

LAWS VERSUS TELEOLOGY

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The word ‘teleology’ derives from the Greek *telos* meaning end, completion, fulfillment, perfection. *Telos* includes the best condition, activity or operation of a natural or human agent, e.g., a prize-winning animal, an excellent (virtuoso) performance by a performing artist. The *telos* of a process is that for the sake of which each stage occurs. It is the final, most authoritative cause. Most generally, teleology is the account (*logos*) of the ends at which human beings, nature, history, God aim. The following article focuses on teleology in human action and non-human nature. Its *telos* is to explain the modern (post-17th-century) rejection of teleology in favor of non-teleological laws—both natural (laws of physics) and human (legislative acts). This is a large terrain and the constraints of a short article require painful truncation of subject matter.

Background: Natural Form and Human Virtue

The rejection of teleology in modern philosophy and science can best be understood against the background of the premodern, teleological understanding of nature and human law. Emblematic of the teleological understanding of nature is the notorious Aristotelian term *form* (*eidos*, *morphê*). For the form of a natural substance, e.g., a cat, “is [its] nature more than the matter”; form (cat-form) is the “end (*telos*) and that-for-the-sake-of-which” in the generation of the cat (Aristotle, *Physics*, 193b7, *Metaphysics*, 1015a12). Emblematic of the teleological understanding of human law is the term *virtue*, for “virtue [e.g., moderation] must be a care for every city” (Aristotle, *Politics*, 1280b7); indeed, “the proper effect of law is to lead its subjects to their proper virtue” (Aquinas, *Summa Theologiae* I-II, q. 92, a. 1, resp.). We must make an attempt, however brief, to understand these obsolete doctrines.

Form and matter are the constitutive principles of natural substances, which are noteworthy because, unlike artifacts, natural substances “all appear to have *within themselves* a principle of motion and rest. . . . So nature is a cause and principle of motion and rest *in* that to which it belongs, primarily and essentially and not accidentally” (*Physics*, 192b14-15, 21-23; emphasis added). The complicated adverbial phrase, “primarily and essentially and not accidentally,” means (among other things) that natural form is internal to the moved thing in a way that cannot be fully derived from, or completely reduced to its material parts: “[Natural] things will be neither without matter nor determined by their matter” (*Physics*, 194a14-15). Form is thus a holistic principle; the parts of a naturally informed compound are what they are and act as they do only in terms of the whole they compose. If separated by dissection from the whole, they cease to be what they were: “[T]he whole must of necessity be prior to the part; for if the whole is destroyed there will not be a foot or a hand, except in the sense that the term is similar, as when one speaks of a hand made of stone” (*Politics*, 1253a20-22). Therefore, one whole informed material substance cannot be reduced to its parts. Rather, since the whole is ontologically prior to the parts, the parts cede some of their being to the unifying authority of the form. Thus, says Aristotle, the parts of a natural substance exist only potentially in the whole; they are not fully actual in the whole (*Metaphysics*, 1023b33-37, 1040b5-16). In fundamental contrast, the parts of an artifact, e.g., a clock, are what they are independently of the whole; they

are fully actual in, and thus in their being are neutral or indifferent to the whole. Therefore, a watch, which lacks the substantial unity of that cat, can be taken apart, its parts can be analyzed in isolation from each other, and then both the parts and our knowledge of the parts can be reaggregated in the whole, or even rearranged in a new and different whole. Here, the parts are prior, epistemologically, because ontologically, to the whole. The clock is thus a paradigm for the reductionist or mechanical and anti-Aristotelian conception of the whole-part relation.

The Aristotelian conception of the whole-part relation in natural compounds implies limits to the alteration, manipulation, and transformation of bodies by separation and recombination of their parts. Within this understanding, form is not only a source but also a limit of our knowledge and control of nature (*Metaphysics*, 1022a5-10).

Form specifies a visible natural kind, or *species*, especially a living species, in which case form is also called soul. Form is understood to be the source of the behavior that is most distinctive and characteristic of the species, e.g., the distinctive, feline way of moving, and meowing, specific to cats. Consider the specific difference that is perhaps of greatest importance: the use of words by us human animals and the immense impact of their meanings on the way we behave; in this we are unlike any other species. The salient feature determined by the form of a species is also the good—in its exercise the *telos*—of that species: “For what is proper to each kind of thing is best and most pleasant for it” (*Nic. Ethics*, 1178a5). So it is good and pleasant for the cat to act in that feline (not canine) way, and best (and most pleasant!) for us humans to use words well, for the sake of truth in thought and action. (This is a cardinal example of Aristotle’s optimism about the goodness of nature, which does nothing in vain.) Form is thus a principle that is *species-specific*, a term that will acquire sharper sense when contrasted, below, with the *species-neutral* laws of physics. In any case, form can be at work only in appropriate matter, “for a different form, a different matter, [and so] for each motion it is the subject capable of that motion which has that motion” (*Physics*, 194b9, 251a14). Now of all the motions visible to us human beings, it is the ones in the heavens, the celestial motions, that are most distinct, for they are orderly and (as far as we can see) never cease, unlike all earthly changes. But eternal motion can take place only in appropriate—thus eternal—matter, the indestructible matter of the crystalline spheres in which the visible lights in the heavens must be embedded. (The spheres are indestructible in their own nature, but, in the Scholastic teaching, destructible by the power of God.) Thus the Aristotelian and Scholastic doctrine of natural form—well enough suited to the heterogeneity of biological phenomena—also concludes to the heterogeneity of terrestrial and celestial matter. And so we can foresee a major reason for the rejection of the teleological account of non-human nature: the Scientific Revolution, specifically the success of Newton’s theory of universal gravitation, entails the essential homogeneity of celestial and terrestrial matter. Let us sum up results on the meaning of natural form in premodern philosophy.

Things that move, change, behave in essentially different ways as manifested to our senses possess correspondingly different material and sources of motion. They have different natures. Thus, celestial bodies are essentially different from terrestrial bodies, and among the latter, living things are essentially different from non-living things, and among animals, the kind that possesses and functions by speech is essentially distinct. The stable differences in the way things appear to ordinary sense perception are effects that proceed *per se*, not accidentally, from their causes and principles, i.e., from their matter and, preeminently, their form. Thomas Aquinas puts it concisely: “natural forms are not themselves subject to motion . . . they are, moreover, the perfections of mutable things” (*In de trinitate*, q. 5, a. 2, ad 6). This means that

what the different kinds have in common, e.g., mass, is not as fundamental as what differentiates and specifies them. The opposite notion—that what the *apparently* different kinds, e.g., celestial and terrestrial, human and non-human, have in common *is* more important than what differentiates and specifies them—is a defining characteristic of modern natural science.

Against the premodern background, the significance of Darwinism stands out in stark relief: The successes of evolutionary biology show that the forms (species) are not causes and principles but effects and products (of variation and selection), and, in the current interpretation of the theory, that they are such not according to any purposive (teleological) intention of nature or God, but merely by accident.

It remains to discuss the premodern, teleological understanding of human law: what can it mean to claim that “the proper effect of law is to lead its subjects to their proper virtue”? After all, we just said that the form of any species determines its characteristic behavior, e.g., from cat-soul flows feline behavior, from dog-soul, canine behavior. Therefore—by this analogy to other animal species—human-soul should be the sufficient source of our behavior. But the analogy to other animal species fails; we humans do not operate simply from natural instinct. Rather, the human form is open to a great variety of behaviors according to our very different *dispositions* or character types. Aristotle makes this clear: “[T]he pleasures of different species of animals are themselves different in species, and it would be reasonable for those belonging to the same species to be undifferentiated; but in the case of human beings at least they differ by no small amount. For the same things delight some and give pain to others, and things that are painful and hateful to some are pleasant and loveable to others” (*Nic. Ethics*, 1176a8-12). Consider, for example, the sexual exploitation of the young.

In this premodern, Aristotelian account, a person’s disposition or character has four sources: individual traits from birth (we would say today genetic predisposition), childhood training, the laws and customs of the community, one’s own past choices. The third of these gives rise to the teleological understanding of human law, i.e., law as *formative* of character, of the stable capacity for making good or virtuous choices and avoiding bad or vicious ones.

Character refers to the way we come over time to have our emotions and appetites, thus the way we come to be *disposed* toward, and act in the face of the pleasures and pains to which we are subject as animate, rational (possessing speech), individuals in political community. Our dispositions in turn give rise to our characteristic patterns of choices. Disposition is thus both effect and cause of choice. We make choices for the attainment of ends or goods whose appearance to us is a function of our disposition: “By being people of a certain sort, we set down the end as being of that sort” (*Nic. Ethics*, 1114b24). (Alcoholism and the alcoholic disposition illustrate the sense of the preceding five sentences.) To choose well, therefore, we must be rightly disposed toward pleasures and pains in order to be free of extremes of passion that distort perception and judgment. We must be disposed in the *virtuous mean* between excess and deficiency of passion such that action is correspondingly appropriate to the particular situation. For example, how does one come, over the course of their lives from childhood to adulthood, to experience fear in facing dangers? If slight dangers cause great fear and resulting flight, one has acquired a cowardly disposition. If great dangers and risk cause little or no fear, leading to foolhardy actions, one has acquired a rash disposition. The disposition lying in the mean between cowardice and rashness is the virtue of courage. To the defective extremes corresponds distorted perception: “the courageous person appears rash to the coward, and cowardly to the rash” (*Nic. Ethics*, 1108b20). The courageous person feels, perceives, and acts in the mean “for the sake of the noble, for this is the end (*telos*) of virtue” (*Nic. Ethics*, 1115b12-13). Laws

mandating and directing military training lead soldiers to their proper virtue, namely, courage and combat effectiveness. (For the problem of the noble, see below.)

The mean in human action is delimited by practical reason or prudence (*Nic. Ethics*, 1106b36-07a6, 1138b23-25). Without prudence, the human being would be unlimited, boundless, in its passions and actions, unlike any other being in nature. With prudence, reason is brought forward into our passions and actions.

Since there are many pleasures and pains, both physical and especially emotional, pursuant to our complex human nature, there are many human dispositions, virtues and vices, moral strengths and weaknesses. It is important to emphasize that not only individuals but also groups have dispositions; thus we speak of the *culture* or *mentality* of a corporation or a country. A person's or group's character is the set of dispositions (e.g., toward dangers, bodily pleasures, work, leisure, money, power, honor, perceived slights, one's own worth, the fortunes of others, humor) that they have acquired over their individual or collective history.

A controversial but relevant and contemporary (and negative) example of the teleological meaning of law is provided by the financial crisis of 2008. The proper virtue of persons working in the financial services industry is to manage leverage and risk prudently in order to provide clients with an appropriate balance of safety and return (appropriate to the type of investment purchased). Assuming too little leverage and risk means the client gets insufficient return. Assuming too much can (and did) cause unacceptable losses and, ultimately, damage the common good of the community. The laws, regulations and deregulations that facilitated the consolidation of commercial and investment banking after 1970, and then created a high percentage of risky mortgages after 1992 exemplify failure to lead the relevant specialists in society to their proper virtue. The corresponding distortion in their feelings, perceptions and judgments, and the resulting excesses in action have grievously damaged the common good.

As we depart this ancient teaching on law, consider whether there is not significant truth to it. But—as Aristotle himself makes clear—there is also a severe problem: The courageous person acts for the sake of the noble, he says (*Nic. Ethics*, 1115b12-13), yet he also says that “the noble and the just, about which politics investigates, involve great disagreement and irregularity” (*Nic. Ethics*, 1094b14-16). We can thus easily imagine courageous men getting themselves and others killed over clashing conceptions of the noble, the just and, let us add, the holy—as happened in the religious wars of the 16th and 17th Centuries, as happens again today. The transition from the understanding of law as formative to the non-teleological (and secular) doctrine of law as *limitative*, i.e., law should merely limit the actions of others against my life, liberty, and property, has much to do with this unfortunate history of violent conflict. Concurrent with the religious wars, however, is another salient historical development, the Scientific Revolution, which promised vastly enhanced human power over nature. Essential to the new science is a new type of intelligible principle: the mathematical and experimental law of nature. The modern rejection of teleology in favor of non-teleological natural and human laws thus derives in significant part from the desires for civil peace and for technological power.

Laws of Nature versus Natural Forms

Newton's law of gravitational force (*Principia*, Bk. 3, Prop. 7 and Cor. 2) is written today as $F = -GMm/R^2$, where M and m are the masses of any two bodies, R, the distance between them, G, the universal gravitational constant, and the minus sign indicates that the force, F, is attractive. It is a paradigm for the laws of classical physics, and is remarkable for the new type

of universality that it exhibits. Normally, the way two bodies interact depends on what kind or species each is. A dog and a cat, for example, interact in a certain way, a cat and a mouse in another. In fundamental contrast, the law of gravity expresses a principle of motion in nature that is independent of the kind, size, shape, internal structure and function, i.e., the nature, of the two interacting bodies. For *all* bodies—celestial and terrestrial, natural and artificial, living and non-living, human and non-human—possess mass and relative position; also velocity, momentum, acceleration, kinetic energy, etc. These measurable and mathematically representable terms of classical physics are common to all bodies and their parts, unlike Aristotelian forms. As such they are form- or species-neutral. Principles of motion that can be expressed in such terms—the mathematical laws of physics expressed in equations—are thus species-neutral. Spinoza provides a most succinct formulation of species-neutrality in its opposition to natural form: “That which is common to all . . . and which is equally in a part and in the whole [e.g., mass] does not constitute the essence [the species; Aristotle, *Metaphysics*, 1030a12] of any particular thing. . . . Those things which are common to all . . . cannot be conceived except adequately” (Spinoza, *Ethics*, II.37–38). In contrast, forms cannot be conceived except confusedly due to Aristotle’s overreliance on unassisted sense perception.

Although it is not expressed in terms of mathematical laws, Darwinian biology is species-neutral in the sense that common to all living bodies are the principles of random variation and natural selection. The specific behaviors and interactions of the cat, dog, and mouse, above, are thus understood to be ultimately reducible to the universal drive for reproductive success. Similarly for human behavior as conceived by evolutionary psychology. It is because of classical physics and Darwinian biology that species-neutrality is a defining characteristic of modern natural science. This means that no account of the human on its own species-specific terms, e.g., in terms of speech about the noble, the just, the holy, can count as scientific today.

A second remarkable feature of Newton’s law of gravity is that it (together with his second law, $F = ma$) enables us to calculate, thus predict, the trajectory of a body moved under gravitational force if we know the body’s position and velocity at the initiation of motion. The law thus not only refutes the essential heterogeneity of terrestrial and celestial matter, it empowers us to transform, as it were, a terrestrial body into a celestial body: If we can project a body, i.e., a rocket, upward with sufficient velocity at launch, it will go off into space and move like a celestial body, but on a path determined by us. Humanly controlled space flight—impossible according to ancient and medieval astronomy—becomes a reality through mathematical laws of physics. Here we see the relation between a law of nature and mastery of nature, a major theme in the works of Francis Bacon, especially the *New Organon* (1620). There we find a severe critique of the premodern understanding of nature:

When man contemplates nature working freely, he meets with different species of things, of animals, of plants, of minerals; whence he readily passes into the opinion that there are in nature certain primary forms which nature endeavors to educe. . . . [But in] nature nothing really exists besides individual bodies [true particles], performing pure individual acts according to law. (I.66, II.2, II.8)

Baconian laws go hand in hand with material reductionism, i.e., the idea that sensible wholes are no more than collections of subsensible particles that interact according to the laws. This directly rejects Aristotle’s holism of natural form, above. For Bacon, “forms are figments of the human mind, unless you call those laws of action forms” (I.51). Newton follows: “I . . . suspect

that [the phenomena of nature] may all depend upon certain forces by which the particles of bodies [attract or repel] each other; which forces being unknown, philosophers have hitherto attempted the search of nature in vain” (*Principia*, 1686 Preface).

Since the laws span or cut across the species of things, “it is most unskillful to investigate the nature of anything [e.g., gravitation] in the thing itself [a stone], seeing that the same nature [gravitation] which appears in some things [celestial bodies] to be latent and hidden is in others [the stone] manifest and palpable” (I.88). Indeed:

[W]hosoever is acquainted with forms [i.e., laws] embraces the unity of nature in materials the most unlike, and is able therefore to detect and bring to light things never yet done, and such as neither the vicissitudes of nature, nor industry in experimenting, nor accident itself, would ever have brought into act (II.3).

Bacon’s audacious reasoning is that, if the true intelligible principles are species-neutral, then the apparent heterogeneity of species (evident to our senses) is not rooted in the essential nature of things, and, furthermore, might not be a barrier to our operation. Thus, “[o]n a given body to generate and superinduce a new nature or new natures is the work and aim of human power” (II.1). Again, Newton echoes the thought: “Every body can be transformed into another, of whatever kind, and all the intermediary degrees of qualities can be successively induced in it” (*Principia*, First Edition, Hypothesis III). For the founders of modern science, the point is not to comprehend the world but to transform it, “whence there cannot but follow an improvement in man’s estate” (Bacon, *New Organon*, II.51).

Painfully truncated in the present article is medieval Nominalism, which emphasizes the radical contingency of all things before the immense power of the biblical creator God, and thereby undermines the Aristotelian notion of natural form as stable intelligible principle. But (*pace* Nominalism) it is still a long way from the contingency of nature in relation to God’s power to the malleability of nature in the face of human power. Also painfully omitted here is quantum physics and its distinctive, holistic features, whereby a theoretical grounding (classically unavailable) is provided for the heterogeneity and specific properties of the chemical elements. Let us finish the account of laws *versus* teleology.

The technological mastery of non-teleological nature is a historical achievement and a continuing promise (think of synthetic biology today). Accordingly, science rarely reveals barriers to our power; rather, it removes them—with the significant exception of the second law of thermodynamics. This law of physics constrains the efficiency of thermal-to-mechanical energy conversions (as found in, e.g., steam-driven turbogenerators for electric power, and internal-combustion engines for transportation). The low efficiency of these energy conversions contributes to environmental problems, stress on fossil-fuel supplies, and dependence on insalubrious sources. But technological advance has so disposed us that a powerful desire for convenience (hard to moderate) is now a part of our national character.

Human Law as Limitative not Formative

The core of the rejection of the teleological account of human law is that it is based on a false understanding of human behavior: if we are honest with ourselves, we will see that our motives are powerfully and irreducibly self-centered. It is unrealistic—and will be ineffective or counterproductive—to think that weak reason can control or moderate the selfish passions. The

most fundamental human passion is the compulsory drive for self-preservation, after which come the desires for comforts (convenience), the pleasures, and wealth. These drives cannot be gainsaid; they will move human beings necessarily like the physical forces that move a river, whose flow is involuntary (Machiavelli, *The Prince*, Chap. 25). But human behavior, like the flow of the river, can be directed through the clever imposition of channels that bring beneficial effects (like cultivation) and avoid harmful ones (like flooding). In the case of human behavior, the channels are well-enforced laws that aim not at “proper virtue,” e.g., courage and moderation, but at channeling the selfish drives of individuals to good public effect (peace and prosperity). Thus, for example, “private vice is public virtue,” through legally protected enterprise accompanied by tax laws with teeth in them. As Locke memorably puts it,

[T]hat prince who shall be so wise and godlike as by established laws of liberty to secure the honest industry of mankind, against the oppression of power and narrowness of party, will quickly be too hard for his neighbors (*Second Treatise of Government*, §42).

Most generally, individuals are to be guaranteed a protected space in which to pursue happiness as each understands it, consistent with an equal right of others to do the same. Law becomes like a fence around my property, limiting the action of others against me and of me against others without our mutual consent. In this contractual understanding, law “is the direction of a free and intelligent agent to his proper interest” (*Second Treatise*, §§17 and 57). There is no concern here with disposition or character, for the necessary (involuntary) forces of human self-interest are virtue-neutral, somewhat like the forces of nature that are species-neutral: different visible patterns of both natural and human behavior arise not from different internal causes (celestial and terrestrial natures, courageous and cowardly dispositions) but from one and the same forces (gravitation, self-preservation) specified only by differing external conditions.

Despite its successes in the production of wealth and the protection of individual liberty, the bleak realism of the non-teleological doctrine of human behavior (we are moved exclusively by involuntary and self-centered drives) provokes a reaction in German Idealism. In Kant, free will is restored and therewith a sense of virtue as the resolve to do one’s duty according to the moral law (the categorical imperative). Humanity can thus progress over time toward greater rationality; history becomes the domain of a new moral teleology in which individuals are respected as ends, not used as means. Non-human nature, however, remains “material to work on” (Locke, *Second Treatise*, §35).

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