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OVER TIME, nature and human culture have interacted differently in indigenous cultures, in ancient and early modern Europe, New World colonialism, industrial capitalism, and the current global world. Many of the ancient cultures of the East and West and the native peoples of the Americas saw the Earth as animate and a mother – alive, active, and responsive to human action. Greeks, Romans and Renaissance Europeans contributed to a cultural concept that the cosmos was a living organism, with a body, soul and spirit, and saw the Earth as a nurturing mother with respiratory, circulatory, reproductive and elimination systems. The relationship between many peoples and the Earth was an I-thou ethic of propitiation to be made before damming a brook, cutting a tree or sinking a mine shaft. Yet for the past 300 years, Western mechanistic science and capitalism have viewed the Earth as dead and inert, manipulable from outside, and exploitable for profits. Colonial extractions of resources combined with capitalist industrialisation and resource depletion have combined to

the human blood system; its other various fluids were likened to the mucus, saliva, sweat and other forms of lubrication in the human body. As the waters on its surface ebbed and flowed, evaporated into clouds, and descended as dews, rains and snows, the Earth's blood was cleansed and renewed. Veins, veinlets, seams and canals coursed through the entire Earth, particularly in the mountains. In many places the veins became filled with metals and minerals. The cultural image of the Earth as a living organism and nurturing mother served as a cultural constraint restricting the actions of human beings. One does not readily slay a mother, dig into her entrails for gold, or mutilate her body. As long as the Earth was conceptualised as alive and sensitive, it could be considered a breach of human ethical behaviour to carry out destructive acts against it. In much the same way, the cultural belief-systems of many American Indian tribes had for centuries subtly guided group behaviour toward nature. Smohalla of the Columbian Basin Tribes voiced the Indian objections to European attitudes in the mid-1800s. ¶

## NATURE AND CULTURE

create a globalised economy and a global ecological crisis. ¶ THE ORGANIC WORLDVIEW ¶ The cosmos of the Renaissance world

was akin to a living organism. The four elements (earth, air, fire and water) that made up the material world below the moon, and the fifth element (ether) that made the stars and planets, were its material body. The soul was the source of its animate daily motion as the sun, stars and planets encircled the geocentric Earth every twenty-four hours. The spirit, descending from God in the heavens beyond, mingled with the ether and the ambient air to be imbibed by plants, animals and humans on the Earth's surface. The living character of the world organism meant not only that the stars and planets were alive, but that the Earth too was pervaded by a force that gives life and motion to the living beings on it. The Earth was considered to be a beneficent, receptive, nurturing female. In ancient lore, the Earth Mother respired daily, inhaling the *pneuma*, or spirit from the atmosphere. Her "copious breathing" renewed the life on its surface. The Earth's spirings were akin to

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"You ask me to plough the ground!  
Shall I take a knife and tear my  
mother's breast? Then when I die  
she will not take me to her bosom

to rest. You ask me to dig for stone! Shall I dig under her skin for her bones? Then when I die I cannot enter her body to be born again. You ask me to cut grass and make hay and sell it, and be right like white men! But how dare I cut off my mother's hair?" ¶ Today, the organic cosmology, once experienced in some form by many of the world's peoples, has been superseded by a mechanistic worldview and a capitalist economy. ¶ PREINDUSTRIAL CAPITALISM ¶ In the 16th century, as the feudal states of medieval Europe were breaking up, a new dynamic force emerged that shattered early modern ways of life and the organic restraints against the exploitation of the Earth. Arising in the city-states of Renaissance Italy and spreading to northern Europe was an inexorably expanding market economy, intensifying medieval tendencies towards early capitalist modes of economic behaviour. As trade quickened throughout western Europe, production for subsistence began to

be replaced by more specialised production for the market. The growth of cities as centres of trade created a new class of bourgeois entrepreneurs who supplied ambitious monarchs with the funds and expertise to build strong nation-states. ¶ Whereas the medieval economy had been based on organic and renewable energy sources – wood, water, wind and animal muscle – the emerging capitalist economy was based on non-renewable energy (i.e., coal) and the inorganic metals – iron, copper, silver, gold, tin and mercury – the refining and processing of which ultimately depended on and depleted the forests. The new activities directly altered the landscape. Not only were its forests cut down, but swamps were drained and mine shafts sunk. By the 16th and 17th centuries, the emergence of preindustrial capitalism heralded a new relationship between nature and culture, one of domination and exploitation. ¶ COLONIALISM ¶ The growth of early capitalism in the European world (and later in North America) was intimately connected to and dependent on a colonial system in the New World. European capitalism expanded through the establishment of colonies in the western and southern hemispheres that supplied both the natural resources and cheap labour that extracted them from the ground. The former hegemony of the Mediterranean world gave way to the new hegemony of the Atlantic. Triangular trading patterns established Europe as the centre of manufactured goods, Africa as the source of slave labour, and the American colonies as the “inexhaustible” supply of natural resources. The oceans were charted, the new lands mapped, and the natural histories of the peoples, animals, plants and minerals found there catalogued. European explorers and colonisers brought with them an ecological complex of diseases that devastated native peoples along with livestock, crops, weeds and varmints that invaded and transformed native lands. ¶ The accumulation of economic surplus through mercantile expansion helped to fuel 18th- and 19th- century industrialisation. Textiles and shoes, guns and ammunition, mechanised farming equipment and standardised consumer products all depended on atomised replaceable parts and atomised replaceable labourers. Fewer people lived off the land by subsistence and more worked in cities fed by specialised market-farmers. Since the period of the pre-industrial and industrial revolutions of Europe (16th–19th centuries) and North America (19th and 20th centuries), more and more people throughout the world have come under the spread of the capitalist system. ¶

THE RISE OF EXPERIMENTAL SCIENCE ¶ During the scientific revolution of the 17th century, the Renaissance framework that characterised nature as a living organism was replaced by a new cultural framework that saw nature as a machine – dead, inert and insensitive to human action – that legitimated the exploitation of resources. In his various writings between 1605 and 1627, the English philosopher Francis Bacon advocated dominion over nature for human benefit. Nature’s womb, Bacon argued, harboured secrets that could be wrested from her grasp through the use of technology for the improvement of the human condition. He compared miners and smiths, whose technologies extracted ores for the new commercial activities, to scientists and technologists penetrating the earth and shaping “her” on the anvil. “By art and the hand of man”, nature should be “forced out of her natural state and squeezed and moulded”. Nature must be “bound into service” and made a “slave”, put “in constraint” and “moulded” by the mechanical arts. The “searchers and spies of nature” were to discover her plots and secrets. In this way “human knowledge and human power can meet as one”. “The new man of science”, Bacon held, “must not think that the inquisition of nature is in any part interdicted or forbidden”. ¶ The development of science as a methodology for both understanding and manipulating nature and the interests of scientists in the mechanical arts became a significant programme during the latter half of the 17th century. Other philosophers realised even more clearly than had Bacon himself the connections between mechanics, the trades, commercial interests and the domination of nature. Scientists spoke out in favour of “mastering” and “managing” the Earth. French philosopher René Descartes wrote in his *Discourse on Method* (1637) that through knowing the crafts of the artisans and the forces of bodies we could “render ourselves the masters and possessors of nature”. In his *Experimental Essays* (1661), English scientist Robert Boyle distinguished between merely knowing as opposed to dominating nature in thinly veiled sexual metaphor: “For some men care only to know nature, others desire to command her” and “to bring nature to be serviceable to their particular ends, whether of health, or riches, or sensual delight”. ¶

¶ The experimental method developed by 17th-century scientists was strengthened by the rise of the mechanistic philosophy. The emerging mechanical worldview was based on assumptions about nature consistent with the certainty of

physical laws and the symbolic power of machines. Clocks and other early modern machines in the 17th century became underlying models for Western philosophy and science. These assumptions were completely consistent with another feature of the machine: the possibility of controlling and dominating nature. The following assumptions about the structure of being, knowledge and method made possible the human manipulation and control of nature. 1. Matter is composed of particles (the ontological assumption). 2. The universe is a natural order (the principle of identity). 3. Knowledge and information can be abstracted from the natural world (the assumption of context independence). 4. Problems can be analysed into parts that can be manipulated by mathematics (the methodological assumption). 5. Sense data are discrete (the epistemological assumption). ¶ Descartes' method depended on the manipulation of information according to a set of rules that began with simple precepts and advanced to more difficult questions and their solutions. In the same manner, the operation of a machine depended on the manipulation of its material parts in accordance with a prescribed set of physical operations. ¶ In his *De Cive*, written in 1642, Thomas Hobbes advocated the application of this method of analysis to society. Just as a watch could be taken apart and its parts viewed and studied, so the same approach could be taken to study the "rights of states and duties of subjects". For Hobbes, the mind itself was a special kind of machine – a calculating machine similar to those constructed by mathematicians John Napier, Blaise Pascal, Gottfried Wilhelm Leibniz and other 17th-century scientists. To reason, Hobbes held, was but to add and subtract or to calculate, a view later elaborated by Martin Heidegger's 20th-century information theory in which all objects are put into a form "as to assure man's domination over the entire earth and even the planets". ¶ THE NEWTONIAN SYNTHESIS ¶ As the most powerful synthesis of 16th- and 17th-century celestial and terrestrial mechanics, Newton's *Mathematical Principles of Natural Philosophy* (1687) epitomised the dead world resulting from mechanism. Throughout the complex evolution of his thought, Newton clung tenaciously to the distinguishing feature of mechanism – the dualism between the passivity of matter and the externality of force and activity. ¶ Mechanism eliminated from the description of nature concepts of spatial hierarchy, value, purpose, harmony, quality and form central to the older organic, vitalistic description of nature, leaving only

material and efficient causes: matter and force. Motion was not an organic process but a temporary state of a body's existence relative to the motion or rest of other bodies.

The mathematising tendencies in Newtonian thought – which emphasised the planets and satellites as ideal spheres and point sources of gravitational force, frictionless inclined planes, and bodies falling independently of air resistance – were manifestations of the mechanical philosophers' concern with stability, structure, being and identity, rather than organic flux, change, becoming and process. The book of nature was no longer written in symbols, signs and signatures, but in atomic parts. The atomic analysis of matter became an exemplar for the atomic division of data, problems and events on a global scale. ¶ Newton's speculations on atomic structure (in the form of small solid masses) became a foundation for 18th- and 19th-century scientists, who wished to complete the task of reducing known phenomena to simple laws which – like the law of gravitation – would quantify other mechanical, chemical, electrical and thermal observations. The new conceptual framework, emphasising matter as divided into rearrangeable components, could provide a justification for the domination and manipulation of nature fully compatible with capitalist economic development. ¶ Today much of modern science is widely assumed to be objective, value-free, context-free knowledge of the external world. The more the sciences can be reduced to this mechanistic mathematical model describing the everyday three-dimensional world, the more legitimate they become as sciences – an approach first proposed in the 19th century by French positivist philosopher August Comte – with the most mathematical and highly theoretical sciences occupying the most revered position. But the rise of relativity theory and quantum mechanics in the early 20th century, ecology and systems theory in the mid-20th century, and chaos and complexity theory in the late 20th century help to expand the older mechanistic model into a new global realm. ¶ GLOBALISATION ¶ Since the late 20th century, the world has experienced a global ecological crisis, one that is both a product of past ecological and economic patterns and a challenge for the future. From nuclear disasters to Gulf War oil spills; from tropical rainforest destruction to polar ozone holes; from alar in apples to toxics in water and hydrocarbons in the atmosphere, the Earth and all its life are in trouble. Industrial production, accentuated by the global reproduction of population, has put stress on nature's capacity for the reproduction of life. Pollution, depletion

*Still Life in a Pantry*  
Jerémie Plume  
France  
1628

H. 105.5, W. 200 cm; oil on canvas  
TOUVRE ABC D'HABI

and poverty are systematically interlinked on a scale not previously experienced on the planet. ¶ The global ecological crisis is exacerbated by the globalisation of capitalism. The term globalisation has been in currency since the 1980s to characterise the expansion of corporate capitalism across national boundaries. Environmental problems in the developing world are rooted in poverty and hunger, population pressure on marginal lands and unbalanced land distribution, while those in the first world stem from industrial pollution, waste, conspicuous consumption and planned obsolescence. Both worlds however are increasingly affected by climate change from the burning of fossil fuels. ¶ SUSTAINABILITY ¶ Many observers believe that the world is moving toward some new state of affairs that will radically change current patterns at all social levels. Such changes could alter current ecological, economic and social

relations with nature, as well as the mechanistic worldview itself, helping to create a sustainable world. One way to approach sustainability is through global studies that investigate and integrate differences between scientific and cultural representations of nature, including literature, history and art. ¶ Studying art history over many ages and differing cultures can help to achieve an integration and healing that could lead toward sustainability. We can not only embrace Western cultural themes, but also emphasise past and present cultures in the Near East, India, Asia and other parts of the world – both east and west, north and south. The visual and auditory arts, the art of movement and other forms can provide integrative and liberating ideas. In these ways the interactions between nature and human culture that have evolved over many centuries and places could be transformed into a sustainable global world.

This essay draws from Carolyn MERCHANT, *The Death of Nature* (San Francisco: Harper Collins, 1980) and MERCHANT, *Radical Ecology* (New York: Routledge, 1992), reprinted by permission.

