist, through Whose cross all things are reconciled to God, and, in whom all treasures of wisdom and knowledge are hidden. Above all Paul preached obedience to God's Word, that is to say, the necessity of rebirth and conversion of the heart.

In post-Apostolic Christianity the essence of Paul's preaching faded into the background. A rift threatened to come into being between faith and science, between the unlearned and the wise. The Apologists had the great merit of maintaining the ideal of a Christian science, established in principle by Paul, in the fight against paganism. But in their defense of the Christian religion, which they often called the true philosophy, they took over much of the Platonic-Aristotelian philosophy. They believed that the wisdom of the world can be a preparation for the wisdom of God. Justin taught that God had revealed himself in a special manner to the Greek philosophers as well; he thus came to accept a special relation between the Logos of God (John 1:1 ft) and the thinking and speaking of men. The notion that the science of the world is a preparation for the knowledge of God can be called the Fall of Christian science. Certainly can one now, without Christ, have an extensive knowledge of the world, which raises the soul, step by step, to the true, the highest knowledge of the Logos, which is achieved in theology.

Clement and Origen were the first theologians to try to systematically build a structure of Christian knowledge. They praised Paul as a true philosopher, whose writings are full of the mind of Christ. But they also praised Plato as the philosopher who **almost** attains the truth. According to Origen the encyclopaedic sciences - among others, arithmetic, geometry, physics, and (natural) history - lead us in a series of steps to philosophical studies, which is a preparation for theology, where the

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[16] D H Th Vollenhoven, **Het Calvinisme en de Reformatie van de Wijsbegeerte**, Amsterdam, 1933, p. 204. See also H Dooyeweerd, op. Cit., pp. 92-93.

summit of Christian knowledge is achieved: Christ, the Wisdom of God, the eternal Logos. Origen sharply distinguished this Logos from the historical Christ, the Word incarnate. Here the influence of Platonic philosophy is revealed. For Paul makes no distinction between Christ as the power of God and Christ as the Wisdom of God. Faith and science are not separated by Paul.

Augustine dealt the death-blow to Hellenistic Paganism. This is not the place to sketch Augustine's spiritual development;[17] /161/ for our purpose we need only to bring the following to the fore. Augustine was deeply influenced by the Neo-platonism of Plotinus - a synthesis of Plato's and Aristotle's philosophies - and only in the course of his later life did he come more and more in line with Paul. Being Christian initially meant for him after his conversion: Platonic philosophy and life. Christ is therefore an exalted model, an authority. Augustine then attributed to Plato and Plotinus the highest knowledge of truth attained through observation out of their own ability. But the more he lived out of the confession of the Triune God, the more his knowledge ideal gained Christian content and the more he saw the deficiency of heathen philosophers; they are proud and will not accept a mediator. Augustine came to see that man, fallen in Adam, must first be recreated by the Spirit of God, if he is to be able to see eternal things clearly. The Christian can learn a great deal from Platonic philosophy but he must always remember that it was revealed by grace through God's Word. The heathen philosophers, however, rejected this grace and regarded the hosts of simple people, who cannot contemplate with disdain. But according to Augustine a simple believer can also obtain the highest, saving knowledge apart from science and philosophy.

Augustine always remained Platonic to a certain extent. Ideal knowledge, to which the true way leads, is the knowledge of the unseen things of God. But though philosophy and theology are of the highest worth, the encyclopaedic sciences must also be studied by the Christian. This culture, which is a gift of God's common grace, is by no means safe with the unbeliever. The Christian must conquer it and glorify God and serve his fellow man with it. But he can not be saved by it, if he does not first "celebrate the Passover." Augustine thought that much can be learned from the Greeks also in the fields of mathematics and natural history. Something of the eternal wealth of truth is revealed in the fixed relations of measure and number which Plato and Pythagoras sought. These are logically compelling results of scientific thinking, for the Christian as well.

Augustine strove constantly not to isolate true knowledge, also in the science of nature, from the Christian faith. He acquired lasting merit /162/ for Christian science by his searching exegesis of the creation story. But Augustine underestimated the radical corruption of all ancient science. For from this nothing is to be taken over. Because the point of departure for the Christian is totally different, knowledge is also totally different – even though there seems to be so much in common. The objects of normative thinking are not immaterial ideas, but created natural things, which are subject to the laws established by God. These laws are not abstract ideas, which are divested of matter (Plato, Aristotle) but are concrete truths of God, eternal logical ideas which are worked out in creation by the Spirit in the wealth of individual diversities. All these truths are contained in the Logos; in Him the fulness of the Godhead dwells **bodily**. From a purely Christian standpoint the concept is not a form, in which the universal is conceived as an idea on the basis of a great number of particular observations; rather, a concept is a concrete thing, a formed idea. In the concept a rich diversity of individual structures (the content of thought) is formed by means of one and the sane considered law (the thought form). The universal of

[17] For details see Th L Haitjema, **Augustinus' Wetenschapsidee**. Academic Thesis 1917. Some material has been derived from this.

individuals is their being-subject to the unity of the law. From a Christian standpoint matter is no longer considered inferior, and unity and diversity both come into their own. The inferiority of natural science with respect to philosophy is still a Platonic remnant in Augustine.

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VI

When the Editor asked me to write one or more articles on the significance of Calvinist thought for modern philosophy of nature, I decided I could not do this without first pointing out the roots of modern natural scientific and philosophic thought in heathen thought. Also in Christian circles one invariably meets up with the notion that those who laid the foundations of modern natural science achieved their results independently and free from ancient metaphysics. This is not correct; these pioneers of modern natural science were completely devoted to the classics. Their concept of nature was not Christian but pagan.

I have elucidated the concept of nature in antiquity and in the Middle Ages in the preceding articles. I will now go on to that of modern times. The resistance to the Aristotelian concept of nature continued to increased, coming especially from the camp of those who fought against Thomas Aquinas for a natural science independent of all theology and metaphysics (Roger Bacon, Occam and others). According to these men true philosophy is empirical science which is universally valid and which concentrates on finding relations between the phenomena in temporal nature. Nominalism now gained the ascendency over realism, and the Platonic concept of nature over the Aristotelian. Final causes were set aside and natural science became mathematical. Concepts were now interpreted as /186/ creations of the subject, which do not reflect a higher real world of truth external to man, but one which he brings forth from himself as a consequence of the impressions of the external world. Man constructs his own cosmos out of the chaos of sensations. Truth must be brought out of man himself, and this can only happen through abstracting more and more from the perceptible matter.

Nominalism triumphed in the 16th century in the pantheistic nature philosophy of the Renaissance. The humanist movement in the 15th century had acquainted the West with the original writings of Plato; in him, in the Neo-Platonics and in the Stoa, the anti-Aristotelian nature-philosophers found fuel for dissention. For Cusa, Bruno, Kepler and others the beauty of the whole is primary; the Godhead is the unity of the world, which harmoniously surrounds the multiplicity of the material world. Nature is animated: it is a living whole, a macrocosm. And man is nature-in-germ, the microcosm, the divinity becoming the world. To the extent that man is himself true nature, he knows true nature; to the same extent self-knowledge is also knowledge of nature. For the Renaissance philosopher, all true knowledge arises from the mystical unity of God and man.

Subsequent natural science must be regarded in the light of this nature philosophy. Copernicus came to reject the system of Ptolemy because it conflicted with the simplest and most harmonious geometry of the heavens. And he was led to these ideas by the study of Pythagorean-Platonic philosophy. Kepler was even more strongly influenced by these philosophers and. like Plato, he believed that God always works geometrically. According to Kepler the goal of inductive natural study lay in the tracking down of constant quantitative relations, the natural laws which are

"mathematical harmonies in the Spirit of the Creator." Knowledge is for Kepler an awakening from sleep; ideas are innate in man. God rules the world through him.[18]

Now this is humanism, self-deification. The fundamental error of humanism traditionally lies in the identification of the objective order with the normative order of things. Christianity however - and here lies the special significance of Calvin for Christian thought - steadfastly maintains the distinction between these /187/ two. It maintains that the objective order finds its fulness in the normative order and that this latter is in the bodily Logos, in Christ Jesus. Modern natural science is not born out of the spirit of the Reformation, it is "the daughter of humanism."[19]

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VII

In his "Institutes"[20] and in his "Commentary on Genesis"[21] Calvin discusses the relation of Creator and creation. A favourite expression of Calvin's is that heaven and earth are a wonderful work of art by the Supreme Architect. God is omnipresent in the world; He, who is otherwise invisible, in a certain sense takes, on the shape of the world so as to reveal Himself to us. He must always be imagined as clad in this most beautiful, of ornaments. Therefore it is true "that it can be said in all piety, provided that it comes from a pious heart, that nature is God." But Calvin considers this an unclear manner of expression "because nature is rather **an order prescribed by God**." In matters of such great importance it is harmful "to connect God in a confusing manner with the lower order of His works."

Calvin is well up on the natural philosophy of his day, whose adage is: God or the unity of nature. He wholeheartedly acknowledges the element of truth in this. But Calvin - and here his tremendous faith is revealed - sees deeper. He sees that God is not absorbed in nature; rather, nature is a lower order, an objectivised order of truth. The creature is subject to the ordinances or laws of the sovereign Creator in all its life expressions, and these laws form the relation between Him and the lower order of His creation. Even though much of nature has been greatly spoiled by sin, it is in its origin divine, beautiful and good. But it always remains **His creation**.

In Paradise man was gifted with the light of true knowledge, created as he was in God's image. For this image is a fulness of truth, of pure reason. In Paradise roan saw the eternal ground of creatures. But his bliss was destroyed when, through his own fault, he fell. His understanding was darkened and his reason corrupted. Calvin sombrely pictures /209/ the devastating outworking of sin in the world. But he does not stop there, he points to Christ, through whose merit mankind has recovered the lost image through grace. Only through Him can fallen roan again obtain true knowledge; only when Christ's invisible kingdom occupies his heart, is he again right with God.

But this pious attitude of life, this seeking of the things which are above so as to learn to understand through faith "what the eye has never seen, nor the ear has heard, and what goes far above our heart and understanding," does not, according to Calvin,

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18 K Joel, **Der Ursprung der Naturphilosophie aus dem Geiste der Mystik**, 1903, pp. 7 - 22.

19 W Windelband, op cit., p. 294.

20 Translated by A Sizoo. Vol. 1, 1931. The first citation is from page 24.

21 Translated S O Los, 1900. The remaining citations are from this.

prevent our senses from "directing themselves to the contemplation of heaven and earth and from finding something therein that fortifies us in the true knowledge of God". Calvin was a great admirer of natural science. Let the natural philosophers study nature and uncover its delightful order. This knowledge can only strengthen faith. Only a fool thinks the study of nature is reprehensible. It is in fact a duty for him who possesses the time and ability for it. It is ridiculous and nonsensical to contend that he who puts himself in the standpoint of Calvin, should be afraid of the results of the true study of nature. A conflict between faith and true - Christian, if you will - science, is impossible. And if a conflict arises, it must be a consequence of erroneous premises, conflicting with Revelation, on which natural science is based. For the Christian faith in the infallible truth of Scripture is absolute.

This faith in Scripture is at root nothing other than faith in Christ. If the Bible is God's Word, it cannot be anything other than Christ, who was revealed in the flesh. The unbeliever does not understand this, for he only sees the parts, the different books of the Bible and their components. However the Logos is the reality and the life of all this; the power binding it together. Whoever believes that Scripture (God's Word) and Christ (God's Word) are two different things and separates them from each other may be a Christian but he does not stand in the tradition of the Reformation. For these both signify one and the same thing.[22]

Knowledge of nature without faith in Christ is as dead as knowledge of Scripture without faith in Christ. For the Christian researcher in nature, the truth of the reality of the Logos, of God's Word in creation, is fundamental. Calvin, who separated nothing from faith, also saw this and has pointed it out emphatically. /210/ Christ is present everywhere in the creation. For Calvin, Christ is "the image in whom God has not only let us see His heart, but also His hands and feet." And these "hands, and feet" are the "works which are displayed before our eyes," But when love for the Crucified Redeemer- fades and the Holy Enthusiasm - and what else is personal faith? - cools off, then man's desire for eternity withers and in a heathen manner he devotes himself to the study of the temporal, without living in the patient expectation of the Kingdom of God and proclaiming this. Faith and science then become separated from each other and the latter is reduced to the level of a horizontal mechanical explanation of nature.

Apart from the Word of God no true knowledge of nature is possible: that Calvin has clearly recognised. I can therefore not agree with Prof. Visscher when he says that Calvin's concept of science is not defined by dogma. I do believe with Prof Visscher that Calvin did not want to restrict natural science to the representations of naive experience, such as Moses used in the story of the creation.[23] But scientific knowledge is knowledge based on logical thought, which is focused on the positivised order of truth. And this theoretically exact thought is never neutral: not for a moment can the logical subject withdraw itself from the sovereignty of the norms without sinning. And these norms are all in the Logos, in Christ. This is what Calvin meant when he writes: "As soon as we remove ourselves from Christ, we will necessarily go astray in the most mysterious as well as in the most obvious things."

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VIII. (Conclusion)

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22 A Kuyper, **De Schrift het Woord Gods**, 1870.

23 H Visscher, **Het Calvinisme en de tolerantiepolitiek van Prins Willem van Oranje**. Lecture, 1933, pp. 20-22.

Whoever begins to delve into the true Christian knowledge of elements, plants and animals must first of all ask himself: what is the object of knowledge, which 1 as subject attempt to obtain, and how are the subject and the object related to one another? Knowledge must be subjectively certain, and objectively must offer truth, and also dare to presume to do this. Whoever is not convinced, profoundly convinced of the truth of his theoretically-acquired knowledge, will never be able to defend his ideas enthusiastically, and will not be able to awaken love and inspiration for the truth in his hearers or readers.

Thinking must be predicated on belief in the objective existence of the truth and in roan's ability to come into possession of it. But this scientific truth cannot be the absolute truth, because the absolute truth, as Word-revelation, the incarnate Logos, is the foundation for scientific truth. The Christian who stands on a Calvinistic, that is, on a Biblical standpoint, and thus is mindful of the boundary between God and the creation, does not ask, "What is truth?"; instead, he asks, "What is the truth **about the creation**?"

In His Logos, that is, in His image, God reveals Himself, the cosmos and man himself. This means that man exists cosmically, that all the cosmic functions are contained in the unity of his consciousness and that knowledge of the creation can therefore be obtained through deepened consciousness of self. Resting in the supra-cosmic Truth, the cosmic subject sets himself over against the psychic, the organic, or the physical structures of cosmic things which are created by the Logos, and exist in the Logos as objects. Such structures are intuitively perceived and are a universal aspect of the cosmos. It is a specific perceivable cosmic order or law and thus is not natural reality itself, but an abstraction from this natural reality obtained by synthesis. True Christian science is concerned with this firm law. The universal element of, for example, the different plants as logical /230/ objects, is not the organic law of the cosmos, but the being-subject to this law, which is incredibly richly specified.

Scientific knowledge is relative and belongs to the creation. But this relativity may not be understood in a heathenistic, relativistic sense, because that which is relative presupposes something absolute to which it is related. And this absolute is religious knowledge which gives scientific knowledge its truth-character and meaning. Without a religious background true, scientific knowledge can not exist; it is a meaningless delusion. Whoever does not believe in the existence of absolute truth, also does not believe in the possibility of human truth seeking as a calling from God, and he reduces the study of science to a useful expedient in the struggle of existence.

Modern natural science has been structured by thinkers and researchers who believed in the existence of an absolute truth and who derived strength for their work from this. However, they did not follow Calvin in seeking the absolute in Christian truth-consciousness, but in the tradition of Democritus and Plato, they sought it in mathematical thought, which imagines that nature is structured according to man's rational consciousness. For men such as Galileo, Newton and Descartes, this rational consciousness was mathematical thought; that is why particularly Descartes excluded all knowledge which is not mechanistic or which would not eventually become mechanical from true natural science. The object of knowledge is that which is perceived with the senses and this must be mastered totally mathematically. Natural things must be seen as mechanisms, as merely material and not possessing any spiritual functions. This method of doing science was established as normative by Kant's theory that the amount of true knowledge to be found in each science is directly related to the applicability of mathematics to that science. Kant excludes the physical, organic and psychic subject-functions from self-consciousness, and reduces them to objects under the rule of absolutised mathematical thought. Natural science

must, according to him, push mechanical causality to the extreme, and must see ail natural laws as special instances of the fundamental mechanical laws.

Nineteeth century natural science carried out this agenda, making it possible to apply causal-mechanical methods to an increasing number of fields of nature. Technique was continually refined, and research and theory came ever closer to the examination of the behaviour of individual atoms. And here, with the discovery of the fact that the law of entropy is not deducible from the fundamental laws of mechanics and that /231/ empirical laws of nature possess the character of laws of probability, the first blow was struck against the classical idea of the absolute calculability of natural processes.[24] How natural science has developed since; the understanding of how physics has been fundamentally modified during the last half-century, to the point where matter has been divested of its fixed substantial character and the idea of causality has been practically totally abandoned; how the idea of nature as a unique historical event is steadily gaining ascendency in physics as well as biology; all these I can not go into further here.[25]

In conclusion, I want to say the following. For anyone who cares to look, natural science today is in a fundamental crisis. It has virtually abolished heathen metaphysics, and it has also banished barren directions, but it has thereby also undermined its own foundations. Much work is being done to renew the theoretical foundations of physics and biology, but this work passes Christianity by. To demonstrate that only on the basis of Word-revelation can the richness of the cosmos come to full expression is the task of all those working in physics and biology who love truth above all and who must proclaim in God's name the absolute truth of Christianity, also in the sciences. Those who seek in His strength God will not let go unrewarded.

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24 See P Kohnstamm, **Ontwikkeling en onttroning van het begrip natuurwet**, Haarlem, 1916.

25 See W C Dampier Whetham, **A history of science and its relations to philosophy and religion**, Cambridge, 1930, pp. 215-480. Also G J Sizoo, **Causaliteit en waarschijnlijkheid in de nieuwere physica**, Orgaan Chr. Ver. Nat. en Geneeskunde, 1932, afl. 2 and 3.