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Physicalist Theories as Science and Physicalist Theories as Philosophy

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Abstract

Physicists and philosophers sometimes claim that all of the phenomena of the universe, as in "theories of everything," are or should be explainable in terms of the elementary constituents of matter or elementary particles; I seek to show that physicalist theories that attempt to reduce "higher order" phenomena in chemistry, bio-chemistry, biology, and the neuroscience of mind, brain, and consciousness to explanations involving elementary particles are either untestable or not empirically valid; moreover, I seek to show that there are successful cases of reduction in science, such as in chemistry, bio-chemistry, neuroscience, and evolutionary biology including Darwinism, that do not necessarily involve or imply "physicalism" or the tenets of physicalist theories; I also seek to show that physicalist theories undermine and do not address the empirical and theoretical content of successful discoveries and theories at different levels of reality, and within and across different branches of science.

***Keywords:** Elementary particles; Penrose; Roger; Reductionism; Neuroscience; Written languages; Moore's Law; Graphical User Interfaces*

Introduction

Physicists and philosophers sometimes claim that all of the phenomena of the universe, as in "theories of everything," are or should be explainable in terms of the elementary constituents of matter, such as atoms or other elementary or subatomic particles, such as electrons, protons, or neutrons (the "original" subatomic particles), or quarks, gluons, or bosons.

Thus, physicists may claim that it is possible to develop theories that explain or reduce all of the forces of physics or all of the phenomena studied by different branches and sub-branches of science in terms of elementary particles. From the point of view of the theory and framework of physicalism, every scientific theory is in principle reducible or explainable in terms of a physicalist theory, that is, a theory that reduces or explains the phenomena in question in terms of elementary particles, from galaxies to stars, from planets to synapses to brains, from metabolism to photosynthesis, from cellular growth and differentiation to genes, from claws, to talons, to hoofs, to hands, or from societies, to languages, culture, and the exponential growth of technology and Moore's Law. From the point of view of the theory and framework of physicalism, the only exception or exceptions might be theories of elementary particles themselves: these are not reducible further with physicalist theories since they are already the physicalist theories of elementary particles or the elementary constituents of matter.

The paper also includes a provocative discussion on the nature of causation related to mind-brain-culture interactions: that access to higher written languages in world history, like Japanese or Chinese, or Greek, Latin, and Arabic scripts, are kinds of causation related

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to technological and scientific growth and innovation, and that access to new kinds of symbolic technologies and media, particularly Graphical User Interfaces for video games and commercial, business, and science applications are partly analogous to access to higher written languages as kinds of causation at the level of culture.

Neuroscience and Physicalism

Is every layer of the complex evolved human brain explainable in terms of physicalist theories and explanations?

There are physicists, philosophers, and neuroscientists that claim that, in principle, the phenomena of the brain, including consciousness itself, are reducible and explainable in terms of elementary particles or elementary constituents of matter [1-4].

That is, there are neuroscientists, physicists, and philosophers that claim that the brain, the mind, cellular interactions of neurons and synapses, modules of functional specialization distributed across neurons in the brain, correlations of neurons, "coalitions" and "assemblies" of neurons, networks of neurons, neuronal plasticity or brain plasticity, and consciousness itself, may be explained in terms of the behavior of atoms or sub-atomic particles; physicalists claim that these phenomena may be explained in terms of the behavior of elementary particles and forces of physics related to elementary particles that influence or cause events at the cellular level of neurons and synapses, that influence or cause events at the level of unconscious physiology, or that influence or cause events at the level of brain regions, brain modules or mini-organs in the brain, or that influence or cause events at the level of the brain as a complex organ or the mind as a complex phenomenon; (these include the unconscious maintenance of cellular structures and metabolism, unconscious brain patterns including imagery, speech, language, and memories during sleep, the conscious movement of body parts, tissues, and muscles for movement, the conscious and unconscious use of lung and breathing patterns, the conscious use of mind, mouth, tongue, and lips to produce speech or singing, the conscious use of the mind to produce speech, singing, music, imagery, and memories).

Moreover, since physicalism attempts to explain the behavior of minds, the theory or set of principles of physicalism implies that the elementary constituents of matter or elementary particles cause or explain events at the level of the interaction of minds, and cause or explain events at the level of cultural patterns and symbolic systems with which minds express or excrete thought in the evolution of the Genus Homo and the evolution of the species Homo Sapiens; the theory or principles of physicalism should explain phenomena resulting from the interaction of minds, like the manipulation of tools, symbols, early technologies, spoken languages, and written languages.

Moreover, since minds interact with each other, and interact with each other in different ways, it is thus possible to observe and seek to understand and explain phenomena involving the interaction of minds; these include the cultural patterns through which minds interact, such as speech, language, written languages and patterns, and also sounds, signs, and forms and instruments of and for the transmission of signs and sounds; relatedly, these also include various media that combine different physical instruments, cultural patterns, and spoken and written languages, like musical instruments, flags, banners, billboards, drums, newspapers, magazines, radios, televisions, film, and other media; are all of these phenomena explainable in terms of the theory of physicalism, or specific theories of physicalism that might apply to different interactions and levels of phenomena across these layers of the interaction of minds, spoken languages, written languages, cultural patterns like music, dance, and religion, and large scale phenomena involving societal growth, cultural growth, and technological growth like Moore’s Law?

Testability and Cause & Effect in Physics, Chemistry and Biology

From the standpoint of science and natural philosophy, there are at least two related ways of how to evaluate these questions related to the nature of the universe and how to evaluate the larger framework and theory of physicalism, and potential theories of physicalism that might apply or explain specific phenomena involving or related to the nature of the brain, the mind, and the interaction of minds: testability and cause and effect. Is it possible to test the theory of physicalism across all of these levels of mind and the interaction of minds, from different aspects of brain physiology, plasticity, metabolism, conscious and unconscious reflexes, instincts, and trained or honed talents? It is not possible to test the theory of physicalism across these levels of mind. Is it possible to test the theory of physicalism across phenomena related to the interaction of minds, spoken and written languages, patterns of culture, religion, music, dance, art, or patterns of societal growth and technological growth including Moore's Law? No.

There is also the question of cause and effect: Is the explanation of cause and effect always improved or supported by explanations by lower-order phenomena; in the history and development of science, new and powerful explanations of phenomena are not always reduced to lower-order phenomena, or the elementary constituents or particles of matter; examples include Copernicus' explanation of celestial bodies with a new predictive astronomy that is not related to the explanations connected to the elementary particles or constituents of matter; Galileo's explanations of moving bodies and classical mechanics that are not constantly reduced to lower order phenomena or elementary particles or elementary constituents of matter; Newton's Laws and unification of gravity as an explanation of celestial bodies and objects and bodies at or near the surface of the earth do not constantly refer or are reducible to lower-order phenomena or elementary particles or elementary constituents of matter; in other branches of science, Mendel's Laws contributed significant ideas to the development of biology and genetics, including the idea and conception of a particulate unit of genetic inheritance or gene that departed from Aristotelian ideas or Aristotelian derived ideas on the nature of genetic inheritance (philosopher John Dewey comments that Darwin's ideas on 'gemmules' and others from the 19th century continued to use an Aristotelian framework related to blending inheritance before Mendel's conception).

Darwin and Wallace's original theory of evolution by natural selection is not reducible to physicalist theories [1,5,6]: the theory explains "higher-order" phenomena, i.e., given constant or near constant slight variations across individual organisms in the natural populations of species, variations in the breeding populations of individual organisms more favorable for adaptive fitness and reproduction are more likely to be conserved and retained by the breeding populations of species (this is also discussed, below).

There are cases of 'reduction' in the explanation of phenomena in terms of genes, though these do not necessarily require reference to elementary particles like protons, neutrons, electrons, or possibly quarks or bosons: Sutton and others contributed to the re-discovery of Mendel's work by discovering an empirical basis to genetic inheritance in the discovery of chromosomes; Watson and Crick's discovery of the double-helical structure of the DNA, and their theory that their model of the DNA provided a structure for the universal nature of genetic inheritance across a cellular life, is partly reductionist in nature; however, it may not be an explanation in terms of the elementary particles or elementary constituents of matter, or even elementary molecules since bio-chemists and chemists were not successful in modeling the genetic information using other simple or complex molecules, like proteins or fatty acids. Thus, particular instances of reduction in science, like Sutton explaining genetic inheritance in terms of the discovery of chromosomes, or Dewey Watson and Crick explaining genetic inheritance in terms of the reproducible structure of the double-helical DNA, does not necessarily imply explanations or reductions in terms of atoms, sub-atomic particles, or other elementary particles; as suggested, genes and genetic information were not explained in terms of elementary particles per se; moreover, before Watson and

Crick's model of the double-helical DNA, prevailing ideas of the scientific community of chemists and bio-chemists included ideas that the molecular structure of the genetic information was a protein molecule or protein molecules.

Does the physical or philosophical doctrine of physicalism even apply to chemistry? Consider the work for modeling complex molecules using chemical bonds: The Periodic Table of Elements conceived and invented by Mendeleev was available to all chemists, and the Periodic Table was available to all scientists and to all engineers in related fields; however, the frameworks for modeling complex molecules developed by bio-chemists and chemists in the mid-20th century, and borrowed and adapted by Dewey Watson and Francis Crick for modeling the double-helical structure of the DNA, was available to only a small group of chemists and bio-chemists for modeling complex proteins and other molecules; moreover, within this small group of chemists and bio-chemists involved in modeling complex proteins and other complex organic molecules, only Dewey Watson and Francis Crick departed from the larger community of chemists and bio-chemists that thought that the molecule or molecules that might carry the genetic information were complex protein molecules that performed a multitude of tasks in large, eukaryotic cells.

Evaluation of Physicalist Theory, or Physicalist Theory as Philosophy and as Science

By contrast, there are protagonists of the framework and theory of physicalism, like physicist and neuroscientist Roger Penrose that make claims such as: "At the root of quantum theory is the wave/particle duality of atoms, molecules and their constituent particles. A quantum system such as an atom or sub-atomic particle which remains isolated from its environment behaves as a 'wave of Possibilities' and exists in a coherent complex-number valued 'superposition' of many possible states. Quantum gravity effects could plausibly have relevance at the physical scales relevant to brain processes. For quantum gravity is normally viewed as having only absurdly tiny influences at ordinary dimensions. However, we shall show that this is not the case, and the scales determined by basic quantum gravity principles are indeed those that are relevant for conscious brain processes such as collective mass of particles in superposition for a time period long enough to reach threshold, and brief enough to be useful in thought processes [7,8]."

These claims by Penrose and others are not testable, and thus there is also the question of whether physicalism or different varieties of physicalism are themselves testable; moreover, there is the related question of whether they are useful for describing or manipulating phenomena at different levels of reality, like engaging in testable experiments or developing or using instruments and technologies that make no use or reference to phenomena at the level of elementary particles or elementary constituents of matter (I also call this a 'Standard of Technological Growth' with which to evaluate 'theories of everything' or physicalist theories that are attempts to develop scientific theories that do not have clear or direct consequences or applications for technological invention, engineering, or instrument design) [9].

Physicalist theories sometimes overlap with "theories of everything" that attempt to unify theories of gravity with quantum effects at the level of elementary particles [10,11].

Theoretical physicist Strominger comments that String Theory is a "potential unified theory of nature, string theory not only reconciles quantum mechanics and gravity, but can also contain within it electrons, protons, photons, and all the other observed particles and forces, and hence is a viable candidate for a complete unified theory of nature."

Theoretical physicist Witten compares quantum field theory to String Theory, and suggests that String Theory is more powerful than quantum field theory: "Even though we do not really understand it, quantum gravity is supposed to be some sort of theory in which, at least from a macroscopic point of view, we average, in a quantum mechanical sense, over all possible space-time geometries. (We

do not know to what extent that description is valid microscopically.)"

However, the American Physical Society comments that "theories of everything" like String Theory, though they are potential alternatives to quantum field theory have "not yet made any testable predictions, and some scientists' worry that string theorists have strayed too far from physical reality."

Physicalist theories sometimes resemble "theories of everything" in physics in that "theories of everything," such as String Theory or Quantum Gravity attempt to unify all of the forces of nature in a single grand theory; "theorists of everything" have the underlying belief that it is the direction of science to unify all of the local, regional, or isolated causal factors and concepts of every early branch of physics into a single branch of physics, and, ultimately, into a single theory unifying all of the forces of physics and all of the forces of nature; physicalists have a different though related underlying belief on the nature of the science, that all scientific phenomena of any branch of science, including the mind, brain, and consciousness, are subject to reductionist theories and explanations, and, ultimately subject to reduction to explanations in terms of the elementary constituents of matter or elementary particles. Both underlying beliefs on the nature of science may be wrong.

Moreover, both underlying beliefs on the nature of science may be unnecessary, possibly counter-productive because of their untestable nature, and unrelated to scientific productivity and also technological productivity derivative of scientific discoveries and theories.

Moreover, both underlying beliefs on the nature of science may undermine simplicity in science, simplicity related to the success of particular theories and discoveries in specific branches and sub-branches of science, like Mendeleev's Periodic Table, or Watson and Crick's model of the double-helical structure of the DNA, or Edwin Hubble's discovery of that the galaxies are separating from each other at accelerating rates, or Darwin and Wallace's theory of evolution by natural selection, or Ogburn's Theory of the Accelerating Rate of Technological Evolution, or Moore's Law.

Attempts to reduce and unify all of these discoveries and theories and more to a single theory or a single type of reductionism by elementary particles are unwieldy, ugly, untestable, and wrong.

There are many varieties of physicalism, are they all wrong? Philosophers such as Willard V. Quine or Richard Rorty have suggested that physicalist theories are, in principle, right, though unimportant [12,13]. However, I argue that physicalist theories are, in principle, wrong.

The Special Case of Darwinism and Physicalism: Darwinist Theories are Sometimes Reductionist, though not "Physicalist" in Nature

There are neo-Darwinists that claim that the phenomena of the brain are reducible to theories derivative or explainable in terms of Darwinism; these include neural Darwinism, that is, the reduction of the behavior of neurons to Darwinist processes; this is a peculiar kind of reductionism since Darwinism originally explained higher order phenomena: Darwin and Wallace's original theory of evolution by natural selection is not reducible to physicalist theories per se: the theory explains "higher-order" phenomena, i.e., given constant or near constant slight variations across individual organisms in the natural populations of species, variations in the breeding populations of individual organisms more favorable for adaptive fitness and reproduction are more likely to be conserved and retained by the breeding populations of species.

Darwinist theories attempt to explain phenomena that are not elementary particles or elementary constituents of matter, and thus

Darwinist theories and the phenomena that they seek to explain, if they are ever reductionist in any way, are examples of scientific theory that are sometimes reductionist in nature, though not physicalist.

Moreover, not all Darwinists agree on the nature of explanatory reductionism; an example is the co-discoverer of Darwinism or the theory of natural selection, Alfred Russel Wallace: Russel Wallace did not support Darwin and others' attempts to extend or apply Darwinism to the faculties of intelligence of the brain or emotions and personality characteristics.

Wallace, like Darwin, sought to show that there were constant or near constant slight variations across individual organisms in the natural populations of organic species; however, Wallace claimed that the theory of evolution by natural selection explained the adaptation of organisms to the immediate needs and wants of the environment, i.e., that the theory explained the conservation and retention of characteristics or properties that were immediately useful to the fitness and reproduction of organisms in their survival in the breeding populations of organisms of the natural population of any species.

Thus, for Wallace, the theory of natural selection did not explain the emergence of the human brain and its faculties of learning, reasoning, and logic; Wallace concluded that by the standards of the theory of evolution by natural selection, the emergence of the human brain with higher faculties and capacities for learning, memory, and scientific reasoning was an extravagance instead of an immediate adaptation to the needs and wants of the environment; Wallace's criticism suggested that the evolution of the human brain with faculties and capacities for learning, reasoning, and logic were a product of other processes besides Darwinist natural selection.

Atari, Steve Jobs, Bill Gates, and Causation: Are Access to Written Languages and Graphical User Interfaces Kinds of Causation, and at What Level of Reality?

The languages of the world are sometimes organized in different ways by their spoken properties, and attempts to trace the history and evolution of their spoken properties are connected to extant written sources and also customs, artifacts, and early religions [14-17]. Linguists identify the Altaic language group as originating in Central Asia, and including contemporary populations in Central Asia, Turkic populations in the Middle East and Europe, and other populations including Koreans and Japanese. Semitic linguistic populations include populations in the Middle East, the Mediterranean, and North Africa, and the thousands of early dialects of Semitic languages largely unified into Arabic, though earlier Semitic languages survived through the 20th century like Kablye in parts of the Mediterranean and North Africa, and Hebrew in the Eastern Mediterranean and Jewish populations in Europe and Western societies; It is also possible to organize languages by their written properties.

Phoenician was an early Semitic written language, before the consolidation and standardization of Arabic over two thousand years later; the early Phonecians were mercantile, and Phonecian was sometimes a simplified written language for successful traders in the mediterranean; letters and aspects of the Phoencian written language were adapted and simplified by Greeks in the ancient mediterranean and thus aspects of Phoenician were incorporated in Greek, and, indirectly, Latin and Cyrillic in the history of written scripts and languages of European societies, Russia, and Western societies; 13th century mathematician Fibonacci adapted and simplified Arabic numerals, a significant feat of cultural diffusion (discussed below).

Earlier in world history, written Arabic spread to Turkic populations, Persian populations, and Central and South Asian populations at the height of the Ottoman Empire; the decline of the Ottoman Empire resulted in Turkey adapting the Latin script to its written language, Persians returning to Farsi, and Central Asian Republics employing Cyrillic based scripts, Latin based scripts, and sometimes also Arabic scripts.

Thus, written Cyrillic scripts and Latin scripts also have spread to the Middle East, Central Asia, and internationally; written Cyrillic, an adaptation of Greek to Russian, Serbian, and other languages, spread to Soviet Republics, including Central Asian Republics; Uzbekistan and Kazakhstan, for example, have used Arabic, Cyrillic, and Latin based scripts, and officially use Latin based scripts.

Prominent historian of science Arthur Koestler writes of the origins of science in the the early scientific revolutions and achievements of ancient astronomers in ancient Mesopotamia, ancient Egypt, and ancient Greece; the build-up of established knowledge and the early conceptual revolutions and scientific revolutions amalgamating disparate word concepts and astronomical observations of ancient Mesopotamia, the Middle East, and ancient Egypt set the stage for the cultural diffusion of early astronomy from the ancient Middle East and Egypt to the early science of ancient Greece; over generations, the disparate concepts, forces, and theories of different settlements and countries were amalgamated into the achievements of ancient scientists from Egypt, Mesopatamia, and Phonecia, and these early achievements were culturally diffused and absorbed into early Greek science that then expanded, centuries later, across different regions of the Mediterrean, Europe, and also the Middle East; Koestler writes that by the 4th and 3rd centuries B.C. the achievements of a few Greek scientists, like Heraklides, Aristarchus, and Archimedes, were spectacular to the point that European science did not reach their level until the 1500s; similar to Koestler's reactions, Muslims in the Middle East translated and referred to the predictive astronomy of Claudius Ptolemy (of Alexandria in formerly Greek Roman Egypt), that was based on the idea of "mother earth" being the center of the universe instead of a heliocentric theory, as the Almagest or "the Greatest Book"; the simplification and introduction of Arabic numerals by Fibonacci was a revolution in cultural diffusion from the Muslim world to the Western, Christian world in the 13th century.

The simplification and introduction of Arabic numerals in the Western, Christian world post Fibonacci clearly improved societal productivity in science, technology, business, and government; however, from the standpoint of the philosophy of science of causation (that different branches of science might have their own causes, forces, and phenomena as objects of study and inquiry), Arabic numerals were not sufficient cultural or symbolic causes for scientific and technological revolutions in the Christian or Muslim worlds; the Mesopotamian, Phoenician, Egyptian, Greek, and Roman worlds had early scientific and technological revolutions before the simplification and introduction of Arabic numerals per se; thus. access to early "higher" written languages, like proto-Arabic Semitic languages, Phonecian, and Arabic, or Greek and Latin, were necessary causes for technological and scientific revolutions in these in the ancient world, and the early Muslim and Christian worlds; access to written Chinese was a necessary cause for technological and scientific revolutions in early China; however, access to written Chinese did not result in industrial revolutions, or technological or scientific revolutions in the history and development of other East Asian societies like Japan, the Koreas, Thailand, Vietnam, Malaysia, Indonesia, the Philippines, or other East Asian societies; instead, industrial progress at the level of industrial revolutions of Western societies did not result in Japan until forced cultural contact with Western societies and the introduction and standardization of Arabic numerals and Romanji in Japan, and also access to Western languages like English, French, and Italian; similarly, in the 20th century and especially post WWII, industrial progress at the level of industrial revolutions in Western societies did not result in other East Asian societies like the Koreas, Thailand, Vietnam, Malaysia, and the Philippines having industrial progress at the level of industrial and scientific revolutions of Western societies until the collapse of Western and Japanese Empires earlier in the 20th century and with WWII; in these East Asian and Southeast Asian societies political independence and the enjoyment of national sovereignty and standardized national education and information systems resulted, counter-intuitively, in greater access

to Western languages, culture, science, and Arabic numerals.

On the nature of causation at the level of GUIs, written languages, and cultural symbols: the invention of Graphical User Interfaces or GUIs, by video game companies like Atari, and also by Apple Computer and Microsoft for commercial, business, and educational applications, facilitates greater productivity in science, technology, business, and government, and potentially facilitates more and greater scientific and technological achievements and revolutions; however, like Fibonacci's simplification and diffusion of Arabic numerals to Western and other societies, the introduction of the graphical user interface or GUI increases cultural and technological growth though is not a sufficient cause to scientific and technological revolutions in the contemporary world (i.e., as suggested, scientific and technological revolutions do not necessarily require Arabic numerals or GUIs; however, access to GUIs may function like access to higher written languages: access to the higher written languages or GUIs may function as necessary causes for some scientific and technological revolutions); thus, this discussion treats causation as legitimately occurring at multiple and different levels of reality, including at the level of written languages, GUIs, and symbolic culture, instead of assuming, as "physicalist" philosophers and scientists believe, that "everything" or all phenomena might be explained, ultimately, by elementary particles or the most elementary constituents of matter.

This section also seeks to show that simplicity in science does not necessarily involve undermining, eliminating, or ignoring discoveries or empirical content related to the subject matter or subject matters in question. Physicalist theories and the tenets of physicalism largely ignore the mind-brain-culture interactions discussed in this section, including causal interactions at the level of spoken languages, written languages, and graphical user interfaces. Sometimes powerful theories and discoveries in science are credited with unveiling, releasing, and connecting lines of empirical variation that were unrecognized or unacknowledged before the discovery or theoretical contribution (e.g., Mendeleev's Periodic Table for chemistry, or Watson and Crick's discovery of the DNA as the genetic material that identified and recognized the DNA as the genetic material for the cells of all biological life).

Earlier, I discussed that there are at least two ways of evaluating physicalist theories, testability and cause and effect. An additional way of evaluating theories in science is whether the theories undermine, eliminate, or ignore the empirical and theoretical content of discoveries related to the subject matter or subject matters of some branch or branches of science, or address, stimulate, connect, or reveal discoveries or empirical content related to the subject matter or subject matters in question (this is related to testability, though has a different point of emphasis). Perhaps this should be called a theory's capacity for adherence to some subject matter and related discoveries, and the capacity for relevance to some subject matter and related discoveries in some branch or branches of science and engineering.

Physicalist theories and other 'theories of everything,' are so simple that they ignore substantive discoveries and empirical and theoretical content related to the subject matter or subject matters that they putatively address, whether in neuroscience, mind-brain interactions, mind-brain-culture interactions, or, say, physics and bio-chemistry.

This was elaborated and discussed in the preceding sections: the sections on neuroscience and the brain (previous sections) sought to show that the layers of complexity and the distribution of unconscious and conscious functions of the brain are not addressed by physicalist theories of the brain or consciousness; mind-brain-culture interactions (previous sections) are also not addressed by physicalist theories, such as causal interactions at levels of reality involving spoken languages, music, written languages, print, multi-media, and graphical user interfaces or GUIs; I also sought to show that there are successful cases of reduction in different branches

of science, and at different level of reality, such as in physics, chemistry, bio-chemistry, and evolutionary biology including Darwinism, that do not necessarily involve or imply physicalism or physicalist tenets (previous sections);

Successful theories, discoveries, and explanations in science are sometimes revelatory, that is, they may reveal aspects of reality that are ignored, connect aspects of reality or kinds of variation previously disconnected, or identify and organize aspects of reality or forces of nature that are unacknowledged or previously impossible to visualize: examples include the Copernican revolution in astronomy; the revolutions of Galileo and Newton in classical mechanics identifying and organizing the forces of physics; the scientific revolution by Mendeleev identifying and organizing the elements of chemistry in the Periodic Table; Watson and Crick's discovery of the double-helical structure of the DNA, and theory that the double-helical structure of the DNA provided a universal code for the genetic information for all cellular life (Mendel's and Watson and Crick's discoveries organize research more in the biological sciences that Darwin's theory). These scientific revolutions also organized the subject matters of their branches of science, and the discoveries of their branches of science in new ways; physicalist theories are sometimes so simple that they undermine or even eliminate discoveries and empirical content related to the subject matters and branches of science that they putatively address or attempt to unify. Physicalist theories and the tenets of physicalist theories may respond to scientific and philosophical attempts earlier in the 20th century, and through the 21st century, to unify all of the branches of science in a single framework or single theory [18-21]. However, the attempts to do this by physicalist theories and physicalist theorists many times results in ignoring or eliminating discoveries and aspects of reality related to the subjects in question or the branches of science in question.

Kierkegaard and Buddha, Francis Bacon, Erasmus, Auguste Comte, & the 'Law of Three Stages'

Francis Bacon and Auguste Comte, and most natural philosophers and scientists, are usually satisfied by two kinds of evaluation, testability and cause and effect; sometimes, they are also satisfied by evaluations related to the generality and simplicity of discoveries and theories (discussed above); humanists of the aesthetic and philosophical stripe, from Renaissance humanists to pre-Darwinian naturalists like Louis Agassiz or Goethe, claim that such reductionist or overly reductionist explanations like physicalist theories are lacking or missing all kinds of information, like colors, textures, and hues that physicalist theories completely ignore; religious philosophers and writers like Erasmus, Sir Thomas Moore, Erasmus Darwin, Soren Kierkegaard, or the cults of Apollo or Dionysus, or the religious prophets like Muhammad, Christ, or Buddha, may discard physicalist theories for similar rationales and reasoning as humanists; however, these theological and religious philosophers ignore the logic of Comte's Law of Three Stages of explanatory progression from religion and magic to metaphysics, and from metaphysics and theology to positive science, for religious ecstasy, religious and supernatural explanations, singing, music, and explanations of the ecstatic nature instead the natural or scientific.

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