

enced by an excessive dichotomy between matter and spirit. The recognition of matter also calls for a theological statement of Christian belief in categories that give an understanding of that belief in its existential reality (Scheffczyk, 151). And with this recognition of matter the need for a new understanding of the Church's catholicity is apparent. The theological conception of the Church's catholicity needs to be enlarged to include the depth of human existence revealed by scientific knowledge of the phenomenal universe.

See Also: MATTER; MATTER AND FORM; CREATION, ARTICLES ON; SOUL, HUMAN; TIME.

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MATTER AND FORM

Within the context of an Aristotelian-Thomistic PHILOSOPHY OF NATURE, matter and form are considered as the primary essential principles of changeable being. Although MATTER and FORM both merit consideration in their own right, additional problems attend an understanding of the relationship between these two, together with their relationship to PRIVATION, when all three are considered under the formality of PRINCIPLE. This article exposes in detail the teaching of ARISTOTLE concerning these relationships, discusses applications of his doctrine in various areas of scholastic philosophy, and concludes with a brief evaluation of historical controversies bearing on this general subject.

Aristotelian Doctrine

Aristotle's proposal of matter and form, as elaborated in Book 1 of his *Physics*, was in reply to a question concerning the first essential principles of changeable reality that must be properly understood. Not itself a query about the structure of matter, or a Platonic question of distinguishing between the sensible and the intelligible, Aristotle's is a question concerning primary principle, not ELEMENT in the modern sense. His problem is the nature of the mobile, and only indirectly, though still importantly, the nature of the sensible (*see* MOTION). The issues he raised were at a general level and consequently led to general solutions. This accords with his conviction that the mind begins with vague and universal notions and increases its knowledge by making these notions distinct and more particular.

Dialectics and induction. In his DIALECTICS, searching for first principles at this universal level, Aristotle is concerned initially with the positions of the pre-Socratics (*see* GREEK PHILOSOPHY). Though rejecting their views in the explicit form in which he reports them, he finds that all previous thinkers about the principles of nature implicitly affirm that such principles are contraries. For the modern reader, these predecessors of Aristotle may be of only historical interest; in the spirit of the *Physics* it is Aristotelian to turn also to modern philosophers of nature like Whitehead and Bergson, and to modern scientists who have developed the quantum and relativity theories. Alfred North WHITEHEAD, in his concepts of creativity and eternal objects, and Henri BERGSON, in noting two divergent aspects of evolution, attest to the existence of a dualism in nature, while the quantum theory, with its wave-particle view of matter, and relativity, with its space-time continuum, may be considered as further intimations of duality in the material universe.

Contraries and a Subject. The second phase of the dialectical search for factors that, when tested by INDUCTION, become the first principles of a natural science, requires a knowledge of the logic of contrariety (*see* OPPOSITION). Contraries are opposites within the same category. Thus the green is a contrary of the red but not a contrary of the musical. There is no direct CHANGE from not being red to being a musician. Should a man while getting sunburned also be practicing music, two changes are involved; any one change is between opposites in the same immediate genus, i.e., between contraries.

Moreover, and here again induction is invoked, there must be a subject in which the contraries succeed one another, e.g., the fruit that previously lacked a red color and now possesses it, the man who was not a musician and now is, the animal once young but now full grown. According to this analysis, there are three principles of motion, viz, two contraries and a subject.

This same conclusion can be confirmed by an analysis of language. After considering three alternative ways of stating that a man becomes a musician, Aristotle concludes that the most satisfactory sentence is: "The non-musical man becomes a musical man." Here there is a subject possessing one of the contraries at the beginning of the process, and the same subject possessing the other contrary at the end. To supply inductive evidence from reality that supports this linguistic conclusion, Aristotle introduces an ANALOGY between natural becoming and the making of a statue by human art. The marble—or subject—has, with respect to being a statue, a shapeless character before carving and a recognizable shape after the sculpture is done. This example has led to some misunderstanding, as though Aristotle were putting the carving

of a statue into literal correspondence with a motion taking place in nature. In reality statue-making is here only a model taken, like language, from the homely world that man knows best. As a dialectical device, it is not meant to be applied literally to nature but only to suggest the inductions through which the principles of natural change can be truly grasped.

Form and Privation. In technical terminology, the positive principle present in a subject at the end of a change is called form. Although this word originally meant shape and is commonly taken only in this sense, it had acquired a wider meaning even for PLATO. For the Aristotelian it means the positive term (*terminus ad quem*) of any change, a new shape or size or color. The other term (*terminus a quo*) has been identified as a contrary of the form. As a first approximation this language is adequate. Yet sometimes, as in the coming-to-be of a dog, the form does not have a contrary. Unlike a new color that comes to be from a positive opposite in the same genus, a dog comes to be from what is non-dog. To describe such changes, the opposite of the form is called privation, and even where a form, like red, has a positive opposite or true contrary like green, the green is regarded as the privation of the red. In this new and more general language, therefore, all natural motion involves a subject, a form, and a privation.

As another refinement of concept, the subject and the form, entering as they do into the intrinsic constitution of the product of change, say, the red apple, are called essential (*per se*) principles. Privation, on the other hand, does not enter into the thing made, and is thus called an incidental (*per accidens*) principle of motion.

Accidental and substantial change. Having treated change in general, Aristotle next distinguished two types of change, accidental and substantial (*see* ACCIDENT; SUBSTANCE). In the first case, as in the wrinkling of paper, the reddening of the human skin, and the growth of a puppy into a dog, a thing changes only in a qualified way. But in the second case, as in the burning of paper or the death of a dog, a thing changes wholly into another thing. This kind of change, which Aristotle called change “in an unqualified sense,” came to be known in scholastic language as SUBSTANTIAL CHANGE. It is divided into two types: generation, the change from NONBEING to BEING; and corruption or destruction, the change from being to nonbeing (*see* GENERATION-CORRUPTION).

Modern Difficulties. In distinguishing the two basic types of change, Aristotle had to do little more than cite examples to make his case. In modern thought, knowledge of substantial change and of substance itself has been called into question by philosopher and scientist alike. A sample objection, for example, would explain

what is apparently substantial change as a mechanical motion of atoms from one aggregate or compound to another. In this reductionism, substantial change is only local motion, an accidental change (*see* ATOMISM; MECHANISM). There is no intention here of minimizing or of oversimplifying such objections. Yet Aristotle had also to contend with similar arguments from ancient atomists like DEMOCRITUS, who viewed substantial change as reducible to local motion. How then can one justify his giving a highly controverted point such brief treatment in the *Physics*?

Aristotelian Reply. The answer depends upon the much neglected pedagogical principle set down by Aristotle in the first chapter of the *Physics*. He argued that reason, following its natural tendency, must first consider changeable things at a vague and general level; at this level, the difference between accidental change and substantial change is evident. Moreover, at this level things are most intelligible to man and attainable with greater certitude; thus the evident difference between substantial and accidental change can be manifested by a few examples. When ancient or modern atomism, both envisaging more distinct and particular levels of knowledge, object to the concept of substantial change, they can then be dismissed as irrelevant. Whatever truth such views reflect at more specific levels must be interpreted to meet the demands of prior, more generic, and more certain notions. At specific levels of natural knowledge, where certitude is hard to find, many inductive tests are normally necessary to establish a truth. This is not the case at the more universal level, where certitude is easier to attain. Thus could Aristotle treat in an apparently naive way what becomes an embattled issue when argued, as by many moderns, in areas where certitude is weak and where only doubt, difficulty, and controversy can be expected.

EXPERIENCE, at the level where man’s knowledge of nature yields maximal intelligibility and certitude, therefore discloses the difference between substantial and accidental change. Since the accidental, like size or color, depends upon the substantial, such as being a dog or being water, the first principles of changeable reality must be matter, form, and privation in the substantial order. These first principles can now be more precisely identified in the following discussion.

Primary matter. Matter has been generally identified as the subject of change. As such it is a POTENCY or capacity. The subject of substantial change is called primary matter, while the subject of accidental change is known as secondary matter. Secondary matter, such as a dog undergoing the accidental change called growth, is potential with respect to its new size; yet it possesses an actuality of its own insofar as it is a dog. By analogy to

the subject in such accidental changes, there must be a subject also in substantial change. Experience manifests an abiding material or substratum in such changes as the burning of coal or the death of a dog. Among the arguments reason can supply for the necessity of such a substratum is the generally accepted principle that nothing can come from nothing. This first subject in any physical thing is primary matter, and its reality is that of potency.

The evidence that primary matter has no actuality of its own but of its nature is potency for substantial being is found in the unity of the so-called composite of matter and form, say a dog. If primary matter, prior to its union with the form or ACT that makes a dog come to be, had an act or form of its own, its composition with the form of dog could yield no more than an extrinsic type of unity. The dog, or the so-called composite, would then be an accidental unity, not the intrinsic and substantial type of unit that experience reveals (*see* POTENCY AND ACT). Such an argument, while metaphysical in character, serves to explain the nature of the first subject attained by induction in the philosophy of nature.

Substantial form. Form, in general, is the END or term of matter. The term in accidental change is called accidental form; examples would be the color, size, or shape of a thing, or its place. In the substantial order, the form is called substantial form. Accidental form makes its matter to be qualified in this or that way. Substantial form makes its matter to be; it confers BEING in an unqualified way.

From another viewpoint, matter is that out of which a thing is made, like marble in the case of a statue; form, on the other hand, is what makes a thing to be what it is, for instance the shape in the case of the statue. Arguing analogously, primary matter is that out of which a physical thing is made, while substantial form is what makes it to be a dog, a cat, copper, water, or a tomato plant. One limitation of this way of speaking is that such words do not respect the reality of matter in determining the ESSENCE of a thing. Further, as in the case of assigning a purely potential character to primary matter, the discussion passes beyond the limits of natural philosophy into the area of metaphysics. For form as a principle making a thing to be what it is becomes synonymous with essence, and essence is the proper concern of the metaphysician.

Substantial form, however, has a more particular application in the philosophy of nature. The form of living physical things is called a SOUL. As such it is an animating principle in plants, animals, and men. In the sub-human world (to avoid special difficulties concerning the human soul), modern knowledge of embryology affords striking evidence of form as the end of matter. The matter

is gradually prepared in the embryo for the form or soul that makes possible the independent or substantial existence of the offspring. A similar disposition of matter is required for forms in the mineral world. Natural form is, therefore, considered to be the end of matter.

This way of defining form is more appropriate to the philosophy of nature than the metaphysical definition identifying it with essence; for the natural philosopher, substantial form is part of the essence of a mobile being, the other part being primary matter.

Privation. Unlike matter and form, privation is not divided into substantial and accidental kinds; as nonbeing it cannot be divided into species. Privation is contrasted with form but associated with matter, primary or secondary. For matter in either case is never without privation. When it has one form, it lacks all others, and when it acquires a new form, it lacks the one it previously had. Viewed in this second context, privation represents some kind of lack or loss. Thus, it implicitly refers to a subject competent to possess the form that is not present. That is why, when contrasted with form, privation is associated with the subject or matter; it is the absence of form in a suitable subject. Finally, privation is an accidental principle insofar as it neither enters intrinsically into the thing produced (perfect act) nor into the motion toward that product (imperfect act).

Plato did not distinguish between matter and privation, regarding matter itself as nonbeing. Aristotle claims to be the first to make the distinction, and by means of it to resolve what he considered to be the great problem bequeathed to Greek speculation by PARMENIDES. If being is and nonbeing is not, how can anything come to be? For from being, which is what is, nothing can come to be; it already is. And in regard to the other alternative, nothing can come to be from nonbeing. The solution to this problem, which according to Aristotle's report led Parmenides to deny BECOMING, requires the distinction between matter (being in potency) and privation (nonbeing). From being that is actual, nothing, it is true, can come to be; but from being in potency, namely, matter, something can come to be. Again, regarding the second alternative in Parmenides' argument, one must distinguish the essential from the incidental. From nonbeing as an essential principle entering into the composition of the product of change, nothing can come to be. But from nonbeing as an incidental principle extrinsic to the change in question, a thing can come to be. Thus, by a recognition of matter and privation in themselves and in their relation to each other, did Aristotle resolve perhaps the most profound problem raised by the Greeks in the philosophy of nature.

Appetite of matter. Aristotle also spoke of the appetite of matter, probably to counteract the view that form

alone is good and that matter is evil. The thesis that matter is evil, appearing in modified form in Plato, existed in the Mediterranean world long before and far beyond the confines of classical Greece. Thus, to answer an objection against his position that natural science concerns a subject worth studying, Aristotle was forced to deepen his contrast between matter and privation, even though his pursuit took him, for dialectical purposes, into metaphysics. To summarize his position, appetite is ascribed to matter but denied to privation. This raises the questions: Why is it necessary to recognize appetite in the physical world, and why is such an apparently psychic term as appetite introduced?

The starting point in answering such questions is the ordered character of natural change. If ORDER cannot be reduced to CHANCE, it has to be explained by means of FINAL CAUSALITY. It is in this spirit that form in the philosophy of nature is called an end or term. If such language is justified, then there must be a tendency to a term or end in every natural change. But what is the seat of such a tendency? This cannot be form because form, as the term of change, is not present at the beginning to strive or tend. Nor can it be the previous form, here viewed as a privation of the new form that is the term of the change; for in any change there is a repugnance between the old form and the new one, not an attraction or tendency. The seat of the tendency must therefore be the matter. Such a tendency is called a natural appetite by analogy to the appetite most known to man, namely, the APPETITE or inclination that is the human will. In more univocal language, the appetite of matter, as St. Thomas Aquinas explains it, is the ordination of such matter toward the form that is the term of the particular natural change (*In 1 phys.* 15.10).

Dispositions of matter. Though indeterminate in its substantial character, the primary matter involved in any change does not take on in random fashion any of the potential infinity of forms it may bear. Carbon, when burned, does not become stone or water. The reason is the so-called “dispositions of matter.” In any generation of a new substance, these are first known as the effects of the old form. Second, although substantial change is instantaneous, it is induced by accidental changes, first local motion and then alteration, both of which are exemplified when a source of heat is applied to carbon to be burned. In the third place, as explained by JOHN OF ST. THOMAS (*Curs. Phil.* 2.3.1.7), who synthesized the references of St. Thomas to the dispositions of primary matter, the final DISPOSITION of matter, in generation, is the effect of the new form.

In natural processes, which are to be distinguished from those occurring by art or by chance, form has to be

regarded again as the end of matter, and the form that matter is eventually to bear is the end of all the dispositions of its matter. In this sense, all previous dispositions are the result of the most advanced form achieved, and this is the final cause of what went before. These notions are relevant to the evidences for EVOLUTION, especially with the extension of the evolutionary idea to cosmogony. Form is the end of matter in any given change, and matter in turn has an appetite, gradually disposed, to possess the form. But as in the case of the appetite of matter, the probing of its dispositions must pertain to the metaphysics of substance.

Nominal definitions. In the last chapter of Book 1 of the *Physics*, Aristotle comes to a nominal DEFINITION of primary matter as studied in the philosophy of nature: “the primary substratum of each thing, from which it comes to be without qualification, and which persists in the result” (192a 31). The “primary” of this definition marks the definiendum off from secondary matter, and “substratum” distinguishes it from form; the last two clauses further distinguish it from privation. The more classic and metaphysical definition of primary matter, expressing its purely potential or indeterminate character in the kind of negative way by which this principle is known, reads: “By matter I mean that which in itself is neither a particular thing nor a certain quantity nor assigned to any other of the categories by which being is determined” (*Meta.* 1029a 19).

As explained by St. Thomas, “form is the end of matter,” and “privation is the negation of form in a subject” (*In 1 phys.* 15). Both of these nominal definitions, like the characterizations of primary matter above, summarize the long discussions that make up Book 1 of the *Physics*.

Creation and eduction. Substantial form and its privation, two opposites in the primary genus, substance, are the first principles of change. Everything in the physical world is derived from them, and they are underived in the physical world. Primary matter and its form are essential principles of change, while privation is an incidental principle. None of these principles comes about through natural change; if they did, all of them would be again involved as principles of such change and a vicious circle would result. To account for their origins, it is necessary to go to metaphysics and there to raise the question of CREATION.

Given a world already created and given a thing or things that are informed in some way, new natural form (the human soul excepted) is brought to be from matter by what St. Thomas called eduction (*De pot.* 3.9)—a term that has the modern connotation of emergence. Eduction or emergence, as illustrated by the kneading of clay, to

bring forth, say, a spherical shape from the matter being molded, calls attention to the inadequacy of such expressions as “the union” of form and matter or “the acquisition” or “taking on” of form by matter. On the other hand, eduction itself, it should be stated, is not generation. If it were, it would involve matter, form, and privation again, and the vicious circle would once more be opened.

Nature and causality. It is explained in the second book of the *Physics* that NATURE is an intrinsic principle or source of motion. As further specifications of their roles, both primary matter and its form fulfill this definition of nature. Matter is the source from which physical things come to be, and as such is an intrinsic principle of change. Form, as terminating matter to give a physical thing an intrinsic and original character, is also entitled to be called nature.

Matter and form, in addition to being principles, are also causes; privation, however, not being a positive reality, can exert no positive influence on the production of a thing and is therefore not a cause. The material and formal causes, though both intrinsic to the effect, are distinct from it since the effect is neither matter nor form but the result of both. There is thus a sufficient difference between matter and the result, on the one hand, and the form and the result, on the other, to preserve the distinction necessary in a cause-effect relationship (*see* CAUSALITY).

Uses of Matter and Form

In their fundamental meanings, matter and form are properly studied in the philosophy of nature, the only branch of philosophy that considers all four types of cause. The metaphysician also studies form, but form here is already used in a different sense, as synonymous with essence or with the logician’s SPECIES. This extension of the term has been previously noted; historically it is no doubt earlier than Aristotle’s usage, since it appears to be the meaning that Plato had in mind when he developed his notion of matter and form through the contrast of the intelligible and the sensible (*Tim.* 52). Like form, matter also has many meanings in parts of philosophy other than the philosophy of nature, and sometimes even in the philosophy of nature itself. Thus the breakdown of a whole into its parts is characterized by St. Thomas as a resolution toward matter (*In 2 phys.* 5.9). But whatever the many applications of matter and form in human science, they received their first scientific formulation, in Aristotle’s sense, at the physical level where the problem is change, not at the metaphysical level where Plato made his distinctions between universals and singulars.

Human learning. Some of these applications in other areas of knowledge deserve listing, just to show the

uses of matter and form throughout the range of human learning. One of the most crucial areas where matter and form are invoked is in the study of the human soul in its relation to the matter of man (*see* SOUL-BODY RELATIONSHIP). Following a lead in St. Thomas, LOGIC is divided into material and formal parts. Such special logical entities as definition and SYLLOGISM have each a matter and a form: matter is the content and form the arrangement. Literary works—and in general all artistic products—also have a matter and form; in this context there should be mentioned the 20th-century study of the Bible through FORM CRITICISM. In mathematics, there is intelligible matter, e.g., the divisible parts within a triangle, and form, e.g., the three-sided character of the triangle. Even 20th-century thinkers in mathematics and in logic used terms like formalism, which owes its remote origin to the long Western tradition concerning matter and form. A similar residue of this tradition can be found in modern biology, where it is conventional to speak of “living forms.”

Metaphysics and ethics. The extended uses of matter and form in logic and in mathematics are analogous to their primary applications in the physical order. So, too, are the impositions of these terms in metaphysics, where form has already been mentioned as a synonym for essence. The recipient of this essence in the physical world is matter—not pure prime matter but matter with one of the modes of quantity. In another context, when relating universals to reality, the metaphysician argues that these are formally in the mind and materially in physical things. Here again, there is a use of matter and form. The metaphysician also uses the various levels of remotion of form from matter to differentiate the sciences; mathematical physics, for instance, is said to be formally mathematical and materially physical (*see* SCIENCES, CLASSIFICATION OF). As other illustrations of these principles, angels are said to be pure forms, and even the act of EXISTENCE is expressed by St. Thomas as “formal in respect of everything found in a thing” (*Summa theologiae* 1a, 8.1).

In ETHICS, human acts have matter and form; so do VIRTUE, law, family, society, and government. All these subjects, studied again through the use of matter and form, are considered by the theologian, who adds dimensions of his own to the analogous application of these principles. Thus the relation of the natural to the supernatural is often expressed by the analogy of the material as related to the formal. Within the supernatural order itself charity is called, for instance, the form of all the infused virtues, and all the SACRAMENTS are explicated in terms of matter and form.

Thus, not only in those studies that are available to reason alone but through the whole range of Christian in-

tellecual life, matter and form are truly fundamental principles. The above list has merely provided a sampling of their scope.

Historical Controversies

Like all other claims of human reason, matter and form have been objects of controversy inside and outside the Christian tradition. At least in some of his language, Plato seems to have identified matter and space because both are in some sense receptacles (*Tim.* 52). With PLOTINUS there is something of a return to a pre-Aristotelian view that matter is privation or evil (*Enneads* 2.4; 3.6.7; 6.3.7). St. AUGUSTINE, though his views on this question are not always uniform, referred to the existence of the so-called SEMINAL REASONS (*Gen. ad litt.* 6.5.8)—a term of Stoic origin. This has prompted the conclusion that Augustine did not hold to the purely potential character of primary matter. Remnants of Augustine's thought on this point, even though their meanings are not always clear, appear at least as late as St. BONAVENTURE (*In 2 sent.* 7.2.2.1). However, any attempt to recite even the most important figures in the Middle Ages who expressed views on primary matter would have to enter the complicated question of the plurality of forms (*see* FORMS, UNICITY AND PLURALITY OF). Though some partisans in this controversy, including at times St. Albert the Great (*Summa de creaturis*, Borgnet, 34:323), expressed the view that primary matter is purely potential, this point was most emphatically and unequivocally defended by St. Thomas. After his time, new interpretations of primary matter appear in the writings of John Duns Scotus (*Op. Ox.* 2.12.1.10) and Francisco SUÁREZ (*Disp. Met.* 34.5.36, 42) whose views, though differing from each other, both seem to accord primary matter at least some measure of act.

After the decline of scholastic thought in the Renaissance, matter and form continue to appear in the works of the great original philosophers, including KANT and HEGEL, though in many cases there is little similarity, except in name, with older Greek principles of mobile being. In their explanations of the material world, including living things, post-Renaissance thinkers, scientists and philosophers alike, turned away from matter and form and to either mechanism or dynamism.

Mechanism and dynamism. The typical version of mechanism attempts to explain nature by means of quantity and local motion; with advances in modern science, the raw material in such a mechanical view can be identified not merely as quantity in general but as atoms, in the case of lifeless world, and cells, in the case of the living. Prominent mechanists in the modern world were R. Descartes, P. Gassendi, E. H. Haeckel, J. Loeb, H. von Helm-

holtz, E. Du Bois-Reymond, Lord Kelvin, and, in general, all who took Newtonian mechanics in physics, and the cell theory in biology, or a Darwinian type of evolutionism, to provide an authentic philosophy of nature. Mechanism tends to deny nature as an intrinsic principle and to affirm that the fundamental stuff of the world is inert.

By contrast, DYNAMISM lays stress on the active, energetic character of the basic constituents of our world. G. W. LEIBNIZ, for instance, held to the existence of the MONAD, which is an indivisible, inextended unit of process having perception. R. Boscovich held to the existence of points of force as the underlying physical realities. Other prominent dynamists were Kant, D. Palmieri, and W. Ostwald, who envisioned physical things as fundamentally energy. More recent proponents of dynamism have been Henri Bergson (*Creative Evolution* [New York 1911]) with his theory of the *élan vital* as an all-pervading reality, and Alfred North Whitehead (*Process and Reality* [New York 1929]), who reduced the universe to units of process called actual entities, themselves manifestations of a still more fundamental principle called creativity.

Though constructive criticism of the modern alternatives to matter and form cannot be undertaken here, it bears mention that, in their typical forms, mechanism tends to see only passivity in the physical world and dynamism, only activity. This suggests that judged merely in the light of alternative philosophies of nature the explanation of change through matter, or the potential, and form, or the actual, would appear as a combination of the positive insights of its rivals, without their extremisms.

Modern Thomism. After the revival of THOMISM in 1879, matter and form, as discussed in the scholastic tradition, were also revived (*see* SCHOLASTICISM). Most scholastics have accepted the two principles, though for varying reasons. While claiming to be Thomistic in inspiration, many books and articles written in the 20th century presented the philosophy of nature as an applied metaphysics, despite the fact that metaphysics leaves the material cause out of account. Matter and form were thus treated in a rationalistic and even Cartesian spirit. Typical of this was the mathematical approach to matter and form through the nature of the continuum, and as an answer to the question: What is bodily essence? This is far different from the type of question Aristotle raised in the *Physics*.

In a modern context, the establishment of primary matter and substantial form through the kind of evidence invoked by Aristotle, namely the fact of substantial change, had to face, on the one hand, philosophical arguments like Hume's to the effect that the reality of substance cannot be grasped by the human mind, and on the

other, arguments invoking the success of modern science in reducing all change to mechanical principles. Such difficulties led scholastics like P. Descoqs to reduce the status of matter and form to that of a probable explanation (*Essai critique sur l'hylémorphisme* [Paris 1924]).

Hylosystemism. Other scholastics like A. Mitterer in Germany (*Das Ringen der alten Stoff-Form-Metaphysik mit der heutigen Stoff-Physik* [Innsbruck 1935]), and C. Bittle in the United States (*From Aether to Cosmos* [Milwaukee 1941]) proposed a theory of bodily essence called HYLOSYSTEMISM, a term designed to parallel a modern name for matter-form doctrine, namely, HYLOMORPHISM. While retaining a so-called hylomorphic view of organisms, hylosystemism alleged that the findings of the modern sciences do not require the traditional view of matter and form as principles of inorganic things. In resolving the world into its constituents, hylosystemism argued that inorganic reality can be reduced to atoms and that atoms themselves are broken down into still simpler parts, such as protons, and electrons. These subatomic parts were called hylons, and atoms themselves were regarded as systems of such hylons. Hence the term hylosystemism.

Hylons are considered to be material substances, but not bodies, since they do not tend to exist in an independent status. Similarly, the system peculiar to each type of atom is not regarded as a mechanical sum to be explained by the mere addition of its parts. In comparing hylosystemism to hylomorphism, a critic might note that the former is a theory of an integral WHOLE, while the latter is an account of a physical whole. Thus the two may not be rivals, since they are not genuine alternatives.

Other Views. More recent philosophers who would claim, like the hylosystemists, to stand within the Aristotelian tradition, have also been beset by modern philosophical arguments against the knowability of material substances and by the success of science in accounting for change without recourse to matter and form. Yet F. Renoirte (*Cosmology*, [New York, 1950]) argued that when all is said and done there is a duality of space and time; this he offered as evidence for the more fundamental dualism of matter and form, even though man cannot designate this or that thing as being a substantial unit, and as thus having a substantial form of its own that informs primary matter. A. Van Melsen (*The Philosophy of Nature* [2d ed. Pittsburgh 1954]) has similar reservations about the proof of matter and form through change, but he finds evidence for dualism in the existence of discrete individuals that are each bearers of a common specific type.

Detailed criticisms aside, it is necessary to point out that philosophers who invoke modern science to reject

the evidence for matter and form based on substantial change all neglect the investigative approach to this problem urged by Aristotle and carefully explained by St. Thomas. Primary matter and substantial form are established at the vague and universal level of knowledge where the mind is most at home and most sure of itself. When knowledge becomes more distinct and detailed, as in modern science, it can clarify fundamental knowledge but never replace it, just as a knowledge of polygons makes more specific man's knowledge of figure without rejecting the generic notion of figure itself. On such grounds, in any synthetic explanation of nature, the findings of science must be adjusted to a well-examined philosophy of nature, and not vice versa. In evaluating hylosystemism and the views of Renoirte and Van Melsen, it must be urged that it is not good methodology in the philosophy of nature to overestimate science as a starting point.

Testimony from scientists. Many of the objections to matter and form, from mechanism to philosophies that try to establish a physical dualism by means other than the evidence of substantial change, eventually became as outmoded as the science on which the objections were based. As the 20th century wore on, the mechanism which, except for scattered opposition from dynamists, had dominated science, had to be discarded in the face of facts. Using these new and non-mechanical theories of science, American naturalism in the early 20th century tried to define a so-called nonreductionist materialism in which a non-mechanical matrix was seen as tending to spawn various levels of reality—inorganic matter of various complexities, life in its various grades, and finally mind—with higher levels irreducible to lower ones, but with only one kind of reality underlying it all. The net result was a species of materialistic dynamism. Dialectical MATERIALISM used the same scientific evidences for dynamism to reexamine its philosophy of nature and, among some authors, to draw close to the principles of matter and form (G. Wetter, *Dialectical Materialism* [New York 1959]).

From among modern scientists themselves, though no substitute for the older mechanism had emerged, as the second half of the 20th century got under way there were evidences that primary matter and its form were slowly moving back into prominence. Thus W. Heisenberg (*Physics and Philosophy* [New York 1958]) found that quantum physics, with its emphasis on the indeterminate, restored the Aristotelian notion of potency or matter. Organismal biology also gained ground, suggesting the existence of a whole-making principle. It was also shown that Whitehead, who kept in such close touch with science, used concepts that have affinity with Aristotle's. The synthesis of TEILHARD DE CHARDIN envisioned a

fundamental matrix in development toward a term. This list could be enlarged, if only to suggest rhetorically the respectability of matter and form in the light of recent science and philosophy. For withal, the fundamental evidence for primary matter and substantial form must remain the universal level of human knowledge that, in the proper logical order for constructing a synthetic world view, precedes the detailed theorizing of modern thought.

See Also: PHILOSOPHY OF NATURE; PHILOSOPHY AND SCIENCE.

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[V. E. SMITH]

MATTHEW, APOSTLE, ST.

Traditional author of the first Gospel. His name (Gr. Ματθαῖος or Μαθθαῖος) is from Aramaic *mattai*, a shortened form of the Hebrew *mattanyâ* or *mattatyâ* (gift of Yahweh). By deriving it from another root, some give it the meaning of "the faithful." He is named seventh in the list of APOSTLES in Mk 3.18 and Lk 6.15; eighth in Mt 10.3 and Acts 1.13. In Mt 10.3 he is called a τελώνης, i.e., tax collector or PUBLICAN; this fits with his being called by Jesus from the τελώνιον (toll-house) in Mt 9.9. The calling of a tax collector is found also in Mk 2.13–14 and Lk 5.27–29, but there he is called Levi (to which Mark adds, "the son of Alphaeus"). Because all three Synoptics relate the same event, we must conclude that they speak of the same person: Matthew-Levi. This identification has been challenged by some: Heracleon and perhaps Origen (in Clement of Alexandria, *Stromata* 4.9; *Patrologia Graecae* 8.1281; Origen, *Contra Celsum* 1.62; see *Patrologia Graecae* 14.835). The banquet presented in Mk 2.15–17 and Lk 5.29–32 as given by Levi is also in Mt 9.10–13, where Matthew, however, is not expressly mentioned.

Nothing is definitely known about his later ministry. The *Liber de ortu beatae Mariae et infantia Salvatoris*



Saint Matthew, engraving by Philippe Chery.

attributed to him is a 5th-century apocryphon [see BIBLE, III (CANON), 5]. Tradition relates that he had an early ministry in Judea and later went to Gentile lands, given variously as Ethiopia, Persia, and Parthia. He is revered as a martyr and is commemorated in the Latin Church on September 21, in the Eastern on November 16. In art he is represented with a spear in his hand (an allusion to his martyrdom); his symbol (as EVANGELIST) is a winged man. His relics are said to have been found at Salerno in 1080.

See Also: MATTHEW, GOSPEL ACCORDING TO ST.

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